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TREES OF THE SOUTH

CHARLOTTE HILTON GREEN

$2.50

"For the protection of our forests," says Mr. J. S. Holmes, State Forester of North Carolina, "we must raise up a generation of Tree Lovers, and this cannot be accomplished by lectures on economics. . . . We must emphasize the individual tree, and cultivate intelligent and deepening interest in each one, whether tiny seedling or the tall timber.' Each tree should become to the boy or girl as much an individual as the pet dog or the horse in the pasture; more a living fellow creature than a piece of valuable property. The great panorama of life must embrace these 'oldest living creatures' not only, and not even chiefly, as a source of revenue for the landowner, but as friends and companions of our daily life. In this delightful book on the 'Trees of the South,' . . . Mrs. Green has taken this sympathetic approach. Besides being correct botanically, it is historical and biographical, giving authentic sketches of our friends and acquaintances, the trees, with bits of their family histories. . . ."

"Any time of year," says Mrs. Green, "is a good time to begin 'living with the trees.' . . . Once we know a tree, a brief acquaintance will not satisfy. . . . If the tree is a red maple, for instance, we do not really know it until we have enjoyed the companionship of its cool shade in summer, its pageantry of color in autumn, its bare outline and delicate tracery of its branches in winter, and its unfolding of leaf and blossoms in the spring. . . .

"In the South, September is a good month for a school child to begin tree friendships, an excellent time to choose a tree for 'his tree.' On his tree he will become an authority, and he will live with it intimately throughout the year."

One other aspect of *Trees of the South* needs mentioning—its illustrations. These are photographs—two full pages for almost every tree described, one page a photograph of the tree in its

Continued on back flap

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From The Mudges
of Amesbury -
To the Reds of
St. Augustine -

TREES OF THE SOUTH

Long-leaf pines furnish a stately setting for the plant personality of the South, the flowering dogwood.

TREES OF THE SOUTH

BY

CHARLOTTE HILTON GREEN

THE UNIVERSITY OF NORTH CAROLINA PRESS

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TO

MY HUSBAND

COMPANION IN RAMBLES AFIELD

FOREWORD

By J. S. Holmes

State Forester of North Carolina

For nearly half a century the government and other agencies have been trying to impress upon the rising generation the importance of conservation by quoting facts and figures on damage caused by forest fires, the decline in supply of timber, and the increased costs of forest products. While it is true that ninety-nine per cent of the forest fires which annually devastate the South are man caused; that most of them are due to carelessness; that North Carolina alone loses some three million dollars a year from forest fires and that it is costing this one state two hundred thousand dollars annually to prevent even greater losses from the "red menace"—such statements do not register with the young folks. They must be reached through their emotions and as they grow older "sweet reasonableness" will develop.

Those who would protect the birds, both for aesthetic and for economic reasons, have come to be known as "Bird Lovers" and, thank God, we have a rapidly increasing army of these enthusiastic conservationists. For the protection of our forests we must raise up a generation of Tree Lovers, and this cannot be accomplished by lectures on economics. Millions make little impression on any of us these days. We must emphasize the individual tree and cultivate intelligent and deepening interest in each one, whether tiny seedling or "tall timber." Each tree should become to the boy or girl as much an individual as the pet dog or the horse in the pasture; more a living fellow creature than a piece of valuable property. The great panorama

of life must embrace these "oldest of living creatures" not only, and not even chiefly, as a source of revenue for the landowner, but as friends and companions of our daily life.

In this delightful book on the "Trees of the South," which will amply reward careful study by the student or the casual reader and repay in genuine pleasure those who have already become Tree Lovers, Mrs. Green has taken this sympathetic approach. Besides being correct botanically it is historical and biographical, giving authentic sketches of our friends and acquaintances, the trees, with bits of their family histories, written in so charming a style that the reader is impelled to seek personal acquaintance with these neighbors. The author knows well, from her own experience, that acquaintance will, with growing knowledge, ripen into a rewarding and satisfying friendship.

PREFACE

"In the early years we are not to teach nature as science," says Dr. Liberty Hyde Bailey, "we are not to teach it primarily for method or for drill: we are to teach it for living and for loving."

It is this the writer has tried to do in the present volume: arouse a love, an understanding, and an appreciation of trees, for their beauty, their wonder, and their use.

Again, as in *Birds of the South,* a nature study, instead of a systematic approach has been used. In our South much of the life is still rural. That life can be made more successful, with more of contentment, if we "live in harmony with our environment." There will be more of spiritual riches if there is an understanding of the common everyday things about us: the trees, the flowers, the birds, the clouds, the brooks, the "sunset and evening star."

The writer is drawing somewhat on her own experiences in teaching nature study in rural and graded schools, and in the response thereof. Most children, and even the adult layman, can be more quickly interested in a tree if there is some unusual fact or tradition connected with it. For example, she never failed to awaken interest in the hornbeams, after explaining that the wood is so hard tradition says it was often used in the making of the famous Roman chariots. The use the Indians made of the different trees and their products is always an absorbing topic. The magnolias become almost tree personalities when it is pointed out that they actually "migrated" ahead of the approaching glaciers of the Ice Age—and so were saved from extinction. And from this story, and a moment's comment and comparison of the different directions in which

our own mountain systems, and those of Europe, extend, comes a simple understanding of why, in the present age, there are so many more kinds of trees in this country than in Europe.

Gradually, as an interest in a tree is awakened, comes a desire to know more about the tree itself: its habitat, its leaves, flowers, fruits; its relation to other trees and plants; and its present relation to mankind.

If then, this book leads some of you out among the trees, to "Adventures in Tree Friendships" which may make life a little richer, if it plays some part in opening your eyes to the beauty of bare boughs etched against wintry skies, to the "rose mist" of young unfolding oak leaves, to a love of tree trunks and a fascination for the indescribable beauty of their barks, it will have served its purpose.

C. H. G.

Woodhaven
Raleigh, N. C.
March, 1939

ACKNOWLEDGMENTS

THE AUTHOR has drawn not only on her own studies and field work, but in the preparation of the book has made free use of every available source of information, and wishes to express her indebtedness to the many excellent works on trees. She wishes especially to acknowledge her indebtedness to *Trees of the Southeastern States,* by W. C. Coker and H. R. Totten. From this book she has borrowed largely for the more detailed southern range of many of the trees. Acknowledgment is also due to Mr. J. S. Holmes, State Forester of North Carolina, for his gracious Foreword, and for having read the manuscript, offering valuable suggestions and criticisms; to Dr. W. C. Coker, Head of the Botany Department of the University of North Carolina, for reading and criticising the manuscript; to the following from State College, Raleigh, North Carolina, for suggestions and criticisms of parts of the manuscript: Dr. B. W. Wells, Head of the Botany Department, Dr. J. V. Hofmann, Head of the Department of Forestry, Dr. J. L. Stuckey, Head of the Department of Geology; to the American Forestry Association and the United States Department of Agriculture for their many excellent photographs and for assistance in research; to the various State Departments of Forestry and Agriculture of most of the southern states for graciously assisting with information and research; to the Arnold Arboretum and its staff, especially the librarian, Miss Ethyln Tucker, and Mr. Ernest J. Palmer, for assistance and courtesies extended the writer during her work there and for the use of several photographs; to the American Museum of Natural History for the use of certain photographs; to Mr. L. W. Brownell, nature photographer, for his photographs, many of which were especially made for this book; to Mr. S. A. Grimes, for photographs made especially for this book; to the J. Horace McFarland Co. and the Romeyn Hough Co. for photographs; to Mr. Joseph S. Illick, Professor of Forestry at New York State College of Forestry for permission to quote from his book *Tree*

Habits; to Dr. Liberty Hyde Bailey for permission to quote from *The Nature-Study Idea;* to Houghton Mifflin Company for permission to quote from "Hiawatha's Sailing" and "The Hemlock Tree," by Henry Wadsworth Longfellow; and "The Trees," by Lucy Larcom; to the Cornhill Publishing Company for permission to quote from "The House of the Trees," by Ethelwyn Wetherald; to Carl Speh and The Pine Institute of America for "De Woods of Pine," by Warren Nicke; to Dodd, Mead & Company, Inc., for arrangement by which "Trees" from *April Airs,* by Bliss Carman, copyright 1916, is used; to Scribner's to quote from *Salute to the Trees,* by Henry Van Dyke, and from *The Marshes of Glynn,* by Sidney Lanier; to the editors of the magazine *American Forests* for permission to quote from several poems that had been published in that magazine; to the estate of Mrs. Charlotte P. Stetson for permission to quote from *Tree Feelings;* to *Good Housekeeping* and Margaret Hall Smith for permission to quote from "The Tree"; to Theodosia Garrison for arrangement by which it was permitted to quote from her poem "Shade"; to Samuel Minturn Peck for permission to use parts of several of his poems; to several North Carolina poets—Anne Blackwell Payne, Travis Tuck Jordan, Lucy Cherry Crisp, Sarah A. Heinzerling, Pearl Council Hyatt, Harriet Salls for poems; to her husband, who is always interested and helpful in all she tries to do; to her sister, Miss Alleetah H. Hilton, and Mrs. L. Pearle Green, for help in preparing the manuscript and in reading proof; to the Library Departments of the University of North Carolina, of Duke University, and of State College for the use of books and various publications; to Miss Hattie S. Parrott, Supervisor of Elementary Instruction in the State of North Carolina for her interest in the publication of the book; to the University of North Carolina Press and its staff.

A number of these tree stories have appeared as Sunday features in the Raleigh *News and Observer,* and the writer is indebted to that paper and its editors for permission to use them in revised form, in this book.

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PART I

THE TREE

CHAPTER I

LIVING WITH THE TREES

In the Garden of Eden, planted by God,
There were goodly trees in the springing sod

Trees of beauty and height and grace,
To stand in splendor before His face.

Apple and hickory, ash and pear,
Oak and beech and the tulip rare,

The trembling aspen, the noble pine,
The sweeping elm by the river line;

Trees for the birds to build and sing,
And the lilac tree for a joy in spring;

Trees to turn at the frosty call
And carpet the ground for their Lord's footfall:

Trees for fruitage and fire and shade,
Trees for the cunning builder's trade;

Wood for the bow, the spear, and the flail,
The keel and the mast of the daring sail;

He made them of every grain and girth,
For the use of man in the Garden of Earth.

Then lest the soul should not lift her eyes
From the gift to the Giver of Paradise,

On the crown of a hill, for all to see,
God planted a scarlet maple tree.

—BLISS CARMAN.

ANY TIME of the year is a good time to begin "living with the trees," but the best time is *today*. A friendship with trees will make life richer and fuller. Once we know a tree, a brief acquaintance will not satisfy; our friendship must be long and intimate, extending through all the seasons and through many years. If the tree is a red maple, for instance, we do not really know it until we have enjoyed the companionship of its cool shade in summer, its pageantry of color in autumn, its bare outline and delicate tracery of branches in winter, and its unfolding of leaf and blossom of spring.

In the South, September is a good month for a school child to begin tree friendships, an excellent time to choose a tree for "his tree." On *his* tree he will become an authority, and he will live with it intimately throughout the year. In September the tree is still in full foliage, a shady canopy with a thick leafy roof. There is yet time to become familiar with its leaves—their shape, color, texture.

When Autumn Comes to Dixie

And then to Dixie comes autumn, a saucy young wood nymph touching with light strokes of her brush first the red maples, the sweet gums and the sour gums, and then the dogwoods, the sourwoods, the sassafras, until there are blotches of color everywhere. It is before the broad-leaf trees shed their leaves that many of them don their most colorful robes.

Autumn coloring is not, as some believe, caused by frost. In fact early frosts greatly reduce the intensity of the coloring by killing and injuring the leaves. These early-turning varieties often light their torches weeks before frost comes. Just what does cause this autumn glory is not entirely understood, although there are various theories about it.

We know that red colors can form only in certain plants, and that cool weather, bright sunshine, and large amounts of sugar are necessary. The sugars are used in forming the red pigments and without them this color does not appear. When weather

conditions are such that large amounts of sugar are stored in leaves and fruits the red colors are especially brilliant.

The attractive yellow colors in the leaves of many trees are produced by pigments that have been there all summer long. At that season the green color is so intense that it covers up and hides the yellow and orange-colored pigments that are also present. When the crisp cool days of autumn come, the green pigment is no longer made by the leaves as rapidly as it is destroyed. As the green color fades, the yellow and orange pigments begin to peep through; and soon appear in all their glory when the greens disappear completely.

When we are very young, we may like to think of Mother Nature's wood nymphs running about some cold autumn night touching up the leaves with flaming torches, or with a brush dipped across a rainbow for a palette. But as we grow older, we realize that Mother Nature as a scientist may be equally interesting.

Not All Autumns Are Equally Brilliant

Not all autumns, even in a given section, are alike in the vividness of their coloring. Cool, sunny weather brings out the most brilliant hues, while warm, cloudy weather in the fall keeps the vivid pigments from forming. Most parts of the world outside of our own country are not so fortunate as we in having such a gorgeous pageant of fall colors. In England, paintings of our autumn landscapes are regarded as wild and fantastic dreams, for the trees in that country never show such a riotous display of color. The cloudy, warm weather of England prevents the formation of the bright red pigments. The greens of summer fade to dull browns and unattractive yellows in autumn. Southern France, Italy, the great region of Central Asia, all of Africa, and much of South America likewise never put on the colorful farewell to summer so familiar to us, although the wooded slopes of the Swiss Alps, and of the Danube and Rhine rivers do.

Nor do all parts of our own country share equally in this fall coloring. Eastern North America is particularly fortunate; for from the St. Lawrence River and the Canadian lakes southward the countryside in autumn is like a vast, gaily painted canvas. New England, because of the great abundance of the sugar and red maples on roadsides, hills, and pastures, claims the most brilliant autumns. Scarlet Virginia creeper, sometimes called woodbine, clambering over old stone walls also adds vivid color to the scene.

In the plains beyond the Mississippi and in the western mountains there is much less color; for there the mountain forests are composed largely of needle-leaved trees, and these hold their deep green color through the summer and the winter. On the western coast, weather conditions are not favorable for the production of the vivid reds that decorate our landscapes, but usually produce instead dull browns and yellows. However, in some sections of the mountains certain broad-leaf trees such as the western dogwood and the trembling aspen burn with an Oriental flame.

Here in the South the hickories, catalpas, sycamores, poplars, willow oaks, and fringe-trees may be a rusty green or a pure yellow. The black walnuts, redbuds, shadbush, mulberries, and wild black cherries are bright golden yellow. Even the dark lacy greenish-brown of wild plum thickets is a mosaic in bronze. And all over the southern countryside tulip trees are tall vestal virgins, lifting aloft their "leafy arms to pray"—golden flames against the dark green of the pines.

Many of the oaks show brown, purple, reddish-brown, or bronze tints in various shades and combinations that are delicate as well as beautiful. But the glory that is autumn in the South is the vivid scarlet of its woodland gypsies—more plentiful here than in any other section of the country—the dogwoods, the sourwoods, the sour gums, the sassafras, and the orange, yellow, and crimson—sometimes in the same leaf—of the red maples. And there is a "whole gamut of colors" in the

leaves of our common sweet gum, while the sumachs that border the roadsides and clamber up and down hillsides and ravines are a burning crimson that is all their own.

Trees at Leisure

And then comes winter, a time when the "trees stand revealed, sharing their intimate secrets with those who love them." Trees in winter are not bare of interest, or cold and dreary. They are at rest—and like old-fashioned country folk, settle down for a season of leisure and companionship. Then it is that we fancy we see their human resemblance.

The dogwood is the "loveliest lady of the wood," lifting the delicate tracery of bare branches tipped with silvery pearls that hold the promise of next spring's white bloom. The American elm is a stately matron with graceful, inviting curves and noble dignity. The beeches are the Quaker ladies of the forest, wearing sedately their smooth gray bark wrapped tightly about them. The sycamore is the white-haired dowager among the trees, still vain enough to lean over woodland pools and admire her mottled reflection in the cool water beneath.

The locusts and the redbuds are the gossips of the trees. Through the winter their rusty pods keep up a faint murmuring, as though they were whispering woodland secrets. The river birch is a ragged woodland gypsy, often perching precariously on the stream's edge and flapping impudently its untidy silken tatters in a way that the proper Quaker beeches would scorn.

The American hornbeam, or blue beech, is the rugged athlete of the trees, proudly displaying its "muscles" which show so much more plainly in winter. And though most of the oaks still cling tenaciously to many of their leaves, yet in winter they reveal their staunchness and sturdiness, "like runners bared." In the old veterans among these trees the strong, gnarled limbs and the massive trunks are bent from combat with many a wintry blast.

Spring in the Southern Woodland

To the southern woodland spring comes as a "fair young sybil, dancing in green and gold." Gay in her fluttering garments, she is ready to "herald the April pomp." Green and gold and white—and misty rose, lilac, lavender, and violet—are the colors of trees in spring. The white of wild plums and cherries spilling over old fields and gray zigzag fences; of dogwood, shadbush, fringe-tree, and silverbell; the gold of myriads of pollen-laden catkins on many of the trees. And the rose and lilac and lavender and mauve and violet, misted with silvery down, of young leaves just opening.

Through the slanting silver lines of April rains distant hills and woodlands appear softly blurred, and the white-flowering trees are lovely wraiths, or spirits of the wood. Perhaps springtime *is,* after all, the best of all times to know the trees, to watch the miracle of the unfolding of leaves and blossoms.

"Sakura"

In Japan, says Julia E. Rogers in *The Tree Book,* spring is considered the "season of the eye" and no beauty of color or line or texture is too insignificant to be observed and appreciated. To the Japanese, the cherry is "Sakura," which means "symbol of happiness." So, too, might we of the South consider the dogwood as our "Sakura," for no tree adds so much beauty to our landscapes in early spring.

THE TREE AND ITS PARTS

I wonder if they like it—being trees?
I suppose they do....
It must feel good to have the ground so flat,
And feel yourself stand straight up like that—
So stiff in the middle—and then branch at ease,
Big boughs that arch, small ones that bend and blow,
And all those fringy leaves that flutter so.
You'd think they'd break off at the lower end
When the wind fills them, and their great heads bend.
But then you think of all the roots they drop,
As much at bottom as there is on top,—
A double tree, widespread in earth and air
Like a reflection in the water there.

I guess they like to stand still in the sun
And just breathe out and in, and feel the cool sap run;
And like to feel the rain run through their hair
And slide down to the roots and settle there.

. . . . . .

—CHARLOTTE P. STETSON.

JUST WHAT IS A TREE? As often defined, it is a woody plant, usually with a single stem or trunk, attaining at least fifteen or twenty feet, and with a more or less definite crown shape. Sometimes, however, it is difficult to distinguish a tree from a shrub. Indeed, there is really no sharp line of distinction between the two. But as a rule a shrub is thought of as not growing so high and as having more stems starting from the ground.

Every tree has three main parts—the top or crown, the stem or trunk, and the roots. Often there is nearly as much of the tree underground as above the ground, but the branching

system of the roots is, of course, very different from that of the stem.

The crown, beautiful as it is in winter, with the leafless branches seen against the evening sky, only shows its full glory after the warm spring days have called forth the new twigs with their fresh outgrowths of leaves. And what a wonderful story is that of the tree leaf, one of the commonest bits of the natural world about us.

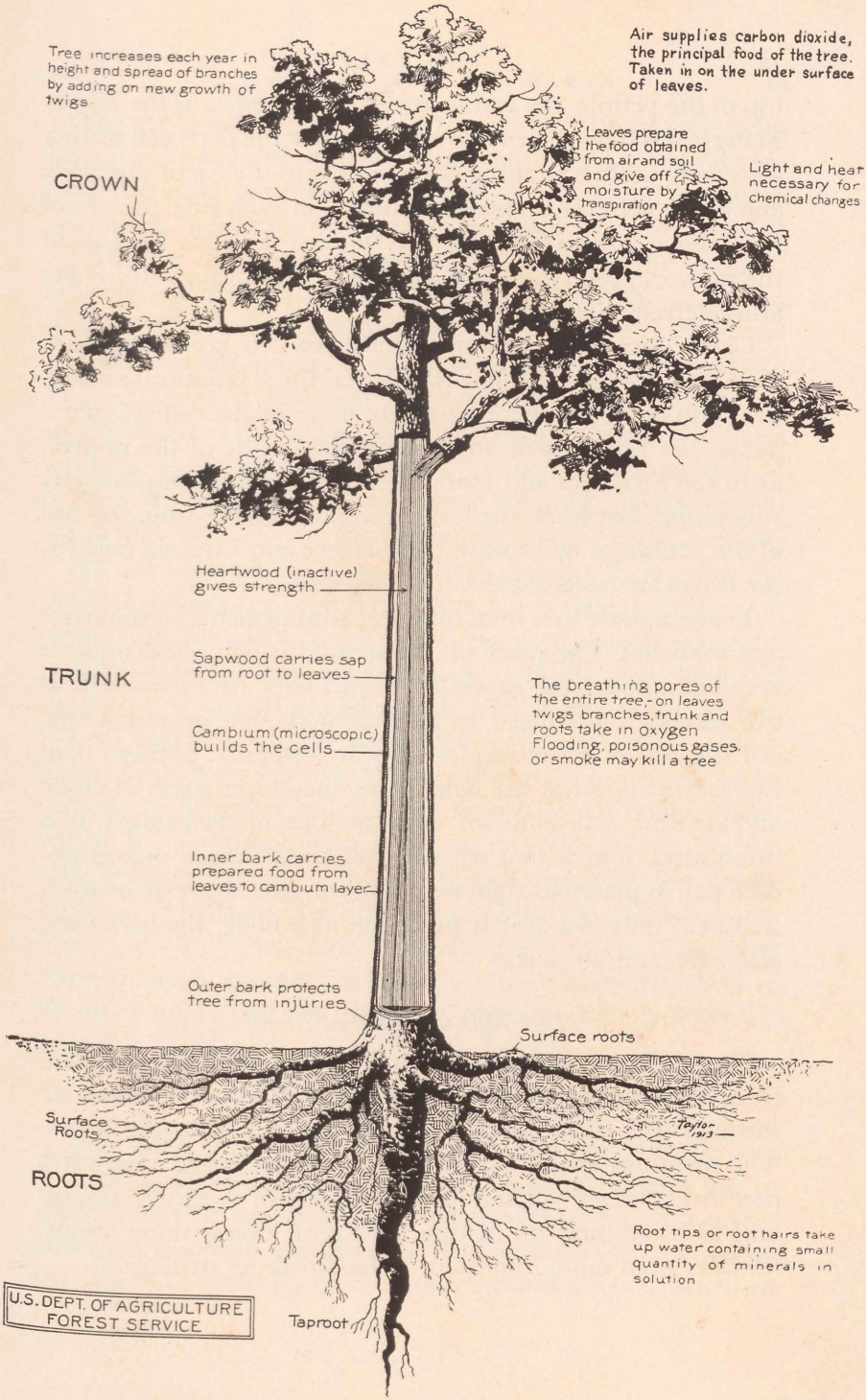
The Leaf

A complete leaf has three parts, a broad expanded portion called the *blade,* a stalk or *petiole,* and small outgrowths on either side of the base of the petiole known as *stipules.* Any of these leaf parts may be absent. Leaves without petioles are said to be *sessile.* Stipules may have a great variety of forms—in some plants, as, for example, the sycamore, they look much like little leaves. In others, such as certain locusts, they are sharp thorns, while in still others they act as bud scales, as in the tulip tree. And in many plants they are not present at all.

The blade of the leaf has one or more main veins which arise at the upper end of the petiole. If only one is present in the blade it is called the *midrib,* or sometimes *midvein* (for the veins of leaves serve for both conduction and strengthening). From both sides of the main veins arise many smaller veins which branch and rebranch forming a network which holds together the softer leaf tissues. When the larger veins are arranged parallel to each other in the blade, the leaf is said to be *parallel-veined,* as in the palms. In such leaves the network may be weak or even absent. When the veins spread from the

---

On the following page is shown a tree, its parts, and how it grows. The growing points of a tree are its buds, root tips, and cambium layer. The fine root-hairs absorb water (which contains small amounts of mineral nutrients) which is carried up through the sapwood to the leaves. There it is combined with carbon dioxide from the air and manufactures plant food. The inner bark carries this food to all the growing parts of the tree.


Tree increases each year in height and spread of branches by adding on new growth of twigs
Air supplies carbon dioxide, the principal food of the tree. Taken in on the under surface of leaves.
Leaves prepare the food obtained from air and soil and give off moisture by transpiration
Light and heat necessary for chemical changes
CROWN
Heartwood (inactive) gives strength
TRUNK
Sapwood carries sap from root to leaves
Cambium (microscopic) builds the cells
The breathing pores of the entire tree,- on leaves twigs branches, trunk and roots take in oxygen Flooding, poisonous gases, or smoke may kill a tree
Inner bark carries prepared food from leaves to cambium layer
Outer bark protects tree from injuries
Surface roots
Surface Roots
Taylor 1913
ROOTS
Root tips or root hairs take up water containing small quantity of minerals in solution
U.S. DEPT. OF AGRICULTURE FOREST SERVICE
Taproot

top of the petiole, the leaf is *palmately-veined,* as is the maple. Many leaves have their veins arranged like the parts of a feather —a strong midrib running from petiole to the tip of the blade and many veinlets branching from it on each side. Leaves of this kind are *pinnately-veined,* as those of the elms. Because of the network, the types with pinnate and palmate veining are also referred to as *net-veined.*

Classed according to form, there are two kinds of leaves, *simple* and *compound.* In a simple leaf there is only one blade; in a compound leaf there are two or more blades called *leaflets.* When the leaflets arise in rows on either side of the midrib, as in the hickories and ashes, the leaf is said to be *pinnately compound,* but when the leaflets radiate fan-like from the end of the petiole, as do those of the buckeye and Virginia creeper, the leaves are called *palmately compound.*

Leaves appear in several different arrangements on the stems and branches. The place on the stem at which a leaf appears is called a *node;* the spaces between nodes are *internodes.* If two leaves are produced at the same node, one on either side of the stem, as in the maples, they are *opposite.* If more than two leaves appear at the same node, they form a sort of circle and are said to be *whorled,* as in the case of the catalpa. It is interesting to note that when leaves are arranged oppositely, each pair is placed at right angles to the pair above or beneath it. But if only one leaf is produced at a node, the leaves are *alternate,* as in the oaks.

The Manufacture of Food

Many things happen in leaves. Every warm day great quantities of water vapor escape from their interiors to the ouside air through tiny openings in the surfaces, especially the lower. The openings are called *stomata.* It is the loss of this water that makes leaves wilt and often die in hot dry weather. Important as leaves may be in thus giving off excess water vapor, they are even more important as food-making structures.

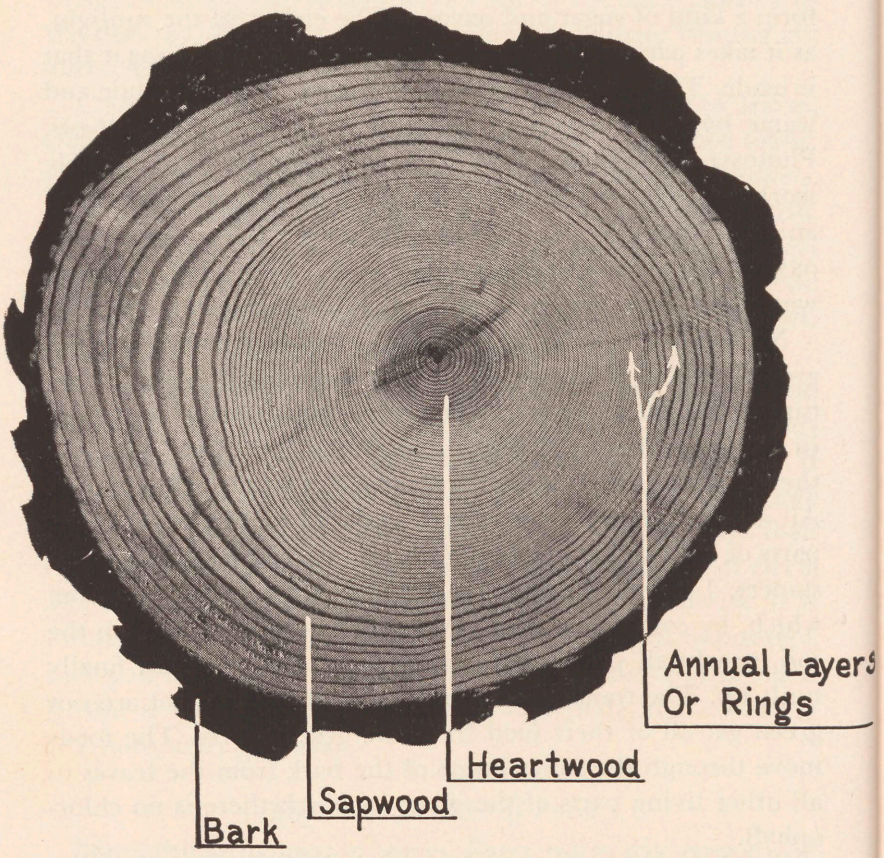
The green coloring matter in the leaves (*chlorophyll*) helps in capturing some of the energy from sunlight. Carbon dioxide from the air enters through the stomata and in the interior is combined chemically with water obtained from the roots to form a kind of sugar and oxygen. The energy of the sunlight, as it takes part in this process, is stored away in the sugar that is made. This manufacture of sugar from carbon dioxide and water by green leaves in sunlight is called *photosynthesis.* Photosynthesis is the most important process in the whole world; for it is the source of all the food of both plants and animals. It is the only process by which large amounts of oxygen are turned back into the air. Without photosynthesis we should soon have no food to eat and no oxygen to breathe.

No one understands photosynthesis—no one knows how the green leaves of plants can form sugar and oxygen so easily from carbon dioxide and water. The process often goes on so rapidly in the leaves that more sugar is made than the plant uses, and the excess is usually stored temporarily in the leaf as starch. All day and all night the sugar moves out of the leaf to other parts of the plant where it is changed into countless other substances. In fact, this sugar is the foundation substance from which, by combining with it various minerals taken from the soil, nearly all plant, and even animal, materials are finally built up. The roots and other parts of the plant that are not green get all of their food from the green leaves. The foods move through the inner layers of the bark from the leaves to all other living parts of the plant in which there is no chlorophyll.

The Trunk and Its Functions

The trunk has two main functions. It supports the crown and its divisions, the branches, which hold the leaves out to the sunlight; it is also the channel through which the water and food materials are transported. Held aloft by the trunk, the crown is made up of the branches and twigs which bear

the buds, the leaves, the flowers, and the fruits. "The trunk lifts the branches aloft, the branches hold the twigs far out, and the twigs, in turn, spread the leaves out into the sunlight."



Trunk of tree in cross-section, showing bark, sapwood, heartwood, and annual layers.

Because the function of branches is to hold the leaves up to the sun and light, the number required depends on the size of the leaves. Thus trees with small, simple leaves, as the birch, elm, and willow, have numerous fine branches, while those

with larger, compound leaves, such as the ashes, the hickories, and the ailanthus, have coarser but fewer branches. The leaves themselves reach out to the sun and help fill up the space, too. An extreme example of this is the palm tree, which has no branches at all, but does have immense leaves with long stalks to enable them to reach out to the sun and light.

Looking at the trunk as pictured in cross-section (page 14), one sees that it is divided into several parts: the outer dead bark, the inner living bark (phloem), the cambium layer, the sapwood, and the heartwood. The outer bark protects the trunk and branches, preserving the growing tissues beneath and protecting them from injury. It also adds greatly to the beauty of the tree. But as it is not alive, this outer bark cannot grow with the growing tree; therefore on most trees we find that it gradually cracks and breaks into ridges, plates, scales, or strips.

Annual Rings

Lining the outer, dead bark everywhere is the living inner bark, and this merges into a thin, colorless layer of cells called the cambium. In terms of growth this delicate cambium layer is literally the parent of the trunk, for on its inner side it builds the newest rings of wood, and on its outer side, the newest layers of inner bark.

Year after year the cambium "weaves" its annual "warp and woof" of wood. This, because this "weaving" starts in the spring with a loose and open pattern and changes gradually to a closer and finer design as the summer advances, gives the wood its characteristic "ringed" appearance.

In these rings may be read the life history of the tree—the records of fires that swept through the forest; tales of long years of drought when growth was very slow and the rings formed were so narrow and so fine that they can now scarcely be seen with the naked eye; of years of abundant rain, during which the rings grew wide, showing a splendid development.

In temperate regions, where trees cease growing in winter, a tree's age can be told quite accurately by the number of annual rings. This is because with trees spring and summer is a period of growth and winter a period of rest. Each year's increase is usually distinct.

A tree may be hollow, or it may have its top or great limbs torn from it, yet live and bear fruit. But let a mouse, a rabbit, a beaver—or man—completely girdle the tree, cutting through the inner bark to the sapwood, and the tree dies. The vital connection between crown and roots is gone, and the latter, no longer able to receive food from the leaves, starve to death.

Sapwood and Heartwood

This is the way that the sap-river ran
From the roots to the top of the tree
Silent and dark,
Under the bark,
Working a wonderful plan
That the leaves never know,
And the branches that grow
On the brink of the tide never see.

—JOHN B. TABB.

(So wrote Father Tabb, the Confederate soldier-poet-priest and great nature-lover.)

Just inside the cambium is the sapwood. For the first few years of a tree's life all the wood of the trunk conducts sap. But gradually, as the size of the trunk increases, the innermost layers begin to undergo changes, to form a core of harder, usually darker, wood called heartwood. No longer does this part conduct sap; no longer is it a living part of the tree, yet it is very important. It still gives strength and support to the trunk, and from man's viewpoint, when it is converted into lumber it is the best part of all. At different ages in different trees heartwood formation begins. In some oaks it is at around fifteen years, in the ashes, around forty, but the persimmon of the

South is often an ancient veteran of nearly a hundred before it forms heartwood.

The Root and Its Functions

Roots have two major functions. They anchor the tree in position, and furnish the place of entry of the all-important water and nutrients. In deep soil, most trees have a taproot which makes contact with deep and permanent sources of water and shallow lateral roots which spread widely in the rich surface soil where the valuable nitrogen and numerous mineral elements are concentrated. Thus, functionally, the tree roots are specialized by performing different tasks in absorption.

Did we say "roots . . . in absorption"? That will only be correct if we have in mind, as parts of the root, the hundreds of tiny cell outgrowths called "root hairs" borne near the root end. These are so small that they readily push, or rather grow, their way in among the particles of the finest soils. On warm, clear days when a great tree is losing many gallons of water per hour through its leaves, the supply in the trunk is maintained through the countless millions of these invisible buried root hairs, growing out and harvesting the water from the thin liquid films which have hung to the soil particles since the last rain. In this process they also take up the nutrient salts, but curiously enough not all those present may go in with the water; the root hair acts as an admittance gate where only certain materials may enter.

How Trees Grow

Trees do not grow in height by the gradual lengthening of trunks and limbs. I remember puzzling about this when I was a child, for on the trunk of a mountain ash in our yard was the outline of a horse which my father had carved in the bark when he was a little boy. Why, I wondered, wasn't this picture now 'way up in the top of the tree, instead of being just on a level with my eyes? In later years I learned that it

was because a tree increases in height each year only by lengthening its twigs. Every year the new leaves form on new shoots. Later these new shoots become branches that bear other new shoots. Thus the height and the spread of the branches increases.

The Story of Winter Buds

I love the promise of the trees when winter strips them bare
Of all their autumn glory—for cradled in the air
Leaf-babes in soft scale-blankets are cradled softly now,
Weaving a dream of springtime for every naked bough.
—ROWENA ARTHUR MILLS, in *American Forests.*

Winter buds! What a fascinating story they have to tell! In reality most trees have as many leaves in winter as in summer, but they are packed away in the buds covered by little red or yellow or black or brown or purplish "scale-blankets," themselves leaves of special form and function. These bud-scales protect the bud, not from cold or freezing, but from mechanical injury and loss of moisture.

We might begin the story of the tree's growth in early spring, or even late winter, when these buds are opening. Where did they come from? When were they made? In winter, many people say, because these buds are most noticeable then, and because they are generally spoken of as "winter buds." *But no, these winter buds were completely made the summer before!*

Long before autumn, long before the deep, cool, green foliage of summer, almost at the beginning of the leaf's new life, the tree began to develop young buds for the *next year's bloom and foliage!* At or near the end of the shoot, and in the axils, or hollows, between the petioles and the twig, are these buds. Always they are there. Sometimes, however, the buds are very small; sometimes they are half hidden in the bark; sometimes they are entirely concealed, but all trees have them. In each bud is a whole shoot in miniature. It may contain just leaves,

just flowers, or both flowers and leaves. And every part already formed, snugly rolled and packed away!

These tender buds are covered * and protected by hardened scales which may be downy, as those of the red ash, or varnished, as those of the Carolina poplar and the horse-chestnut. When the buds swell in the spring, the bud-scales fall. Sometimes, however, as with some of the hickories and the beech, *before* falling they lengthen with the growing shoot.

If we learn to read their story, these winter buds and the leaf-scars beneath them tell us the name of every tree we see. For in deciduous trees (trees that shed their leaves in winter) when the leaf drops, a scar is left on the twig where its petiole was attached. This is called a *leaf-scar*. The number and position of these leaf-scars show whether the leaves were alternate, opposite, or whorled.

Within each leaf-scar are a number of slightly raised, dot-like scars. These are the *bundle-scars* left where the conducting strands passing out from the twig into the petiole were broken off when the leaf fell. These leaf-scars and bundle-scars are always constant in a given tree species and help to identify the tree. With a hand lens they can be seen very clearly. On the horse-chestnut the leaf-scar is somewhat the shape of a horse's hoof, and the five to seven bundle-scars form an outline not unlike the nail prints formed in putting on a horse-shoe.

Once begun, study of tree-buds, with their accompanying leaf-scars and bundle-scars, becomes an absorbing and fascinating hobby, more interesting—and sometimes more puzzling—than any crossword puzzle.

* Some tropical trees have naked buds.

CHAPTER III

TREE FLOWERS, FRUITS, AND SEEDS

Smiling up to the smiling sky,
A marvel of bloom and sweetness,
Just one bountiful, vast bouquet,
The pride and glory of later May,
No brush could paint it, no pen portray
Its perfect and rare completeness.

—ELIZABETH AKERS.

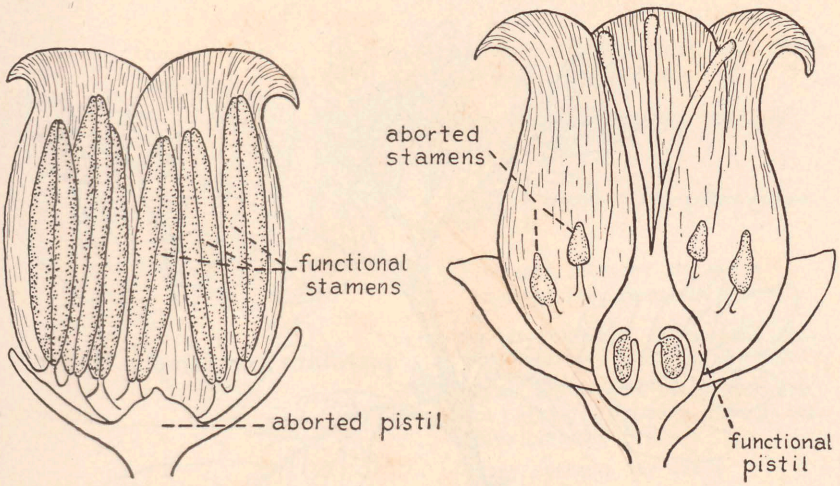
NOT ALL trees bear flowers that are "marvels of bloom and sweetness," as does the apple tree of the poem. But all mature trees *do bear flowers, though they do not all bear fruits!* This may sound like a "tree conundrum," but it is really very simple to understand. For some trees have two kinds of flowers—the *staminate,* or pollen-bearing flowers (these are called the male flowers), and the *pistillate,* or seed-producing ones (these are called female flowers)—which are borne on *different* trees. Trees with flowers thus distributed include the willows, the sassafras, the red cedar, and the holly. That is why certain cedars and hollies do not have berries, for of course only those having the female flowers produce fruits.

On the other hand, some trees still have these two kinds of flowers, but they are both found on the same tree, and sometimes on the same branch. These include the oaks, the hickories, and the birches. Still other trees, like the magnolias, the basswoods, the redbuds, the plums, the cherries, and the apples have what are called *perfect* flowers. That means that each flower has its own stamens, which produce the pollen, and its own pistil or pistils, which receive the pollen.

Not all trees follow the example of the magnolias, the bass-

woods, the horse-chestnut, the redbud, and the catalpa, in having showy flowers. Some, like the elms and the beeches, have such inconspicuous flowers that we often fail to see them.

The earliest true flower-bearing trees had very large flowers. The magnolias and the tulip poplar, which are still in existence, show us what these ancient tree ancestors were like. The



Some kinds of trees, such as the holly, the red cedar, the willow, and the persimmon, also have two kinds of flowers, but on separate trees. Therefore, only the trees with pistillate, or female, flowers bear fruit.

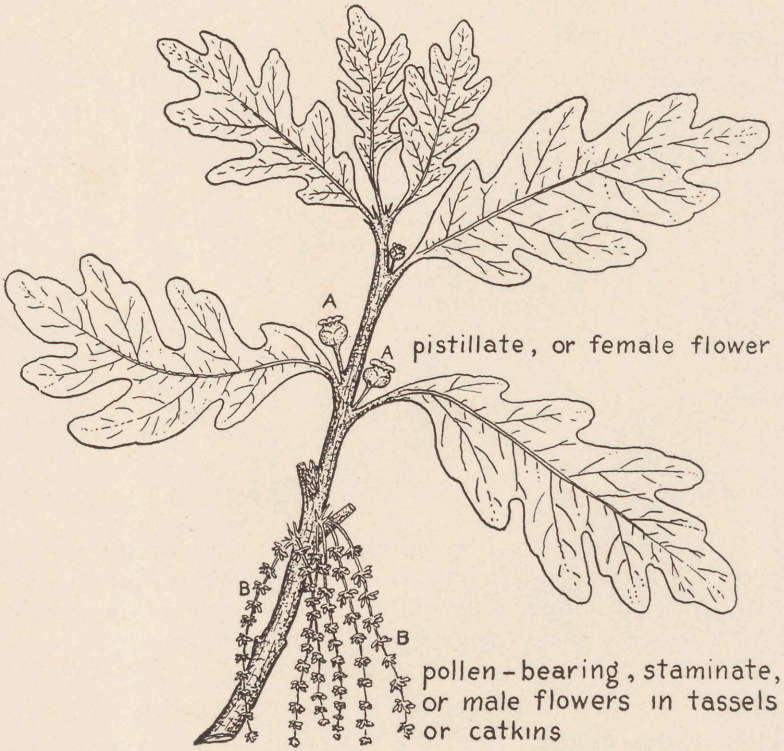
story of tree flowers has been a story of "less and less," for in most of our modern trees the flowers have lost some or all of their showy parts, so that today people do not always associate flowers with oaks, hickories, birches, and beeches, and are surprised to learn that these trees have them. In the willows, reduction of parts is so complete that nothing is left to the flowers on the catkins but either the stamens or the pistil.

In most trees the flowers are cross-fertilized, that is, the

pollen from one flower reaches the pistils of another flower, sometimes on the same, sometimes on a different tree. Mother Nature has two aids that help her in this—insects and winds.

Insect-Pollinated Flowers

Tree flowers which are pollinated by insects are, as a rule, either showy or fragrant. Insects are strongly attracted by both

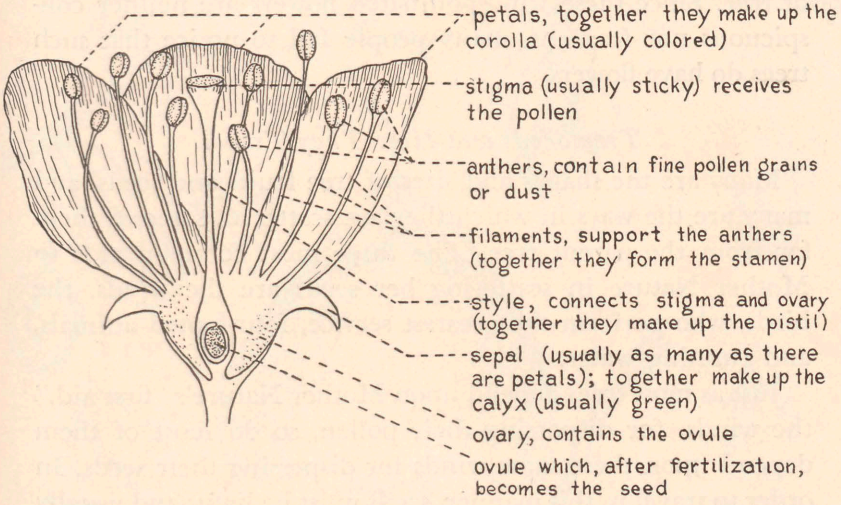


Other kinds of trees, such as the oak or hickory, have two kinds of flowers on the same tree, often on the same twig.

of these qualities. Recall how conspicuous are the flowers of the wild plums, the magnolias, the redbuds, the buckeyes, the apples. Some of them, such as the magnolias and the apples,

are fragrant as well as conspicuous. Think of an apple orchard in bloom, the pink and white blossoms heavy with perfume and the place noisy with the droning music of hundreds of bees.

Hidden somewhere at the base of each flower of such trees is a drop or two of nectar. In trying to get to the hidden sweet, the tiny bee brushes some of the pollen off upon itself. Then



A perfect flower and its parts.

away it flies to another flower, and some of the pollen from the first flower is brushed off on the sticky pistil-tips of the second. Cross-pollination has been accomplished.

Wind-Pollinated Flowers

Many more tree flowers are pollinated by wind, however, than by insects. These include those of all the conifers—the pines, cedars, firs, spruces, hemlocks, cypresses. In fact, the flowers of the remote ancestors of our present-day conifers were being pollinated by the wind many millions of years ago. But

what a wasteful method wind-pollination seems, requiring such large quantities of pollen. Yet so plentiful is it, that when the pines are shedding, it often settles like a golden-green dust film. If you have pines close about your home, you may even have to sweep it up like ordinary dust from porches and steps. These large quantities of pollen are necessary because it is claimed that each pollen grain has perhaps only a few chances in a million of falling on the pistil of a flower of the same kind of tree. Since these wind-pollinated flowers are neither conspicuous nor fragrant, many people fail to notice that such trees do have flowers.

Tree Seeds and How They Travel

Many are the shapes and sizes of tree fruits and seeds, and many are the ways in which they are scattered, some of them far from the parent tree. The three most common aids to Mother Nature in scattering her seeds are the winds, the birds, who perform the greatest service, four-footed animals, and running water.

Just as most trees depend upon Mother Nature's "first aid," the winds, for dispersing their pollen, so do most of them depend upon these same winds for dispersing their seeds. In order to travel in this manner, seeds must be light; and usually they have in addition thin, papery wings or tufts of hairs that keep them drifting in the air. The tulip tree, sweet gum, maples, ashes, pines, and hemlocks have wings either on the seeds or on the small fruits (seed containers) that travel, seed and all, while the sycamore, willows, and poplars have fine tufts of hairs similarly placed.

Most of the fleshy fruits of trees, such as the berries of hollies, cedars, cherries, even persimmons, are eaten by birds or animals. Their seeds have hard coats which are not digested, pro-

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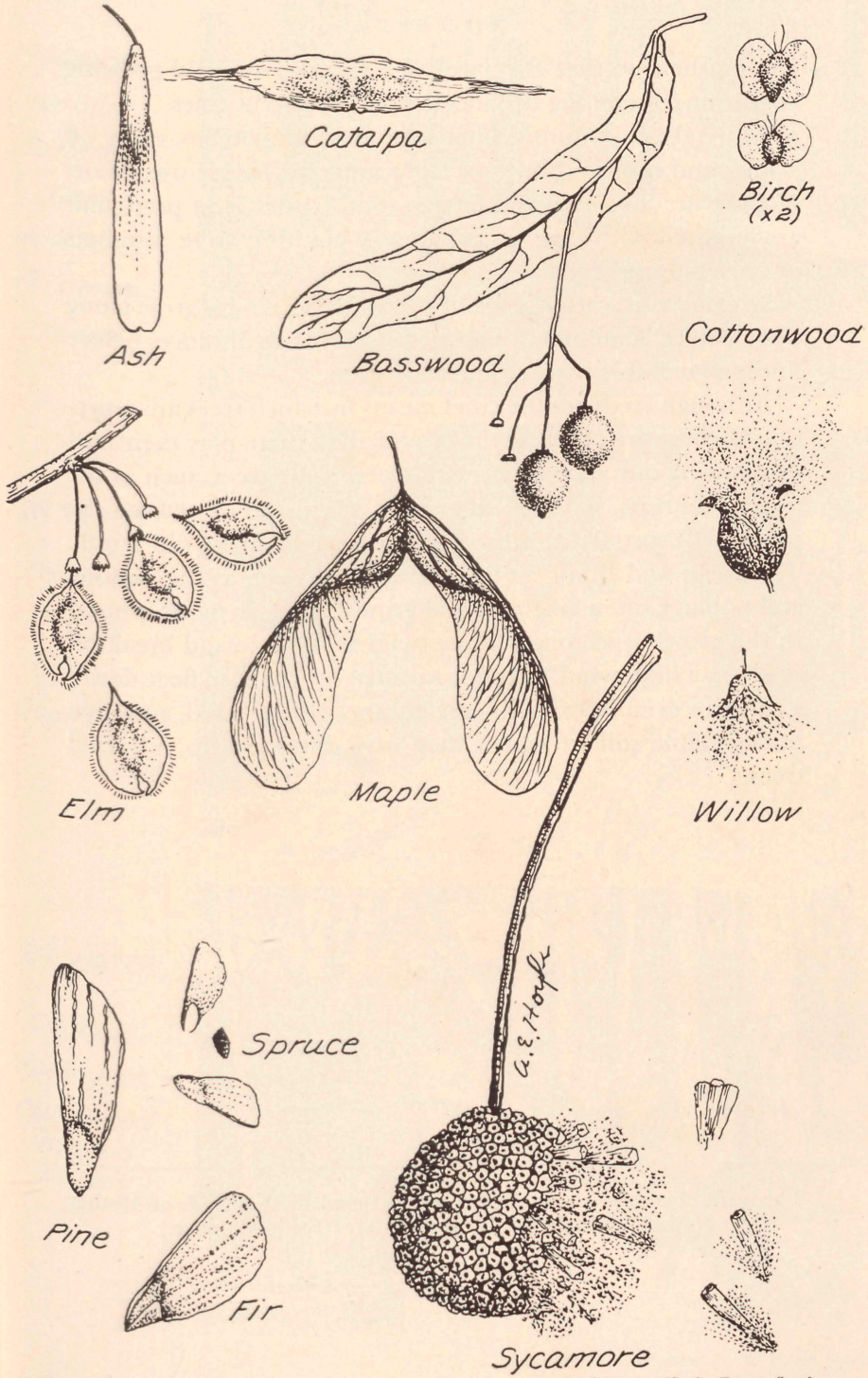
Trees that have seeds with "wings" or tufts of hair or cotton are scattered by the winds. (See next page.)

BY WIND



Courtesy U. S. Forest Service

tecting them so that they are later dropped in good growing condition, often long distances from the parent trees.

Squirrels, chipmunks, blue jays, even nuthatches, carry off acorns and nuts and bury or store some for future use. Many of these are forgotten and later sprout. Squirrels in particular are credited with thus unconsciously planting large numbers of our wild nut trees.

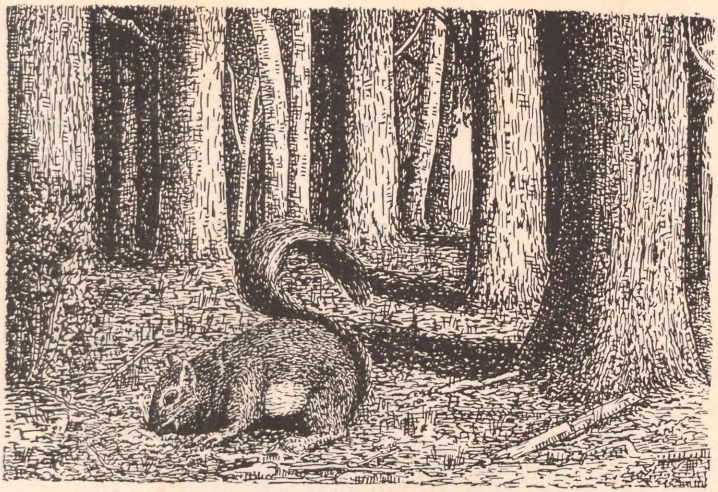
Streams also scatter seeds of certain trees which grow along their banks. Sometimes these seeds travel long distances before finding favorable places for germination.

Although seeds are the chief means by which trees are reproduced, there are other methods, and all of them play their part in planting our good earth with trees. Some trees, such as the oaks, chestnuts, willows, dogwoods, even one or two of the pines, will sprout from the roots or stump of the old trunk. The twigs and branches of certain trees, such as the willows and poplars, often take root and grow if stuck in moist ground in the growing season. Willow twigs are brittle and break off easily in a high wind. It is not unusual for them to float downstream, or even be carried some distance by the wind, and then find suitable soil in which they may develop into full-sized trees.

The seeds of certain kinds of trees are scattered by those aids of Mother Nature—animals, birds, and water. (See next page.)

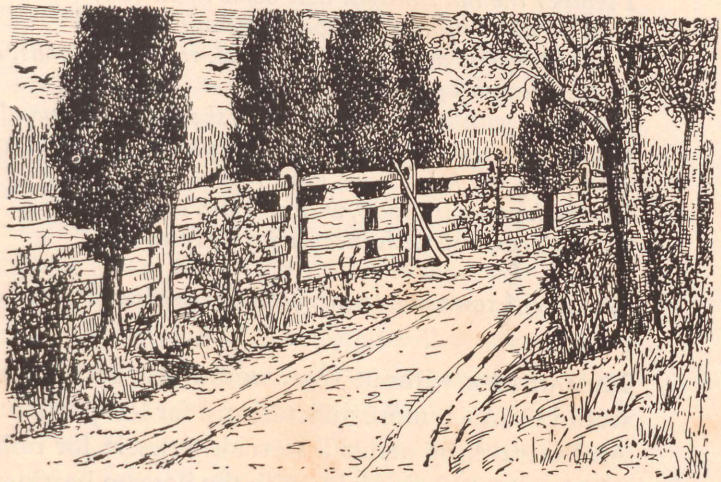
BY ANIMALS

Hickory
Walnut
Butternut
Oak
Honeylocust
Persimmon
Beech



BY BIRDS

Redcedar
Cherry
Holly
Dogwood



BY WATER

Cypress
Tupelo gum
Cottonwood
Willows
Maples
etc.

Courtesy U. S. Forest Service

CHAPTER IV

GIFTS OF THE TREES

. *The Tree at the Court of Justice*

I furnish you shade,
And add beauty to the landscape.
My leaves trace intricate designs for your delight,
And in death provide humus for your soil.
I temper the hot sunlight that beats upon you,
And break the force of strong, cyclonic winds.
I help prevent desolating droughts, ravaging floods, and ruinous erosion of the soil.
My roots, trunk and branches give shelter to birds and beasts.
Out of my crushed body is made the paper that bears your messages,
And from my heartwood guns to fight your wars.
I furnish you with food, with warmth and shelter,
With spices, and with incense for your altars.

When will you cease to sacrifice me needlessly?

HUMAN LIFE without trees would not be impossible; but it would be much more difficult, and far less pleasant. If we were Arabs, traveling across a scorching desert for mile after mile with never a tree in sight, with the hot sun beating down upon us and the hot winds blowing against our faces, how longingly our burning eyes would search the horizon for the first glimpse of an oasis. An oasis! A few trees, cool shade, a bit of green grass, and a fresh spring!

Or if we were Eskimos in certain parts of the Far North of our own continent where no trees grow, how anxiously we would watch the waters for a bit of driftwood to salvage. And how gratefully we would claim it! Or if we lived in the Bad Lands of our own country we might say, as did the little girl I heard recently, "Some day I am going to see a real tree, too."

In most places in the South, and in many other parts of the country, trees are so common and so plentiful that we are largely indifferent to them. We never stop to think what life would be like without them.

Trees Protect Our Watersheds

By protecting our watersheds trees not only furnish us with a more nearly constant supply of water, but with purer water. At the same time they prevent erosion of the soil. Trees continually keep dropping their leaves, twigs, branches and bits of bark. At last, in extreme old age, their decrepit trunks themselves finally topple, crashing, to the ground, and add their prostrate bulk to the general litter on the forest floor. As this forest litter decays it furnishes valuable leaf-mold and humus for the soil. The masses of roots, both large and small, keep this loose, and in the rich, spongy mass grow ferns, springy mosses, and small flowering plants and shrubs.

Thus the forest floor is kept soft and absorbent. And so, when heavy rains come, the drops do not strike this ground with hard pounding blows, for their force has been broken by the leaves, twigs, and branches. The forest soil acts something like a sponge in soaking up and absorbing the moisture. Later, some of this water will come bubbling up again in clear, cool, pure springs; some of it will go trickling off into little streamlets to join larger brooks and rivers. In this spongy forest soil the rains and the melting snows are held for a longer time, and so furnish a more steady and regular clear water stream-flow.

How different the conditions often are where there are no trees, or where the ground has become eroded and sun-baked, the crust dry and hard! The rains, their fall not broken by the trees, come down with harsh, beating force. The water is not absorbed, but rushes on, washing away some of what little precious top-soil may be left. In such places there are often disastrous muddy floods during rainy seasons, or in after-

spring thaws; and then, the water all gone at once, long periods of drought follow.

Trees also play a part in furnishing us with the life-giving rains. Most of the water that is absorbed by the roots of the trees is passed off eventually through the leaves in the form of vapor. This vapor, or moisture, is formed into clouds which may be blown far away, only to condense and come down again as rain.

Trees as Windbreaks

One should really live for a time on a treeless plain, where the winds are scorching hot in summer and bitter cold in winter, to understand fully the value of trees as a windbreak, or shelter-belt. When the farmer plants rows or groves of trees about the homestead they furnish cool shade for summer and break the force of the biting winds of winter. In summers, too, they help keep the hot winds from drying out the soil and thus killing the crops.

To a certain extent trees make the climate of a given locality less subject to abrupt changes in temperature. A desert region is hotter in the daytime, and colder at night, than is a region with trees. Also, in a treeless country the summers are hotter, the winters colder, than where there are trees.

Trees and Recreation

A love of trees is a part of the ancestral heritage of many people, something ingrained in their very being. For untold ages man dwelt among trees—on the edge, rather than in the depth, of the forest. The trees furnished him with food, fuel, weapons, and shelter. Today we still go back to the forest for rest and peace. More and more are people turning to the national and state forests and parks for camping, hiking, fishing, hunting of game—or hunting with camera, field glasses, or note book.

In several European countries there are numerous munici-

pal and town forests maintained largely for timber production, to be sure, but used also constantly for recreational purposes. Especially is this true in Germany, for the Germans are great forest lovers. On Sundays and holidays whole families and groups of friends go out for long tramps in the woods. And not one of them would think of defacing a tree, causing any injury to it, or leaving trash behind. One of my pleasantest recollections is of taking such walks, Sunday after Sunday, with a German family who lived in the South. And they knew more about our particular beauty spots and entrancing views, more about our trees and countryside than did most people whose families had lived there for generations!

Part of our enjoyment of trees, either growing individually or in forests, is in the wild life we may see connected with them. The majority of our birds and animals—the squirrels, chipmunks, opossums, deer, bears—find food and shelter and homes among the trees or their roots. During most of our past we in America have been ruthlessly wasteful of our wild life. Now, when much of it is gone, some of it—like the passenger pigeon and the Carolina paroquet—for all time, we are suddenly realizing our loss. And with that realization comes a desire to know something of that which is left, and to save such remnant of it as we can while there is still time.

Wood—the Greatest Gift

Though wood, the most important gift of the tree, is largely converted into lumber for building and manufacturing, it has numerous other uses. Many a home is still heated by it. Even where it is not the only fuel available, people still want logs to burn. Few of us, especially in the South, where the fireside is a part of our very heritage, would be willing to give up the open hearth and its blazing logs. From the ground pulp of certain trees is made most of the paper used in books, magazines, and newspapers; and from certain woods, rayon and other substitutes for silk. Even in the wars and commerce of

the world trees have played their part. First war clubs, then the bow and arrow, and later gun stocks—all were made from various kinds of wood. And for thousands of years every sort of water craft was constructed of wood. At one time the trees of our own country, and of the South in particular, were supplying most of the navies of the world with their "naval stores"—turpentine, tar, pitch, rosin. And tall pines, those of the South as well as those of the North, furnished masts for many a ship that sailed the seven seas.

Trees give us much more than wood. There are fruits of various kinds, including the nuts. The list of other gifts is long—maple sugar and syrup, tonics, cough syrups, numerous medicines; and from tropical trees rubber, spices, quinine, incense. Trees even furnished the Indian with cloth, as you will see later in the mulberry story, and with thread. It was from the long fibrous roots of the larch that they made the thread with which they sewed their birch-bark canoes.

It is a long story, this listing of the gifts of the trees to man. Since his first appearance on earth they have been his friend and protector. It has been so since man came—and let us hope it will be so until his end. Will we, in return, ever learn to cease sacrificing them needlessly?

PART II

THE BROAD-LEAF TREES

TREE FAMILIES

TREE FAMILIES include those groups of trees which have certain botanical structures in common. Thus most of the conifers —or all that are included in this book—belong to the great pine family, the *Pinaceae.*

But the pines themselves are somewhat different from the others in that their leaves are united into bundles * and set in scaly sheaths. They are therefore placed in a smaller group by themselves, called a *genus* (plural *genera*), the genus *Pinus.* The spruces are *Picea,* and so on.

The oaks belong to the beech family, the *Fagaceae,* but to a smaller group of their own, the genus *Quercus.* The walnuts and the hickories belong to the walnut family, the *Juglandaceae,* but all the different walnuts belong to a particular smaller group, the genus *Juglans,* and all the different hickories likewise belong to a special genus, *Hicoria.*

Following the name of the genus, scientists write the name of the *species*—of the particular kind of tree. In the binomial (two-name) system of nomenclature every tree has two names, the genus name and the specific, or description name, thus: *Quercus alba,* white oak; *Pinus strobus,* white pine; *Juglans nigra,* black walnut. In fact, the plan is not very different from that used in naming people, except that with people the individual's name comes first rather than the family, or group name. Scientists do it the other way round and put the group name first. Thus, the name of my small niece, Betty Hilton, would, according to the scientists' plan, be written Hilton Betty. How this "two-name" system came about is more fully explained in the chapter on the basswoods.

* There is a single one-leaved pine, the Nut Pine (*Pinus monophylla*), of our western mountains.

There are two great subdivisions of seed plants, the *Gymnosperms* and the *Angiosperms*. These have several marked differences, but the one from which they derive their names is the manner in which the seeds are borne. In Gymnosperms the seeds are not enclosed in an ovary, but are borne naked on a flat scale of a cone. Too, the leaves are linear, or scale-like, and the fruits are cones. In Angiosperms the seeds are borne and protected in an ovary. The fruits are not cones, though some of the trees of this, the broad-leaf group, for instance the tulip tree, the magnolias, the birches, and the alders, have fruits which resemble cones somewhat, and which are often called cones.

The Angiosperms (and this is much the larger subdivision) are in turn divided into two great classes, the *Monocotyledons,* and the *Dicotyledons*. The former have one seed-leaf, or *cotyledon,* and leaves that are parallel-veined. Only one of these trees, the Cabbage Palmetto, is included in this book. The Dicotyledons have two seed-leaves, and the leaves are net-veined. All of our hardwoods, or broad-leaf trees, belong to this class, which is very large.

Of these two great subdivisions, the Gymnosperms are much the older, and so come first in all technical and systematic books. But as they are less familiar to most people, their story is better understood and appreciated when one has become more familiar with trees in general. Therefore, in this book the broad-leaf trees have been placed first, followed by the one parallel-veined leaf tree, the Cabbage Palmetto, and then the conifers.

CHAPTER V

THE WILLOW FAMILY

(SALICACEAE)

The Willows (*Salix*)

Oh, it's time for making whistles!
Let us go—let us go,
To the wild secluded places
Where lilting streamlets flow;
Where graceful pussy-willows
In a shining silver throng,
Are dancing by the waters
To the music of their song.

It is time for making whistles
That will blow—that will blow;
For the green is on the upland,
The woods and hedges glow;
The South Wind wafts a greeting—
The birds a welcome sing;
Oh, it's time for willow whistles
To pipe in praise of Spring!

—SARAH A. HEINZERLING.

Willows! The very name brings visions of long, long ago. Since the South is largely of Anglo-Saxon descent, it may even be that some of our early ancestors were among those who fought against the Roman invaders of Britain from behind shields of willow basket-work. And if they were of the common people, they probably lived in wattle huts woven of willow withes and saplings smeared and chinked with clay.*

The members of the willow family, which includes, besides

* Anna Botsford Comstock, *The Handbook of Nature-Study.*

the willows themselves, the poplars, the cottonwoods, and the aspens, are well known and widely distributed. All together there are nearly two hundred of them, the majority of which are willows. Most of the willows are shrubs rather than trees, and there are endless varieties. They may grow prostrate upon the ground, or rise a hundred and twenty or more feet into the air. They are found beyond the Arctic Circle, and a few are even present within the Tropics, but high in the Andes of Chile. In some form or other, willows are known from sea-level to mountain-tops.

There are from one hundred sixty to one hundred seventy species of willows, and they vary and interbreed until they are most confusing, even to well-trained botanists. Once I took a tree walk with a very interesting forester who stammered, during which walk he pointed this out to me saying, "There's only one m-man that knows them all,—b-b-but he's d-dead!"

Salix, the scientific name for willow, points out Illick,* comes from the Celtic words *sal,* meaning near, and *lis,* meaning water, and refers to the tree's fondness for the borders of streams, ponds, marshes, and other watercourses. As a group, willows have slender, flexible twigs that give grace and airy lightness to the tree. Yet these twigs are tender and brittle enough to break off easily during winds and storms—though all this seems but to fit in with Nature's plan.

Important Soil Binders

Mother Nature must love her willows and appreciate what an aid they are to her as soil binders, preventing erosion and the washing of banks. For the roots, growing in all directions, form thick masses that hold the soil in place, and thus help keep streams in their proper channels.

Perhaps it is because of this that Nature has worked out a clever manner of planting willows along her waterways. As the winds break off the twigs and branches, they drop into the

* Joseph S. Illick, *Tree Habits.*

streams below and are swept along by the current until they find a lodging on wet ground. They may be swept ashore or upon a sandbar, where they will take root, often on ground so poor that not much else will thrive. Thus the borders of many streams and marshes are actually self-planted.

There seems to be just no downing a willow. A twig that may be lying flat on the ground will often, if the ground is moist enough, push out rootlets from below, and from the buds on the upper side shoots will start. Cut-off branches or large limbs, even pieces cut in stove lengths, if driven into the ground, may take root and grow.

Willows are also reproduced by seedlings. The seeds are light, and each one is supplied with a dense tuft of hairs. Wafted on the air like delicate bits of down, they are scattered far and wide, and can stay afloat in a two-mile-an-hour wind. As soon as they strike moist soil they begin to germinate, and grow into sturdy little baby trees the first year. By the end of the growing season they may be two or more feet in height.

An interesting trait of all the willows is that, unlike the majority of trees, the pollen-bearing and the seed-producing flowers are not borne on the same branch, or even on the same tree.

Only One Large Native Willow

In America there is only one large native species, the black willow. It ranges from New Brunswick to Florida, but is most abundant in the basin of the Mississippi River, attaining its greatest size in southern Indiana and Illinois. Though usually about thirty to forty feet in height, it has been known to reach one hundred and twenty feet and to have a trunk diameter of three or more feet.

In the South it is a common small tree along streams from the coast to an altitude of about 3,000 feet. It may be found growing singly or in clumps. The long, slender leaves are simple and alternate, from three to six inches long and gen-

erally a half inch or less wide. The margins are finely toothed and the tips are often curved, making the leaves somewhat scythe-shaped. They are bright green on both sides, and in early autumn turn a pale yellow, or may fall without turning. The pair of round leaf-like stipules often remaining at the base of each leafstalk also helps in the identification of the tree. And, like those of all willows, its winter buds are covered with but a single bud scale. This is characteristic of no other trees.

It is the bark of this willow which gives the tree its name, for though this is occasionally reddish, it is usually very dark, or almost black. The wood is soft and light, and is used in the manufacture of artificial limbs. A high grade charcoal, used in the making of gunpowder, is also made from it. And in the early spring, when the "sap is up" what excellent whistles can be made from a willow branch. All that is necessary is a boy and a branch and a jack-knife—and some one to tell him how to make them. And then he, too, can "pipe in praise of Spring!"

Foreign Willows Naturalized

Several imported willows have been planted so extensively or have become so thoroughly naturalized that we hardly think of them as not being native. The most common of these is the weeping willow, whose home is in Asia. We recall the Biblical quotation, "By the rivers of Babylon, there we sat down, yea, we wept, when we remembered Zion. We hanged our harps upon the willows in the midst thereof."

It is the weeping willow which is named *Salix Babylonica L.,* but no harps could be hung on the drooping branches of that tree. The tree mentioned in the Bible in this connection is now supposed to have been a poplar, a close relative of the willows. The weeping willow was brought into England some two hundred or more years ago. Many of these trees in this country are said to have been derived from cuttings

By L. W. Brownell

BLACK WILLOW (*Salix nigra Marsh.*)

Our only native willow that becomes a large tree.

Two kinds of flowers, on separate trees, coming out with the leaves; fruits in loose racemes on female trees only (lower right); long, slender, finely-toothed leaves, alternately arranged; bark dark and deeply furrowed; female flowers (upper left) resemble fruit. (Black Willow.)

from the famous weeping willow at Napoleon's home of exile on St. Helena Island.

Of those imported from Europe, the white willow is the most common. Early colonists are said to have brought cuttings of it with them to America, and now it is fairly well distributed from coast to coast. In certain sections of New England and the North few streams or marshes are without a border of white willows. So much a part of the landscape have they become that it is hard to realize they are not native. This is the willow which is given preference for planting where landslides and erosion are to be checked.

Pussy Willow

The most-loved willow of childhood is the pussy willow, a shrub or small tree rarely more than twenty feet in height. There may be a few scattered ones in our mountains. However, in sections of the country where it is not native it grows readily from cuttings. It is one of the earliest trees to bloom, and the gray, furry "pussies" are loved by all.

These "pussies" are the partly opened cluster buds that later are to develop into the staminate, or pollen-producing, flowers of the willows, and to give the bees almost their earliest spring feast. When they are in blossom the happy hum of the bees working in them can be heard for some distance from the trees. The pollen furnishes them the "bee bread" for their first brood. The nectar is produced in tiny nectaries at the base of each pollen-bearing flower on the "pussy," and in a tiny pocket at the base of each flower on the pistillate, or seed-producing, flower. As the bees pass back and forth, pollen-laden, from tree to tree, they brush off some of this pollen upon the sticky stigmas of the female trees, and cross-fertilization thus takes place.

The Poplars, Cottonwoods, and Aspens (*Populus*)

An Arbor Day Tree

Dear little tree that we plant to-day,
What will you be when we're old and gray?
"The savings-bank of the squirrel and mouse,
For robin and wren an apartment house,
The dressing-room of the butterfly's ball,
The locust's and katydid's concert hall,
The schoolboy's ladder in pleasant June,
The schoolgirl's tent in the July noon,
And my leaves shall whisper them merrily
A tale of the children who planted me."

—AUTHOR UNKNOWN.

The poplars, a group of trees including the cottonwoods and the aspens, are closely related to the willows, and belong to the same family. Rapid growers, they are found in both the temperate and the arctic regions; in the Far North they sometimes form vast forests. Of the twenty-seven species now generally recognized, eleven are found in North America, five of them native in the East, and three in the South. In addition, three European species are widely planted.

Perhaps every locality has some large willow or poplar with a tradition about how it was planted from a stick used in walking or as a switch to drive home the cows. Eventually it was thrust into the ground, where it quickly took root and grew.

In my high-school days I used to pass such a tree. Two generations before, when my great-aunt was going along the same road to the same school (only it was called academy then), she stopped one day at a farmhouse to tell one of the neighbor boys about a "school sociable." Like many country boys of that day, he went to school only during the winter months. He had been driving the cows home for milking, and as they talked he thrust the poplar switch into the ground and forgot it. Perhaps he was intrigued by the sprig-calicoed, long-pantaletted Miss—

anyhow, he later became my great-uncle, and the tree had a place in the family tradition. By my time the "switch" had grown into a great tree overshading the house, ancient as poplars go.

Fluttering Leaves

All poplars and aspens have more or less tremulous, or fluttering, leaves. This is because the heavy, triangular or roundish leaf has a long and slender leaf-stalk, or petiole, flattened in one direction near the blade and in the opposite direction near the base, so that the slightest breeze sets it in motion. These leaves have been often thought to foretell rain by their turning, the poet Aldrich describing them thus:

> *"We knew it would rain, for the poplars showed*
> *The whites of their leaves...."*

The flowers are catkins of two different kinds and, like those of the willows, are borne on different trees and appear before the leaves. The pollen-bearing, or male, trees are so densely flowered that they have a massed, purplish appearance when in bloom. The female trees are sparsely flowered.

The fruits take the form of small, pointed pods in necklace-like strings, their seeds equipped with loose, white silky hairs which carry them for long distances on the winds. These hairs, like fluffy cotton in appearance, account for the tree's name of "cottonwood." The fruit ripens in the spring. The wood, soft and of light weight, warps easily upon drying, but is used for many purposes in addition to its principal use as paper pulp.

Carolina Poplar, or Cottonwood

The most common poplar of the South is the Carolina poplar, or cottonwood, which is widely scattered but is rarely abundant. It is not native in the mountains and is somewhat uncommon in the piedmont. It seems to be most common in

the coastal plains. It is at its best along the streams in the region between the Appalachian and the Rocky Mountains, where it attains its greatest size and abundance. As this tree is easily propagated by cuttings and grows rapidly, it has been widely planted to get quick shade. It was so used by the pioneers of the plains, both as shade tree and for windbreaks about the farmsteads and fields.

Here in the South, and in the East in general, poplars are not so highly prized as in the Middle West. With forests all about us, we can have no conception of the tree hunger of the early settlers on the treeless plains and prairies. Sometimes families and neighbors would drive miles to some stream bank, just to look at trees. The early prairie settlers had reason to be grateful for these poplars. Besides sheltering their homes, they provided fuel and fencing and satisfied their soul-hunger for trees. Though not long-lived, they grow quickly, giving shade while other better, but slower-growing, trees are getting established.

Also, in many smoke-begrimed cities of the industrial regions, the Carolina poplar is cherished because its smooth, glossy leaves shed soot and dust. Hence it is able to survive in localities where many other shade trees are regularly killed.

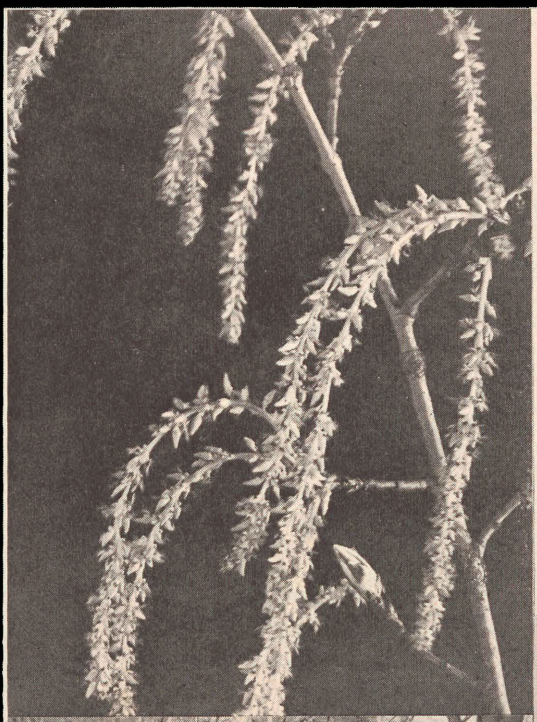
Wood Used for Paper Pulp

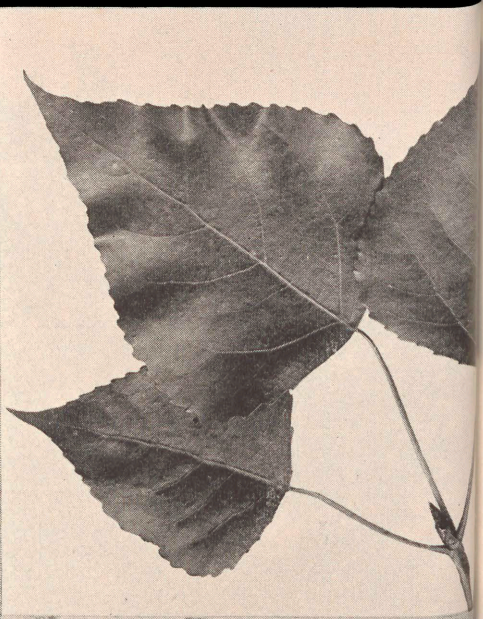
Another of its merits is the ease with which it grows from cuttings. In certain sections of the country large numbers of these cuttings are planted by pulp companies, as the wood is well adapted to the manufacture of paper pulp. It makes a high-grade gloss magazine paper for the printing of half-tone illustrations.

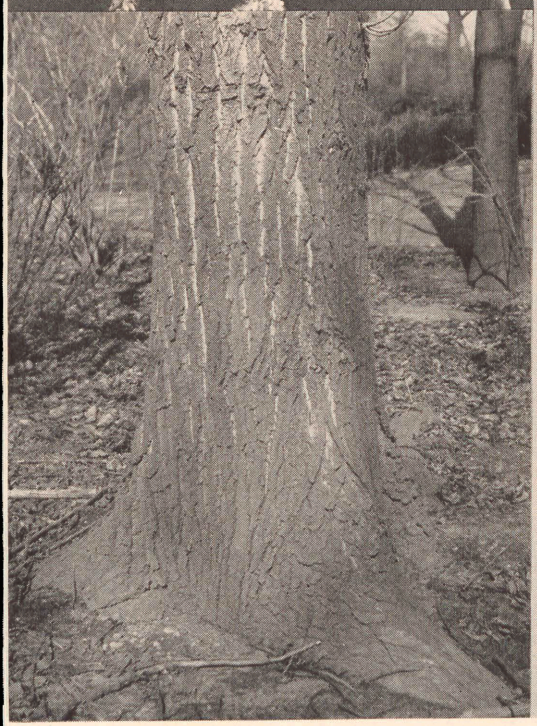
One of the objections to this tree is that it sheds its leaves early, and in spring the large, thick catkins of the staminate trees drop and "litter the ground." This seems to annoy people who like only "tidy grounds"—and see no beauty or interest in dropped catkins, blossoms, pine needles, or cones. Too, the

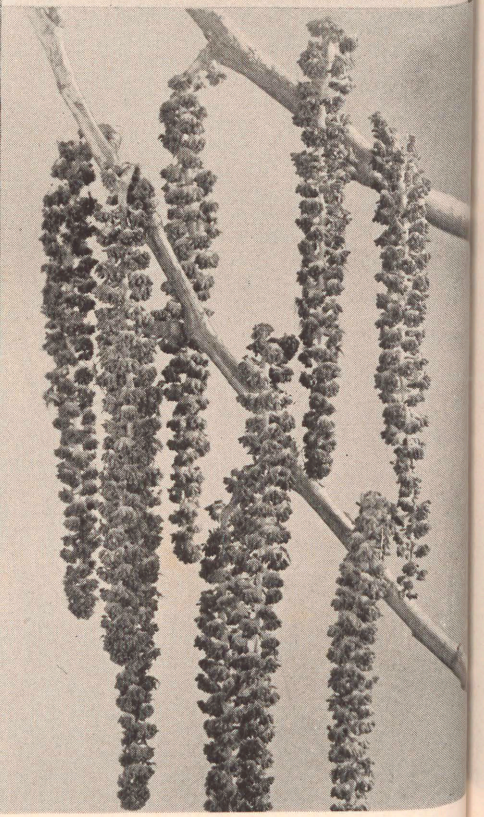
Courtesy U. S. Forest Service

CAROLINA POPLAR OR COTTONWOOD (*Populus deltoides* Marsh.)
A favorite tree for prairie planting, it furnished the early settlers with shade, fuel, and fencing material.









Flowers of two kinds on separate trees; fruit capsules contain seeds with cottony hairs; triangular leaves, resembling Greek letter *delta,* give tree its scientific name. Compare strings of small fruit pods (upper left) with long pollen-bearing male catkins (lower right). (Carolina Poplar.)

branches are easily broken off by strong winds, and the lower limbs die early, giving the tree an untidy appearance. Still another objectionable habit is that it forms an immense growth of roots which often clogs sewers and lifts up walks and pavements.

On old cottonwoods the bark is ash-gray and deeply divided into broad, rounded ridges broken into scales; but on young trees it is almost smooth. The shiny, resinous winter buds are chestnut-brown and half an inch long. The simple, alternate leaves are rather triangular, squarish at the base, pointed at the tip, and coarsely toothed along the margins. They are three to five inches across each way, and in maturity are light shining green above, and paler below. In autumn they turn a bright yellow.

Swamp Cottonwood

This cottonwood is a fine tree of the deep swamps in the coastal region of the South and in the Mississippi Valley region. It reaches a height of seventy to ninety feet and a trunk diameter of two to three feet. The leaves are somewhat larger than those of the Carolina cottonwood, and are less triangular. The margins are more finely toothed. The winter buds, too, are large and resinous.

Large-toothed Poplar

The third native poplar of the South is the large-toothed poplar, or aspen, a medium-sized tree of cooler regions, essentially of more northern range, growing from Nova Scotia and Minnesota southward to Pennsylvania. Rare in the South, it is confined to a few mountain sections, with North Carolina its southern limit.

Though not valuable for timber, this tree produces good pulpwood. Its most valuable function, however, is its service

in restoring forests on severely burned or heavily cut-over areas. In this way it prepares the soil and conditions for other more valuable trees. The leaves are from three to four inches long, and are coarsely toothed along the margin, giving the tree its common name. In early spring the tree is often completely covered with the dangling tassels of flowers, which give it a white, cloud-like effect.

Two Common Foreign Poplars

Probably the best known of all the poplars is not a native at all, but an introduced tree, the Lombardy poplar, which is known to nearly everyone. This is the "exclamation point tree," so familiar in landscape planting. Its short, close-branched limbs do not spread out, but grow upright and cling to the tall trunk.

If properly placed, with diversified plantings, it is very effective and striking. So spire-like is its growth that the outline of the tree is easily recognized, in either summer or winter, even at a great distance. The Lombardy poplar is said to have been one of the first ornamental trees introduced into this country.

Even though it is not a native, the silver, or white, poplar of the poem is well known in some sections of the country. This tree, with large toothed, often lobed leaves that are woolly white underneath, is easily recognized. In certain winds the whole tree shows a massed silver lining to the foliage. The bark also is whitish and helps to name the tree. The roots of this tree not only creep but sucker freely, and so in a short time the tree spreads rapidly, forming dense thickets.

CHAPTER VI

THE SWEET GALE FAMILY
(MYRICACEAE)

The Christmas Eve that's lighted by
A candle made of bay,
Is one whose joy and blessedness
Will never fade away.

—CATHARINE CORNISH.

The Wax Myrtle or Bayberry (*Myrica*)

To the early colonists the wax myrtle, or bayberry, was an important shrub or tree. Its very name was derived from the service the berries rendered in lighting up homes.

In those long ago days, before gas or electricity or even coal oil was known, tallow, or animal fats for making candles was not overly plentiful. The colonists soon learned to use the waxy coating of the berries that grew on the myrtles. There were always plenty of children to gather them—and in those stern, hard days it was considered much better for children to be at work than at play.

At some Thanksgiving season, even in these days, those who live in the bayberry country may like to try making some of these candles. The blue-gray berries can be gathered, simmered in boiling water, and the waxy covering removed by skimming. You can use candle-molds if you wish; you may find one in your attic, perhaps a mold that your great-great-great grandmother may have used in making the same kind of candle. Or you can dip the wicks into the melted wax again and again, hanging them up after each dipping to give the added coating

of wax time to harden, until you have tapers of the desired thickness.

Candles and tapers made from the wax of these berries are more brittle and less greasy than those made from tallow. They are a delicate, translucent green and burn with a distinctly bluish light. And when the flame is extinguished, there is left an elusive but fragrant and pungent odor that lingers like incense.

Wide Coastal Range

These interesting shrubs and trees are known from Nova Scotia to Florida. Though the northern form has larger leaves and berries, it is so similar to our southern form that only a well-trained botanist can tell them apart. In the North, however, wax myrtles generally shed their leaves, while in the South they are more nearly evergreen.

Our southern form is found in the coastal plain from Cape May, New Jersey, through Delaware and Maryland south to southern Florida and west in the Gulf States to Texas; also inland in sections of Mississippi, Louisiana, and Arkansas. In its different homes it has a variety of names, including, besides wax myrtle and bayberry, candleberry, myrtle tree, puckerbush (in Florida) and Cirier (in Louisiana). Myrtle Beach, South Carolina, is named for this plant.

Though usually growing in damp woods, or forming large clumps among sand dunes, wax myrtles also do well in the drier bogs and even range out into the upland, where the water table is not too far beneath the surface, says Dr. B. W. Wells.* They can also be easily grown in cultivation. Sometimes they become slender trees, occasionally reaching twenty, thirty, or even forty feet in height, with a trunk, often crooked or inclined, that may measure ten or twelve inches in diameter. When growing in the open the tree develops a

* *The Natural Gardens of North Carolina.*

By J. Horace McFarland

WAX MYRTLE OR BAYBERRY (*Myrica cerifera* L.)
In earlier days the waxy coating from the berries was used in making candles.

Flowers borne on separate trees; fragrant leaves evergreen in the South; usually a shrub, but sometimes a small tree, as this good-sized trunk shows; berries of the southern form (lower right) are slightly smaller than those of northern form (page 53); male cones in upper picture. (Wax Myrtle.)

rather narrow oblong top of tall slender branches. The bark is about a fourth of an inch thick, with a rather smooth, light gray surface. The wood is light, soft and brittle, dark brown, with thin, lighter colored sapwood.

In the vicinity of the sea-coast, wax myrtles are usually found growing in the company of live oak, yaupon, wild olive, and red bay. Farther inland, in swamps and bottomlands, they are generally associated with red maple, loblolly bay, sweet bay, sparkleberry, and sweet-leaf, or horse sugar.

Fragrant Leaves

One of the most interesting things about this unusual shrub or tree is its fragrant leaves. Long and narrow, up to four inches in length and one-fourth to one-half inch in width, they may either be entire or coarsely and irregularly toothed along the margin. They are wedge-shaped at the base, and pointed or, very rarely, rounded at the tip. Dark green above, on the under side they are paler and rather thickly dotted with orange resin glands which give them a delicate hint of balsamic odor.

The staminate and pistillate flowers, which open in March or April, are ordinarily on separate trees. They are small catkins, located in the axils of the leaves. The pollen-bearing ones are one-third to one-half inch long; the seed-bearing ones are only about half as large.

It is the tiny round fruits, the so-called berries, which give to the wax myrtle its chief charm and interest. Several in a cluster, clinging tightly to the short spikes, these are about one-eighth inch in diameter, and pale green covered with a gray-blue-whitish waxy coat. Beneath this the shell of the nut is thick and bony and the seed very tiny. Ripening in September and October, these fruits, properly known as drupes, but more popularly known as berries, remain on the branches during the winter and then fall irregularly in the spring and early summer.

Birds, especially the myrtle warblers, feed extensively on these berries. Indeed, this bird gets its name from them, for wherever there are wax myrtles, there you may look for the gold-bedecked myrtle warblers during the fall, winter, and early spring.

CHAPTER VII

THE WALNUT FAMILY
(JUGLANDACEAE)

Butternut spoke up and said:
"'Twill not be long before
I'll have to move my quarters
To the farmer's garret floor;

"With Hickory and Walnut,
Good company I'll keep,
And there until Thanksgiving,
Together we shall sleep."

—SELECTED.

THE WALNUTS (*Juglans*)

"YOUNG MAN, have you planted your walnut trees?" was once asked, it is said, of young men before they could marry. This was in certain European countries in the seventeenth century.

Walnut trees make excellent gunstocks, and since European nations were always more or less at war with each other, these trees were at a premium. During some of those wars of the past, the price of walnut trees reached absurd heights, as different countries bid against each other in their attempts to control the supply. Before the battle of Waterloo England is said to have paid 600 pounds for a single walnut tree!

This walnut was the so-called English, or the Persian, or Circassian, walnut, a native of Asia and southeastern Europe, which had been in cultivation for centuries in the Mediterranean region. From there it was introduced to continental Europe, then to England, and then it came to us. Hence the

tree is wrongly called "English" walnut. It has been introduced on a large commercial scale in this country, especially in California.

The Black Walnut

Our own best known native species are the black walnut and the white walnut, or butternut, which are the only two in the eastern part of the country. Both are found in the South. Black walnut wood, which is strong, hard, durable, fine-grained, and finishes with an excellent lustre, is valuable for gunstocks, for furniture, cabinetwork, interior finish, and airplane propellers.

During the World War this wood was in such demand that troops of Boy Scouts went "scouting" for the trees. It became the patriotic duty of landowners to sacrifice these trees, no matter how ancient or beloved, or how much a part of the home place they might be.

Unfortunately, black walnut wood is becoming very rare. The tree was early sacrificed by the pioneers, for its presence was an indication of good soil, and such lands were cleared first by preference. Moreover, the early settlers seemed to have had a special grudge against black walnut trees. They not only occupied fertile land, but they were hard to get rid of, and the stumps presented a very difficult problem. They were difficult to grub out and they did not decay rapidly, so often they were just left standing—a blessing in disguise for which succeeding generations have been deeply grateful. For the day came when black walnut was so valuable—and so scarce—that special machinery was used to salvage the old stumps. The wood from them was carefully cut into thin strips for "veneering" to lay on over cheaper wood. Little "solid walnut" is to be had now, except in really old furniture.

Courtesy U. S. Forest Service

BLACK WALNUT (*Juglans nigra* L.)

One of America's most valuable hardwoods, formerly rather common, but now becoming scarce. Early settlers cut and burned the trees to clear the land they occupied.

Flowers of two kinds, but on same tree; pollen-bearing ones in single drooping tassels or catkins (upper right); compound leaves alternate; fruits round, husks undivided, usually borne singly or in pairs. Lower picture shows bark, wood (right side varnished), foliage, and fruit. (Black Walnut.)

"Thousand-Dollar Bonfires"

The early settlers, of course, knew nothing of the future value of this wood; they thought only of the land they must clear. And so they had "log-rollings" or "fellings," when the men of the neighborhood would gather together and cut trees, and then, fastening great chains about them, drag or roll them to a central pile. Women and children came, too, and great feasts were spread. Those were gala occasions. Finally, when the unwanted logs were piled high, they were lighted. What a spectacle! As, of course, thousand-dollar bonfires should be!

But our early settlers did not realize they were burning gold. They needed the land; they were far from markets; and they had no way of foretelling the ultimate value of this wood. If they had, they could have cut other trees, and left the best of the black walnuts standing. But there was little interest in, or knowledge of, scientific forestry in those days, and so the trees were sacrificed. Many of them were used for great timbers in houses and barns. Often large logs were split for the old worm, or zigzag, fences, some of which are still standing.

The black walnut is found in rich bottomlands and on moist fertile hillsides from Massachusetts westward to Minnesota, and southward to northern Florida and Texas. Like so many of our valuable hardwoods, it is most abundant in the region west of the Allegheny Mountains, and attains its greatest size on the western slopes of the high mountains of North Carolina and Tennessee. There trees of this species sometimes grow from one hundred to one hundred fifty feet in height, and from four to six feet in diameter.

Thick, dark brown, and with deep fissures, the bark of the trunk gives a feeling of sturdy strength and hardness. The slightly flattened winter buds are one-eighth inch long, and are in clusters of two to six.

The leaves are alternate and pinnately compound. They are very large, from one to two feet long, and are composed of from

fifteen to twenty-three leaflets, which are themselves nearly three inches long. These have fine-toothed margins and taper at the tip. Very often there is no terminal leaflet. When bruised they have an aromatic odor. In summer the leaves are yellowish green; in autumn they are bright yellow. They drop early. Because of this, and also because the tree is slow to leaf out in the spring, many people who do not see the beauty of bare branches dislike it for a shade or lawn tree.

The male and female flowers occur separately, but are always borne on the same tree, often on the same branch. The delicious and highly nutritive nuts usually grow singly or in pairs. They are round, and are enclosed in a solid green husk which does not split open when ripe, as do the husks of the hickories.

As black walnut trees are becoming rare, they should be replaced by extensive plantings. The seedlings are difficult to transplant, for the long tap-root is easily injured; therefore it is best to plant the nuts where the trees are to remain.

The White Walnut, or Butternut

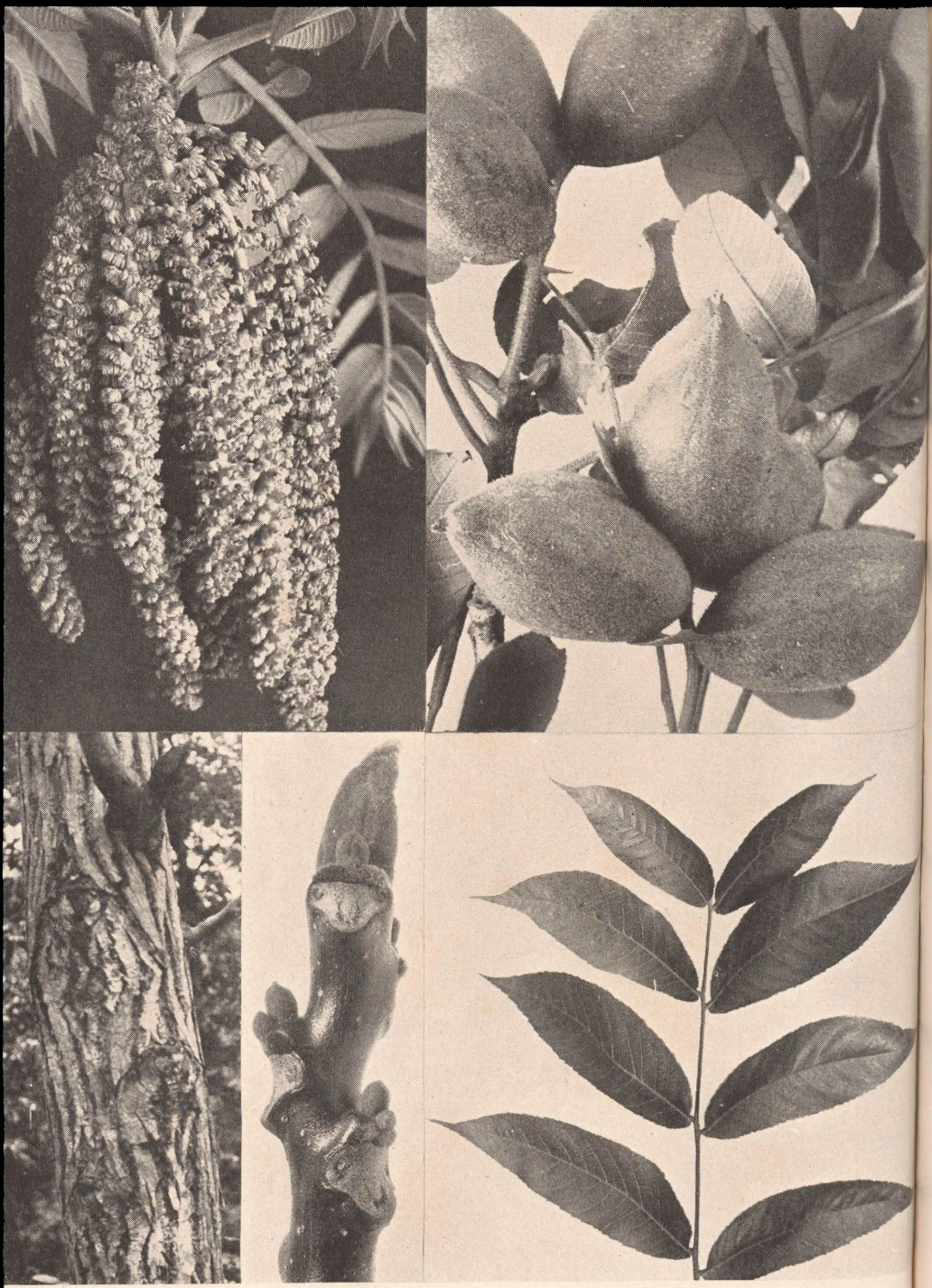
The other of the walnuts of the South is the white walnut, better known as butternut. When young, especially, it is very similar in appearance to its cousin, the black walnut. In our section it is usually a small tree, found at sea-level in Delaware and in damp bottoms and along streams in the lower mountains as far south as Georgia. It also extends somewhat into the upper piedmont. According to Illick, it grows in higher elevations and upon rougher and rockier sites than does the black walnut.*

There are certain characteristics which aid in telling the white from the black walnut. The leaves of the white walnut usually have fewer leaflets—from eleven to seventeen, there is practically always a terminal leaflet, and the petiole is hairy and sticky. The nuts are longer, with husks likewise hairy

* J. S. Illick, *Tree Habits.*

Courtesy U. S. Forest Service

WHITE WALNUT OR BUTTERNUT (*Juglans cinerea* L.)
An attractive tree, but not as hardy or as valuable as the black walnut.



Young leaves and catkins of pollen-bearing flowers (upper left); long and narrow fruits coated with sticky hairs; compound leaf also somewhat hairy and sticky; the twig is characteristic—ram's head leaf-scar with velvety fringe above it and superimposed buds above this. (Butternut.)

and sticky, and there are usually from three to five in a cluster. The queer-looking leaf scars also help in identification. They are the shape of a ram's head and above each is a velvety fringe, like an eyebrow—a characteristic that is confined to this tree. Once these are closely noted, a butternut twig is never forgotten. The twigs of both walnuts have chambered pith.

My country school children used to remember the "three longs" in telling the butternut from the black walnut. Its nut is longer, its terminal bud is longer and flattened, and the spaces between the fissures of the bark on the trunk are wider, or longer across.

The wood of this tree is also beautiful, with a soft lustre and a paler color than that of the other walnut. It is not an important timber tree, for though it is a rapid grower, it is short-lived, and when it reaches medium size is inclined to begin to decay. It is used mainly for interior house finish and furniture.

The Hickories (*Hicoria*)

Said the Shagbark to the Chestnut,
"Is it time to leave the burr?"
"I don't know," replied the Chestnut,
"There's Hazelnut—ask her."

—SELECTED.

The name hickory comes from the Indian word *powcohickora.* John Smith of the Jamestown colony is thought to have been the first white man to have used this name in writing. So difficult to spell, is it any wonder that Smith and others of those early colonists wrote it in seventeen different ways! Probably all of us are glad the Indian name was kept for the tree, although it was wise, perhaps, to shorten and simplify the spelling. Think of having *powcohickora* in a spelling lesson!

The Indians used the nuts of these trees in many ways. The squaws pounded them, shells and all, and boiled them with ground corn meal. This was eaten as a sort of soup. (The shells

would sink to the bottom of the pot, and were not dipped up.) Sometimes venison was added, and it became a stew. At other times more ground meal was put in and the mixture was shaped into cakes and cooked on hot stones, perhaps something after the fashion of our southern hoecake.

Hickories, like Indians, are real native Americans. There is not a native hickory in Europe today, although fossil remains show that before the Ice Age there were some in certain sections of the European continent. Of the twelve species of hickories, all but one (found in Mexico) occur in eastern North America and in the South. They range from the valley of the St. Lawrence River to the mountains of Mexico.

One of the main distinctions between the hickories and the walnuts, which are closely related groups of trees, is seen in connection with their fruits. In the hickories, as these ripen, the husk separates into four or more pieces and the nut drops out. In walnuts and butternuts the husk clings on as an unbroken coat until it rots away or is broken off. The pith of hickory twigs, too, differs from that of walnut twigs, for it is continuous, not chambered.

Like the walnuts, the hickories have alternate, pinnately compound leaves, sometimes a foot long, though usually shorter. They are made up of from five to as many as eleven leaflets. Hickories, like walnuts, have two kinds of flowers, both occurring on the same tree. However, the catkins or tassels of the pollen-bearing hickory flowers are in groups of three, while those of the walnuts occur singly. Both hickories and walnuts are wind-pollinated.

"Tough as Hickory"

Capable of resisting great strain, the wood of hickory is used wherever strength and toughness are desired, as in handles of axes, shovels, pick-axes, plows, and spokes for wheels of wagons. It also makes excellent fuel, producing a hot, glowing yet lasting fire. And of course nothing has ever taken the place of

hickory for smoking hams. But unless the wood is defective, it is too valuable to use as fuel.

In the old days hickory was also largely used as an accompaniment to education. "Taught to the tune of the hickory stick" was too true for him to grow sentimental about, one old gentleman recently told me.

The Shagbark Hickory

The best known and most popular of the hickories is the shagbark, shellbark, or scaly-bark. The common name refers to the loose, shaggy appearance of the bark on the older trees. Dark gray, it separates into strips often three or more feet long and several inches wide. These seem to be attached to the trunk at the middle and to be loose at both ends and along the sides. Younger trees, however, have smooth, close-knit bark, the trunk becoming furrowed gradually. The tree must be six inches or more in diameter before it begins to be shaggy.

In the forest this hickory grows tall and straight, sometimes reaching a height of sixty to a hundred feet, with a trunk diameter of one to two feet. In the Ohio Valley, and on the western slopes of the southern Allegheny Mountains, it attains its greatest size, sometimes reaching one hundred and twenty feet. In the South it is a relatively rare tree of rich low grounds, sparingly scattered throughout most of Virginia and the Carolinas, northern Georgia, and western Florida.

The crown of the shagbark is usually unsymmetrical and oblong, with the lower branches often shorter than the upper ones. The upper branches are irregularly placed, giving an angular effect, and there are gaps appearing in the foliage. Nor do these trees have as many branches as some others, for, as we remember, fewer and coarser branches are the rule when leaves are large.

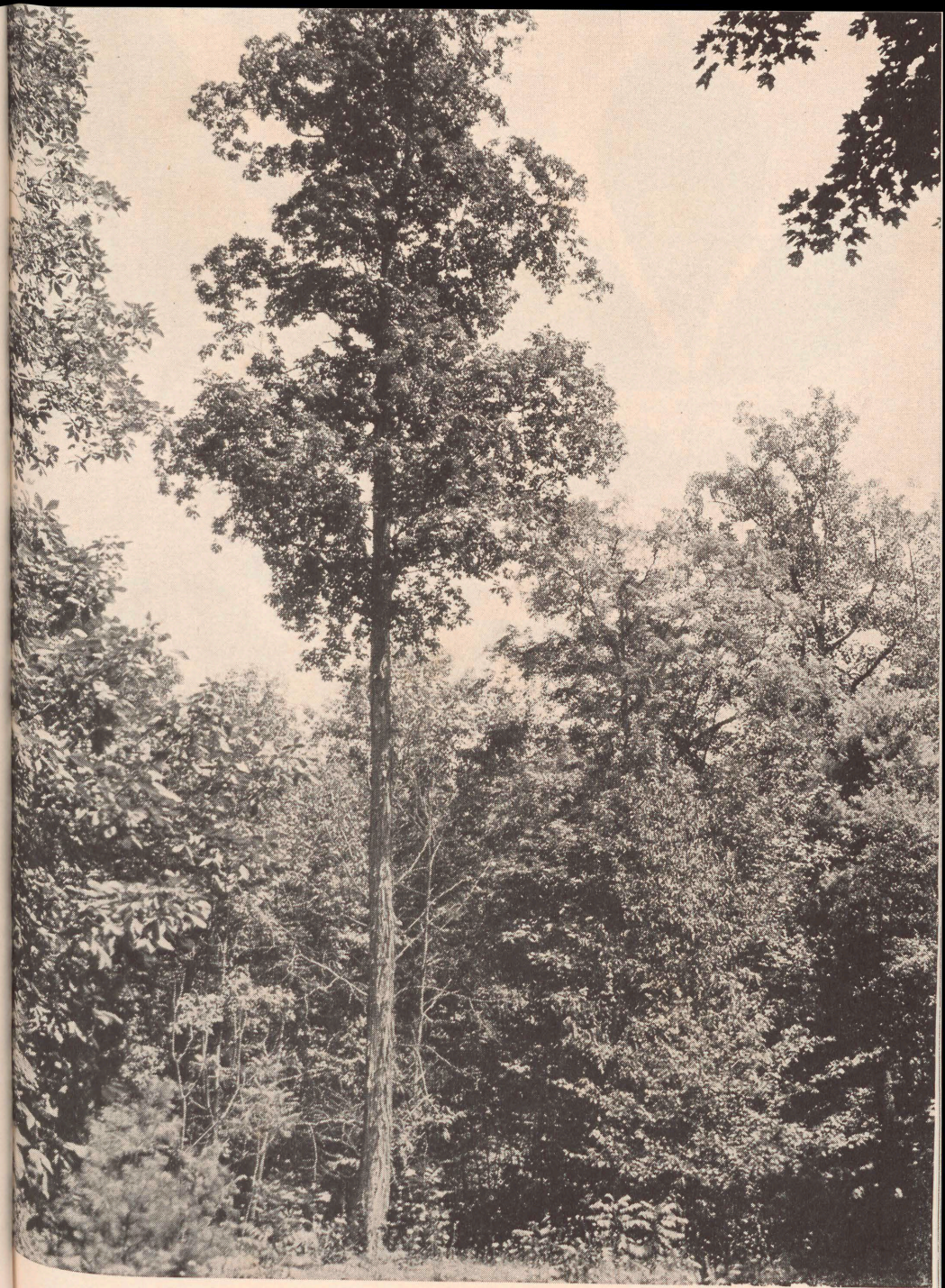
Like a Rugged Frontiersman

Besides the shaggy bark, the coarse, long leafstalks which stay on the tree for a time after the leaves fall add to the rough, unkempt appearance of this hickory. One of these shagbarks always reminds me of a rugged, strapping frontiersman of the Daniel Boone type; and somehow I almost expect to see it wearing a coon-skin cap, with a tail hanging down its back.

The winter buds of this hickory are large, plump, and of dark brown color. Towards spring they begin to swell greatly before opening. In her tree book,* Julia Rogers tells of walking under a shagbark hickory late in April. The sunlight was shining through the top, and as she looked up it seemed as though the tree bore thousands of tiny illuminated candles, each one with a silken frill. It was an enchanting, fairy-like scene. She had happened by the tree just as the sun was shining through it slanting-wise, and at a time when the warm spring air had brought out the buds. In swelling, the buds had cast off their winter covers, revealing the silky inner wrappings of the young shoots, The iris-like appearance was caused by the inner scales of the larger buds. This was late in April in the North, but in the South one may look for the shagbark to "light up its fairy candles" much earlier. I, too, have seen this "candle-lighting" of the shagbarks, and it is worth waiting for. But it is fleeting, and only he who watches his tree closely, living with it intimately from day to day, will see it in this hour of ethereal beauty.

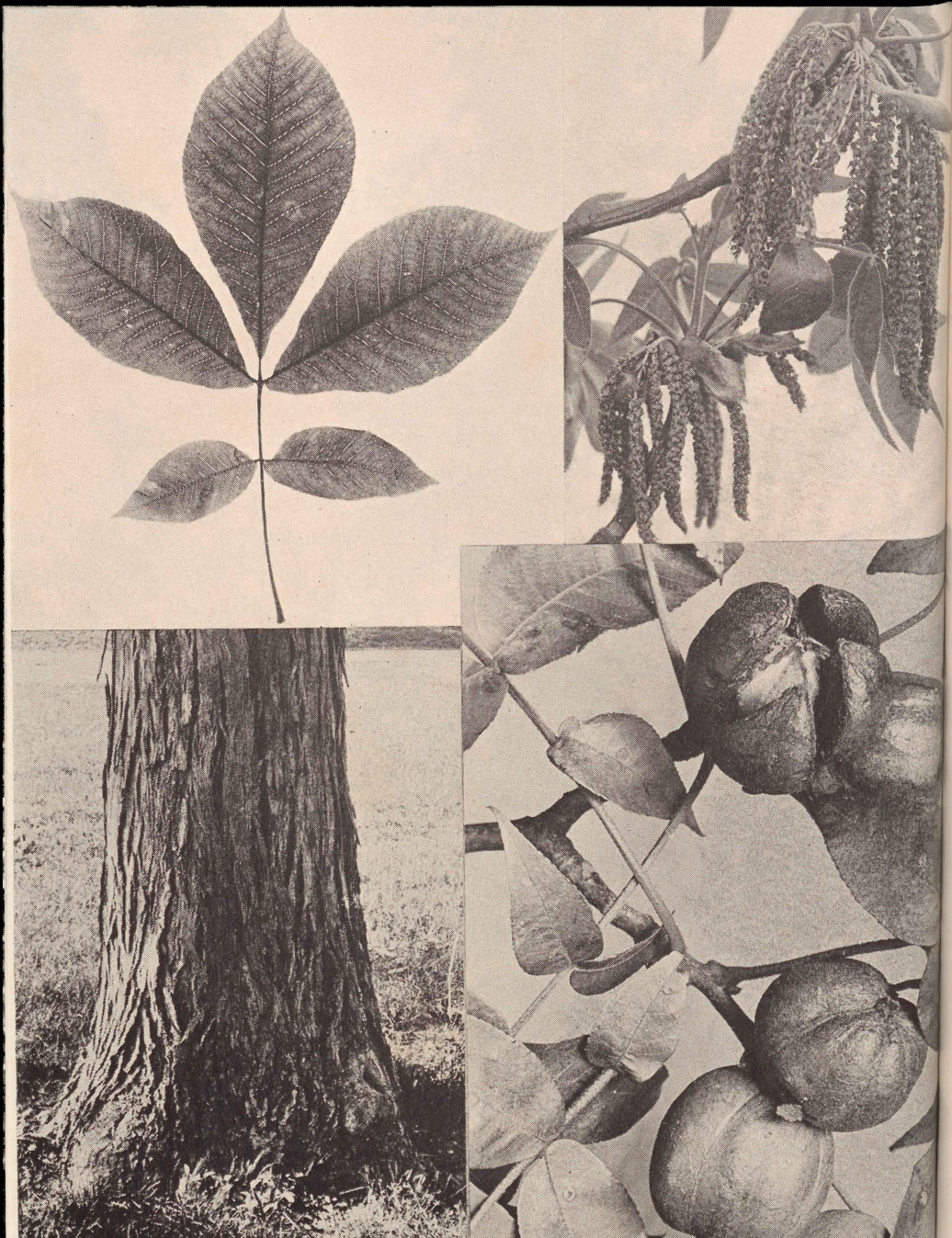
The large, pinnately compound leaves usually have five, occasionally seven, leaflets. the three upper ones very broad and large, and the pair nearest the base much smaller. Their tips are very pointed and their margins finely toothed.

* *Trees That Every Child Should Know.*



Courtesy U. S. Forest Service

SHAGBARK HICKORY (*Hicoria ovata* Britton)
In Washington National Forest, Virginia. In the forest these trees grow tall and slender. The shagbark is our most valuable hickory.



Flowers of two kinds on same tree; pollen-bearing ones in drooping tassels in clusters of threes; compound leaves with five to seven rather large leaflets; bark shaggy, peeling off in long strips; fruits large; hull thick, freely splitting in four sections; kernel sweet and edible. (Shagbark Hickory.)

Flowers When Leaves Are Nearly Grown

Flowering after the leaves are nearly grown, the slender, light green, pollen-bearing catkins, in clusters of three, add their bit of beauty to the tree. Birds sometimes use them after they have dropped, weaving them decoratively into their nests. Such a nest a Carolina wren once built in our window-box. It was almost too clever a bit of camouflage, for it so resembled a bundle of dead leaves, catkins, and pine needles blown by chance breezes into a corner of the box that we were about to throw it out. Only just in time did we discover that it was a nest, with a cleverly concealed side entrance—and five tiny wren babies!

The fruit of this hickory is borne singly or in pairs and is rather angular. The thick husk is deeply grooved, turning brown in the fall and dividing freely into four equal parts. It is this sweet, fine-flavored nut that makes the tree beloved by squirrels and small boys. Yet "going nutting" seems to have lost its old-time flavor—the charm it had in my childhood. In those days commercial nuts, which were mainly English walnuts and Brazil and other "mixed nuts," came in just during the holidays. Nuts for candies, cakes, cookies, and for cracking at night (over an old-fashioned iron, held upside down in one's lap) were gathered from the woods.

No, "going nutting" isn't the joyous adventure it used to be when, after the first frost, we put on our old clothes and happily scoured the autumn woods for nuts, mainly hickories, black walnuts, butternuts, and chestnuts. A few of the trees were still on their "color parade," the sky was blue, the air had a sharp tang to it, and squirrels were also busily garnering their stores—and harshly scolding us for intruding. There were always a few grapes left on the vines of near-by vineyards, and how much better they tasted than when the vines were full! What a fine thing country life seemed then for boys and girls.

We always had to leave the woods before dark, and, tired,

dirty and happy, would go shouting and singing home, proudly swinging our bags of nuts and promising each other we would go again the next Saturday. We felt like pioneer children of some frontier land helping to garner a living from the forest.

The Bitternut Hickory

A common tree of the North, the bitternut's range extends westward from southern Canada to Minnesota, and through all the Atlantic states as far south as northern Florida and Texas. It is most abundant throughout the Mississippi Valley. It grows tall and stately, with a broadly pyramidal crown, sometimes attaining a height of one hundred feet and a trunk diameter of two to three feet. Though nowhere very abundant in the Southeast, it is fairly common in the mountain valleys and along watercourses in the piedmont. It is seldom found in the coastal plain.

"The hickory that is different," children usually say in trying to describe this tree. For the seven to eleven leaflets of the compound leaf are smaller, slenderer, and more willow-like than those of most hickories. They are also more finely-toothed, and taper more at the tip. Then, too, the husk of the nut doesn't separate all the way to the base. But the winter buds give the best identification of all!

Buds Bright Yellow

In winter this tree always has its calling cards prominently displayed—the buds, which are blunt, flattened, and *bright yellow* in color. Once familiar with these winter buds, no one could fail to recognize the tree. In fall the fruit also helps tell which hickory it is. This is almost round, about an inch long, with a thin husk. The nut shell is thin and brittle, and the kernel is particularly bitter, accounting for the tree's common name.

Granite-gray, faintly tinged with yellow, the bark of the

Courtesy U. S. Forest Service

BITTERNUT HICKORY (*Hicoria cordiformis* Britton)

The yellow buds of this hickory are its calling cards.

Compound leaves have seven to eleven leaflets, slenderer and more willow-like than those of most hickories; bark granite-gray, with plate-like scales; hull of fruit thin-shelled, but does not split freely; kernel is bitter, giving tree its common name. (Bitternut Hickory.)

trunk is smoother than that of most hickories, yet is broken into thin, plate-like scales. The wood of the bitternut, although it increases more rapidly than that of the other species and is hard, heavy, and strong, is considered of lesser value. It is used for the same purposes as the others. Because it is reddish-brown in color, it sometimes gives to the tree the name red hickory. Many consider this tree the handsomest of all the hickories.

Growing along river bottoms and in swamps from Virginia south to Florida and Texas, is the water, or swamp, hickory, a close relative of the bitternut, from which it is distinguished by its furrowed nuts. It is a small, slender tree of no particular value.

The Mockernut or Whiteheart Hickory

One of the most disappointing of the hickories, at least to the small boy or girl going nutting, is the mockernut. Thick and distinctly four-parted, the fruit resembles that of the delicious shagbark. How big and promising it looks! But the husk does *not* split as freely. And not only is it difficult to remove, but when one tries to crack the shell of the nut, what a job! Then, after all one's labor—and banged fingers—how disappointing the meat is! Small and not very sweet, nor of a very good flavor. Occasionally it is even bitter. And so we, as children, decided "mockernut" was a good name after all.

But if we didn't like the nuts, we did like the large, strong-scented leaves, which are easier to recognize than those of other hickories. From eight to twelve inches long, they have seven to nine oblong, pointed leaflets, the upper three much larger than the others. The margins are finely toothed, except towards the base, which is entire.

Bruise the leaves slightly, and they are delightfully aromatic. On the stem and the under surface of the leaflets are

hairs and tiny, yellow resinous dots which show plainly under a lens, even under a ten-cent reading glass.

Big Buds

In winter the best way to recognize this tree is by its large buds, which are downy and blunt-pointed. Because they are larger than those of the other hickories, they give the tree still another common name, that of big bud hickory.

The pollen-bearing flowers of this hickory are grouped in slender green triple catkins four or five inches long; the fruit-producing ones are much shorter and are in clusters of two to five.

The hard dark gray bark is closely and deeply furrowed. The wood, heavy, hard, and tough, is dark brown except for a comparatively small, nearly white heart. This gives the tree another of its common names—whiteheart hickory. The wood is used especially for vehicle parts and tool handles.

Less extensive in range than some of its brother trees, this hickory thrives from southern Ontario westward and southward to Florida and eastern Kansas and Texas. In the South it is a tall tree with short limbs and may reach sixty feet in height and one to two feet in trunk diameter. It is common on our well-drained soils.

Sargent, the greatest of tree authorities, says of this tree: "It is the only hickory in the southern maritime pine-belt, growing in great abundance on low sandy hummocks close to the shores of bays and estuaries along the coast of the South Atlantic and Gulf states." *

According to Coker and Totten, in *Trees of the Southeastern States,* this hickory is often found mingled with yaupon and live oak, all three in suppressed forms, on wind-swept, sandy dunes, such as those at Myrtle Beach, South Carolina. Just behind the dunes it assumes the regular tree form, but with a more dwarfed appearance than still farther inland.

* *Manual of the Trees of North America.*

By L. W. Brownell

MOCKERNUT OR WHITEHEART HICKORY (*Hicoria alba* Britton)
A tree valued for its strong tough wood, but disappointing in its fruits.

Leaves hard, large, hairy, strong-scented, composed of seven to nine leaflets with upper three much larger than others; fruits large, hulls thick, and kernel small; terminal bud large, giving tree one of its common names, big bud hickory. Female flower at tip of twig (upper left). (Mockernut.)

The Pignut Hickory

In winter especially the pignut is the most graceful of all the hickories, for its unusually slender twigs etch a delicate tracery against wintry skies. It also has a tapering trunk and a narrow oval head.

This tree has a wide range, from northern New England and Ontario westward to Minnesota and Nebraska and southward to Florida and Texas. Like so many other trees, it reaches its greatest size in the Ohio Valley, but in the South it is more often a small to medium-sized upland tree of poor soils. It occurs plentifully in the middle section, occasionally in the mountains, and frequently in the coastal plain, from Virginia to Georgia. A larger-fruited coastal variety extends into Florida.

The leaves, from eight to twelve inches long, help to identify the tree. They are smooth and glossy; the five to seven individual leaflets are rather small and narrow, and finely toothed along the margin. In autumn they turn yellow or a lovely orange—another claim to the tree's rank of beauty.

In winter the buds help to identify the tree, for they are yellow-brown, flattened, and blunt-pointed. The outer scales of these buds begin to unfold early in autumn and frequently fall before winter or early in spring.

In fall it is the fruit which helps to identify the tree, for this is pear-shaped or rounded, usually with a *neck-like extension* at the base. The husks are very thin and split only halfway to the base or sometimes not at all. The nut is smooth, light brown in color and rather thick-shelled, and has a variable kernel, sometimes edible, sometimes bitter.

The close-fitting, dark gray bark is rather smooth, not so closely and distinctly furrowed as that of the mockernut, nor peeling off in great strips like the shagbark. The wood, heavy, hard, tough and strong yet flexible, is used for much the same purposes as that of the other hickories.

The Pale-leaved Hickory

This hickory is a small tree with an open, spreading crown. It is found scatteringly in upland woods of the piedmont, in the valleys of the coastal plain, and sparingly in the mountains, south to western Florida. Westward it occurs in southern Tennessee, west-central Mississippi, and northeastern Louisiana.

The foliage of this tree is pale and delicate. The five to seven leaflets have a silvery appearance, especially when young; and from this the tree gets its common name. The husks of the nuts are thicker than those of the pignut, to which this species is very closely related.

The Pecan

Here is a Southerner, graceful and slim,
In flavor no nut is quite equal to him.
Ha, Monsieur Pecan, you know what it means,
To be served with black coffee in French New Orleans.

—E. F. NICHOLSON.

Pecanier is what the Acadians of Louisiana called this tree, a French translation of the Indian name "pecan." When these people were exiled from their Canadian homes (made memorable by Longfellow's famous poem *Evangeline*), some of them went to Louisiana. There, more than once pecan nuts saved them from famine, just as they did later settlers in that region and in Texas.

Still later, Audubon, the great bird man, wrote of these nuts in his famous journal. On one of his many wilderness trips in search of new and strange birds, he walked across the state of Mississippi from St. Genevieve to Henderson.

"My way lay through woods, and many small crossroads now puzzled me, but I walked on, and must have traveled another forty-five miles. I met a party of Osage Indians encamped, and asked in French to stay with them. They understood me, and

Courtesy Arnold Arboretum

PIGNUT HICKORY (*Hicoria glabra* Britton)

Winter displays to advantage the more slender twigs of this hickory.

Leaflets usually thicker and smoother than those of some of the other hickories; hulls very thin, splitting only half-way to base; nut usually narrows to neck at base; bark rather firm and close; leaves smooth and glossy, composed of from five to seven leaflets. (Pignut Hickory.)

Courtesy *Garden Gossip*

PECAN (*Hicoria pecan* Engl. & Graebn.)

Large tree at Brookside, the home of Mr. and Mrs. Stanhope S. Johnson, Lynchburg, Virginia. It is one of the largest pecans in the state, having a spread of ninety-three feet, a trunk diameter of nearly seven feet, and is estimated to be more than two hundred years old.

Our most profitable native nut tree. Compound leaves have more leaflets than other hickories; individual leaflets slender, long-pointed and often somewhat sickle-shaped; pollen-bearing tassels in clusters of threes; fruits in compact clusters of from three to eleven nuts. (Pecan.)

before long I had my supper of boiled bear's fat and pecan-nuts, of which I ate heartily."

A glance at this tree shows it to belong to the hickories. The leaves are pinnately compound and alternate as in the other species of the genus, though there are more leaflets, usually from nine to seventeen. These are slender and glossy, finely toothed along the margin, very tapering at the tip, and often somewhat sickle-shaped.

The flowers of the pecan resemble those of the other hickories except that its pollen-bearing catkins are much more slender. The nuts, long and pointed at both ends, occur in compact clusters of three to eleven, each nut covered with a thin husk. This husk is usually marked with wing-like projecting ridges, along which it cracks open when ripe. Not only is the kernel of the nut delicious, but it is easiest of all the native nuts to extract. This is our only native nut tree which has been developed commercially. Today, there are many varieties of large, thin-shelled pecans.

Natural Range Greatly Extended

Although the pecan's natural range is a comparatively small one, limited only to the lower Mississippi River valley, the tree has been so extensively planted that it is now common and well known throughout the South. Besides its value as a commercial nut tree, its importance as an attractive shade tree has long been recognized.

The pecan is the largest tree in the hickory group, in the forest sometimes reaching one hundred and sixty feet in height, and five or six feet, occasionally even more, in trunk diameter. Such trees, of course, are veterans, and are found growing in rich river bottomlands. Perhaps what has saved many of these trees to attain this great size and age is the inferiority of the wood. For, unlike the other hickories, the wood of the pecan lacks strength, toughness, and elasticity.

The value of the nuts, however, more than compensates for

the lesser value of the wood. Horticulturally, in the past fifty years there has been a great development in improving their size and quality. These improved varieties do not reproduce their type from seeds; budding and grafting are used to propagate them, just as with apple and other fruit trees.

THE BIRCH FAMILY

(BETULACEAE)

Give me of your bark, O Birch-tree!
Of your yellow bark, O Birch-tree!
Growing by the rushing river
Tall and stately in the valley!
I a light canoe will build me,
Build a swift Cheemaun for sailing,
That shall float upon the river,
Like a yellow leaf in Autumn,
Like a yellow water-lily!

—HENRY W. LONGFELLOW.

THE BIRCHES (*Betula*)

MOST of us know and love Hiawatha's lines to the birch tree. This particular birch, called the paper, the canoe, or the white, birch, had an important place in the lives of certain tribes of northern Indians. In some sections they could scarcely have done without it. The broad sheets of light, strong bark were made into wigwams, for one reason, because water does not penetrate it; the wood was used as fuel for warmth and cooking; the twisted bark could be made into torches.

During spells of extreme cold and hunger, when hunting was poor, the dried inner bark could be ground into a kind of flour or meal. The outer bark was also used to make bowls, buckets, baskets, and such dishes as the Indians had. But the best, the most interesting, and the most picturesque of this tree's uses was in the birch-bark canoe. Of this canoe John Burroughs said, "The design of a savage, it yet looks like the

thought of a poet and its grace and fitness haunt the imagination."

Nor was the Indian the only one to use this slender and graceful means of transportation. For nearly two centuries the white man who traveled through the northern lakes and rivers as trapper, hunter, missionary, or explorer also used the birch-bark canoe.

The paper or canoe, birch, is a tree of the Far North and does not occur in any southern state. However, one similar to it, a slender, graceful tree known as the southern paper birch is found in the high mountains of North Carolina, and perhaps of Tennessee, but not between there and New England. This is one of the most localized trees in North Carolina, for it is reported only from Mount Mitchell and Black Mountain. It probably also occurs in the Great Smokies in Tennessee.

Characteristic Bark of Birches

The birches belong to an interesting family found chiefly in the colder parts of the northern hemisphere. Of the twenty-eight to thirty species now recognized, twelve are native to North America, nine of them of tree size.

All of them possess individual grace and beauty, together with certain striking characteristics, particularly in the bark which on older trees of most species separates into thin, papery layers. The color of this bark gives each particular species its name: it may be white, red, yellow, gray, or black, marked with long, horizontal lenticels, or "breathing pores."

The use of birch bark goes far back into history. Seven centuries before Christ the books of Pompilius were written, some historians claim, on birch bark. Keeler points out * that *Betula,* the Latin name of the birch tree, is thought by some to be derived from the Latin word *batuere,* to beat, because the *fasces*—bundles of rods of the Roman *lictors* (officers), which

* *Our Native Trees.*

were used to beat or drive back the people—were always made of birch rods. It is interesting to note that the emblem of the Italian Fascisti of today is these same *fasces,* and from it they take their name.

Since ancient times the birch has been considered an emblem of good health; and the oil extracted from some species has been thought to be of value in the treatment of rheumatism and heart trouble. Among certain tribes of the Lapps and Finns in northeastern Europe, a "birch switching" is a part of their form of Turkish bath. In a small bath-hut stones are heated until they are red-hot; then water is poured over them, which produces steam. The bather goes inside, takes a long steam bath, and then runs out into the bitter cold, where his companions beat him with birch switches until his body becomes red and breaks out into perspiration.

The leaves of the different kinds of birches vary but little. All are simple, alternate, rather small, doubly toothed along the margin. The flowers, too, are similar. They are of two kinds, both on the same tree. The pollen-bearing ones are clustered in long, drooping tassels above the seed-producing ones, which are small, slender, and almost erect. The fruits, too, are very much alike in all species. They look something like cones, and, like the cones of evergreens, are made up of numerous thin scales. These scales are three-lobed and bear small, flat nutlets bordered by little thin, papery wings. Birch seeds are so small that they can easily go airplaning off on adventures of their own in search of new lands to conquer.

The River, or Red, Birch

The common birch of the South is the river, or red, birch, a familiar tree along watercourses. It grows in the deep, rich soils along the borders of streams, ponds, and swamps which are sometimes inundated for part of the year. So closely associated is it with water that it has been called water birch.

This is the only native birch of the South found at low elevations, so it cannot be mistaken. A careless woodland gypsy of the waterways, it flings its tatterdemalion ribbons to the breeze as no self-respecting tree would do. But like all gypsies, it adds grace and color and interest to the countryside.

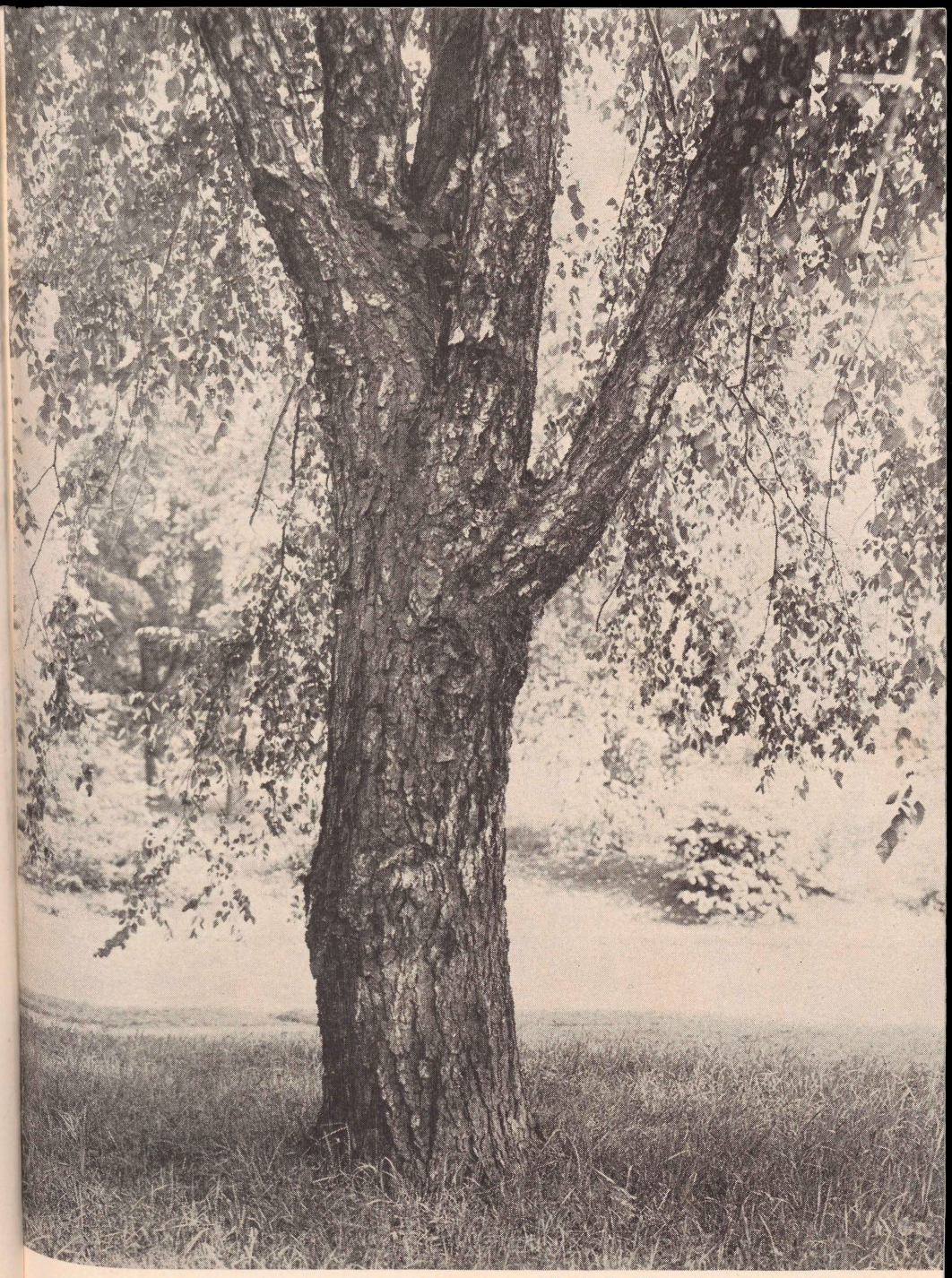
On old trees the bark on the main trunk becomes thick, deeply furrowed and of a reddish-brown color. On younger trees it may vary between reddish-brown and cinnamon-red in color, and it peels back in curly papery layers which remain on the trunk, giving it an appearance of rags and tatters. Usually these thin, papery layers are covered with a gray powder—a characteristic of this birch only.

The leaves are two to three inches long, more or less oval, with double-toothed margins, sometimes slightly lobed. Their bases are wedge-shaped—a leaf characteristic that distinguishes this birch from all others. The leaves are dark green above, paler, yellowish-green beneath. In the autumn they turn a pale, dull yellow. As the petioles are slender and wiry, and the twigs are also light, the leaves dance and flutter with every breeze.

Clever Seeding Arrangement

Wise Mother Nature has worked out a plan by which the seeds of her river birches ripen in spring (in early summer farther North), instead of in the autumn, as do those of the other birches. Thus by the time the high water of floods comes the baby seedlings are well rooted in the mud and can fight for their "place in the sun." For these birches, while not of value commercially, are of great economic importance to the land, as they make swamp lands productive by building up soil and helping to prevent erosion.

This birch is the only semi-aquatic species. Ordinarily it is from fifty to seventy-five feet in height, the trunk often dividing into two or three slightly diverging limbs. The branches are slender and drooping. Though it is found from Massa-



By E. H. Wilson. Courtesy Arnold Arboretum

RIVER, OR RED, BIRCH (*Betula nigra* L.)

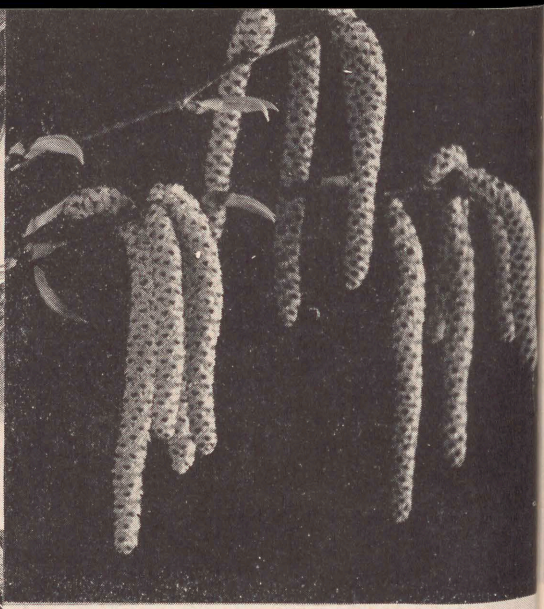
The only native birch growing in low elevations in the South.

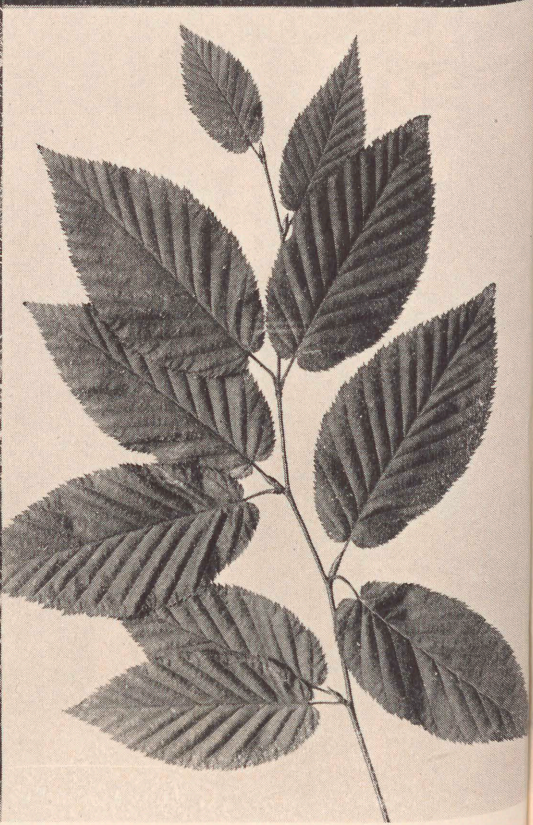
Flowers of two kinds on same tree; tiny winged nutlets in the cone-shaped fruits ripen in spring; leaves wedge-shaped at base—an unmistakable means of identification. Note drooping male catkins, and, in the same picture, the small female catkins emerging from buds. (River, or Red, Birch.)

Courtesy U. S. Forest Service

BLACK, OR SWEET, BIRCH (*Betula lenta* L.)

In the South found only in the mountains. Winter shows up the fine branching of the birches.





Erect cones narrower than those of the silver and red birches; pollen-bearing catkins scatter pollen in early spring; delicate twig, with short, two-leaved spur branches; bark on older trunks rough and broken, on younger ones satiny and marked with horizontal lenticels. (Black Birch.)

chusetts west to Minnesota and south to the Gulf, it attains its greatest size in the lowlands of the South.

River birch wood is light, strong, hard, and close-grained, and is used somewhat in the manufacture of woodenware, wooden shoes, turnery (lathe products), and for wagon hubs. Since it is scattered in its distribution, however, it is not commercially important as timber.

The Black, or Sweet, Birch

In the mountains of the South are two other birches, the black, also called the sweet, or cherry, birch, and the yellow birch. The black birch is a fine, tall tree confined to cool rich soils of mountain coves and slopes south to Georgia. One of the sturdiest, handsomest, and most symmetrical of our native birches, it may always be distinguished from the others by its close-fitting, dark brown, lustrous bark which resembles that of the wild black cherry.

On younger trees and branches the bark is smooth, silky, and close-fitting, and does not fray off into thin, ragged layers. On older trees it begins to crack, and later to break into stiff, irregular black plates, often with curly edges.

Another way in which this tree is different from the other birches is that the bark and twigs have a distinct wintergreen flavor which every country boy and girl of the tree's area recognizes. So closely does a distillation of the bark and twigs resemble the true oil of wintergreen, that commercially at one time it had almost taken its place. Now, however, most of this oil is prepared artificially by chemical means.

The leaves of the black birch are from two to five inches long and one and one-half to three inches wide. At the base they are heart-shaped or rounded, sometimes unequal. In summer they are dull, dark green above, pale yellow-green beneath; in autumn they turn a clear, bright yellow. In winter the partly developed pollen-bearing flower catkins help in

identifying the tree. By early spring these become unusually long, filled with vast quantities of green-gold pollen; and as they hang from the leafless branches they are like golden fountains of the forest.

Of slow growth, this birch reaches an average height of sixty to seventy feet and a trunk diameter of two to three feet. It attains its greatest size in the mountains of Tennessee and North Carolina, from which localities some trees are reported as having six-foot trunk diameters. Around Highlands, North Carolina, trees three feet in diameter are not uncommon.

Slow-growing, this tree produces an excellent quality of hard, heavy wood, dark in color, which takes a fine polish. It resembles wild black cherry, and, like it, is often used as a substitute for mahogany; hence this birch is sometimes called mahogany birch, or mountain mahogany.

The Yellow Birch

In the South this birch is found only in the higher mountains from Virginia through North Carolina and Tennessee to Georgia. It grows generally at greater elevations than the black birch, from which it can be distinguished by its ragged yellowish or silvery-yellow bark. This bark peels off in thin papery sheets that often separate and curl at the edges, giving the trunk a most untidy appearance. Indeed, this birch is the most tatterdemalion of them all.

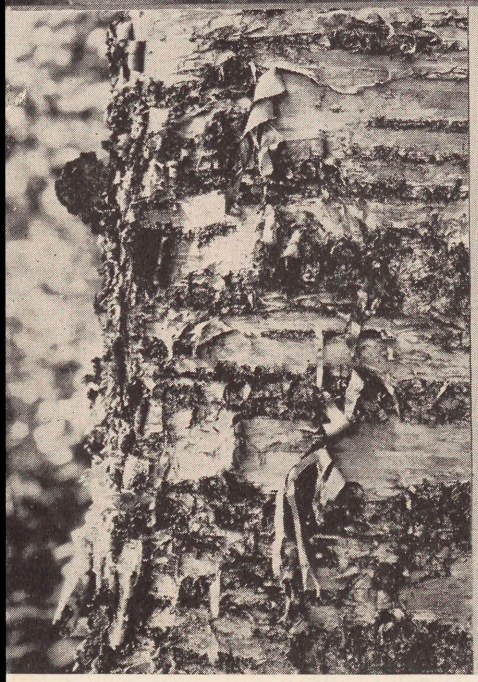
Although silver and swamp birch are other names given this species, yellow seems the most appropriate name, as the bark is almost creamy-yellow or silvery at all ages, at all seasons, and in all localities. In old age it darkens and roughens, but still keeps a yellowish cast.

The twigs, leaves, flowers, and fruit of this tree resemble quite closely those of the black birch, but the leaves are more distinctly toothed. The twigs, though slightly aromatic, lack the distinctive flavor of the other.

By American Museum of Natural History. Courtesy U. S. Forest Service

YELLOW BIRCH (*Betula lutea* Michx.)

In the South this handsome birch is confined to cool, high mountain slopes.



Cones erect; bark peeling in curling strips, with a silky yellow sheen; pollen-bearing tassels and young opening leaves are a part of the beauty of early spring. In picture at lower right, note short female catkins between the opening leaves. (Yellow Birch.)

Essentially a northern tree, its range is from Newfoundland to northern Minnesota, south to Delaware, and also along the Allegheny Mountains. It prefers wet places and is frequently found along streams. It is hardy and has few insect or funous enemies.

Deservedly classed as an important timber tree, the yellow birch reaches a large size and produces wood that is valuable, but not quite equal to that of the black birch. Although it is considered at its best in Canada, New England, and some of the Lake States, where it sometimes reaches a height of one hundred feet and a four-foot trunk diameter, large trees may also be found in the South. At White Top Mountain, Virginia, one was reported which measured over seven feet through.

The Hornbeams

Many a tree is found in the wood,
And every tree for its use is good;
Some for the strength of the gnarled root,
Some for the sweetness of flower and fruit;
Some for the shelter against the storm,
And some to keep the hearthstone warm;
Some for the roof and some for the beam,
And some for a boat to breast the stream;
In the wealth of the wood since the world began
The trees have offered their gifts to man.

—HENRY VAN DYKE.

Many of the chariots of ancient Rome which were used in the famous "chariot races" of those remote but colorful days were made, it is believed,* of the hard wood of the hornbeams. So hard is this wood that throughout the ages it has been called "ironwood."

These trees, growing very slowly, produce a wood that is not only hard, but also heavy and close-grained. In strength and ability to withstand strain it is said almost to equal steel.

* Loudon, *Arboretum et Fruticetum Britannicum.*

Our own early pioneers made ox-yokes of it, and claimed that they never wore out. In those early days of hand-made tools, in many sections where metal was either unobtainable or very scarce and expensive, this "ironwood" was widely used as a substitute. Anything that had to withstand strain was made of it—rake teeth, wedges, mallets, wooden cogs, tool handles. When a farmer needed a lever he went out to his woodlot and chose a hop hornbeam tree, and, incidentally, gave to this tree still another name, lever wood, or lever tree.

Many a pioneer baby's gruel was served in a hornbeam cup or bowl, for household utensils were also made of this wood. When our great-great-great-grandmothers were doing their own spinning, and weaving, our great-great-great-grandfathers, if they were adept at all, were carving out wooden utensils and tools in their spare time. Do you recall, in Caroline Miller's *Lamb in His Bosom,* how Cean's husband, Lonzo, used to carve out these wooden utensils at night, or during the long winter days when he could not work outside?

Naturally, wood that is hard is very difficult to work, but our pioneer ancestors were used to hard labor, and in those days every farm home had its own workshop. An early writer, speaking of the wood of these trees, said: "In time it waxeth so hard that the toughness and hardness of it may be rather compared to horn than unto wood, and therefore it was called horne-beam, or hard-beam."

Hornbeams belong to the same family as the birches and the alders. The leaves are rather birch-like in appearance, showing the family relationship. The trees, small and graceful, never attain great size, and are usually found in the forest under the shelter of larger trees.

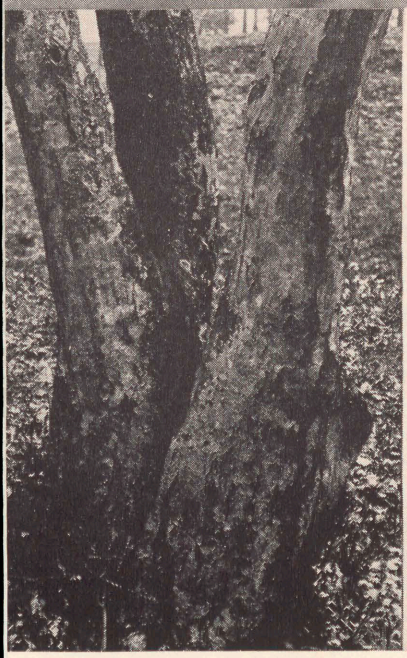
The American Hornbeam or Ironwood (*Carpinus*)

If, in passing through a woodland, you come upon a small tree that looks as if it might be a "little brother" to the beech,

Courtesy U. S. Forest Service

AMERICAN HORNBEAM OR IRONWOOD
(*Carpinus caroliniana* Walt.)

The swellings on the trunks and larger limbs of this tree give it the appearance of being muscled.



Drooping tassels of pollen-bearing flowers; dark bluish bark resembles that of the beech, giving tree one of its common names, blue beech; seeds are tiny nutlets attached to small bracts that serve as wings; branch with mature leaves and fruit at lower right. (American Hornbeam.)

look at it closely. Yes, the bark *does* look like beech bark, but isn't it a bit more bluish? And aren't the leaves different? If so, you have probably found an American hornbeam, also called a "blue beech," or, because it usually grows near water or in low, moist soil, "water beech."

Look still more closely, and if the lower branches and the trunk seem to be fluted with irregular ridges extending up and down the tree, you may be very certain. This characteristic gives the tree the appearance of being sinewy or muscled, a slim athlete of the forest. The lower branches of this tree always remind me of the great muscled arm of the "mighty smith" who used to shoe our horses when I was a child. The Indians, who were close observers and always had appropriate names for things, noted this characteristic of sinewy trunks and limbs in this particular tree and called it *O-tan-tahr-te-weh,* meaning "lean tree."

This American hornbeam is found along streams and in low grounds in rich woods of the piedmont and mountains of the southern states. In the coastal plain it is less common, for it is there confined only to the deeper swamps. Its general range is from Nova Scotia to Georgian Bay and south to Florida and eastern Texas.

Although it usually varies from twenty to thirty feet in height, with a trunk diameter of four to eight inches, it does occasionally become larger. The slender branches often droop and have a graceful, delicate arrangement of foliage. The leaves are simple, alternate and from two to four inches long, curl finely, and are doubly toothed along the margin. They are dull, deep green above and paler beneath. The midrib and veins are very prominent on the *under* side. In autumn the leaves turn a brilliant glowing orange or scarlet. The tree is often found leaning over still pools, where it is reflected in the water.

Fairy-like Fruit Clusters

As with the birches and the alders, the flowers are of two kinds, both on the same tree. The pollen-bearing catkins are borne along the sides of the branches, instead of clustered at the tip, as in the hop hornbeam—another way to distinguish between the two. In winter these catkins resemble leaf-buds, only they are two or three times larger.

The female flowers are one-half to three-fourths of an inch long. These develop into interesting clusters of tiny, leaf-like bracts, each one partly enclosing a small oval nutlet. These bracts resemble small editions of maple leaves, each one turned up a bit at the end. Inside, the nutlet is like a wee brownie sitting in a fairy boat, or airship. The fruit clusters often remain on the trees long after the leaves have fallen. But at last they drop, or are torn from the tree by a gusty wind, and the wee brownies in their fairy ships "go sailing away" borne on the wings of the winds.

Often this hornbeam grows in thickets, and again sometimes as scattered trees in marshy ground and along the borders of streams, ponds, or small lakes. It should be better known as an ornamental tree. In low places in parks, private grounds, school yards, and along highways bordering marshes it would be an interesting tree to plant, and in the autumn would add charm to any landscape.

The Hop Hornbeam (*Ostrya*)

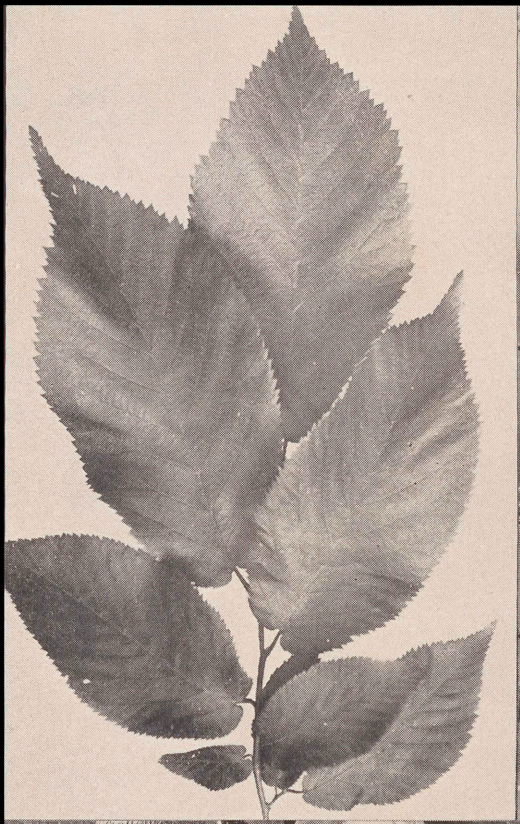
Think of a tree that bears hops—hops that look very much like the ones that grow on the regular hop-vine! Isn't that enough to give a tree the name of hop hornbeam?

Like the other hornbeam, the American, this one is also a small tree that grows in the shelter of larger trees. In many ways the two are very similar. Their leaves look much alike, but this hornbeam's leaves have veins that branch near the margins, and those of the other do not. The ranges of both are

By J. Horace McFarland

HOP HORNBEAM (*Ostrya virginiana* K. Koch)

Tradition says the wood of hornbeams is so hard that the Romans used a close relative, the European hornbeam, in making their chariots.



Leaves birch-like; bark peels off in long narrow strips, similar, on a small scale, to that of the shagbark; fruit gives tree its common name and is a pale green hop-like cluster of bags, each containing a single seed; winter twigs show stiff, partly-grown male catkins. (Hop Hornbeam.)

quite similar; that of the hop hornbeam extends a little farther into the northeast and northwest than does that of the American. But whereas the American hornbeam likes to grow in low, moist ground, the hop hornbeam, or ironwood, prefers the higher, well-drained gravelly ridges and slopes.

The mode of growth and the general leaf distribution are also very similar, but in the fall the hop hornbeam turns a clear golden yellow instead of scarlet. The barks, however, are very different. If, because of its smooth, blue-gray bark, the blue beech, or American hornbeam, might almost be taken for a "little brother of the beech," the hop hornbeam, because of its bark, might be taken for a "little brother of the shagbark hickory." Its bark has the same shaggy characteristic, but the strips are small and narrow, and not as loose. Like those of the American hornbeam, this hornbeam's flowers are also of two kinds, on the same tree.

Quite different, however, are the fruits, though at first glance they might seem a little similar. The fruit cluster of the hop hornbeam is from one to two inches long. Each little "balloon sac" of the "hop" contains a small, flat ribbed nutlet. These clusters also stay on the tree long after the leaves have fallen, and then, one by one the little balloons, each with its tiny seed passenger, go "sailing away." In this case it may be "for many a day," for if there is a strong wind the balloon may be carried on, or picked up again if it has been dropped. This may continue time after time, until the tiny balloon-sac is pierced or broken.

Because the seed is so wind-scattered, this hornbeam is more often seen as a solitary tree. Unlike the American hornbeam, it is not found in thickets.

The Alders (*Alnus*)

Now lady birch from melting snow
Lifts trailing robe with dainty hand;
Lithe alder bushes, bending low,

In reverence about her stand.
While birch and willow hesitate
To choose a color to their taste,
These ardent beaux, without debate,
Their tasseled gold put on in haste.

—ISAAC BASSETT CHOATE.

One of the earliest and most familiar of the heralds of spring is the lengthening of the stiff catkins of the alders. With the first warm days of February or early March they begin to expand and droop as graceful tassels, and soon they are shedding their soft golden pollen.

An alder swamp, resembling a purple haze from a distance, punctuated with tall sycamores rising wraith-like here and there, is surely an enchanted land. Such a swamp is but a short distance from our home, and always its haunted silence, broken now and then by a soft bird call, offers peace and contentment. Dim trails wander along the higher bits of land and out to the alders on the boggier ground. In spring and early summer honeysuckle clambers wherever it can get a foothold, filling the atmosphere with an elusive fragrance, and afar off a tiny woodland stream makes faint, elfin music. Overhead a buzzard or a hawk sails majestically on almost motionless wings, and below, in the security of a somber thicket, a chewink "flirts with his dear."

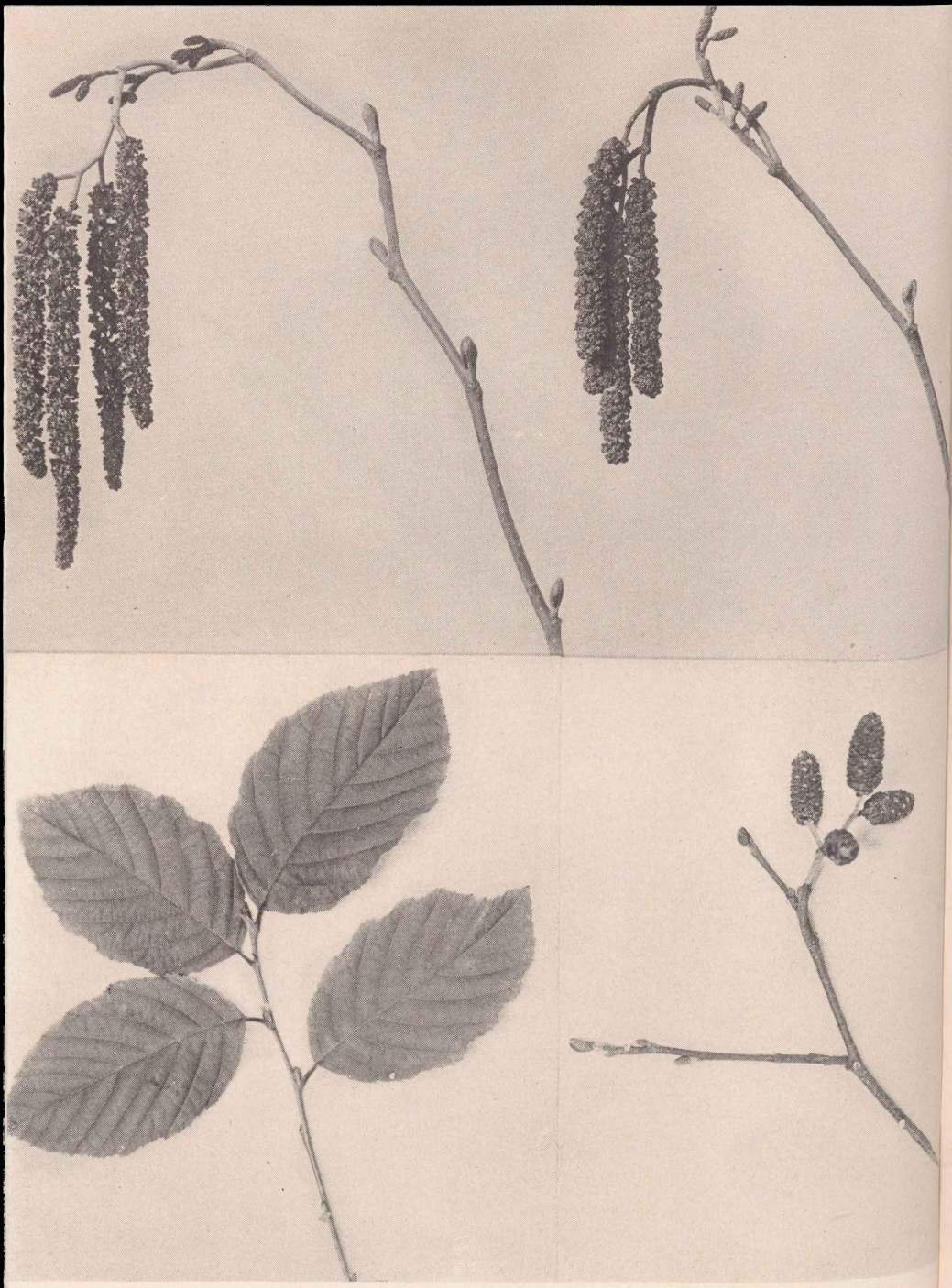
At no season of the year, or hour of the day or night, is the swamp without an elusive, mystical beauty. And the alders have their part in its life. In winter from a distance they seem to hang suspended low over the land, a deep purple mass. This color effect is caused by the red-brown or purplish catkins which hang profusely from the ends of the twigs.

Related to the birches and the hornbeams, the alders form a limited group of small water-loving trees and shrubs. Alders are well known in most sections of the country, for one or more species are usually found in every locality. They are met with from the seacoast to our high mountains. Most of them prefer

By L. W. Brownell

SMOOTH ALDER (*Alnus rugosa* Spreng.)

Usually shrubs, but sometimes small trees, they serve by protecting banks of streams and by preparing the way for more valuable trees.



One of the first harbingers of spring in the South is the lengthening of these pollen-bearing tassels. Leaves stiff, with straight veins; small, woody, cone-like fruits, usually present throughout the year, identify the plant. Note small female catkins and stalked buds. (Smooth Alder.)

such locations as swamps, banks of streams, or borders of ponds and lakes. They do not thrive in dry situations.

"They Also Serve"

Because of their small size, most alders are not important commercially. They do have a real value, however, especially in the South. For here, where soil erosion is a grave problem, they help to protect stream banks from too strong currents. Their closely interlaced roots hold the banks of these streams and of lakes and ponds against crumbling. Indeed, they do well in situations that even the willows and poplars scorn. They do more than hold the soil; they help prepare the way for growth of more important trees.

Of the three principal alders of the eastern states, the speckled is the most common form in the North, and the smooth, in the South. The rarer seaside alder, which is more likely to reach small tree size, and which is confined in its range to Maryland and Delaware, is seldom found on the coast itself; the borders of streams, ponds, and small lakes near the seacoast seem to be its favorite habitat. Occasionally it reaches thirty feet in height, with a tall, straight trunk four to five inches in diameter and slender, spreading branches. More often it is shrubby, with numerous slender, spreading stems fifteen to twenty feet high. Unlike the other alders, the seaside alder shares with the witch hazel the honor of being a late bloomer. It is August or September before one may look for its small, pale golden catkins.

The Smooth Alder

The alder which we see so commonly about watercourses in the South is the smooth alder, which only rarely becomes a tree. But, regardless of size, it is always interesting. In summer it is easy to recognize by its stiff leaves, usually, but not always, with rounded tips, wedge-shaped base and straight

veining extending from midrib to the finely toothed leaf margin. In winter the partly developed pollen-bearing catkins, hanging stiff and rigid, help in its identification. Arranged in clusters at the ends of the twigs, they become from two to four inches long when they shed their pollen. The seed-producing ones, on the same twig, but lower down, are much smaller and therefore less conspicuous.

By fall these seed-bearing catkins have developed into small, woody cones about half an inch long. Many of them remain on the tree throughout the winter, and sometimes into the second summer.

So early do the pollen-bearing catkins begin to lengthen and expand that only a little warmth or sunshine is needed to bring them out. Long before they bloom out-of-doors, a spray gathered and placed in water in a warm room will be dropping its sulphur-like powder.

Because of its small size, the smooth alder of the South has no commercial value as timber. On the Pacific Coast, however, the Oregon alder grows to a fair size and is one of the principal hardwoods of that region. Much alder timber is cut there and utilized in wood-working industries of the Northwest. It is especially adapted for cabinet purposes. In the old days the Indians of that region made many of their canoes and dugouts of the logs of this tree. They also fashioned cooking vessels, troughs, and food containers from alder wood.

In Europe the black alder is also of commercial importance. The wood is adapted to water conditions, and is very lasting if left submerged. The piles in Venice were often made of this wood, and are said to have lasted for centuries. It was long used in boat construction, also. "Excepting the Ark," says an early historian, "most boats were made of the alder." And the poet Virgil wrote:

"And down the rapid Po light alders glide."

THE BEECH FAMILY
(FAGACEAE)

Plant a beech tree when I go
Into God's White Fields of Snow;
Plant it where the red bird calls,
Where the sunshine softly falls.

Plant it where the fireflies,
Bees, and men with tired eyes,
Turn to rest on living green,
Finding hope and light serene.
—SALLIE BELLE WYLIE, in *American Forests.*

The Beech Tree (*Fagus*)

Were we Dutch or French peasants we might be going along cloppety, cloppety, clop in a pair of wooden sabots of beech wood. These shoes are made by simply hollowing out a block of wood, generally of beech or walnut, and shaping it to fit the foot.

Beech wood is hard and strong, very close-grained, and takes a fine polish. In this country it is used to some extent in the manufacture of furniture, flooring, plane-stocks, and farm implements, especially the handles of tools. Because of its close grain it does not absorb liquids, and so for hundreds, and even thousands, of years it has been used for bowls.

This tree's smooth, gray bark has long been so tempting to lovers that it has been called the "initial tree," for initials, entwined hearts and lovers' knots may be found carved on these trees, not only in our own country, but in many other parts of the world.

Nor is carving on beech bark a recently developed habit. In the century before Christ was born the poet Virgil wrote:

"Or shall I rather the sad verse repeat
Which on the beech's bark I lately writ?"

In India, long before the Christian era, the Hindus wrote down their thoughts on strips of beech bark; and during the wars in later ages messages written on beech bark were carried by runners.

Of course, these foreign beech trees are not exactly the same as our one native American beech. In the Old World there are four or five kinds; one is widely distributed in Europe and southwestern Asia, and the others are confined to eastern temperate Asia. Some specimens of the European beech are planted in America for shade trees, especially popular ornamental varieties—the copper, or purple, beech, the weeping beech, and the cut-leaf beech. Our own native beech has a paler bark and lighter green leaves than the European species.

The Boone "Bar" Tree

One of the most famous beech trees of the South, if not of the whole country, was the "Boone Tree" which stood on the old stage road leading from Jonesboro to Blountville, Tennessee. This tree contained the following inscription:

D Boon
Cilled A Bar
In Year 1760

Mr. Ralph H. Peck, Assistant Forester of Tennessee, writes me that this was a magnificent tree, twenty-nine inches across the stump and seventy feet high. Almost until it fell, in 1916, there were old settlers who, years after this inscription had become illegible, could remember having seen it while the carving was still clear. After the tree fell, some logs were cut and various articles were made from them. Recently Dr. Arch-

Courtesy U. S. Forest Service

BEECH (*Fagus grandifolia* Ehrh.)

A monarch in Williamson County, Tennessee, with a height of one hundred feet and breast-high trunk diameter of four feet and two inches.

Two kinds of flowers, both on the same tree, the pollen-bearing ones in drooping ball-like heads; buds long and pointed; veins of leaves straight, each one ending in a tooth; prickly four-valved burs contain two small triangular nuts. The Boone "Bar" Tree is at the lower left. (Beech.)

ibald Henderson, of Chapel Hill, North Carolina, showed my husband a walking stick made from the wood of this famous tree.

The American beech is widely scattered from Nova Scotia to Wisconsin and southward to Florida and Texas. It reaches its greatest size in the lower Ohio basin, and in the moist coves of our southern Alleghenies, where it may be found in rich, well-drained bottomlands, and creeping up the mountain slopes. It particularly likes ground underlaid with limestone; hence the many beautiful beech trees one sees in Kentucky. In a motor trip across that state we saw more beautiful beeches and beech groves than we had ever seen anywhere else.

The beech does not send its roots deep into the ground, but, rather, spreads them horizontally just under the surface. Its foliage is so dense that under its thick shade all growth, especially of ferns and grasses, dies for lack of sun. Foresters say this tree does more than any other to enrich the forest soils.

Ordinarily the tree grows from seventy to eighty feet in height, but under favorable conditions it has reached one hundred and twenty feet, with a trunk diameter of from three to four feet. In the crowded forest it grows tall and slender, free of branches for more than half its height and with a narrow head. In the open it is shorter, with a broad, round-topped head and slender, slightly drooping branches.

Winter Buds Distinctive

The winter buds of this tree could not be mistaken for those of any other. Slender, long, pointed, they are from three-fourths of an inch to an inch in length, and golden brown in color. In these buds are not only the perfectly formed leaves, but whole shoots, in miniature. If you watch closely during the leafing period of the trees, you can see these shoots breaking forth from the enlarged scales, which have lengthened as the bud opens. To watch the unfolding that takes place at this stage is to observe a bit of tree magic. The alternate and simple,

rather oval-shaped leaves are pointed at the tip and coarsely toothed along the edge, with each primary vein ending in a spine. They are from three to four inches long, pale green and silky at first, and when full grown, dark green above and paler beneath. On young shoots these new leaves often have coppery tones that are exquisite. They can be used in most unusual, interesting, and attractive arrangements. In autumn the leaves turn first a clear, golden yellow, and later a coppery bronze. The lower branches and younger trees retain many of these leaves throughout the winter and give a note of color to the landscape.

The delicate beech flowers are seldom noticed, as they are inconspicuous, fade quickly, and come out when the leaves are about a third grown. There are two kinds, both on the same tree. The pollen-bearing ones are arranged in ball-like heads about an inch in diameter; the seed-producing ones are in two-flowered clusters in the axils of the leaves. These develop into the prickly burs which contain the tiny triangular nuts. In May and June these burs are attractive green-gold spiny balls. When full grown they are dark green, and at the first severe frost they open and drop the nuts. The bur remains on the branch long after the nuts have fallen. Like the bur of its relative, the chestnut, the beechnut bur has the same function as that of the cup of the acorn of the oaks, which also are members of the same family.

Though the nuts are so tiny, they are very sweet and nutritious and have long been used as food by man, animals, and birds. In Europe swine used to feed on this "beechen mast" in the large forests. And in the long, long ago, when our own European ancestors were wearing skins and living in caves, this mast furnished a part of their food. Even today in Europe, where trees and wood are far scarcer than they are here, the thrifty peasant gathers the nuts of the beech for food, collects the dried leaves for winter forage for his cattle, and carefully salvages any dropped twigs for fuel. Over there no dead

branches or fallen trees are left to rot on the forest floor, as in this country. Every bit of the tree is utilized.

The Chestnut and the Chinquapin (*Castanea*)

Old Mistress Chestnut once lived in a bur,
Padded and lined with the softest of fur.
Jack Frost split it wide with his keen silver knife,
And tumbled her out at the risk of her life.

—E. F. NICHOLSON.

O-heh-yah-tah—prickly bur, is what Indian children called the chestnut. And Chinese children, Italian children, and yes, even Greek children also "had a name for it."

For the chestnut is known on every continent of the northern hemisphere. Widely distributed in eastern North America, southern Europe, northern Africa, western Asia, and central North China and Japan, is it known and loved everywhere. Two species that reach tree-size are found in eastern North America—the common chestnut, and its little southern brother, the chinquapin.

Wherever they grow, chestnuts are an important item of food. They bear about the same relation to the peasants of Spain and Italy as the white potato does to the peasant of Ireland. When the first colonizers came to this country they were delighted to find these nuts. In old histories we read of those early discoveries:

"In some places we fynd chestnutts, whose wild fruict I maie well saie equalize the best in France, Spaine, Germany, Italy or those so commended in the Black Sea by Constantinople, all of which I have eaten."—*Histoire of Travaile into Virginia Britannia.*

The Chestnut of a Hundred Horsemen

Occasionally chestnut trees reach great age and enormous size. Perhaps the most famous of all was the one on Mount

Etna, on the island of Sicily, which is said to have had a trunk circumference of nearly two hundred feet. The legend goes that Queen Joanna of Aragon, on a trip to see the volcano, was caught in a sudden, severe storm, and that she and her escort of a hundred horsemen sought shelter beneath this tree. Some authorities believe that this great chestnut was not one tree, but five, which through the long centuries had grown together in a manner that made them appear as a single tree. It was said to be around two thousand years old when it was destroyed by an eruption of the volcano.

Another ancient and enormous chestnut was the Tortworth Chestnut in Gloucestershire, England, which is said to have been more than a thousand years old. Perhaps the largest of our American chestnuts was the one in Francis Cove, in western North Carolina, which had a diameter of seventeen feet and a height of more than one hundred feet. Another large chestnut is described on page 124 below.

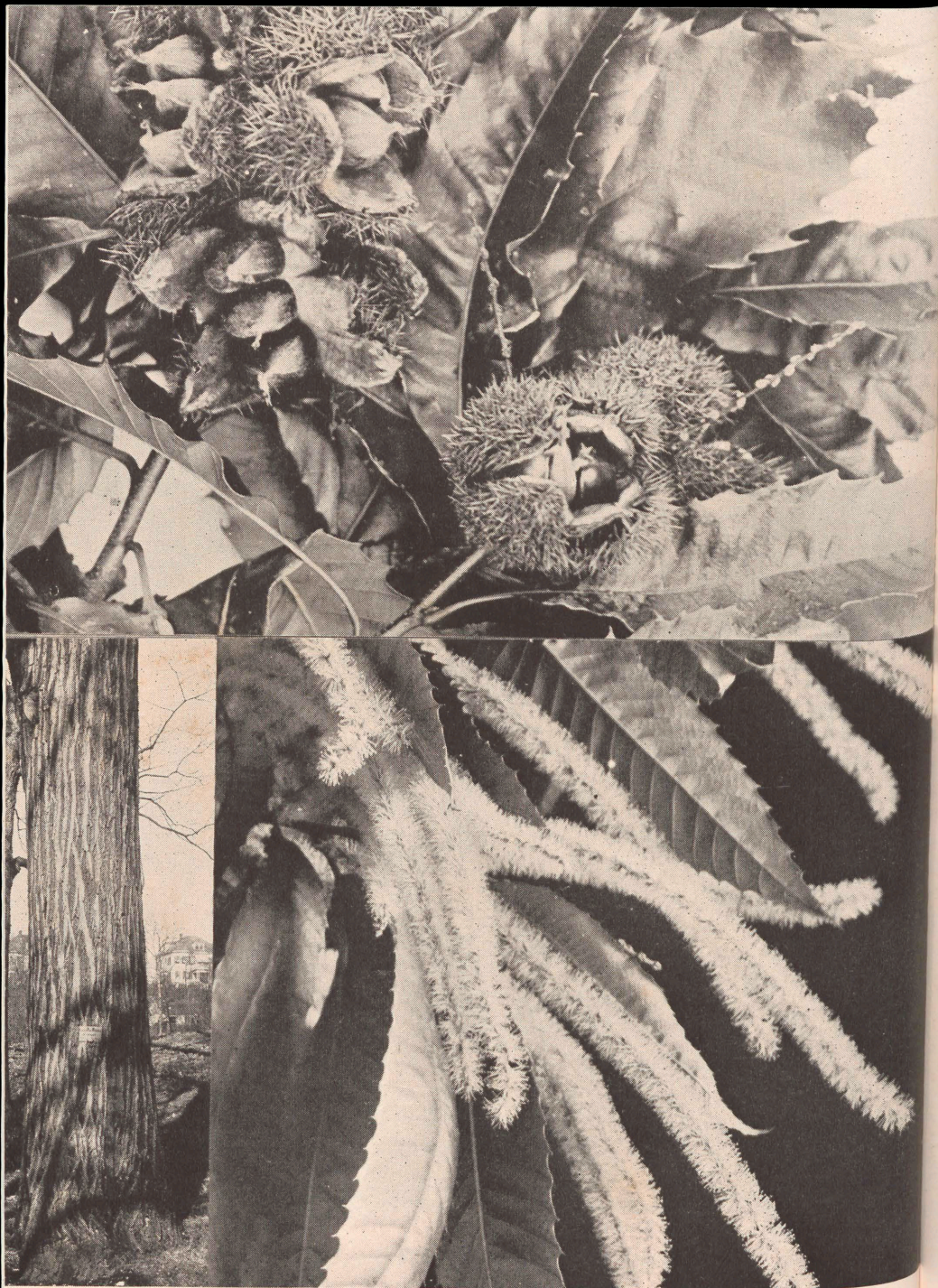
Our own native chestnut is one of the most beautiful of our forest trees. Tall, stately, with a great round head set firmly on a straight, columnar trunk, it sometimes reaches a hundred or more feet. And again we proudly state, "attains its greatest size in western North Carolina and eastern Tennessee"—that land of giant trees of the East.

The foliage is a delight to the eye and heart. The long, slender, graceful leaves, tapering at both ends, are a glossy and brilliant green above, paler beneath. Simple and alternately arranged, they are five to ten inches long, with deep straight veins, each ending in a curved spine. They bear some resemblance to the leaves of the beech, its relative, but are much longer and more pointed, with margins more sharply toothed. They also resemble somewhat the leaves of the chestnut oak, except that the edges of the latter have rounded, scalloped margins instead of sharp toothed ones. The leafstalks of the chestnut are short and stout, and are unusually enlarged at the base. In autumn the foliage turns into a mass of tawny gold.

Courtesy U. S. Forest Service

CHESTNUT (*Castanea dentata* Borkh.)

Before the chestnut blight killed the chestnuts, this was a stately tree in Howard County, Maryland.



Fruiting branch and open, four-valved spiny burs showing brown nuts within; pollen-bearing flowers make creamy cascades of the trees in early summer; each vein of the long glossy leaves ends in a pronounced tooth or spine; bark grayish-brown, with flat, irregular ridges. (Chestnut.)

Late Flowering

Unusually late in flowering, keeping company in bloom with the basswoods and the catalpas, the chestnut's long catkins seem to be waiting for a golden setting—until midsummer, when the ripening grain is a field-of-the-cloth-of-gold. Each slender catkin is from five to eight inches in length. Looking at it through a lens one finds it made up almost entirely of rosettes of pollen-bearing flowers. At the base of each tassel are just a few that produce seeds.

Although late to bloom, once started the chestnut seems to be in great haste and matures its fruit quickly. By August the green burs are well formed; by September they are full grown; and by the first frost they are ready to open and drop. But woe unto the fingers of the impatient boy or girl who tries to open one of these prickly burs before Mother Nature herself is ready!

Nature must be particularly fond of these nuts, so securely has she packed them away. First a coat of sharp green prickles, then a stiff bark-like rind lined with a rich, light brown velvet, like the lining of a precious jewel-casket. Not until King Frost majestically waves his wand do the burs open and drop, and even then the sweet kernel is protected by a glossy brown waterproof jacket.

The prickly, four-valved burs usually contain two nuts set with flat sides together. (This bur, by the way, corresponds to the "cup" of the acorn.) Sometimes there are three nuts, and then the middle nut has two flat sides; occasionally a bur contains only one nut, and then it is round. In color the nut is a lovely polished red-brown with a gray, downy tip.

Covered with a grayish-brown bark which is divided into rather flat, irregular ridges, the trunk is also characteristic. There is sometimes a tendency for these ridges to spiral around it. The twigs are smooth and shiny, dotted over with pale breathing pores, called lenticels. Alternating along the twigs

are the solitary, egg-shaped, blunt-pointed buds, about one-fourth inch in length.

In spite of being rather soft, light, coarse-grained and not strong, the wood is very durable in contact with the soil. It is used for fence-posts, rails, cross-ties and telegraph poles. Both the bark and the wood are rich in tannin, and find use in preparing leather. As this wood splits easily, in parts of the country where it was formerly common it was used for the lovely old worm, or zigzag, fences, the most artistic type of fence ever designed by man. All of these that remain should be greatly treasured, as assets of charm to the countryside.

The Chestnut Blight

And now comes the tragic part of the chestnut saga, one of the saddest stories in the history of our native trees. For our native chestnut is almost gone. Soon it may be entirely extinct, like the passenger pigeon, the Carolina paroquet, and the great auk of the bird world. Some twenty-five or more years ago, foresters and other tree-lovers began to notice that the chestnut blight, a fungus disease from China, was killing thousands of our chestnuts.

This death-dealing blight is recognized by yellowish-brown blotches on the trees attacked. Gradually these blotches enlarge, finally completely girdling and killing the tree. So far, no means of fighting this blight has been found, and it now seems almost certain that our native chestnut is doomed. All over the country may be seen gaunt, dead trees, sad specters of a mighty past. Starting in the North, the disease spread rapidly over all chestnut territory, and is now in most of the tree's range throughout the South.

According to Drs. Coker and Totten,* the largest chestnut now known to be standing is in the Great Smoky Mountains, three miles from Crestmont, North Carolina. It is said to have a diameter of ten feet and seven inches. With the exception

* *Trees of the Southeastern States.*

of an oak tree in California, this, says Dr. Coker, is now thought to be the largest nut-bearing tree in North America. Chestnut trees sprout easily. An old decaying stump, covered with lichens, is often seen surrounded by a circle of young trees that have sprung up from the roots of the old tree. There is some hope that in the future young trees may develop which will be immune to the blight. It is too soon to tell, and foresters consider it a rather vain hope, anyhow. I have, however, found some of them bearing nuts, in the mountains near Roaring Gap, North Carolina.

Chinquapin—Little Brother to the Chestnut

In the upper South this "little brother to the chestnut" is either a shrub or a small tree, rarely more than twenty feet high and six or seven inches in trunk diameter. Usually it has more than one trunk. West of the Mississippi, in Arkansas and Texas, where it is most abundant, it becomes a medium-sized tree.

The chinquapin is easily told from the chestnut, the only tree it resembles, by its much smaller size and smaller leaves. They are covered with a whitish down on the under surface, while those of the chestnut are smooth. Usually occurring in clusters, the small burs as a rule contain but one nut, the kernel of which is very sweet.

The chinquapin is too small to be of any commercial value; however, as an ornamental tree it does well on hillsides, on dry, rocky slopes, and even along the edges of swamps. By its habit of root-suckers, it often covers hillsides and bare ridges. Its time of greatest beauty is in autumn, when the clusters of small spiny burs open among the golden leaves. Although really a southern shrub, it grows from New Jersey and Pennsylvania south to Florida, and westward to Texas.

The Oaks (*Quercus*)

A song to the oak, the brave old oak,
Who hath ruled in the greenwood long;
Here's health and renown to his broad green crown,
And his fifty arms so strong.
There's fear in his frown when the sun goes down,
And the fire in the west fades out;
And he showeth his might on a wild midnight,
When the storms through his branches shout.

—H. F. CHORLEY.

To everyone of English descent the oak seems a part of his dim ancestral rites and culture. The tree's physical sturdiness, its rugged strength, great size, and venerable age appealed to the imagination of our primitive Celtic ancestors. They considered it sacred, and around it developed the strange worship of the Druids, who often performed their religious rites in oaken groves. We feel we can even agree with the English poet, Cowper,

"It seems idolatry with some excuse
When our forefather Druids in their oaks
Imagined sanctity."

For untold ages the oak has been "the emblem of grandeur, strength and duration"; it occupies a more permanent place in history than that held by any other tree. Before the time of Christ the Roman poet, Virgil, wrote of it as

"Jove's own tree
That holds the woods in awful sovereignty."

And down through the long centuries other poets have paid tribute to it in song and story. The ancient oaks of Robin Hood and Sherwood Forest, of Epping Forest, and of Windsor Forest are a part of our ancestral heritage.

Slow growers mostly, oaks live on to a grand old age. It takes from one hundred twenty to two hundred or three hun-

dred years for some oaks to reach full size, and often they live on for many hundreds more. In Europe, oak trees are living which are known to be a thousand years old, and in England, as Keeler points out, there are said to be oaks still standing which are believed to have been old trees when William of Normandy came and conquered in 1066.

Our Own Ancient Oaks

In our own country we also have ancient oaks. The famous Charter Oak, one of the best known, was a venerable tree when the first settlers came to Hartford, Connecticut. The Indians begged the colonists not to cut it when they made their clearings. They said that for centuries it had been the guide of their ancestors as to the time of the planting of corn. "When the leaves are the size of a mouse's ears, then is the time to put the seed into the ground." The settlers granted the Red Man's plea, and saved the tree—which was afterwards to become famous. For in later years the colony's precious charter, which Governor Andros had come to take away, was hidden in its hollow trunk and, from this event, ever afterward until it met destruction in a heavy storm, the tree was known as the "Charter Oak."

In Athens, Georgia, is a most unusual tree, a fine old white oak that "owns itself." The former owner, Mr. W. H. Jackson, so loved the tree whose friendship he had enjoyed through many years that he had a deed made out to it. "In consideration of the great love I bear this tree and the great desire I have for its protection for all time, I convey to it entire possession of itself, and all land on eight feet of the tree on all sides."

The tree is still standing and in fair condition. It is cared for by tree surgeons; and another tree lover, Dr. George Foster Peabody, had a guard fence of stone pillars and chains put around the tree's plot to protect its roots from injury by the tramping of too many feet. This type of protection is usually

given all historical or famous trees; otherwise the ground at the base becomes too firmly packed, and raindrops, instead of being absorbed, run off.

Of the two hundred and seventy-five known species of oaks, fifty-four are native to America, and most of these are in the eastern part of the United States. There are also a large number of varieties and hybrids.

Inhabiting the temperate regions of the northern hemisphere and the high altitudes in the tropics in the New World, the oaks range southward to the mountains of Colombia, and in the Old World to the Indian Archipelago. Each continent has its own oaks.

The oaks as a whole have very marked characteristics of flowers and fruits. The flowers are all very much alike. All oaks have two kinds—both on the same tree and on the same branch. The pollen-bearing ones are like beads on a string, with several strings hanging down from the same point on the twig, making a fringe. These strings with their flowers are called catkins. The small, inconspicuous, seed-producing flowers which later become acorns are in the axils of the newly-opening leaves. The leaves of all oaks are simple and have the alternate arrangement.

Two Groups of Oaks

In spite of their great numbers and different characteristics our American oaks naturally divide themselves into two groups, the white oak group, and the black oak group. When once learned, the differences in these groups are instantly recognized:

In the white oaks:

The leaves have rounded lobes.
The bark is usually light.
The acorns mature in a single season.
The inside of the acorn shell is smooth.
The kernels of the acorns are usually sweet.

In the black oaks:

The lobes of the leaves are angular and bristle-tipped.
The bark is usually dark.
The acorns require two seasons to mature.
The inside of the acorn shell is hairy.
The kernels of the acorns are usually bitter.

The White Oak Group

To the white oak group belong some of our finest shade and timber trees. The wood of these is noted for its strength and durability. Beside the white oak, from which it is named, the group contains the following which are mentioned in this book: the post oak, the Margaretta or scrubby post oak, the overcup oak, the bur oak, and the chestnut oaks. By many botanists the live oak is also classed with this group; by some others it is thought to be distinct enough to belong to a separate group.

The White Oak

Best known of all of our native oaks is the white oak. This tree is the one most closely akin to the common oak of England—the oak of myth and legend, of poetry and song. It is called white oak because of its light bark, which is ashy gray in color. The most important as well as the most stately and handsomest of our oaks, it often reaches heights of eighty to one hundred or more feet with a trunk diameter of two to four feet. In its most favorable locations, in the bottom of the Ohio basin and on the western slopes of the southern Allegheny Mountains, it occasionally reaches one hundred fifty feet in height and a much larger trunk diameter.

Since it is tolerant of many soils, the tree has a rather widespread range, extending from Canada to the Gulf and westward to Texas. Unfortunately, one of the things that has aided in its rapid disappearance is the fact that wherever this tree

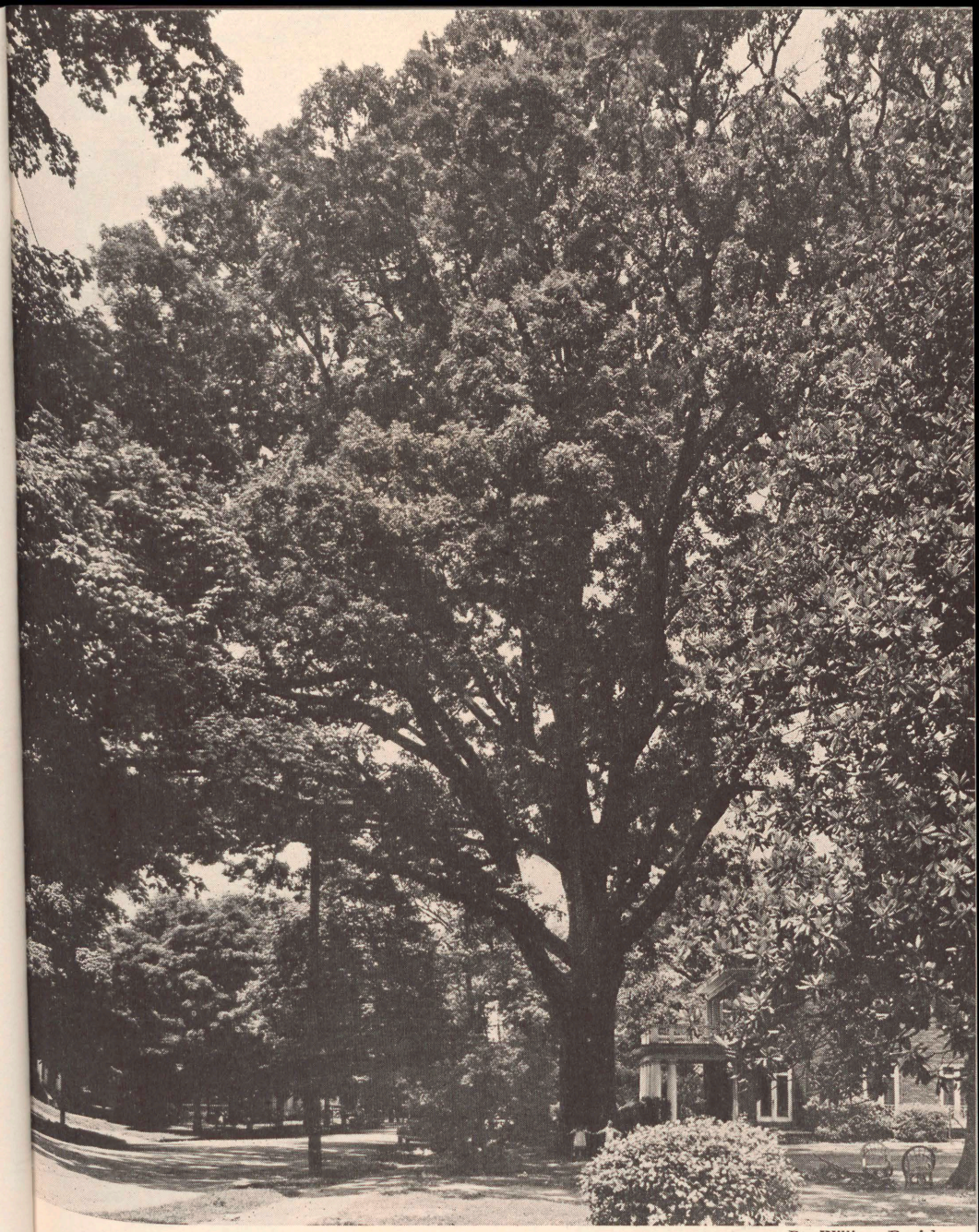
is abundant one may expect to find good soil. Realizing this, the early settlers cleared such lands, sacrificing the venerable, great white oaks—as they also did the black walnuts—to the need of farm lands.

Too, as the acorns of the white oak are the sweetest of all, they are the ones most eagerly sought by cattle, deer, swine, squirrels, chipmunks, crows, and blue jays, while the more bitter fruits of the less valuable oaks are left to propagate. The Indians also ate white oak acorns, cooking them like hominy.

Nor are the seeds of the oaks as widely spread as those of some trees. Acorns are too heavy to ride on the wind as do many of the lighter tree seeds, especially the winged ones. Instead they drop heavily to the ground and are only scattered as they roll or are carried about by men or animals. Squirrels are great foresters of these trees; it has been estimated that they plant some two-thirds of them. The squirrel buries the acorn for future use, and then either forgets it, or has more than he needs—or he himself may furnish a meal for a hawk, owl, or other enemy—and so the abandoned seed has a chance to sprout and grow.

As the white oak is not an easy tree to transplant, it is best to raise it from acorns planted where the tree is wanted, though this method is practical only in forest planting. One reason for the tree's sturdiness is its strong hold on the good earth. The roots grip the earth in two important ways. The stout tap root goes deep down into the soil, and the widely spreading horizontal surface roots act as braces.

The tree is one of the most valuable timber trees of the forest, for its strong, tough, heavy, durable wood is also fine-grained and beautiful. Its uses are many, including construction, ship-building, furniture, wagons, farm implements, flooring, and interior finish. More than any other tree, says Illick, this oak was used by the early settlers for their log cabins, barns, mills, forts, and bridges. Its bark was also used for tanning leathers. This bark is ashy-gray, shallow-fissured,



By William Daniel

WHITE OAK (*Quercus alba* L.)

The finest of the oaks. This particular tree is estimated to be six hundred years old, and is still in good condition. It was formerly a part of the Andrews estate, of Raleigh, North Carolina. Under this tree President James K. Polk wrote his famed public letter against the annexation of Texas.

All trees of white oak group have leaves with rounded lobes *without* bristles, and acorns that mature in one season; most have light bark; male and female flowers borne on same tree. Note variation in depth of lobing of leaves and the relatively long acorns. (White Oak.)

and scaly. Like all oaks, the white has terminal winter buds in clusters on the ends of the twigs. In this species their scales are reddish-brown.

"Rose Mist Cannot Wait"

"A rosy mist veiled with silvery frost" is what a white oak looks like when the new leaves are just coming out. They shade from rich rose to delicate lavender, mauve, pale pink, or green-gold, and are covered with silvery down. This breath-taking beauty of the tree is elusive, seen only for a fleeting period during which nature lovers might well forget all else and pay tribute to the tree.

When full grown, white oak leaves are five to nine inches long and three to four inches wide, and have seven to nine finger-like rounded lobes. Some trees of this species have leaves which are more deeply cleft than others. The most extreme form has what might almost be called skeleton leaves. In autumn the foliage is less colorful than when it first comes out in the spring. Turning at first dark purple or reddish-brown, it later becomes a dull dun brown as the leaves hang on the tree all winter. For white oaks are especially tenacious of their leaves, and on younger trees, particularly in the South, the old ones cling until just before the new crop comes out. In fact, the saplings of all classes of trees hold on to their leaves longer than do the older specimens.

The white oak flowers open when the leaves are about one-third grown. The light brown shining acorns are three-fourths of an inch to one inch long; the little cup encloses about one-fourth of the nut.

The Post Oak

The "cross-leaf" oak, is the way some people identify the post oak. The leaves do furnish an easy means of identification, for seldom is the tree without them. They turn brown

in the autumn, and usually remain on the tree through the winter and into early spring.

These leaves have five large, roundish or squarish lobes. The lower lobes are smaller than the others, and, taken together with the terminal and the two upper ones, form somewhat the shape of a cross. The sinuses, or clefts—the spaces between the lobes—are large and broad. Full-grown leaves are usually six to nine inches long. Coarse, stiff, dark green and shining above, they are lighter beneath and coated with rusty-brown hairs, star-shaped under the microscope, which give the tree its scientific name of *stellata*—which means "star-shaped."

In winter the clustered buds at the ends of the twigs are also covered with rusty brown hairs—another way of identifying the tree. The pollen-bearing flowers are in drooping clustered catkins; the seed-producing ones are very inconspicuous.

Smaller than most of the acorns of the white oak group, those of the post oak are about one-half inch long. The nuts are enclosed for about a third or a half of their length in shallow cups covered with pale, thin scales. These cups are sometimes, but not always, stemless; when so, the acorns are often crowded on the ends of the twigs.

Pioneers Named It "Post Oak"

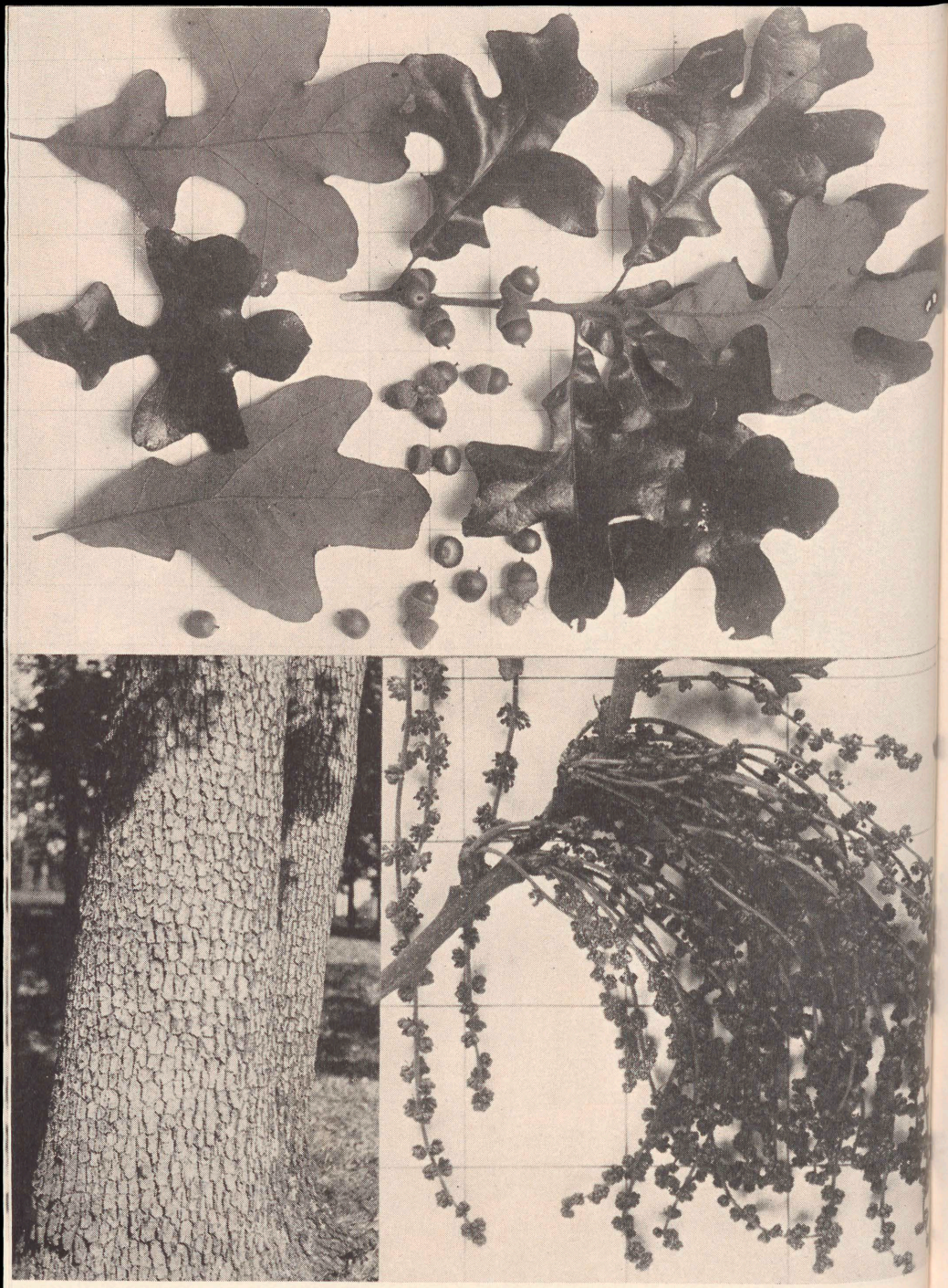
The bark, somewhat similar to that of the white oak, but rougher and darker, is broken into smaller scales. The light to dark brown wood is very heavy, hard, and close-grained, and is durable in contact with the soil. In early days it was used largely for fence-posts—hence its common name; later for cross-ties. Today it is too valuable for such uses, and when large enough to cut, its wood is often classed as white oak lumber.

Although the post oak is found as far north as Massachusetts, it occurs there usually only as a small tree or a shrub. It is really a southern tree, extending to Florida and Texas. At medium size, it commonly reaches a height of fifty to eighty

By L. W. Brownell

POST OAK (*Quercus stellata* Wang.)

Because early settlers liked the wood of this oak for fence posts, they called the tree post oak.



Sometimes called "cross-leaf oak" because of the cross formed by the upper lobes of the leaves, which are thick and coarse; bark slightly darker than that of white oak. Compare checkering of this bark with white oak's. Measure sizes of leaves, flowers, fruits by the one-inch squares. (Post Oak.)

feet and a trunk diameter of one to two feet. In the lower part of the Mississippi Valley it becomes much larger. Locally, some specimens in Chapel Hill, North Carolina, have attained very large size. In Texas it is one of the most common trees of the forest. Though it does well in rich soil, it is also abundant in the poorer soils of the piedmont, and is one of the most common trees of the sandhill region of the South.

Because the post oak is not always attractive in appearance, it does not serve well for street or ornamental planting. It may develop an ungraceful form; and the heavy, crooked branches sometimes extend horizontally.

"Margaretta" Oak

This "scrubby post oak," a variety of the foregoing species, is a small southern tree, sometimes little more than a shrub. It occurs in dry, sandy soil from the sandhills to the sea, from Virginia to Florida, and is one of the most conspicuous of the sandhill oaks. It differs from the post oak mainly in its smaller size, smaller leaves, and reddish-brown slender twigs.

The Overcup Oak

Taking the name "overcup" from the small, button-like acorn, this oak is also known as swamp post oak. It is a medium to large-sized tree with small, often drooping branches. Occurring in river swamps and rich low grounds of the coastal plain and to some extent inland as well, it is found from Maryland to Florida, and west to Missouri and Texas. Nowhere is it abundant.

The irregularly lobed leaves are seven to nine inches long and one to four inches broad, narrow at the base, widest through the upper side lobes. They are dark green above, whitish beneath, often turning a bright scarlet in the autumn. The flowers open in April with the unfolding leaves.

The rough, flaky, gray bark is tinged with red, and the heavy, hard, strong, and durable wood is used for the same purposes as that of the white oak. The swamp post oak is closely related to the post oak.

The Chestnut Oaks

There are two of these oaks, the rock chestnut and the swamp chestnut, also called basket oak and cow oak. They are closely related to each other and are very similar in appearance.

The rock chestnut oak is more often called merely chestnut oak. Ranging from southern Maine and Ontario southward along the mountains to Alabama and Georgia, it reaches its greatest size in the Alleghenies. It is the smaller of the two trees and is a piedmont and mountain tree, confined to upland soils and preferring rocky or mountain ridges. In our southern mountains it is one of the most abundant trees and the largest specimens are found there. From the mountains this tree extends eastward into the piedmont, but becomes scarcer and smaller as it goes.

The leaves of both of these chestnut oaks are rather similar to those of the chestnut (that is what gives them their common names) but, belonging to the white oak group, they lack the bristly points that the real chestnut leaves have. The rock chestnut oak's leaves are oblong, five to nine inches long, scalloped or irregularly waved on the margin. They are a lustrous, yellow-green above, paler and slightly downy beneath.

The oval, shiny brown acorn is enclosed half its length in the cup, both together measuring about an inch to an inch and a half in length. The sweet kernel is eagerly eaten by squirrels. The dark, thick, reddish-brown bark is deeply divided into broad, rounded ridges, and, since it is rich in tannin, is of high commercial value.

Heavy, strong, and durable in contact with the soil, the close-grained wood is similar to that of other upland white

By L. W. Brownell

ROCK CHESTNUT OAK (*Quercus montana* Willd.)
One of the handsomest and most abundant oaks of our southern mountains.

Long, chestnut-like leaves give tree its common name, but note margins lack the spines of the chestnut leaf. Picture shows well the warty character of acorn cups of white oak group. Bark deeply divided into broad, rounded ridges; of high commercial value for tanning. (Rock Chestnut Oak.)

oaks. Its very hardness gives it the name rock chestnut oak. It is used for heavy timber construction, fence-posts, and cross-ties.

Swamp Chestnut Oak

This, the larger of the two chestnut oaks, is a fine tree of the low grounds of the coastal plain, growing on the borders of watercourses and on lands often inundated. It also extends inland into the piedmont. It ranges from New Jersey and Delaware southward to Florida and Texas, and up the Mississippi Valley to Arkansas and Illinois. Sometimes it attains heights of about one hundred feet and a trunk diameter of four feet. In the South this oak takes the place somewhat of the swamp white oak of the North. Some consider it the southern representative of the swamp white oak.

The oval leaves are four to eight inches long and broader toward the tip than are those of the other chestnut oak. One forestry student distinguished between them by saying the swamp chestnut leaf was "short and stout" and the other, "longer and slenderer." The margins of both are similar. In the fall these leaves turn rich crimson.

The dark gray bark on old trees is broken into broad flakes or rounded ridges. The acorn has a shallower cup than that of the rock chestnut oak. Because the acorns are frequently eaten by cows, the tree is sometimes called cow oak; and because its wood is used extensively in making baskets, it is called basket oak.

This wood is also heavy, hard, tough and strong, close-grained, and capable of taking an excellent polish. It is used in manufacturing lumber, veneer, cooperage, fencing and fence-posts, cross-ties, and baskets.

The yellow chestnut oak is a closely related form in which the tips of the leaves are sharper. Very similar to this is the chinquapin oak, or scrub chestnut oak, a shrubby tree with

smaller leaves and deeper acorn cups with thicker warty scales.

The Bur, or Mossy Cup, Oak

"The oak with the mossy acorn cup," is the way the bur oak is sometimes described, especially by children who are partial to this tree.

"An oak with wings," is another way that people remember the tree, for, like the sweet gum and the winged elm, this oak also sometimes has corky layers, or "wings," on its young branches.

In the southeastern states the bur oak is an unfamiliar tree, the South's claim upon it resting on the fact that it grows in the more western of the southern states—in Oklahoma, Arkansas, and northern Texas. It is also native in parts of Kentucky and western Tennessee.

However, the tree is best known, and reaches its greatest size and perfection, in the rich bottomlands in southern Indiana and Illinois, and in the magnificent forests of the Wabash. Though its average height is around eighty feet, in those localities it sometimes becomes a fine old sovereign of one hundred and forty to one hundred and seventy feet, with a diameter of six or seven feet. Growing from Maine to Manitoba and the foothills of the Rockies, and dipping down the Mississippi Valley to northern Texas, it also has the distinction of ranging farther into the northwestern part of our continent than any other of the trees of the white oak group of eastern North America.

"Oak Openings"

Rugged and picturesque, somewhat wayward in growth, with great shaggy, gnarled trunk and branches, the bur is a kingly oak indeed. Sometimes the boughs are so long they bend down to the ground, forming "living arches," that make

Courtesy U. S. Forest Service

SWAMP CHESTNUT OAK (*Quercus prinus* L.)

This is the chestnut oak of the coastal plain of the South, extending well into the piedmont. This particular tree is in Franklin County, Mississippi.

Oval leaves broader toward the tip than those of the rock chestnut oak; bark dark gray, on old trees broken into broad flakes of rounded ridges; acorn cup covers one-third to one-half or more of the nut; leaves scalloped or irregularly waved on the margin. (Swamp Chestnut Oak.)

wonderful "green cathedrals," playrooms, or hiding places for children.

Out on the Iowa prairies, where I lived for a time as a small child, we sometimes picnicked in the famed "oak openings" of these trees. Wild gardens of the blue asters, golden sunflowers, and pink prairie roses that grew in the rich black earth held something of the beauty and the mystery of the early, unplowed land.

So many things are distinctive about the magnificent bur oak that no one who lives within its natural range should be unfamiliar with the tree. The three main characteristics are its mossy acorn cup, its "wings," and its unusual leaves. Although the lobes in the leaves vary greatly, somewhere about the middle of each leaf are two opposite clefts, or sinuses, that extend almost to the midrib and nearly cut the leaf in two. In size the leaves are from three and one-half to twelve inches long, and from three to six and one-half inches broad. When mature they are bright shining green, thick and leathery; on the under side they are paler and covered with a velvety down. The short petioles are also covered with this down. In fall the leaves turn yellow, or yellow-brown.

The acorns, too, vary greatly in size and shape. In general they are rather large (the scientific name of the tree, *macrocarpa,* means "large fruit") and may be anywhere from three-fourths of an inch to two inches in length. Along the margin of the cup the tips of the scales are extended, forming a fringe-like or "mossy" border.

The deeply furrowed and scaly bark is light gray-brown; the wood is heavy, strong, close-grained and very durable. It has much the same uses as that of its close relative, the white oak.

In its natural range the bur oak is much used as an ornamental and a shade tree. As it transplants easily, grows rapidly, and has a rugged beauty and picturesque form, it should be more widely used.

The Live Oak

With his gnarled old arms, and his iron form,
Majestic in the wood,
From age to age in the sun and storm,
The live oak long hath stood.
With his stately air, that grave old tree,
He stands like a hooded monk,
With the gray moss waving solemnly
From his shaggy limbs and trunk.
And the generations come and go,
And still he stands upright,
And he sternly looks on the woods below,
As conscious of his might.

—HENRY R. JACKSON.

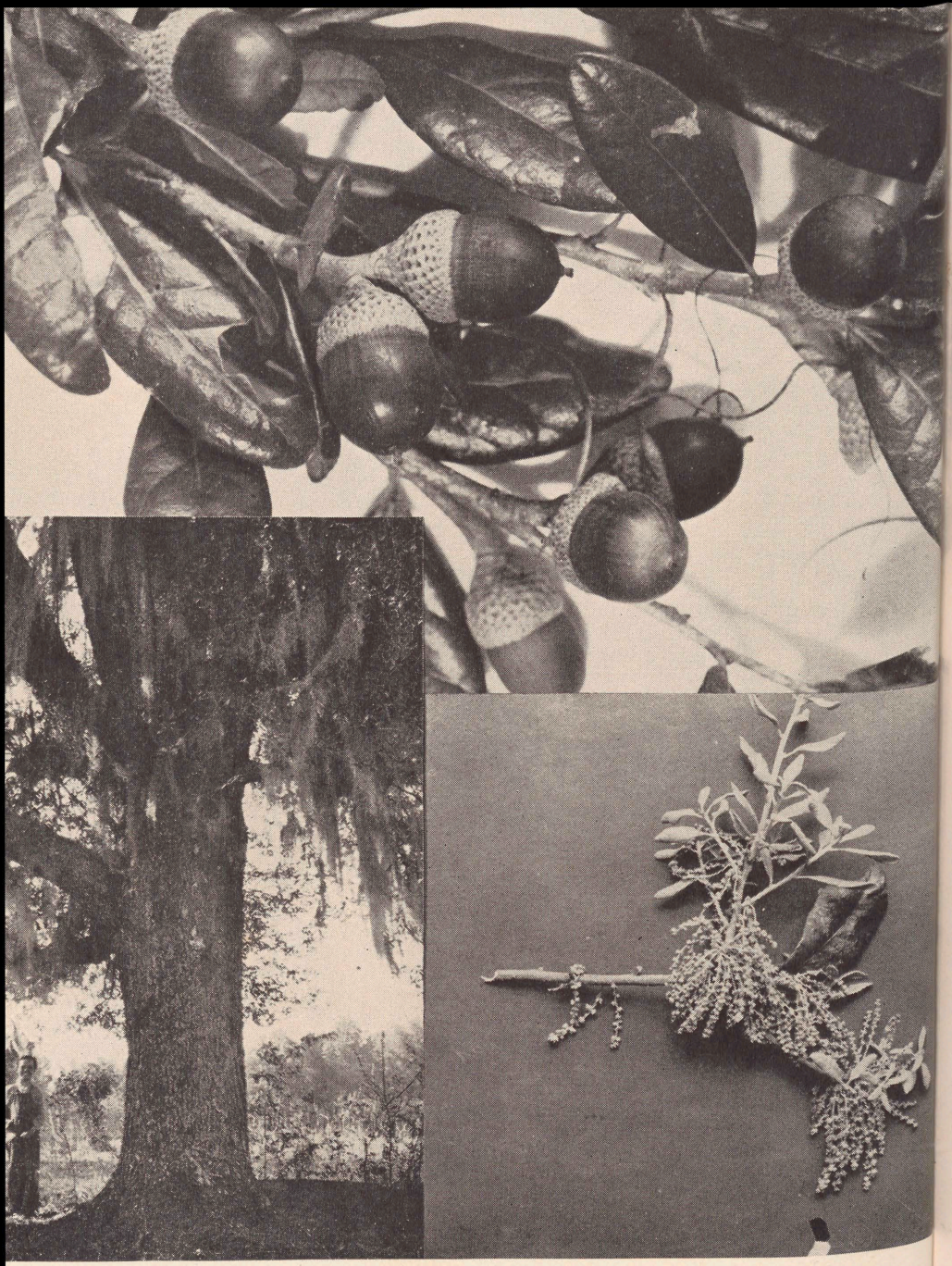
"Four ships of war for the purpose of protecting American commerce against the attacks of Algerian pirates." This order, given in May, 1794, turned the attention of the young American government to the value of live oak trees in the naval program. Indirectly, it led to the passage of one of our first official forestry recommendations: "Every precaution should be taken to secure to the United States a lasting fund of Live Oaks for future use." And so in Georgia, and later in Florida and in Louisiana, when these territories were acquired, lands with timber suitable for ship-building were taken over by the young republic.

Why were the live oaks so important to our ships, especially to our young navy that was so valiantly fighting Algerian pirates? It was because of the "knees" of these sturdy trees. "Knees" in this connection has an entirely different meaning from the "knees" of cypress. Those of the live oaks were used to brace the sides of the wooden vessels of that day. They were the angular sections of wood taken from the part where the great, massive limbs join the short, stout trunk. Here there are formed "natural joints" which are much stronger than any artificial ones a shipbuilder could make.

By J. Horace McFarland

LIVE OAK (*Quercus virginiana* Mill.)

In Audubon Park, New Orleans, Louisiana. Often draped with Spanish moss, this is the majestic oak of the Deep South.



Small, thick, evergreen leaves, usually without teeth or lobes; acorns oblong, borne on short or long stalks, and annual; trunk branches low, forming the famous "knees" used in ship-building of former days; bark dark brown with reddish tinge and slightly furrowed. (Live Oak.)

For generations the live oaks of the South furnished such joints to brace not only the ships of our own navy, but many another ship that sailed the seven seas. And then, in later years, came increased use of iron and steel in ship construction, and with it began the decline in the use of these knees. No longer was there any great demand for live oaks. The short trunk and great, strong branches which had made the tree so important to the world for long years did not make good lumber. From a lumberman's point of view, a good timber tree is one that grows straight and tall, branching only at the top. Moreover, the wood of the live oak is very difficult to work.

And so gradually the vast tracts of live oak stands which had been set aside as naval reserves were neglected and forgotten. Squatters moved in and took up some of the land. Eventually most of these forest tracts were ceded by the Department of War to the Department of the Interior.

Distinctive Tree of Deep South

But aesthetically, as an ornamental tree and as a part of the landscape of the coastal plain and of the Deeper South, the live oak is still very important. Imagine for a moment a South without this familiar moss-hung tree! More and more as one gets into the South does it appeal.

On a recent trip along the Old Spanish Trail westward from New Orleans we noted thousands of these picturesque trees. Later, from a live oak enthusiast of Louisiana, we learned that there are, by actual count, 5,230 live oaks along this particular highway on the one hundred and seventy mile stretch that we had traversed. Every old ante-bellum plantation there had its numbers of ancient—and of course locally famous—gnarled, moss-draped live oaks.

To the Southerner this is the tree that instinctively comes to mind when he reads the following lines from Longfellow's *Evangeline:*

"Bearded with moss and in garments green, indistinct in the twilight
Stand like Druids of old with voices sad and prophetic,
Stand like harpers hoar with beards that rest on their bosoms."

Even though the trees this poem refers to were *not* live oaks, nor even southern trees, but pines and hemlocks from far-away Canada, the lines are still appropriate. Indeed, the South has every right to connect them with its own bearded live oaks. For it was under such a tree, on the Bayou Teche in the Acadian land of southwestern Louisiana, that the real Evangeline of the poem actually met her long-sought lover, Gabriel. And it isn't legend, but actual history. Longfellow used a poet's license when he changed the place and the manner of meeting in this beautiful Acadian maid's tragic story.

Haunted Beauty

In different lights and at different times of the day these moss-hung oaks take on a variety of aspects. One summer we tried to know them in all their moods. Along dim lagoons and bayous we saw them, sometimes peering over the water's edge at their own fantastic shadows. In the "Land of Evangeline," as the Bayou Teche country is called, we drove slowly under a mile-long avenue of these trees, an avenue planted by slaves over a hundred years ago. On that still, hot day we were grateful for the cool, dark shade of the gnarled, bearded branches which no sunlight could penetrate.

Again, in the haunted beauty of silvery moonlight we walked along the Teche under the eerie black shadows of these trees, and listened to the voices of the night in this remote land. No lapping of waters, as on the shores of northern lakes; no chatter of swiftly flowing mountain brooks, such as we had heard in the Great Smokies a short time before. Silent, still, black, the waters of the Bayou Teche held their own secrets. But from a great live oak came the hoot of an owl; and from

far away the frogs, minstrels of these lonely marshes, seemed to answer.

The live oak is more than a tree of the Deep South. Along the coast and the adjacent islands it extends from southeastern Virginia to Florida, then west to Mexico and inland in Texas and Louisiana. In height it seldom reaches more than forty or fifty, sometimes sixty, feet; but due to its wide-spreading, horizontal branches its spread is sometimes twice as great as its height! Often this spread reaches a hundred, sometimes even one hundred sixty or more feet.

The trunk, short and stout, often buttressed at the base, may be three or four, or seven or eight, or even more feet in diameter. The massive buttresses are probably developed to help support the great spread of the tree. The bark of the trunk and larger branches is dark brown with a reddish tinge, and is slightly furrowed.

Different, too, are the leaves from those of most oaks. In size they are relatively small, only from two to four inches long and half as wide. They are evergreen (unlike most oaks of this region), thick and leathery, oblong in shape, smooth above and pale silvery beneath. Their margins are usually entire. Of the flowers, the more conspicuous are the pollen-bearing catkins, which come out before the new leaves.

The acorns of the live oak, unusually long and borne on long stems, are often edible and sweet. Indeed, some of these trees are said to have nuts as sweet as chinquapins. The Indians used them in many ways—as thickening for their venison soup, roasted and boiled, and cooked with hominy and wild rice. They also extracted from them an oil similar to olive oil and almond oil.

Historic Live Oaks

For roadside and street planting, the live oak never becomes monotonous. Many a town and city of the Deep South is known as a "city of Live Oaks." Memory brings pictures of

some of them to mind: Griffin, Georgia; Mobile, Alabama; and the towns and cities along the famous Gulf Drive—Gulfport, Biloxi, Pass Christian. And ancient trees along the old River Road into New Orleans; on the banks of the bayous, long avenues of them leading to the "big house" of old plantations.

There is hardly a community in the lower part of the South which does not have a "famous" or "historical" live oak around which tradition, if not actual history, has grown. In Georgia, on St. Simon's Island, is the live oak under which the Wesleys preached. In Florida is the "De Soto Oak" under which the Spanish conquistador is said often to have rested. In New Orleans are several famous live oaks, including the "duelling oaks" under which the young bloods of Creole days used to fight to "defend their honor."

In the Middleton and Magnolia Gardens on the Ashley River, near Charleston, South Carolina, are some very beautiful as well as large and ancient live oaks. And on the old River Road to these gardens one passes under an arched avenue of these moss-draped trees.

On a tributary to the Neuse River, near Oriental, North Carolina is "Teach's Oak." Teach, or Blackbeard, as he is better known, used this tree as a rendezvous for himself and crew, and tradition says that some of his ill-gotten treasure was buried beneath it. Repeated diggings, however, have failed to disclose this booty.

Although in the Upper South the natural range of the live oak is only along the coastal region, it makes a fine ornamental tree in cultivation and is hardy and thrifty inland at least as far west as Greensboro, North Carolina. An interesting story is told by Miss Hattie Parrott of how one of these inland trees was planted—the famous "Kinston Oak" which is the only live oak in the county.

During the coastal warfare of 1812, some soldiers had come inland on scouting trips, sailing up the Neuse River as far as

Kinston, North Carolina. They camped on a hill about two miles above the river, and while there buried a quantity of live oak acorns which they had with them. At least one little acorn grew and the seedling flourished. Today this great live oak, cherished and protected by the community, stands, a living, ever green monument to those "Boys of 1812" who had camped there. How much better monument is a green, living tree than a cold shaft of marble!

Live oaks! They are as much a part of the coastal region and of the Deep South as are the "marsh and the sea and the sky" of which the poet of "The Marshes of Glynn" wrote:

O braided dusks of the oak and the woven shades of the vine,
While the riotous noon-day sun of the June-day long did shine
Ye held me fast in your heart and I held you fast in mine.

—SIDNEY LANIER.

The Black Oak Group

"O-ho!" laughed the sturdy oak;
"The life of the field for me.
I weather the lightning stroke;
My branches are broad and free.
Grow straight and slim in the wood if you will,
Give me the sun and the wind-swept hill."

—SELECTED.

The black oak group contains about half of the American oaks and includes a number of important forest trees. Members of this group are easily distinguished by their bristle-tipped leaves, which are nearly as smooth below as above. As a rule the bark of these trees is darker than that of the members of the white oak group. The acorns require two years to mature (those one year old may be seen on the trees in winter), and they have bitter kernels. The inside of the acorn shell is hairy.

To this group belong the red, the scarlet, the southern red, the black, the willow, the water, the black jack, the shingle, the

laurel, the turkey, and the pin oaks, besides several other lesser-known ones.

The Black Oak

Easy to identify is the black oak, for on older trees the bark is nearly black, the inner bark (scratch between the furrows with a pen-knife) is yellow, and the winter buds are covered with down.

In the early days, and again during the World War when foreign dyes were difficult to obtain, this inner bark was prized because of its dye properties. Some of the khaki cloth that clothed our soldiers was colored with the inner bark of the black oak.

As this is being written, on a day in mid-April, the black oak in our yard is a misty tremulous mass of beauty. The young leaves are rose-red covered with silvery, silky hairs, and the flowers, like yellow beads strung on short strings, toss with every passing breeze.

When full grown the leaves are dark, glossy green above, paler beneath, with conspicuous brown hairs where the principal veins branch. They tend to vary greatly in size and shape, measuring from five to ten inches long and from three to eight wide. They may be either shallowly or deeply lobed, and are always bristle-tipped.

The light brown acorns are from one-half inch to an inch long, and are from one-half to three-quarters enclosed in the thin, dark red-brown, scaly cup. The yellowish kernel is extremely bitter.

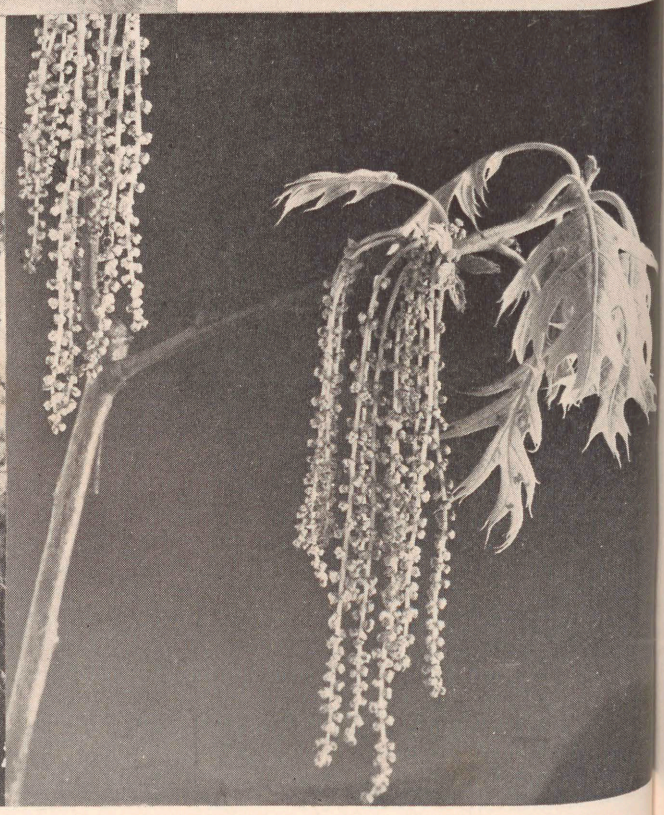
The wood of this oak is hard, heavy, strong, and coarse-grained. Its color is bright brown tinged with red, with paler sapwood. It is used for the same purposes as red oak, and is marketed under that name.

Slow growing, the black oak usually averages about seventy or eighty feet in height with a trunk diameter of one to three

Courtesy U. S. Forest Service

BLACK OAK (*Quercus velutina* Lam.)

Although a handsome tree, it is less resistant to breakage and disease than many oaks, and so is not desirable for planting.



In black oak group leaves have bristle-tipped lobes and acorns take two years to mature; usually bark is darker than in white oak group and nuts are bitter. Black oak is only oak with inner yellow bark; leaves usually broadest across upper lobes; outer bark nearly black. (Black Oak.)

feet. It is found throughout the South from the mountains to the coastal plain, and from Florida and the Gulf Coast to Texas. It is common in the lower mountains, abundant in the piedmont, and increasingly rare near the coast.

The Red Oak

The red oak, one of the handsomest and stateliest of our oaks, reaches an average height of about seventy feet and a trunk diameter of two to three feet.

There are two distinctive features about this oak: the large acorn, with its shallow cup enclosing only the base of the nut; and the rather smooth bark. Even in old age the bark of the trunk, though thick and broken into small plates, is never extremely rough; that on young stems is always smooth and light gray.

Like those of the black oak, the leaves vary and are of two typical forms. One form is much broader than the other, and has shallower clefts. The narrower and more deeply cut type is perhaps the more common. In size, both types are from five to nine inches long and four to six inches wide, with the greatest breadth towards the tip. When full grown they are firm, dull green above, paler beneath, and in the fall often turn a brilliant red.

The red oak is one of the most important timber trees of eastern North America. Because it is generally free from insect and fungus attacks, grows rapidly, and produces high-grade wood, it is widely planted both for timber production and as a shade and ornamental tree in the upland parts of the South. It has wood that is strong, hard, and coarse-grained, in color light reddish-brown with lighter colored sapwood. This is used for furniture, interior finish, construction, cooperage, and cross-ties.

The range of this red oak, including both its northern and southern varieties (but not the southern red, or spanish, oak

whose description follows) is wide, extending from Nova Scotia to Minnesota and Kansas, and south to the Gulf. In the South it reaches its greatest size in the mountains from West Virginia through North Carolina to Tennessee and Georgia.

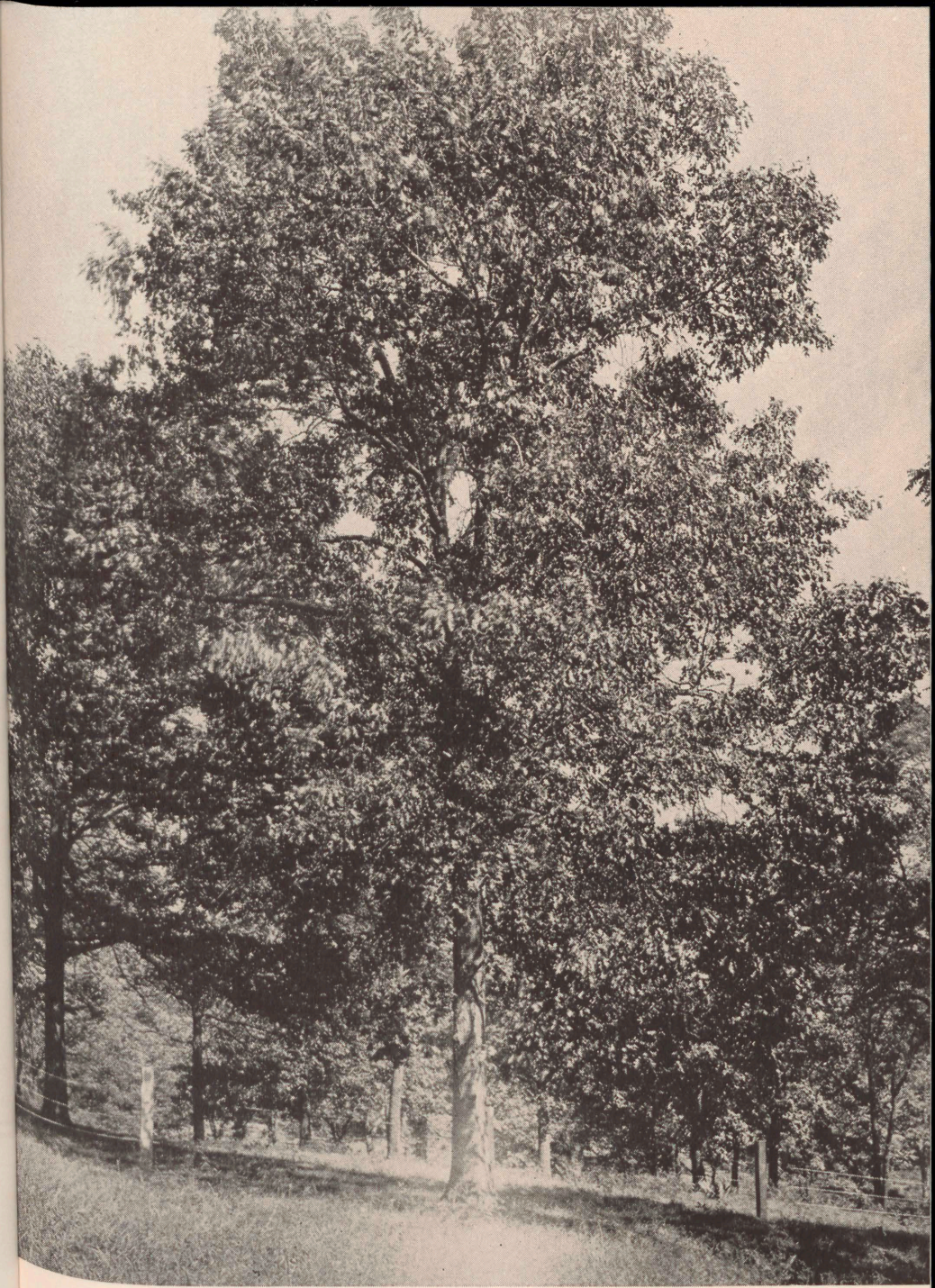
The southern form is found abundantly in good soil in the mountains, sometimes near the edges of low grounds and along streams in the piedmont, and occasionally in the coastal plain.

Though it is sometimes confused with the black oak, the two trees can be readily told apart. The red oak grows nearer watercourses; its leaves are lighter green and smoother; the acorn is larger, with its cup more shallow; and the branches are straighter.

The Southern Red Oak

Formerly, and even yet, often called the spanish oak, this, the official southern red oak, is the easiest of the black oak group to identify. For although the leaves vary greatly, as do those of so many of the oaks, they do not closely resemble any other oak leaves. On the tree, or on the ground beneath if the leaves have fallen, you will be sure to find bristle-tipped leaves with the narrow terminal lobes greatly elongated, and often slightly curved, or sickle-shaped. Once you have recognized them, you will enjoy scuffing dead leaves on the sidewalks or woods, to look for the "leaf with the long narrow lobe." A pleasing "leaf game" is to see who can make the most interesting collection of these particular leaves. Pressed and mounted they make an attractive and informing display. The other typical leaf form is "pear-shaped," with three bristle-tipped lobes at the outer end.

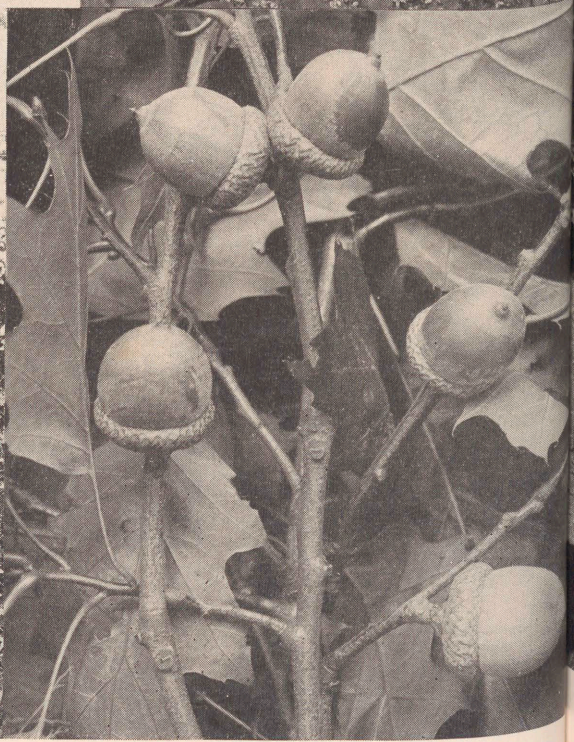
In size the leaves of this species also vary greatly, ranging from five to nearly twelve inches in length. They are dark, lustrous green above and downy-grayish beneath, the two colors presenting a contrast "particularly striking during a



Courtesy U. S. Forest Service

RED OAK (*Quercus borealis* var. *maxima* Ashe)

This oak is a good tree for landscape planting. It is generally free from insect and fungus attacks.



Leaves dull and deep green above; flowering tassels hang in long thick clusters; acorns large with unusually shallow cups; bark comparatively smooth, even on old trees, and though broken into small plates is never extremely rough. Note large number of leaf lobes. (Red Oak.)

Courtesy U. S. Forest Service

SOUTHERN RED OAK (*Quercus rubra* L.)

A fine shade tree of southern plantations, it was formerly called Spanish oak. It is long-lived and not easily subject to decay and disease.

Leaves of unusual form which always aid in identifying this oak—terminal lobe is long, narrow, and sometimes slightly curved. Some leaves are pear-shaped, with but three lobes. Dark gray bark has narrow, shallow fissures. Note, on branch, the one-year-old acorns. (Southern Red Oak.)

rain or wind storm when the leaves are being tossed about."

Opening in April, when the leaves unfold, the female flowers develop into tiny acorns which—as this tree belongs to the black oak group—do not mature until the end of the second season. These, small and rounded, about half an inch long, are set in thin, saucer-shaped cups.

Though not deeply furrowed, the bark is rough and varies from light gray on younger trees to dark brownish-gray on older ones. The wood is heavy, hard, strong, and coarse-grained, and is less subject to decay than that of most of the black oaks. It is used for furniture and rough lumber in construction.

Although this tree appears as far north as certain parts of lower New Jersey, especially around Cape May, it is really a southern species. It is one of the most abundant of our upland oaks, from the low mountains to the coastal plain, as far south as Florida and in the Gulf States to eastern Texas. Distinguished looking, with tall trunk and a broad, open head, it makes one of our handsomest shade trees, and is especially popular in cities and towns of the south Atlantic and Gulf States. Usually it reaches a height of seventy to eighty feet and a trunk diameter of two to three feet.

The Scarlet Oak

The showiest of our southern oaks, and on this account considerably used for ornamental planting, is the scarlet oak. In the autumn the leaves turn a brilliant, glowing scarlet which gives the tree its common name. Such an oak is at the end of our front path. Changing color later than the other trees, it remains a pillar of flame for several weeks in the late fall, and is almost a conflagration when the slanting rays of the westering sun light it up.

Thin, smooth, shining above and paler beneath, scarlet oak leaves are three to six inches long and two and one-half to

four inches wide. Usually they are seven-lobed, the lobes, like those of the leaves of all the black oak group, being bristle-tipped. The deeply-cut, rounded clefts, extending at least two-thirds towards the midrib, give the leaves a graceful, airy appearance.

The acorn is one-half inch to one inch long, light reddish-brown, occasionally striped, and is one-third to one-half enclosed by the cup.

In the mountains of the South the scarlet is one of the most common of the oaks. Even in the rocky hills of the piedmont as far south as Georgia it is still plentiful. In the coastal plain, according to Coker and Totten, it is found mostly in the valleys.

Ordinarily this tree reaches a height of from sixty to eighty feet and a trunk diameter of from two to three feet. The crown is round, the trunk tapers rapidly, and the branches droop at the ends. On young stems and trunks the bark is smooth and light brown; on older trunks it is divided into shallow ridges and is often mottled or spotted with gray. An unfailing means of identification is by the red inner bark. (Again, scratch the bark with a pen knife.) Another means of identification is by the winter buds, which are stout, blunt-pointed and covered with downy hairs from the tip to the middle. Those of the black oak, remember, are downy all over, and those of the red oak are smooth.

The wood is pale brownish-red, and is strong, hard, heavy, and coarse-grained. Though sold as red oak, and having the same uses, it is yet somewhat inferior in quality.

The Black Jack Oak

This tree seems to have got off to a bad start; for a bad name, whether deserved or not, is certainly a handicap. In early days, when only the best timber was considered worth cutting, this tree was passed by. And as it seems to indicate infertile soil, it

Courtesy Arnold Arboretum

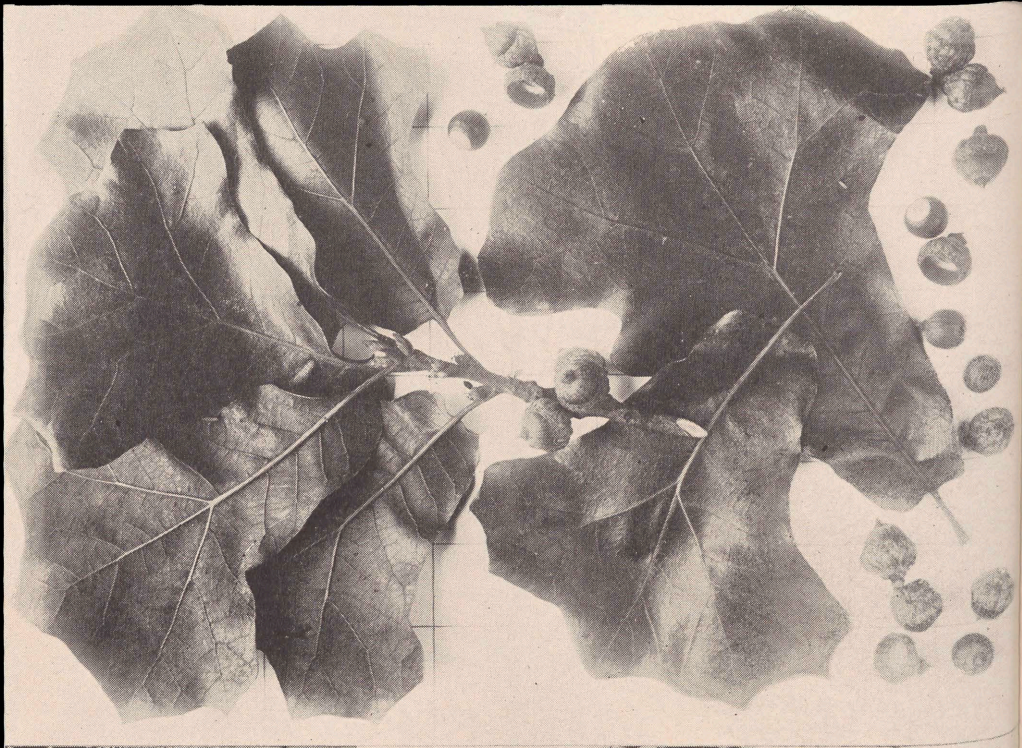
SCARLET OAK (*Quercus coccinea* Muench.)

Attractive in its bare outline of winter and in its scarlet robe of autumn.

Leaves very deeply cut; tassels long and fringe-like; inner bark is scarlet which accounts for tree's common name; acorns vary in size and shape, with distinct grooves around apex of nuts. Compare acorn cups of this picture with those of the rock chestnut oak. (Scarlet Oak.)

Courtesy John G. Hemmer

BLACK JACK OAK (*Quercus marilandica Muench.*)
Though often a knotty, scrubby oak with drooping branches, here is an attractive specimen at Pinehurst, North Carolina.



Thick, leathery leaves are broadest at tip, with indistinct, spine-like lobes; bark dark brown, almost black, and broken into rectangular plates which make it quite characteristic. Note, in both flower and fruit photographs, the young acorns in the leaf axils. (Black Jack Oak.)

may be that people began to think of it as a worthless tree on worthless land.

This common, knotty, scrub oak, often with stiff, contorted branches is plentiful in poor, dry, sandy, or clay soil throughout much of the South, except the high mountains. If the tree clothes sterile grounds, where few other forest trees can thrive, from New York to Nebraska and southward to northern Florida and Texas, who shall say it does not also serve? And today, when wood is fast growing scarcer, the tree is also on that account beginning to be looked upon with slightly more favor.

The black jack grows slowly, probably because it is on poor soil, and seldom becomes over twenty-five or thirty feet in height; occasionally it does reach fifty or even sixty feet. There is little of beauty in its shape as a rule, although occasional specimens are handsome and quite symmetrical. Generally, it is black-trunked, twisted-limbed and spreading. The leaves are leathery, wedge-shaped at the base and broadest at the outer edge. They are dark green above, lighter beneath, and from four to ten inches long, often ending in three indistinct bristle-tipped lobes of variable size and form. They provide the tree with one redeeming feature—its glorious dark red color in autumn.

The acorn is about three-fourths of an inch long, yellow-brown and often striped, and is enclosed for half of its length or more in a thick light brown cup. It matures in the autumn of the second year.

The very dark, often nearly black, bark is rough and broken into small, hard scales or flakes. The wood is heavy, hard, and strong, and is used mainly as firewood.

The Water Oak

The water oak is a tree that grows plentifully along the borders of swamps and streams and in rich low grounds on the coastal plain, and that extends along streams farther inland.

It also occurs to the base of the mountains, but rarely. Distinctly southern, it is known from southern Delaware to Florida and Texas, through Arkansas and the eastern border of Oklahoma to southeastern Missouri, middle Tennessee, and Kentucky. Because it is handsome, fast growing, and easily transplanted, it is considerably used in the South along streets and in lawns and parks for shade. When fully grown it reaches a height of about eighty feet and has a shapely trunk with a diameter of from one to two feet.

The glossy, blue-green leaves are quite variable in shape, but are mostly oblong, broader near the tip and narrower and wedge-shaped at the base. Sometimes they are entire; more often they are slightly three-lobed at the outer end. They are generally smooth, from two to four inches long, and from one to two inches wide. Water oak foliage remains green longer than that of most oaks. Many trees even hold their color until Christmas time.

The squat acorn, about one-half to two-thirds of an inch in length, is light brown and often striped. It is enclosed at the base in only a thin shallow cup. The rather oblong nut is rounded at each end.

The grayish bark is furrowed with narrow ridges, with many smooth, thin scales over the surface. The heavy, hard, and strong wood is little used as lumber, but finds service as piling, cross-ties, and fuel.

The Willow Oak

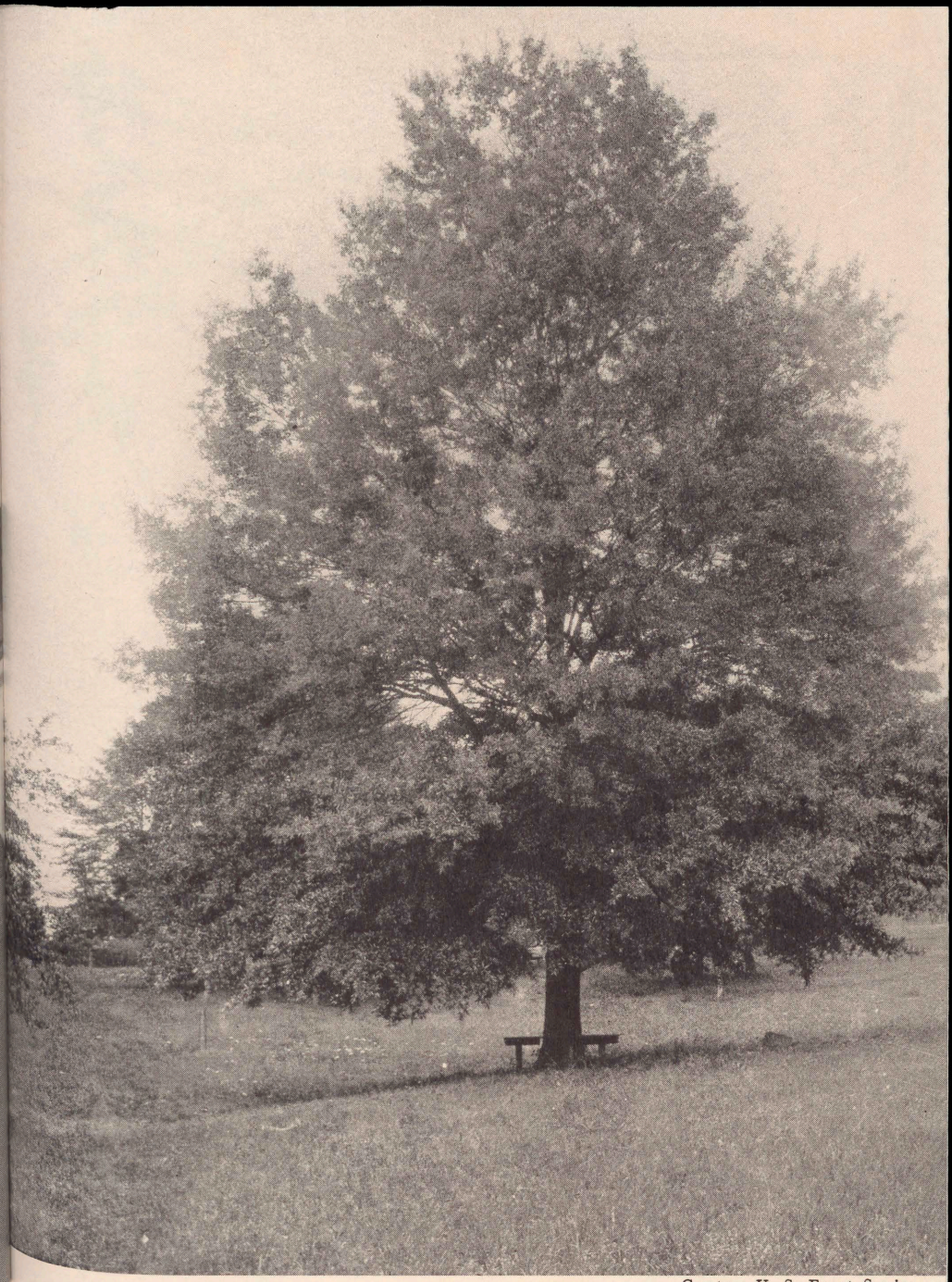
Willow-like in many respects, this oak is true to its name. The long, narrow, unlobed leaves are much more like those of the willows than of the other oaks, and the straight and slender shoots resemble those of the willows. Also it has the same habit of growing along borders of streams and swamps. It even hybridizes very freely, another willow-like trait. But if you think it may be a willow after all, the bristles on the tips

By J. Horace McFarland

WATER OAK (*Quercus nigra* L.)

A favorite shade tree of the South. It is quick-growing, easily transplanted, and does well in cultivation.

Shining, leathery, blue-green leaves are variable, for though all are broadest at the apex, some are entire while others are lobed at the tip; acorns small with flat, shallow cups; bark grayish and rather smooth for an oak. The male flowers above are only half-grown. (Water oak.)



Courtesy U. S. Forest Service

WILLOW OAK (*Quercus phellos* L.)

Another popular shade tree of the South. As an ornamental tree it has few equals. It is larger and longer lived than its close relative, the water oak.

Long, narrow leaves suggest a willow rather than an oak; acorns small in flat, shallow cups; bark generally smooth and reddish-brown, though on older trees it becomes rough and scaly. Note in top photograph both kinds of flowers among the narrow unrolling leaves. (Willow Oak.)

of the leaves and the acorns on its branches will quickly point out your mistake.

The range of this oak extends from southern New York southward east of the mountains to Florida and Texas, and up the Mississippi Valley to Arkansas, Tennessee, northwestern Kentucky, and Illinois. In the South it is a common tree of the low watercourses of the coastal plain, but is less common in the piedmont.

Graceful and quick-growing, yet beautiful and long-lived, it is very desirable for roadsides, lawns, and streets, and has been widely planted throughout the South as a shade tree. The smooth, glossy, slender leaves are light green above, duller and paler beneath and sometimes slightly hairy. They are from two to four inches long and one-half inch to one inch wide. Their margins may be slightly wavy.

The small acorns, about one-third of an inch thick, are set closely along the stem in shallow flattened cups. They are eaten by blue jays, grackles, several other birds, and by squirrels and chipmunks.

The bark is generally smooth and reddish-brown; on older trees it becomes rough and scaly and is divided by narrow ridges. Commercially the wood is sold with other lumber of the black oak group. It is heavy, strong, rather coarse-grained, and pale reddish-brown. It is used for cross-ties, bridge planks, and general construction.

The Shingle Oak

Because the wood of this oak splits easily for shingles, the early French colonists of Illinois are said to have named it shingle oak. Many of their cabins were roofed with hand-wrought shingles from this tree.

More a tree of the mid-continent than of the East, the shingle oak grows from Pennsylvania to Michigan and Wisconsin, south to Arkansas, Georgia, and Alabama. In some places

within its range it is fairly abundant; in many other sections it is rare. In the South it is a small tree occurring along fertile bottomlands of streams and good soil in the mountains.

The leaves of this species are entire, oblong, deep green and shining above, about three to six inches long. The acorns are small; the cup encloses the nut for about half its length. The bark is light brown and scaly. Although not an important tree of the forest, the shingle oak produces a considerable amount of good quality wood. And as the tree has an attractive form, shining green foliage, and is beautiful at all seasons, it is recommended for ornamental planting.

The Laurel Oak

Another beautiful little southern oak, nearly evergreen, and closely related to the shingle oak, is the laurel oak. It occurs in moist woods and along streams in a rather narrow strip near the coast from Williamsburg, Virginia, southward to Mississippi and Louisiana. It is more widely distributed in the coastal plain of Georgia and Florida than in the other parts of its range.

Thick, laurel-like and lustrous, usually without lobes but sometimes with a few notches, the leaves are about one and one-half to three inches long, and one inch or less broad. The acorns are small, with cups flat and saucer-shaped. As these acorns are produced in great abundance, the tree spreads rapidly in good soil.

In appearance this oak resembles somewhat both the willow and the water oaks.

The Pin Oak

If we can claim Washington, our national capital, as a southern city, we can certainly claim the pin oak as belonging to our southern trees, for some of the capital's most beautiful

By S. A. Grimes

LAUREL OAK (*Quercus laurifolia* Michx.)

A handsome specimen of this oak, with nearly evergreen foliage, in eastern Florida, where it reaches its greatest size.

Leathery, laurel-like leaves give this tree its name; acorns small in flat cups and produced in great abundance; bark on old trees almost black, divided into broad flat ridges. In lower photograph pollen-bearing tassels crowded on the twigs are not yet fully opened. (Laurel Oak.)

Courtesy U. S. Forest Service

PIN OAK (*Quercus palustris* Muench.)

When young and growing in the open, this oak is a graceful, pyramidal tree. Though rare as a native tree in most of the South, it is often planted for ornament. Note the drooping lower branches.

Leaves small, deeply-cut, with long, bristle-like tips; acorns small, cups covering about one-fourth of nut; tree gets its common name from the numerous small, pin-like twigs scattered on its branches. Note young, half-grown pollen-bearing tassels in upper photograph. (Pin Oak.)

streets are planted with this oak. As a rule, however, this tree is both rare and local in the South, where it is found in swamps and low grounds. Because of this liking for low places, it is also known as the swamp spanish oak.

The pin oak is one of the most attractive of the oaks, and has found much favor as a planted tree for shade in lawn and park. Though not so large as the other oaks, it grows rapidly and produces valuable wood. When young and grown in the open, its pyramidal form is easily recognized, for the trunk is continuous to the top. The lateral branches are rather short and slender, the lower ones inclined to droop, sometimes almost to the ground. A characteristic of the tree, which accounts for its common name, is its possession of tiny pin-like twigs which are set thickly along the branches. This always helps in its identification.

The leaves are very similar to those of the scarlet oak, but are less lustrous. They are from four to six inches long and have from five to seven lobes, each ending in a long, slender bristle. The clefts extend well in towards the midrib. In summer the leaves are dark, shining green above, paler beneath. In autumn they turn deep scarlet.

Light brown-streaked nuts are set in thin, saucer-shaped cups. The kernels are very bitter, and only when food is scarce are they eaten by squirrels and other hungry creatures.

The pale, steely-brown bark is generally smooth but is sometimes scaly. The wood is heavy, strong, and coarse-grained, and is occasionally used in construction.

The Turkey Oak

An abundant and characteristic small tree throughout practically the entire sandhill region of the South is the turkey oak. A tree of "poor soils," it is found on dry, sandy ridges, and on bluffs and hummocks. Growing wherever the long-leaf pine

thrives, this tree extends from southeastern Virginia to Florida and west to eastern Louisiana.

On the average it reaches from twenty to thirty feet in height, but occasionally rises to sixty feet. Its stout, spreading, more or less contorted branches form an irregular round-topped head.

This oak takes its common name from the shape of its leaf, which is supposed to resemble a turkey's foot. This leaf is rigid, with two or three long-pointed lobes deeply separated by wide, rounded clefts. It is the short, twisted petiole which holds the leaf rigidly at a right angle to the ground. By some botanists this is supposed to be an adaptation of the leaf so that it will reflect less heat from the sand.

The acorns, about an inch long, have a dull, light brown color, and are enclosed for about one-third their length in the cup. The bark, dark gray tinged with red, and on old trees becoming nearly black, is deeply and irregularly furrowed. The wood is heavy, hard, strong, and rather close-grained. It is used largely for fuel.

The Blue Jack Oak

Another common and small oak of the sandhills which grows in company with the turkey oak and the long-leaf pine is the blue jack, or upland willow, oak. Especially in the drier pine flats of the coastal plain and down to the seashore is it found playing a modest role in the dwarfed vegetation of the exposed dunes.

The leaves resemble somewhat those of the willow oak, but are smaller and gray-green, and decidedly whitish-downy beneath. The acorns are small, rather flattened, and set in a shallow cup.

In places, this species and the Margaretta oak make up much of the smaller tree growth of the sandhills.

Courtesy John G. Hemmer

TURKEY OAK (*Quercus Catesbaei* Michx.)

Picturesque twin oaks, with long-leaf pines in background, at Pinehurst, North Carolina. This is the dominant oak of the sandhills region.

Leaves thick and stiff, petiole, especially on seedlings, so twisted that leaf is edgewise to sun and hot sand; medium-sized acorns show stripes plainly; bark deeply furrowed. Discolored spots on leaves caused by small beetle living inside leaf, eating away tissue, but not breaking through. (Turkey Oak.)

CHAPTER X

THE ELM FAMILY
(ULMACEAE)

The Elms (*Ulmus*)

In full-leaved majesty, primeval gladness,
The broad elms tower above the village street;
They draw from sun and cloud and earthly stillness
Their nurture and their life with years replete.

—IRENE PUTNAM.

"The Wonderful One-Hoss Shay" of which Holmes wrote was made in part of the wood of elm. Hard, strong, tough, and difficult to split, this wood made excellent hubs for wagons and carriages. Tradition says the ancient warriors of England carried long bows made of the tough British elm, although it is generally believed the majority of them were made of yew.

There are eighteen or twenty species of elms in the world, and three of the more important ones are found native throughout a large part of our country. Besides the American, they are the slippery and the rock elm. In the South, in addition, there is a smaller but common species, the winged elm. In this country there are also some imported species of elms which are rather widely planted.

The American Elm

Our American elm is the famous shade tree of New England. To realize the full beauty, grace, and stateliness of these trees, one should know the elm-lined streets of innumerable New England villages and cities. Our national capital also has many

beautiful elm-shaded streets, which add greatly to that city's charm and beauty.

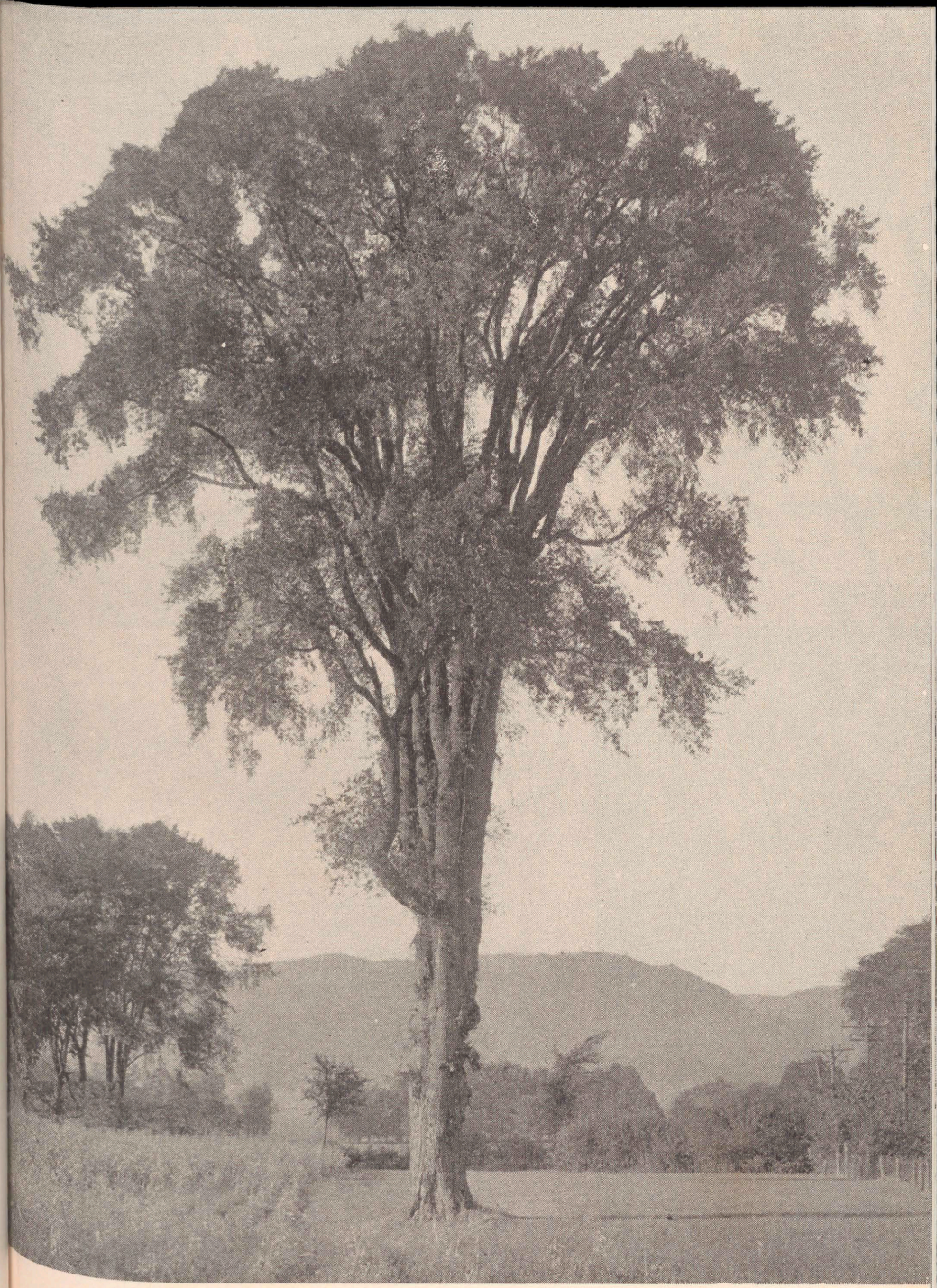
Though this elm is not as common in the South as in the North, its range extends from southern Newfoundland westward to the northern shores of Lake Superior and the eastern base of the Rocky Mountains, and southward to parts of Florida and Texas. Farther south it becomes a smaller tree. This range covers some 2,500 miles in both directions; but within this area there are many places where the tree does not grow. In the South, it seems to be plentiful in low grounds, preferring the neighborhood of rivers and extending throughout the coastal plain and into the piedmont of all our states except Florida, where it is uncommon.

Graceful at All Seasons

For lawns, roadsides, or parkway plantings few trees can equal this elm. Its graceful, slightly drooping branches, its splendid foliage, and its delicate leafless silhouette against a wintry sky create beauty at all times of the year. There is never a season when an elm is uninteresting or unattractive.

Although their average height is sixty to seventy feet, with a trunk diameter of four to five feet, elms have been known to attain a height of one hundred and twenty feet. At about one-third of the way up, the trunk usually divides into from two to five branches which grow upward and outward, giving the tree an Etruscan vase-like form, the most graceful of all tree forms.

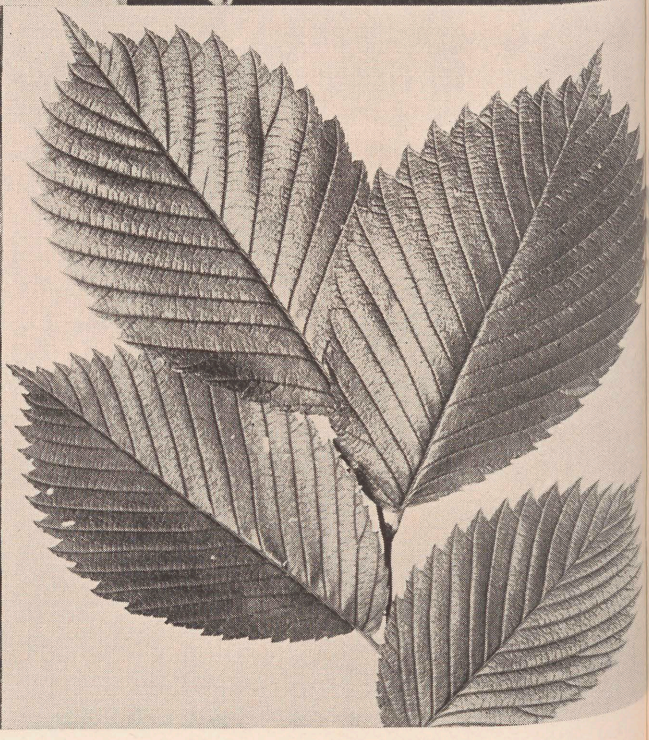
Though this is the usual outline, the American elm may assume several different shapes, all of which are graceful and interesting. Sometimes its growth takes the form of a simple or compound plume with a rather feathery top. Again, if it is in the open, it occasionally becomes oak-like, with a broad, rounded head. Some elms have the peculiar habit of growing short branches all the way down the trunk, covering it with



Courtesy Massachusetts Horticultural Society

AMERICAN ELM (*Ulmus americana* L.)

America's most stately and graceful tree, now threatened by the Dutch elm disease. Will it follow the chestnut?



Flowers before leaves are out, sometimes as early as January, giving tree a purplish haze; flat, winged fruits, with hairs on margins; leaves very oblique at base, straight veined with double-toothed margins; bark ashy-gray. Note notches in bottom of fruits. (American Elm.)

foliage and making it appear to be entwined with a thick-growing vine.

The bark, ashy-gray in color, is divided into irregular, flat-topped, broad ridges, generally firm, though on old trees it tends to come off in thin scales.

One of the First Trees to Bloom

The elm is really one of the first of the forest trees to bloom, yet so tiny and insignificant are the flowers that many people never even realize that they are present. The bees, wiser than mankind in this respect, get some of their early nectar from these blossoms. With the first warm days of winter, the elm seems to feel that spring has come to stay, and courageously puts forth her blossoms on the topmost branches. This bloom gives a purplish haze to the tree-tops.

The small, perfect, greenish-red or greenish-yellow flowers are borne in loose, feathery clusters on slender, thread-like stems sometimes an inch long. The papery winged fruits, called samaras, are about one-half an inch long, and ripen as the leaves unfold. By the aid of these "wings" the light fruits are widely scattered by the winds of spring. A deep notch opposite the point of attachment helps to identify the one belonging to the American elm.

The pale, tender green leaves as they come out are folded like tiny fans that might belong to the fairies. Simple, alternate, four to six inches long, their bases quite lop-sided or oblique, they are doubly toothed on the margins and pointed at the tip. Their straight veins are deeply sunken. In summer they are dark green and rough above, pale green and smooth below. In autumn the elm foliage turns a golden brown or yellow. Unlike the leaves of the poplars, which flutter almost continuously, the leaves of the elm, because of their very short petioles have little independent motion but move with the branch. However, the slender, delicate branches sway with every passing breeze.

The Winged Elm

By far the most common elm of the South is the winged elm, sometimes called the wahoo, the smallest and the daintiest of this tree family. It gets its name from the corky growths, or "wings," usually found on the smaller branches. In this respect it resembles the better known sweet gum, but the "wings," as well as the terminal branches and the buds, are much smaller and finer.

This elm occurs scatteringly through our area, except in the higher mountains. It is usually found on dry, gravelly uplands, but again it often grows in moist soils along streams and in waste places. It sometimes springs up along fence rows. Even though it grows more rapidly when in moist situations, it is also a good tree for planting along roadsides in dry, poor locations. Up to now it has been comparatively free from disease, but, because of brittleness of the branches and their susceptibility to storms, the tree is not long-lived. When of medium size, it is usually forty to fifty feet in height, with a trunk that rarely reaches two feet in diameter. It forms an open, round-topped head.

Smaller than those of any other native elm the simple, alternate leaves are from two to two and one-half inches long and one to two inches broad. They are thick, dark green and smooth above and softly downy below, with coarsely double-toothed margins. The flowers, reddish-purplish-brown and perfect (stamens and pistils in the same flower), come out any time from late January until March. The tree in bloom gives the appearance of a purple-brown mist enveloping the tree—one of the most beautiful sights of earliest spring. The flowers are past and the fruits completely formed before the tree leafs out. The fruit is winged, with two tiny tips or beaks, and is covered with white hairs.

The bark of this elm is light brown, tinged with red, and is divided into irregular flat ridges and shallow fissures. The

By William Daniel

WINGED ELM (*Ulmus alata* Michx.)

This, the common elm of the piedmont of the South, is smaller and shorter lived than the other elms.

Flowers (lower right) and fruits (upper left) early, both before leaves are out; leaves elm-like, but small; bark light brown, tinged with red, and divided into irregular flat ridges and shallow fissures. This elm is named from the corky layers or "wings" along many of its branches. (Winged Elm.)

wood is very similar to that of the other elms—heavy, hard, strong, and difficult to split, and is occasionally used for hubs, mauls, and the handles of tools. It is the peculiar twisting and interlacing of the fibers that makes the elms so exceedingly tough and difficult to split. In the past, ropes made of the inner bark were used for binding the covers to cotton bales.

South of Virginia this tree is commonly planted as a street and lawn tree. There is another elm with corky wings, the rock, or cork, elm, but as its range is chiefly through the central states, and does not often coincide with that of our winged elm, they are not likely to be confused.

The Slippery Elm

Though smaller and less attractive than the American elm, the slippery elm is popular with the northern schoolboy who likes to chew the fragrant, sticky inner layer of the bark. Animals as well as boys like it, and it is this bark which gives the tree its common name.

At the time the sap is running this inner bark is best, and is then often collected for use in home remedies, especially for throat trouble, fevers, and inflammation. Hunters chew it to allay thirst, and in the woods of the Far North moose eat this soft bark and the twigs so much that the tree is sometimes called "Moose elm."

Though its range extends south almost to the Gulf, it is not common in the South. Where it does grow it is as a medium-sized tree, chiefly in the low grounds or near the foot of hills in the piedmont and sparingly in the lower mountains and coastal plains. In Florida it is found only in the northern part, and then very rarely.

The leaves of this elm are much rougher than those of the American elm; they are harsh and rough any way you rub them, while those of the American elm are rough only one way. Too, the buds of this elm are covered with tawny hairs,

those of the American elm are smooth. But the greatest point of difference is in the fruits, or samaras, which in this species are much larger and rounder than those of the other two elms. They ripen when the leaves are half-grown.

The Hackberries (*Celtis*)

They went and found themselves
Among the lotus-eaters soon, who used
No violence against their lives, but gave
Into their hands the lotus plant to taste.
Whoever tasted once of that sweet food
Wished not to see his native country more
Nor give his friends the knowledge of his fate
And then my messengers desired to dwell
Among the Lotus-eaters, and to feed
Upon the lotus, never to return.

—*Odyssey*, BOOK IX.

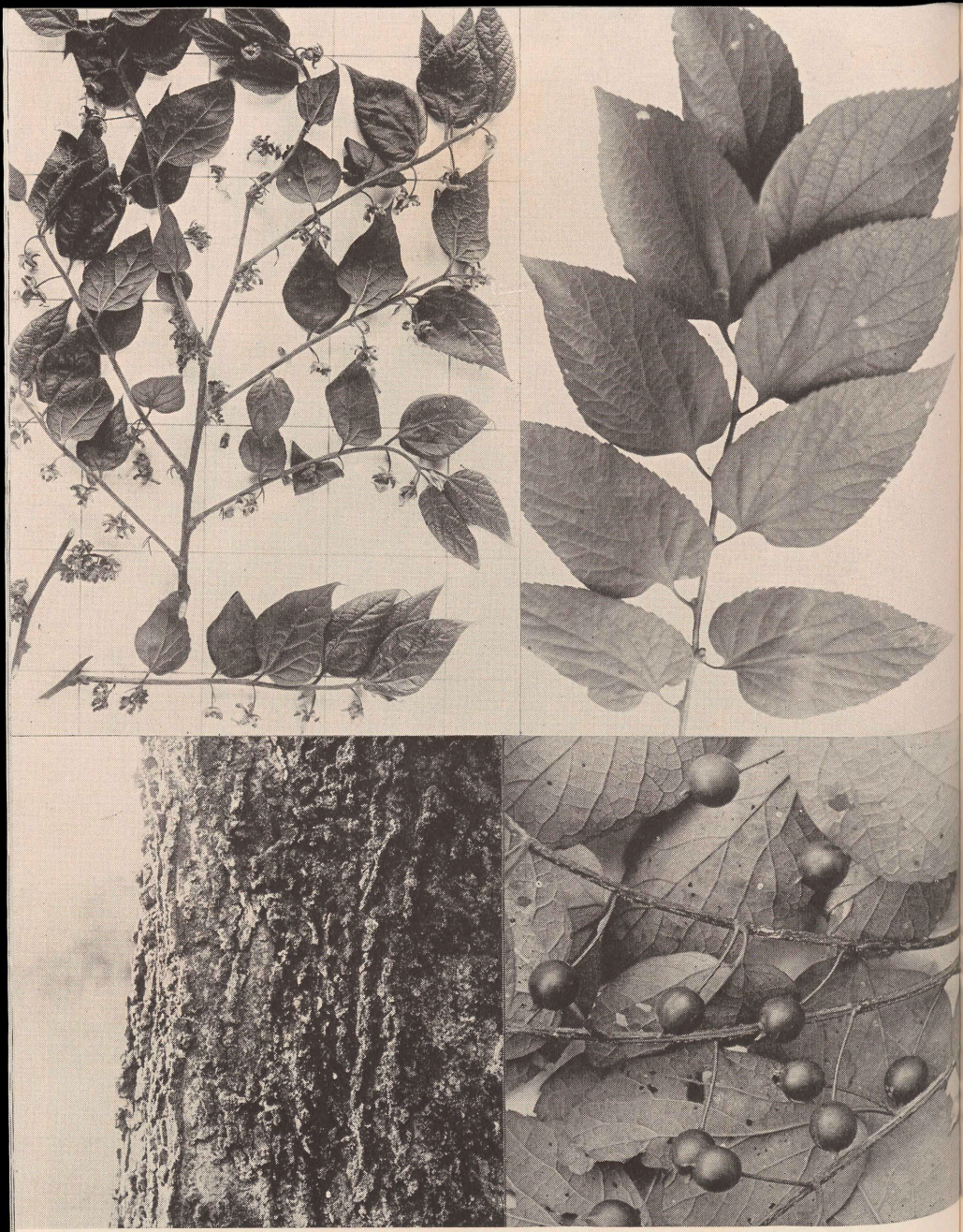
According to Greek mythology, the fruit feasted upon by the lotus-eaters of Ulysses' Odyssey was that of the nettletree, which is the European form of our hackberry tree. In reality, of course, the fruit is pleasant but harmless, with absolutely no drugging powers. However, we probably should not care to inquire too closely into the scientific foundations of ancient myths. Most of us, at times, still like to dream of a half-mystical and mythical ancient world in which gods and goddesses roamed the earth and had strange adventures.

I recalled this myth when, in an old colonial garden in Williamsburg, Virginia, I saw nearly a score of cardinals feeding on the berries of an ancient hackberry tree. Never before have I seen so many cardinals at one time. Were they, too, feasting upon the lotus (for tradition says that *Celtis*, the tree's scientific name, was the ancient name of a species of lotus) and desiring to dwell there forever? It was a snowy day, and the scarlet males and the more delicately colored ash-rose females flitting about among the falling snow flakes and perched on

Courtesy U. S. Forest Service

HACKBERRY (*Celtis occidentalis* L.)

This, a relative of the elms, may occasionally fool us, but look at the bark —and the fruits!



The berries, beloved by birds, are sweet and one-seeded; leaves resemble those of the elm, but are easily told apart by the three main veins arising from the base. The warty bark is another means of distinguishing this tree from the elms. Flowers (upper left) are on the new twigs of the season. (Hackberry.)

snow-covered branches, created a winter symphony of "scarlet and ermine" that will always be a treasured memory.

Though it was an old, old garden with trees, shrubbery, and many of the wild tangles so loved by birds, with bird baths and feeding stations, it was probably the heavily berry-laden hackberry tree that attracted and held the birds. For they love its sweet, purplish berries.

The Hackberry Belongs to the Elm Family

Seeing a hackberry tree for the first time, one might be inclined to think, "Here is another lovely elm." But, if it is fall or winter, and if one is at all observing, he'll add, "That's queer—it has purple berries, and no proper elm has berries!" And then, if he looks at the bark, he is still more puzzled. "Surely, an elm doesn't have this warty bark!"

In summer, when in full foliage a hackberry does resemble an elm, which is natural, as it belongs to the elm family. The points of resemblance are the leaves, the graceful sweep of the branches, and the foliage mass. But, where the hackberry's fruits are purple berries maturing in autumn, those of the elms are the winged samaras, maturing in the spring before or with the appearance of the leaves.

There is also a difference in the flowers, those of the elm occurring in early spring on the *twigs of the previous season's growth,* while those of the hackberry come later and are on the *new twigs of the season.* And though there is a strong resemblance between the leaves of the two trees in both their queer shape and their obliqueness, or one-sidedness at the base, there is a distinct difference in the veining. The veins of the elms are very straight and regular, with a prominent midrib; in the hackberry there are three nearly equal main veins branching from the base of the leaf. Though the midrib is longest, the two side veins are very prominent—a rather unusual arrangement.

Between the barks of the two trees there is also a distinct

difference. That of the elm is usually roughened by flat ridges; that of the hackberry is marked with corky wart-like excrescences. On some of the limbs these warts are so close together as to form a continuous ridge. For the benefit of those who are interested in twig study it may be added that the pith of this tree, like that of the walnuts, is chambered.

"Witches' Brooms"

In winter, hackberry trees may often be recognized by a queer growth of the twigs in thick clusters known as "witches' brooms." Some believe these are caused by a fungus growth which produces dense tufts of twigs at the ends of the branches. But whatever causes them, they are sometimes very popular with the birds. Many a winged baby's cradle is hidden away in them.

The creamy-greenish flowers, two kinds on the same tree, are inconspicuous. The pollen-bearing ones are in dense clusters along the bases of the young shoots, and the seed-producing ones are borne singly in the axils of young leaves. The berries of the most common variety are purple; those of a variety growing in the Mississippi Valley are orange-red. Because of the sweetness of these berries the trees are also known as "sugar-berries."

The wood, although not very valuable, is popular for wood-carving as it is easy to work and takes a satiny polish. It is also used for cheap furniture, agricultural implements, and for fencing.

Widely Distributed But Not Common

Though these trees have a wide range, from Canada to the Gulf and through much of the West as far as the Rocky Mountains, they are not common anywhere, and so are not as well known as most of our other native trees. In the entire range they do best in the rich bottomlands of the lower Ohio basin. East of the Alleghenies they are rarer. They do well, however.

in various types of soil, from rich to poor, and are not difficult to transplant. They are easy to grow from seed, and should be more commonly planted. Because of their ability to withstand drought they are valuable trees to grow in sterile places. They are used very effectively as shade and ornamental trees in the coastal plain region of the Carolinas. New Bern, North Carolina, has some particularly beautiful and interesting hackberries.

THE MULBERRY FAMILY
(MORACEAE)

The Mulberries (*Morus*)

"As we go round the mulberry bush,
The mulberry bush, the mulberry bush,
As we go round the mulberry bush,
So early in the morning."

So runs the old rhyme which generations of children have played and sung, for mulberries have long been known in many lands, and much history has been associated with them.

The early colonists of Virginia, finding the red mulberry tree growing in that region, thought they could easily use it to start a great wealth-producing industry. They were familiar with the white mulberry of Europe, which had been introduced from the Orient and on the leaves of which silkworms fed. Surely, the colonists argued, the silkworms would do even better on the larger, coarser leaves of the native red mulberry!

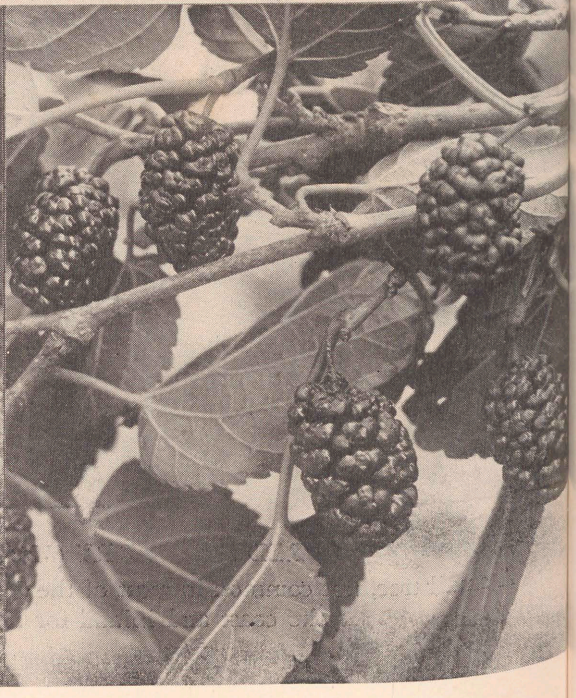
The Chinese were the first to cultivate the mulberry for silkworm feeding. According to tradition, as far back as 2700 B.C. the Empress, known as the lady of Si-ling, observed silkworms feeding, and collected and fed them by hand. She observed that in cultivation they thrived better, and that the cocoons became larger. For long centuries silk was a great luxury, and China guarded well its precious secret. Cleopatra's galley had silken sails, made from silk from the far-away Orient, but no one knew how this silk was made.

And then, in the sixth century after the birth of Christ, so

By J. Horace McFarland

RED MULBERRY (*Morus rubra* L.)

A small tree, not common in most of the South. It is most abundant near the coast and inland for some distances.



Flowers of two kinds on different trees. Female flowers to the left above become the "berries," multiple fruits formed from a cluster of flowers rather than a single flower. The leaves shown do not have the mitten-like lobing which some of the red mulberry leaves possess. (Red Mulberry.)

the legend goes, two monks smuggled the eggs of the silkworm out of China, concealed in hollow canes, and carried them to the court of Justinian at Constantinople. From there silkworm culture spread throughout Greece and later to other countries of Europe.

But to get back to our American colonists. Unfortunately, silkworm culture was not a success in this country. The worms would not feed on the leaves of our native red mulberry, and although later the white mulberry was introduced, and large fortunes were spent to develop the silk industry, it never throve well. Even in those early days America did not have cheap, painstaking labor that could compete with the labor of the Orient.

However, in spite of the fact that the colonists could not use this tree in producing silk, the Indians, especially the Choctaws of northern Florida, did make a coarse cloth and ropes out of its inner bark.

"The tree (the mulberry) is found in abundance in the northwestern parts of Florida. The Choctaws put its inner bark in hot water along with a quantity of ashes and obtain filaments, with which they weave a kind of cloth not unlike a coarse hempen cloth."—Roman's *Natural History of Florida.*

The red mulberry, the only mulberry native to the country, is a small tree occasionally reaching a height of fifty or more feet and a trunk diameter around two feet. It is found from Massachusetts west to Kansas and Nebraska and southward to the Gulf. Like many of our trees, its best development is in the lower Ohio Valley and the foothills of the southern Appalachians. It does not grow in our higher mountains. Ordinarily it is a low, broad-branched tree with a rather short, thick trunk.

The tree is easily recognized by its unique leaves. On older trees they are usually roundish or somewhat heart-shaped, short-tipped, and with peculiar veining. There are three main veins, deeply sunken and extending from the base of the leaf,

and many fine yet conspicuous veinlets which produce a network of markings. The leaves themselves vary from three to five inches in length; they are blue-green, simple, alternately arranged, rough, especially above, with short, soft hairs below, and have toothed margins. On young trees or shoots they are often mitten-shaped, having two, three, or four lobes, sometimes after the manner of the leaves of the sassafras. There is no confusing the two trees, however, for the leaf of the latter is smaller, darker green, and less veined. It is smooth, of finer texture, and has an entire margin. Another easy way to recognize the leaf of the red mulberry is to break or cut off the stem of the leaf, which will exude a milky substance. This is a rare characteristic found in no other tree except the Norway maple, which is not native, but is sometimes used as a planted tree.

"Wayside Inn" for Birds

Appearing in early spring, when the young leaves are developing, the pollen-bearing and the seed-producing flowers may occur separately on the same tree, but are generally on different trees. Both kinds are catkins, the former, long, drooping ones (two to two and one-half inches long), the latter oblong, densely flowered, about an inch long.

The "aggregate" fruits, popularly called berries, and resembling blackberries, nearly an inch in length, change from green to red and finally to purple or black. They are sweet and juicy. Fortunately for the birds, who dearly love them, the fruiting season is a long one, for the berries ripen from June to August. He who would be host to birds—and incidentally, protect his cultivated fruits—should plant red mulberries. If they are located near or around cherry orchards, the birds will ignore the cherries, so much fonder are they of mulberries.

In winter the tree is easily recognized by its twigs, which are light greenish-brown, bearing oval, hollowed-out leaf-scars with numerous bundle-scars. No other tree seems to have these same hollowed-out, bowl-shaped scars.

The bark is thin, dark brown tinged with red, and peels off in irregular scaly plates. The branches are reddish, the twigs green and downy, the winter buds egg-shaped, blunt, and small. The orange-yellow wood is rather light and soft, not strong, but very durable in contact with the soil, and so is used chiefly for fence-posts. The tree has a strong hold on life. Its seeds germinate readily, and cuttings, whether from roots or stems, grow quickly.

It is truly an interesting tree. Plant it to attract birds. See that there are available plenty of nesting sites, a convenient bird bath, some protection, and you will have song and winged splashings to add color and sound and joy to your garden.

Two Foreign Mulberries

The white mulberry and the paper mulberry, two other species which are sometimes found in waste places in the South, are introduced trees which have to some extent become naturalized. The white is an attractive small tree with smaller, smoother, and shining leaves, and whitish or mottled fruits, which are even more popular with the birds. Like our native red mulberry and the sassafras, the leaves are of two or more distinct shapes on the same tree or twig. The first leaves of the year's growth are often strongly lobed, or "mitten-shaped"; the later ones are entire and toothed.

The paper mulberry, a native of China and Japan, sprouts freely from the roots, and when once planted may thus spread rapidly. The leaves are variable, resembling those of the other two, but are rough above and downy beneath. The red fruits are more round than those of our native mulberry.

THE OSAGE ORANGE (*Maclura*)

Though other trees may nobler seem,
But few could march with pioneers;
While you along the roadsides teem,

To prove to all you have no fears
Of endless plains and winds that sweep.

You serve to gladden and to share
The hardships man and beast find there.

—R.W.G.

Long before the white man reached these shores, the Indians of the South were making their bows and war clubs of the wood of the Osage orange. So highly did the Indians prize these bows that Bradbury, an early traveler in the interior of America, said they asked in exchange for one of them a horse and blanket. Because the fruits resembled oranges, and because white men first met with the tree in lands then occupied by the Osage Indians, they called it Osage orange, or mock orange, tree. The early settlers of Louisiana called it *Bois D'Arc,* or wood-of-the-bow.

The original home area of this tree was a very limited one in what is now parts of Oklahoma, Arkansas, and Texas. At that time it probably did not extend more than a hundred miles east and west. But between the time of its discovery and the present the tree has been planted over such a vast territory that it is now one of our most widely distributed native trees.

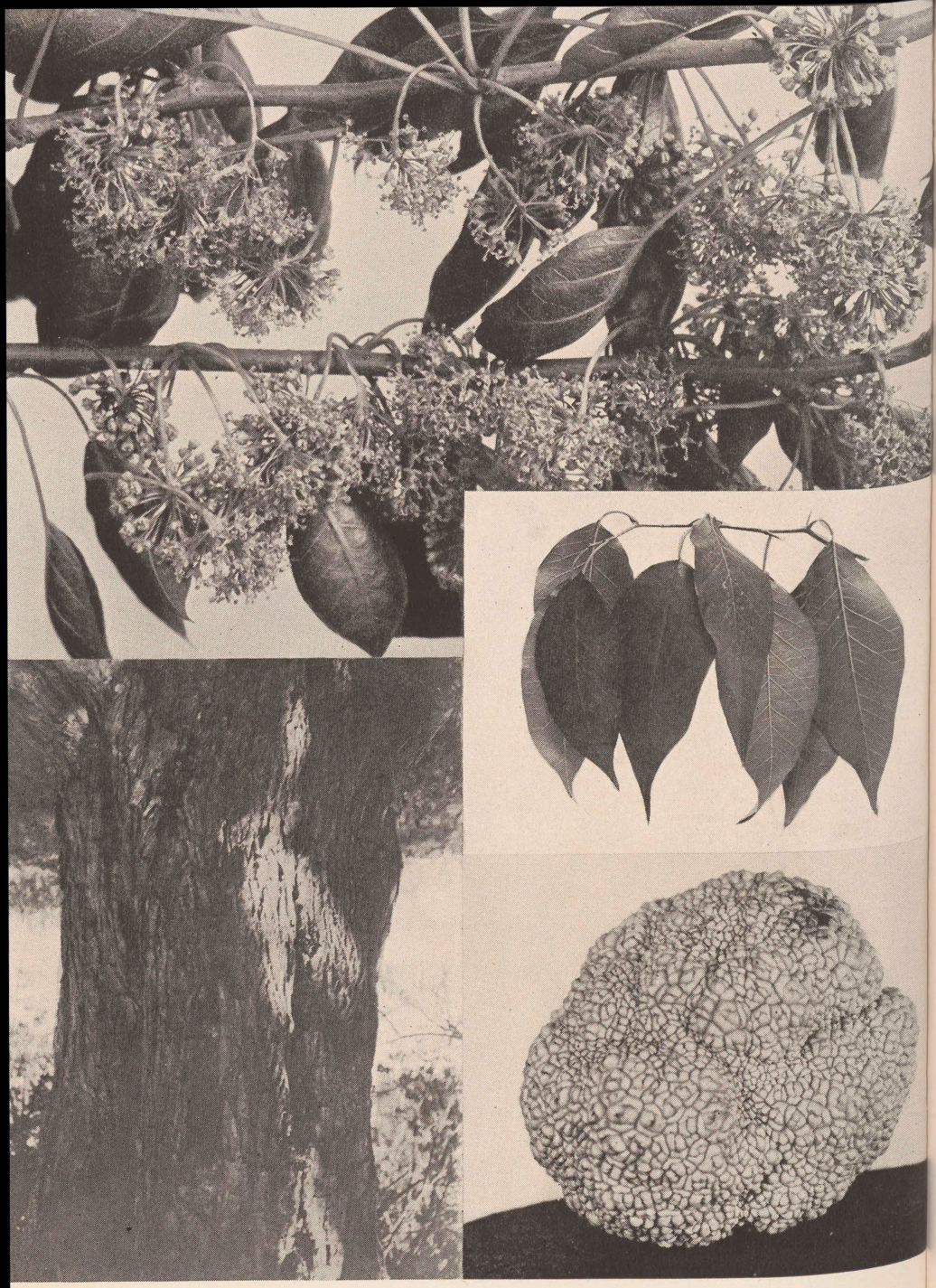
In parts of the old South this tree was sometimes used for hedges to mark off the boundaries of plantations, and many remnants of these hedges still exist. About fifty years ago it had a great vogue as a hedge-fence tree, especially in the more treeless prairie states. For a time the settlers felt that their fence problem was thus not only solved, but in an easy, cheap way. For because of its stout branches armed with strong spines it made a hedge that was almost impenetrable. But its popularity did not last long. Men and cattle were injured on the thorns; the tree spread where it was not wanted; and once started, it was hard to eradicate.

Although the tree belongs to the mulberry family, there are no apparent points of resemblance. It is not large, seldom

Courtesy U. S. Forest Service

OSAGE ORANGE (*Toxylon pomiferum* Rafn.)

Also called *Bois d'Arc* (Wood of the Bow) by the early French settlers who found the Indians of the region using its wood for bows and clubs. It is a thorny tree, at one time popular for hedge-fences.



Two kinds of flowers on separate trees, with male flowers shown here; leaves glossy with entire margins and tapering tips; fruit a "mock orange," green and rough, containing many seeds and bitter, milky juice. Note thorns on leafy twig. (Osage Orange.)

reaching more than fifty or sixty feet in height, with a short trunk one and a half to two feet in diameter. Yet, because of its spines and fruit, it is interesting and unique. Straight, stiff, sharply pointed and almost as strong as steel, the spines occur along the branches in the axils of the leaves.

The simple, alternate leaves, dark, shining green, smooth above, paler beneath, end in a pointed tip. Their margins are entire, their mid-vein is prominent, and their petiole very long, often nearly two inches. The leaves are borne on short stems, or spurs, rising from the previous year's growth. After once becoming familiar with them, one can always tell this tree, or just a small twig of it, by these small spurs. In autumn the leaves turn a clear, bright yellow.

The flowers, of two kinds, and on separate trees, appear in April or May, when the leaves are full grown, and they, too, are borne on the short spurs. The pollen-bearing ones are in loose head-like spikes; the seed-producing ones in small round heads.

Fruit a "Mock" Orange

Resembling an orange in size and form, but with a roughened surface, the fruit, at first green, becomes yellowish-green at maturity. When bruised it exudes a milky juice that soon turns black. This "mock" orange is not a single fruit at all, but a compound one made up of numerous small one-seeded drupes crowded and grown together. The squirrels particularly enjoy the oblong seeds which are enclosed. Many of the fruits, however, are seedless.

The scaly, deeply furrowed bark of this tree is dark yellowish-brown to dark gray. That of the roots is a deep orange and produces a valuable dye which the Indians, and later the white settlers, used. It produces beautiful shades of orange-yellow, deep tan, old gold, olive, and dun brown. It is also used as a base for greens and grays when combined with other colors. During and since the World War there has been an increasing

demand for American dyes, and it is barely possible that the Osage orange will come into its own in this field.

The wood, brilliant orange-yellow when first cut, but turning duller with age, is exceptionally hard, strong, and durable, yet flexible. It is this last characteristic which made it so valuable for bows. It is now used largely for fence-posts, cross-ties, and wheel-stocks.

The tree grows easily from cuttings of root or branch.

THE MAGNOLIA FAMILY
(MAGNOLIACEAE)

THE MAGNOLIAS (*Magnolia*)

A wonderful fragrance, deep and rare—
The breath of the great magnolia flower,
That after the long day's din and glare,
Comes softly forth, like a silent prayer,
To bless and sweeten the grateful hour.

. . . . . .

Queen of the South, and love of the sun!
Happy indeed must the sleeper be
Who finds his rest, when at last it is won,
And the dew hangs heavy and day is done,
Under the broad magnolia tree.

—ELIZABETH AKERS.

"MIGRATING TREES" may sound a bit like a fairy tale, but that is exactly what happened to the magnolias in the long, long ago. They migrated, or retreated, before the advancing glaciers of the Ice Age.

Just before the Ice Age the polar regions were not ice-bound, but had a temperate climate somewhat similar, perhaps, to that of North Carolina today. And in those far distant years, back in what is known as the Cenozoic Period, magnolias and palms grew even beyond the Arctic Circle. Think of magnolias and palms in Greenland! Yet they existed there then, as we know from the story the rocks tell us.

Indeed, magnolias grew not only there, but also over much of North America and the midcontinental plain of Europe. Fossil forests showing the trunks, leaves, and even the seed cones of these trees have been found in the rocks.

And then into this warm northern land came the searing, bitter cold. What brought this about? There are many theories, but no one really knows. But we do know that great ice sheets, sometimes nearly a mile high, formed and moved slowly, relentlessly, southward. And as these sheet-like glaciers spread slowly—oh, so slowly—southward, all life, both plant and animal, was either destroyed or forced to retreat before them. Even before the approaching ice reached them, its cooling influence gradually killed the trees on the northern side of the forest belt. But we must not forget that this change of climate was very gradual, for it took thousands of years for these ice sheets to make this advance. And always, somewhat ahead of them, trees and other forms of plant life, as well as animal life, were retreating or dying out.

And so the magnolias—and many, many other kinds of trees also—grew, bore seeds, and scattered these seeds, aided by birds, winds, and other agencies. Some of these that were scattered southward took root, grew to maturity, and in their turn bore seeds, and scattered them. Thus, generation after generation of these trees, through hundreds and thousands—perhaps millions—of years, gradually moved southward, or "migrated" ahead of the slowly advancing ice toward the safety of the warm southlands.

Why We Have More Kinds of Trees Than Europe Has

It was fortunate for America that her mountain chains, the Rockies and the Appalachians, since they extended mainly north and south, presented no barrier to this southern migration. But, unfortunately for Europe, her main mountain ranges lay more east and west. Thus, the Alps, the Pyrenees, and the Carpathians extended directly across the path of the advancing ice, and the trees could not retreat before it. They grew as far up the mountains as they could, and there died from cold—and so Europe lost hundreds of her tree species. Today she has plenty of forests (and she takes much, much better care

of them than we do of ours), but she has very few *species,* or *kinds,* of trees.

Today, our magnolias are known as sub-tropical trees. Only the fossils in the rocks remain to tell us that they once grew in the Far North. There are now about thirty species of magnolias in the world, all confined to eastern North America, southern Mexico, and eastern and southern Asia. Here in the South we have nine of them. There are ten if we include the tulip tree, which also belongs to the family.

First of the Flowering Trees

Aside from their "migrating" history, magnolias are unusual and interesting trees. As far as we can tell, they were the first trees to develop flowers. And the blooms of some of them are among the largest borne by our trees today. The glossy green foliage, the exquisite waxy flowers, and the "cone"—which isn't a real cone, all add to their charm. These trees were named after Pierre Magnol, a famous French botanist of the seventeenth century.

Some of the magnolias are classed among the "broad-leaf evergreens," along with such other trees as the live oak and the holly. Although, unlike the conifers—the pines, firs, spruces, hemlocks, and cedars—most broad-leaf trees are deciduous (that is, they drop their leaves every autumn), a few have acquired the habit of remaining green all winter. These, and especially the evergreen magnolias, are very popular as cultivated, ornamental trees in all countries of temperate climate. In our eastern states few of them are hardy in the North; but from Washington southward they begin to take a more prominent part in landscape planting.

Magnolia

This, our finest evergreen tree, is commonly known simply as magnolia, sometimes as great magnolia, great laurel, and

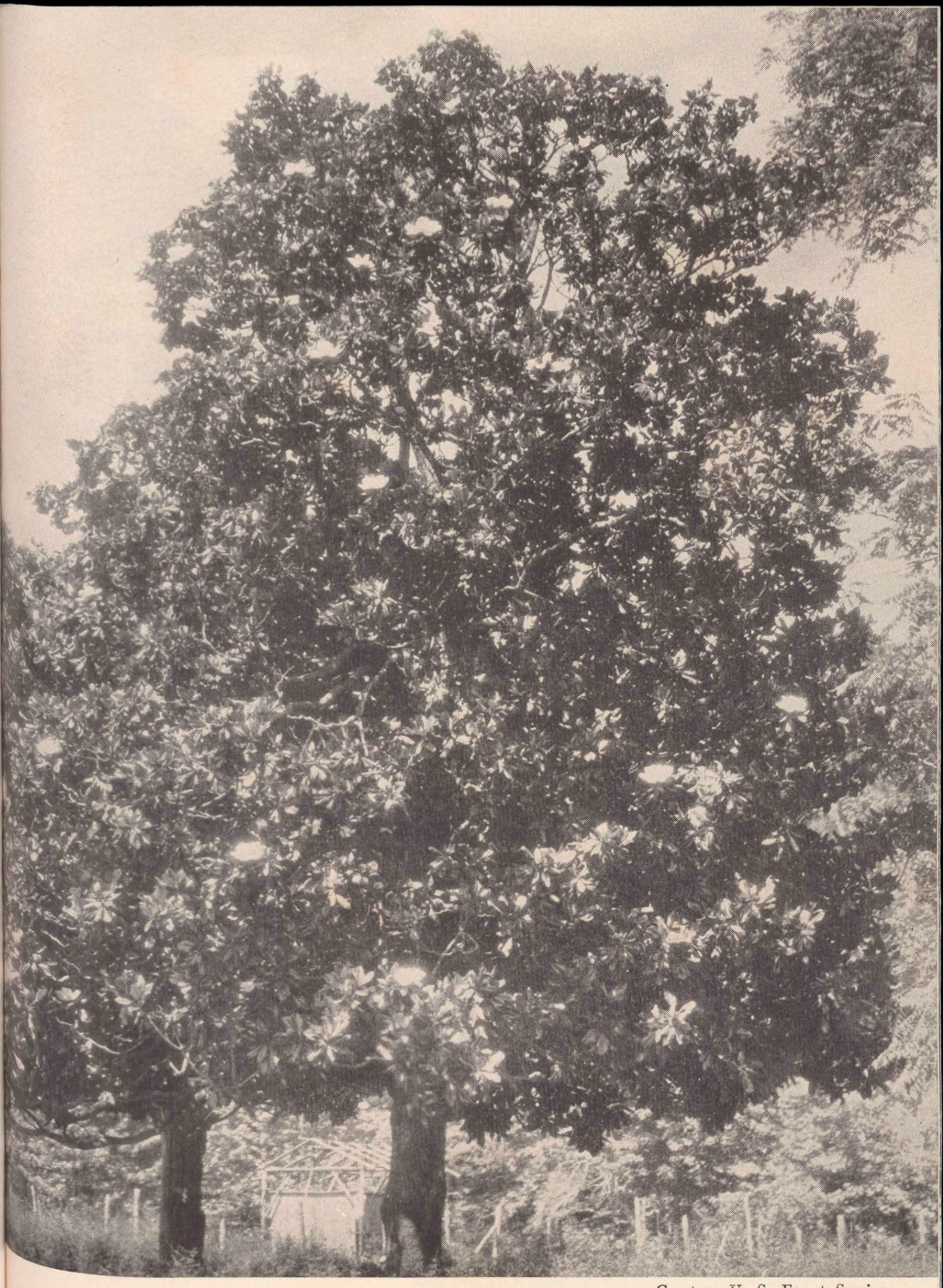
bull bay. Though it is native in North Carolina only in swamps and along watercourses in the southeastern corner of the state, it ranges southward to Florida and westward into Texas. In the forests of western Louisiana it reaches its greatest development, and is often the most characteristic and conspicuous tree. It also extends somewhat up the Mississippi along the bluffs, and into southern Arkansas.

From Charleston northward it is very scarce growing wild, but has found its "place in the sun" as a cultivated tree. Southerners have taken it to their hearts and planted it extensively in yards, in parks, and along streets. Indeed, magnolias seem as much a part of a southern setting as mockingbirds and honeysuckle. California, also, has adopted it extensively as a park, lawn, and street tree. For although its preferred habitat is rich, moist soil, it does well in other situations.

A regal, conical tree, it may reach fifty to eighty feet in height. The stiffly ascending limbs are more stately than graceful. It is the lustrous foliage mass which gives the tree its beauty. Dark green, glossy, of thick, leathery texture, the leaves, clustered at the ends of the branches, are sometimes lined with rusty brown, sometimes smooth and dull green. Alternate, simple, oval to oblong, pointed at both ends and with entire, slightly wavy margins, they measure from five to ten inches in length. They persist on the tree until the second spring. As both the leaves and the manner of growth of these trees are variable, some forms are much handsomer than others.

Fragrant Flowers

The large, perfect flowers, fragrant and white, borne solitary on the ends of the twigs, are sometimes six to eight inches across. Occasionally they are even larger. Their beautiful, waxlike texture causes them to bruise easily, after which they turn brown. Usually there are six, more rarely nine or even twelve petals. The heart of the flower is purple; a spot of color at the base of each petal may act as a wayside sign to insects, pointing



Courtesy U. S. Forest Service

MAGNOLIA (*Magnolia grandiflora* L.)

The "Magnolia" of the South. A magnificent tree in bloom in the Ouachita National Forest, Arkansas.

Large flowers are fragrant, beautiful, and perfect; leaves glossy, leathery, and evergreen; fruits are furry erect "cones" with scarlet berries hanging on slender white threads; trunk branches low; bark is thick, scaly, light brown or gray. (Magnolia.)

out the path to the drop of nectar at the bottom of each flower cup.

Standing out startlingly from the dark green foliage, these blossoms look like great camellias or water-lilies. William Bartram, an early American botanist, said they seemed to him like great white roses, and that he could distinguish them at long distances.

Strange as it may seem to most of us, this lovely, fragrant, aristocratic-looking blossom is our most primitive flower. This, according to modern botanists, is based upon the fact that the magnolia flower is large, radial in symmetry, with all floral parts present, and all distinct: separate sepals, separate petals, separate pistils, separate stamens.

Because the fruit of this tree is a little similar in shape to those of the conifers, it has been called a cone. But it is no true cone. Somewhat oval, three to four inches long, it is made up of many seed-vessels that have grown together. Its color is rusty brown and its appearance velvety. It contains several flat, scarlet seeds. When released from their capsules these seeds hang for a time on slender white threads, then fall to the ground, or are eaten by birds.

The bark is thick, scaly, light brown or gray. The wood is hard, heavy, close-grained. Its color is creamy-white turning to brown when exposed. Perhaps the fact that the wood is of no great commercial value has been instrumental in saving the tree. However, because of its glossy, decorative foliage, large branches are cut and shipped north and west for decorations, especially during the Christmas holidays.

The Sweet Bay

With "flowers large as roses and fragrant as lilies," and a blossom period extending over many weeks, sometimes into months, is it any wonder the sweet bay, or swamp magnolia, is beloved wherever it is known?

This magnolia, also called small magnolia, white bay, and laurel bay, is a small tree found in swamps or near water in the coastal plain mainly from Virginia to Florida and westward. In some sections it extends inland for some distance, and it even occurs very sparingly in Massachusetts and on Long Island, and from New Jersey southward. In its more northern range, however, it is reduced to a shrub. As a small, slender tree of fifteen to sixty or seventy feet it is known only from Virginia to Florida and through the Gulf region to Texas.

Instead of producing all its flowers at one time, this magnolia spreads out its blooming period from May until July, sometimes even until August. Its creamy-white, fragrant, perfect, wax-like flowers are two to three inches wide, the smallest bloom of any of our native magnolias. Borne singly at the ends of the branches, they are surrounded by a whorl of glossy green leaves, an exquisite setting for their loveliness. Each flower has nine to twelve petals, which are in rows of three, and form a cup. Inside the cup are many stamens with purple bases, and inside these is the cluster of pistils, packed tightly together into a small, oval cone.

After being fertilized by pollen from the stamens, this compact cone of pistils develops into an interesting fruit cluster, oval in shape, dark red, smooth, and about two inches long and one-half inch wide. In its own way it is as interesting and as beautiful as the flowers. As the capsules of the cone open, the scarlet seeds are released and hang on slender threads.

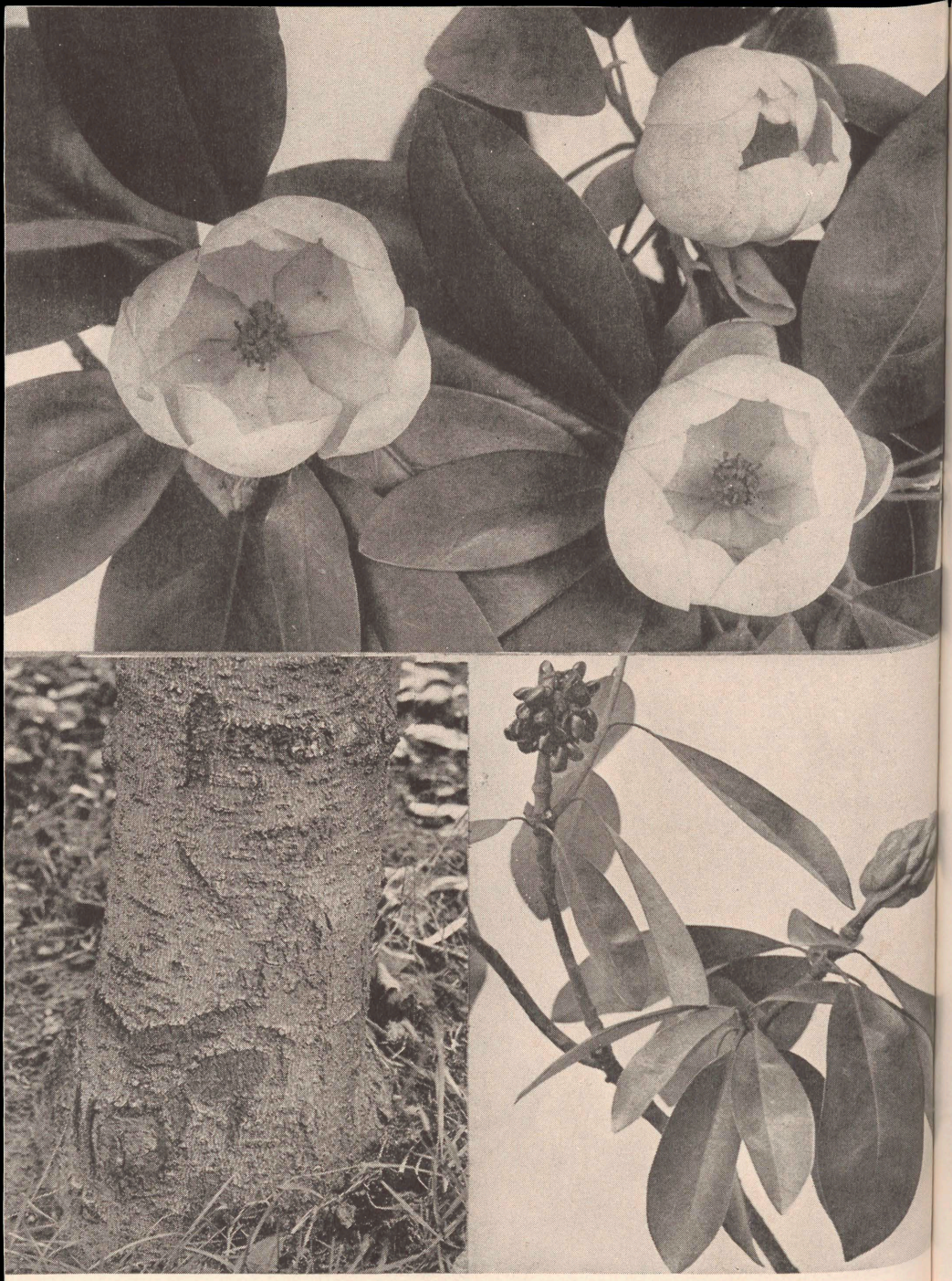
The simple, alternate, oblong leaves are four to six inches long and have entire margins. They are pale green above with a whitish bloom beneath which accounts for one of the tree's common names. In the extreme northern part of its range the leaves drop off early; in the upper South most of them drop off during the winter, and farther south they are almost evergreen.

On young trees the bark is light gray and smooth; on older trees, light brown and scaly. The soft, light brown wood is

By Romeyn B. Hough Company

SWEET BAY (*Magnolia virginiana* L.)

A small but well-loved magnolia, common in coastal regions in the South. Because it grows in swamps, it is also called swamp magnolia.



Evergreen leaves small and glossy, whitish beneath; fruit cones small, but contain several scarlet seeds; bark light brown and scaly on old trees. This magnolia blooms over an extended period, and the fragrant white flowers, large as roses, gleam against the dark foliage. (Sweet Bay.)

tinged with red; the sapwood is creamy-white. Ordinarily the tree is too small for the wood to be of importance commercially, though it is sometimes used with gum for woodenware, and also for pulpwood. The tree's chief value is the beauty it adds to the countryside. In that respect it is popular as an ornamental tree both in this country and in Europe.

To know the sweet bay at its best one should see it growing wild along the borders of watercourses, in swamps and ravines and fertile bottomlands. There it is usually found with the red bay, wild olive, holly, yaupon, and red maple. Often, too, it is associated with the southern white cedars in what are called "juniper bays."

The poet Samuel Minturn Peck has given the atmosphere of this tree in the following lines:

In the thicket with the possum and the coon,
Where the log-cocks hammer and prate,
And the gray owl hoots at the waning moon,
And the wild cat leaps to its mate
With a dim dark sound,
O'er the oozing ground
Below——
O that's where the bay flowers ***blow!***

The Cucumber Tree

Because its curious fruit, when green, somewhat resembles a cucumber, this magnolia is commonly called the cucumber tree. It is the hardiest of the group, and grows from western New York and Ontario to Illinois and Arkansas and southward along the mountains to northern Georgia. Its favorite locality is rich woodland soil near streams, but it also does well on drier soil on rocky river banks.

More than almost any other tree it shows two distinct types of growth under different circumstances. In the forest, where the struggle for existence is keen, trees must grow straight and

tall and reach up to the air and sunlight for their own small "place in the sun." And so there this tree has a straight, columnar trunk bare of branches for two-thirds of its height. But out in the open it assumes a conical form, with the lower branches sweeping the ground, forming a nice, cool, green tent which makes an excellent playhouse.

Lacking both the beauty and the fragrance of some of the other magnolia flowers, those of the cucumber tree, though large, look so much like the leaves that they are seldom noticed. Cup-shaped, three to four inches across, each flower has six greenish-white petals, tinged with yellow. Perhaps it is because these flowers are neither showy nor fragrant that not even insects pay much attention to them, and thus many of them are not pollinated. That accounts for the greenish, knobby, crooked fruit with its many undeveloped capsules. First greenish, then pink, the "cone" finally turns reddish in the autumn, and the individual capsules break through the outside covering and release their fruits in the same manner as those of the other magnolias.

The sharply-pointed, oblong leaves are alternate, simple, and from six to ten inches long and three to five inches broad, with slightly wavy margins. When full grown they are bright, dark green above, paler and slightly downy beneath. In autumn they turn a pale yellow.

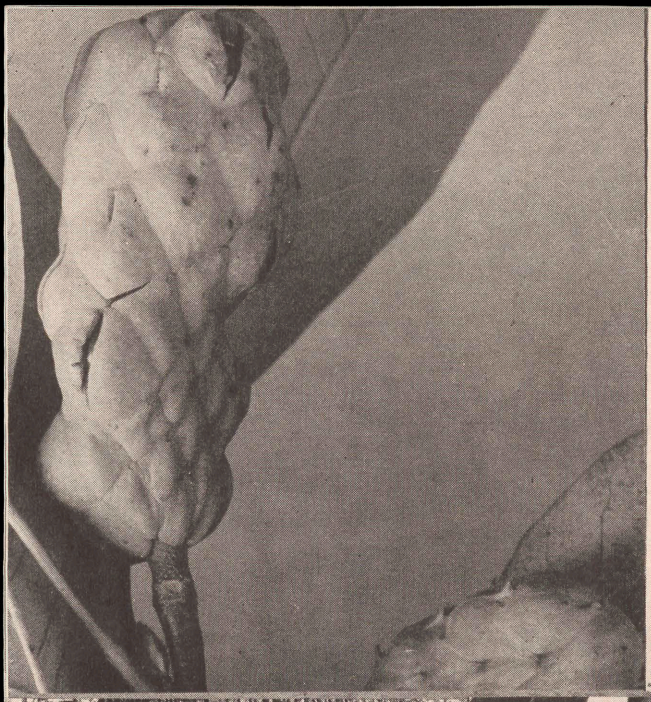
This is the only one of the magnolias which has a rough bark. Brown or grayish-brown, it is regularly furrowed, resembling somewhat the bark of its near relative, the tulip tree. The wood is soft, light, close-grained and durable, also somewhat similar to that of the tulip. Commercially, it is used for interior finish, furniture, household utensils; and in the mountains, on account of its great durability, pump logs and troughs are often made of it.

Besides being a valuable timber tree it is desirable for roadside and ornamental planting. It has only one bad habit, that of dropping its leaves more or less through the summer.

Courtesy U. S. Forest Service

CUCUMBER TREE (*Magnolia acuminata* L.)

Tree in Pisgah National Forest, North Carolina. Growing in the forest this tree is tall and slender, branching high. Growing in the open it has lower branches which sweep the ground.



Lumpy dark red fruits look something like contorted cucumbers and give tree its common name; seeds bright red and flattened; leaves large with slightly wavy margins; flowers, though large, are neither conspicuous nor fragrant. It is the only magnolia which has rough bark. (Cucumber Tree.)

Closely related to this tree is the large-leaved magnolia, a rare and very local tree found in fertile valleys of the foothills of the Alleghenies to North Carolina and on to Florida and westward to Arkansas. Its great leaves, green above and silvery below, may be two or more feet long and up to a foot wide, and have very wavy margins. The creamy-white flowers, of six waxen petals, are also large, sometimes a foot and a half across.

Another magnolia with queer, large leaves is the ear-leaved cucumber, or mountain magnolia, a small tree found in cool soil throughout the mountains from Virginia to Georgia, and westward to Alabama and northern Mississippi. These leaves have the base shaped like an ear-lobe. The creamy-white flowers of from six to nine petals are large, solitary, and from eight to ten inches across. They are fragrant, with an odor resembling that of the great magnolia. The cone-like fruits of this and the next species are a brilliant red.

The umbrella tree, another magnolia, is a small tree found along the borders of watercourses and the banks of mountain streams from southern Pennsylvania to the Gulf States. It is most common in the piedmont, but rare in the mountains. Throughout much of its range it is usually scattered, and sometimes absent over large sections. Its large leaves are somewhat similar in shape to those of the other magnolias, and are clustered at the ends of the branches. The flowers are creamy-white and have a disagreeable odor. The fruits are similar to those of the ear-leaved magnolia, especially in their brilliant red coloring.

The Tulip Tree (*Liriodendron*)

Out of a giant tulip tree
A great gay blossom falls on me;

Old gold and fire its petals are,
It flashes like a falling star.

—MAURICE THOMPSON.

In certain sections of the North, as we know, the Indians built canoes out of the bark of the white birch tree. In certain parts of the South, and the Middle West, where there are no white birches, the Indians made less attractive, but far sturdier canoes out of the trunks of large tulip trees. With much painstaking labor these giant trunks were hollowed out with stone tools and fire. Early settlers also used these "dugout canoes," and so they came to call the tulip tree, out of which they were made, "canoe-wood, or canoe tree."

Of course, a tree that could be so used must have a large, straight, strong trunk, and the tulip tree trunk has all of these qualities. Not only has it the straightest trunk in the forest, but it is one of the largest of the hardwood trees of the South. As commonly seen it has a height of sixty to one hundred feet, and a trunk diameter of two to four feet. Some unusually large tulip trees, however, are from one hundred fifty to one hundred ninety feet, with diameters up to ten feet. In Cades Cove, in the Great Smokies, we saw some almost this large.

On young trees the bark is gray and very thin, on older trees it is thick and grayish-brown, with deep furrows. Young twigs are reddish at first, and have a peppery smell. The winter buds, with large, roundish leaf-scars beneath, are flat with elongated tip, dark purplish covered with a whitish powdery bloom.

The light yellow or brown wood, with wide, cream-colored sapwood is light, straight-grained, soft and easily worked. It ranks highly among the hardwoods, is handsome in appearance, and takes a good polish, and warps and shrinks but little. It is extensively used for interior and outside trim and for shingles, for veneers, vehicle bodies, turnery, and other high-grade uses. It is often known commercially as whitewood.

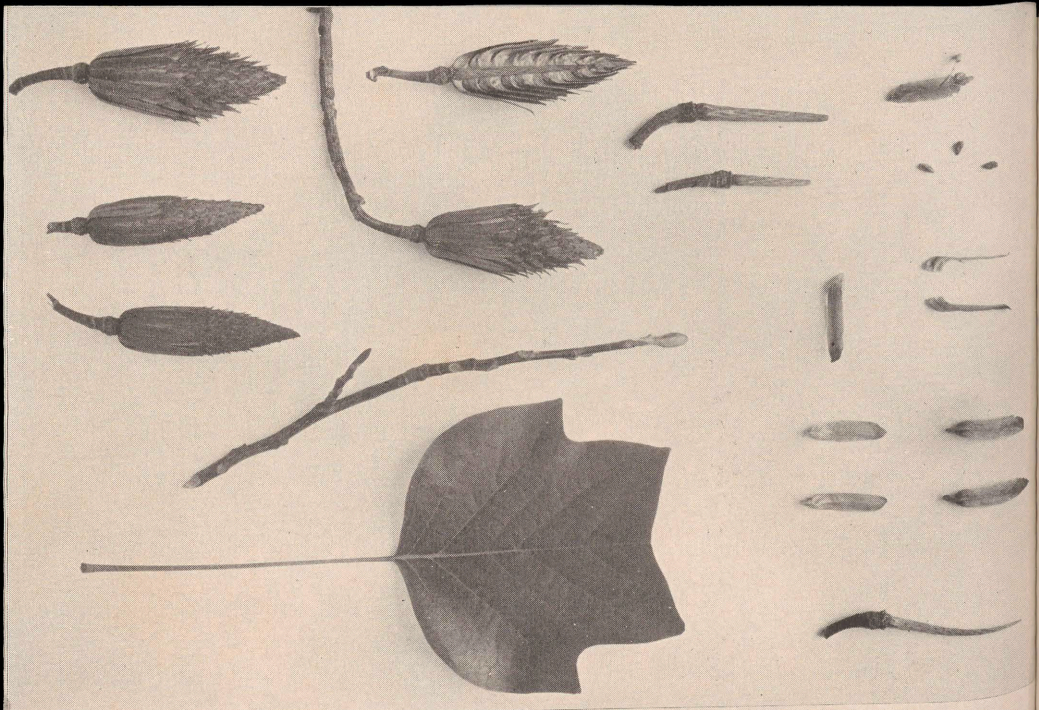
Unique Leaves

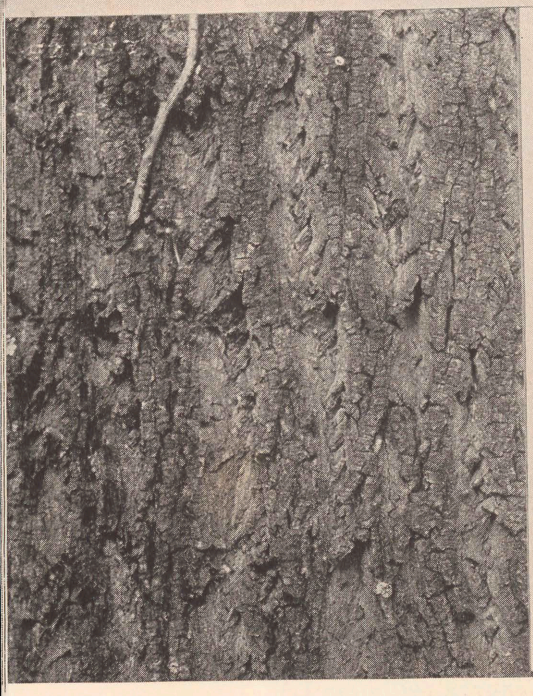
Dark green and shining above, paler beneath, the four-lobed leaves are four to six inches in length and breadth, with two pointed lobes at the side, and a blunt, indented end, as though

Courtesy U. S. Forest Service

TULIP TREE (*Liriodendron tulipifera* L.)

In Natural Bridge National Forest, Virginia. Grown in the open, it branches low. The tulip tree is one of our largest and most handsome hardwoods. It is native only in eastern North America—and in far-away China.





No other tree has a leaf like this—with two pointed lobes at the side and a blunt, indented end, as though a wide bite had been taken out of it. Erect cones contain winged seeds; large flowers resemble tulips and give tree its common name. Note long, flattened leaf-bud at end of twig. (Tulip Tree.)

a wide bite had been taken out of it. No other leaf is like that of the tulip tree. It also develops in a unique manner. The leaf-buds are composed of stipular scales which grow with the growing shoot. Each pair develops into an oval flat bag which contains the young leaf and protects it from severe change of temperature. When ready to come out, the tiny leaf emerges carefully folded along the midrib, opening as it matures. The bases of the stipules encircle the twig, and when they drop they leave scars around it, which help identify the tree in winter.

Opening in late April or May, when the leaves are well out, the exquisite blossoms resemble tulips, and so give the tree its most common name. They are from one and one-half to two inches long and the six petals are greenish-yellow, with orange bands across the base. "Old gold and fire its petals are." These colorful bands are Nature's guide-posts to the bees, to the nectar hidden in the bottom of the "cup" among the bases of the many stamens.

As the tree often branches, and so flowers, at great heights, especially in the forest, these lovely "tulip blossoms" are not as well known as they should be. Although in the open the tree often branches low, some unobserving people have lived with it in their yards for years, yet have never noticed the flowers.

The fruit is equally unique—a narrow light brown "cone" formed by many scales, or carpels, which fall during the autumn and early winter. The empty axis of the cone, still pointing upward, remains on the tree all winter, and is an excellent means of identification.

The seed at the lower end of the scale-like fruit acts as a weight, causing it, as it drops from the tree, to whirl like an airplane doing the "falling leaf." This rapid spinning as it falls make it appear to be two-winged. If you happen to be passing under a tulip tree when birds are feeding on the seeds in the cones, the scales come twirling down on you like a golden-brown rain. Of the sixty to seventy seed scales in each cone, only a few are fertile and reproduce.

Not a Poplar, But a Magnolia

Because of the similarity of the wood to that of the true poplars, and because of the fluttering of the leaves, a habit common to the poplars and the aspens, the tulip tree is also known as "yellow poplar." This fluttering is caused by the petioles being long, slender, and angled, so that the leaves tremble with the slightest breeze. In autumn, the leaves change to a clear yellow. Among the dark green of the pines a tulip tree then looks like a pillar of pale flame lighting up the forest's edge.

Though known as yellow poplar, this tree is not related to the poplars at all, but belongs to the magnolia family. Like the magnolias, it, too, was once widely distributed over North America and Europe, so the story of the rocks tells us.

Only one species of the tulip tree survived the glacial period (before that, scientists claim, there were sixteen kinds in the world)—and today it is found native in only two widely separated parts of the world. They are eastern North America —sparingly in New England, abundantly on the southern shore of Lake Erie, westward to Illinois and southward to northern Florida, Alabama, and Mississippi (west of the Mississippi River it is rare)—and western China!

And so, on some spring day when little boys and girls in America are picking tulip tree blossoms, perhaps on the other side of the world a sleepy little almond-eyed cousin may be planning to do the same thing. I wonder what "tulip tree" sounds like in Chinese!

THE SASSAFRAS, THE BAYS, AND THE PAWPAW

THE SASSAFRAS (*Sassafras*)

Fringing cypress forests dim
Where the owl makes weird abode,
Bending down with spicy limb
O'er the old plantation road.

. . .

Oh, where skies are summer-kissed
And the drowsy days are long,
'Neath the sassafras, to list
To the field-hands' mellow song!
In some old cathedral dome,
Catch the distant klingle-klang
Of the cow-bells tinkling home.

—SAMUEL MINTURN PECK.

"LOOK for the mittens and double mittens" among the leaves of the sassafras tree, is a woods game country children love. For the sassafras has more leaf variation than any other native tree, with one exception—the red mulberry. There may be as many as one to four leaf shapes on the same tree, or even on the same twig. Some leaves are entire and oval, others may have one lobe at the side—like the thumb of an old-fashioned woollen mitten—and some may have three, or more rarely, four lobes.

In the mulberry story the different points were given by which the two kinds of leaves might be distinguished from one another. A fascinating tree-study activity for Scouts and others interested is to make a collection of the leaves of both these trees, of various shapes and sizes, to see just how many differ-

ences can be found. It is a curious fact that there is much more variation in the leaves of young trees of both species—and of other species too—than in those of mature trees.

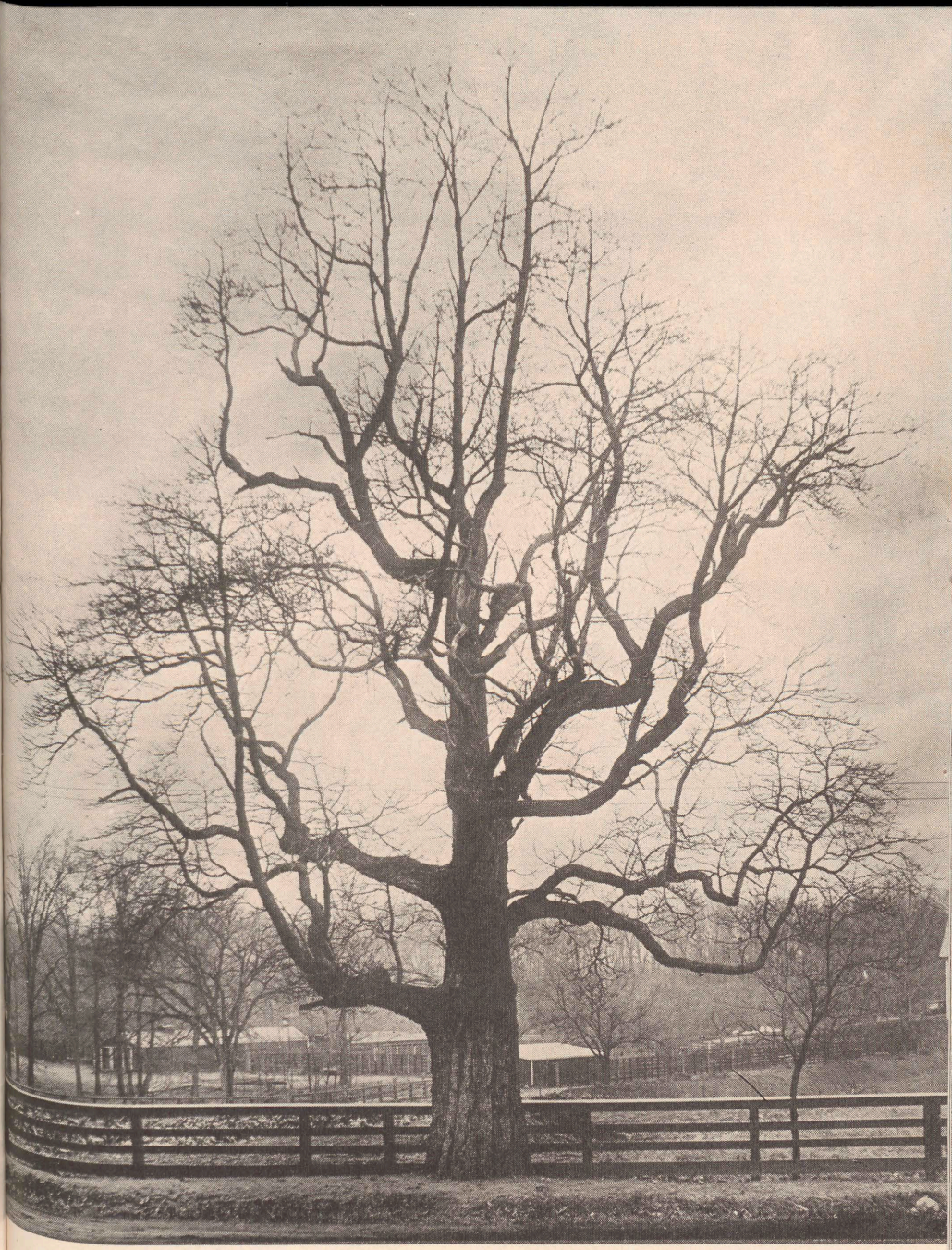
In size the sassafras ranges from a shrub to a large tree. On the higher mountain slopes it is only a shrub; in the upper South it is seldom over forty feet high or a foot in diameter, while in the Middle and Gulf States its height sometimes reaches ninety or even a hundred feet. According to Sargent, under very favorable circumstances it may occasionally have a trunk diameter of six or seven feet.

Aromatic Wood, Bark, and Roots

Most of us have tried nibbling the dainty green winter buds for their aromatic flavor; for these, and also the twigs, bark, and especially the roots of the sassafras are spicy and aromatic. They formerly were believed to have great medicinal and tonic value.

For over two centuries this belief persisted, and quantities of sassafras root and bark were shipped to Europe. The tree was also early introduced to European gardens and nurseries. So great was this demand for sassafras that history was made by it. The first ship that John Smith sent back to England is said to have been loaded with sassafras root and bark, and one of the early attempts to settle New England was for the purpose of obtaining a steady supply of these products for the old countries. In Virginia, in 1610, it was among the many articles required to be sent home to the mother country by the daughter colony.

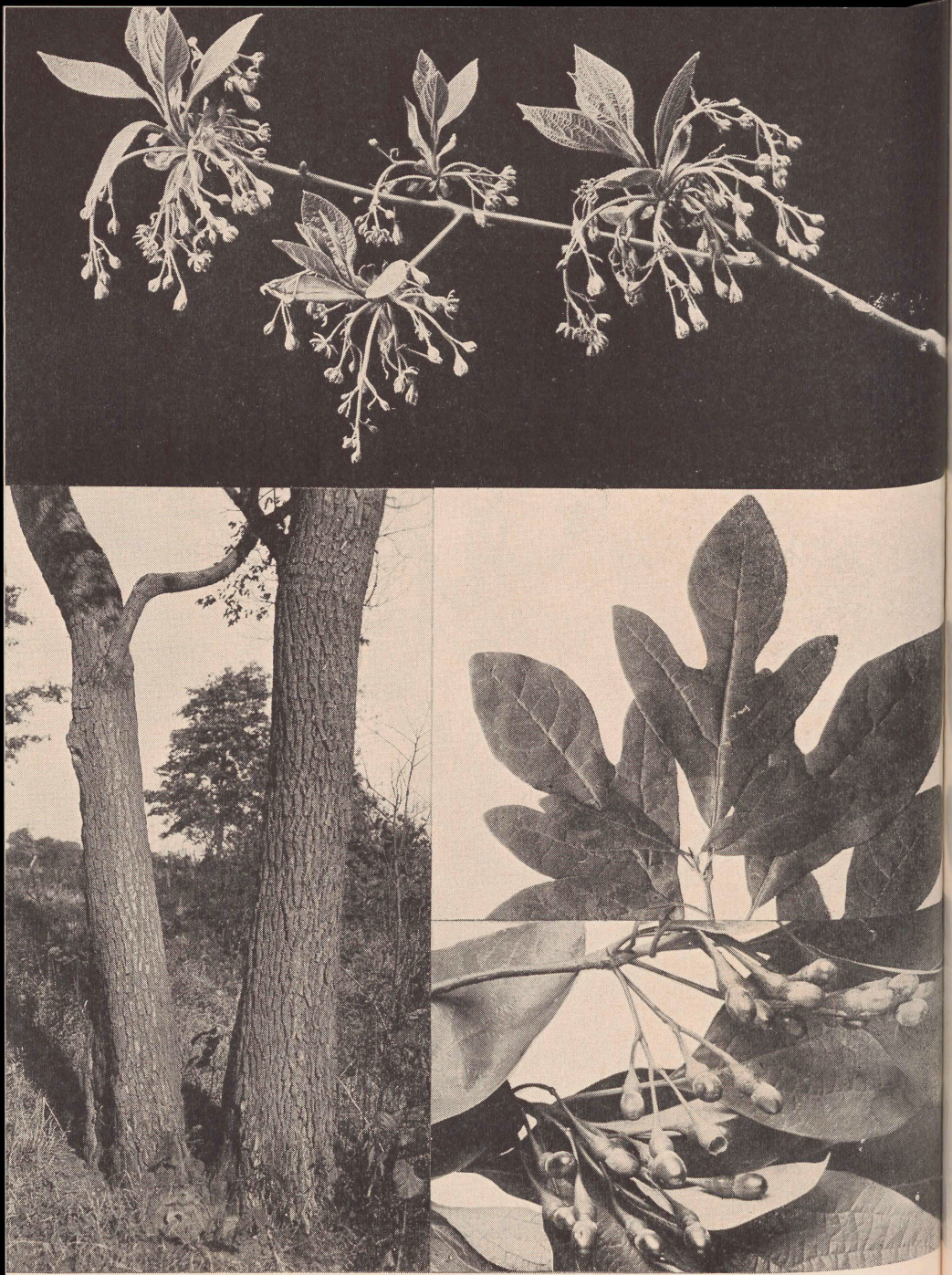
Today much of the tree's medicinal value is discredited, but sassafras is still in use as a mild stimulant, as a perfume for soaps, and as a flavor for bad-tasting medicines. If it were not for this tree we'd probably often make still more wry faces over some of the bad doses we have to take. The twigs are also mucilage-like, and children sometimes experiment in making a home-made glue from them. From the Choctaw Indians early



Courtesy U. S. Forest Service.

SASSAFRAS (*Sassafras variifolium* Ktze.)

The largest known sassafras in the country, in Madison, New Jersey. It is seventy-five feet high and has a trunk diameter of five feet at the ground.



Leaves may be entire or mitten-lobed; fruits are blue berries set on scarlet clubs on long stems; bark thick, reddish-brown, and deeply furrowed. Note half-opened male flowers and young leaves above; also the three forms of leaf on same spray. (Sassafras.)

settlers of Louisiana learned to use the powdered leaves and twigs as flavoring and thickening for their gumbo soups.

Fishing Poles for Boys

The bark of the trunk is thick, reddish-brown, and deeply furrowed; that of the young twigs is green. A noticeable trait of the tree, which will help in its identification especially in winter, is the cracking of the bark, which begins on young stems. Country boys who, like the late Dr. Henry Van Dyke, are "only wishing to go a-fishing," find that by cutting long limbs of sassafras and stripping them of their leaves they have excellent fishing poles.

From four to six inches long, with or without lobes, the simple, alternate leaves are thin and bright green, with entire margins. The flowers are of two kinds, usually on different trees, and open with the first unfolding of the leaves. They are delicate, greenish-yellow stars arranged in drooping racemes that are clustered at the ends of the twigs. The male tree bears the more attractive flowers and so is the more ornamental in spring, but it is the female tree which bears the beautiful, shining blue berries set on scarlet, cup-shaped stems.

How the birds do love these berries! So much so that they often eat them before they are fully ripe. Bright eyes, greedy beaks, and fleet wings early make the rounds of the fruit-bearing sassafras. Birds are usually "paying guests," however, and in this case they certainly "pay as they go" by acting as tree planters and scattering the seeds far and wide.

The tree also propagates by root suckers, and as these are often produced in great abundance, a parent tree may soon have a healthy, prolific family extending in all directions and filling up waste places. Sassafras seems to like particularly fence-rows and abandoned, neglected fields. However, because of the large, fleshy roots which penetrate deep into the ground, sassafras trees are difficult to transplant, and therefore only very young plants should be selected for this purpose.

Decorative, long-lived, and almost free from disease, the sassafras should be used more as an ornamental tree in parks, gardens, lawns, and streets. In spring the reddish-green, velvety leaves and green-gold flowers create a delicate picture; in autumn the scarlet and gold leaves offer a pageant of their own, and the blue berries on their scarlet stems spread a feast for our winged friends. And in the winter, when we most need interest and beauty, the terminal flower buds and the bare red-brown bark and smooth green branches offer delightful contrasts.

Cradle for Young Swallowtails

Is it, we wonder, because the tree offers such a dainty and fragrant cradle that the graceful black, green-clouded swallowtail butterfly so often chooses the opening leaves on which to lay her tiny green eggs? Or is it just that she instinctively knows that her young, during the caterpillar stage, particularly like its leaves for food?

Sassafras grows from southern Vermont west through Michigan and Iowa and south to Florida and Texas. For a long time it was supposed to be native only to eastern North America, but in recent times a sassafras, a very close relative, has been discovered in China. Before the last Great Ice Age a sassafras grew in Europe. It survived three stages of this glacial invasion, only to lose out and become extinct there during the final one.

Our Sassafras belongs to the *Lauraceae,* or laurel family. Strange to say, it is *not* related to the Mountain Laurel and the rhododendrons, but to the Red Bays.

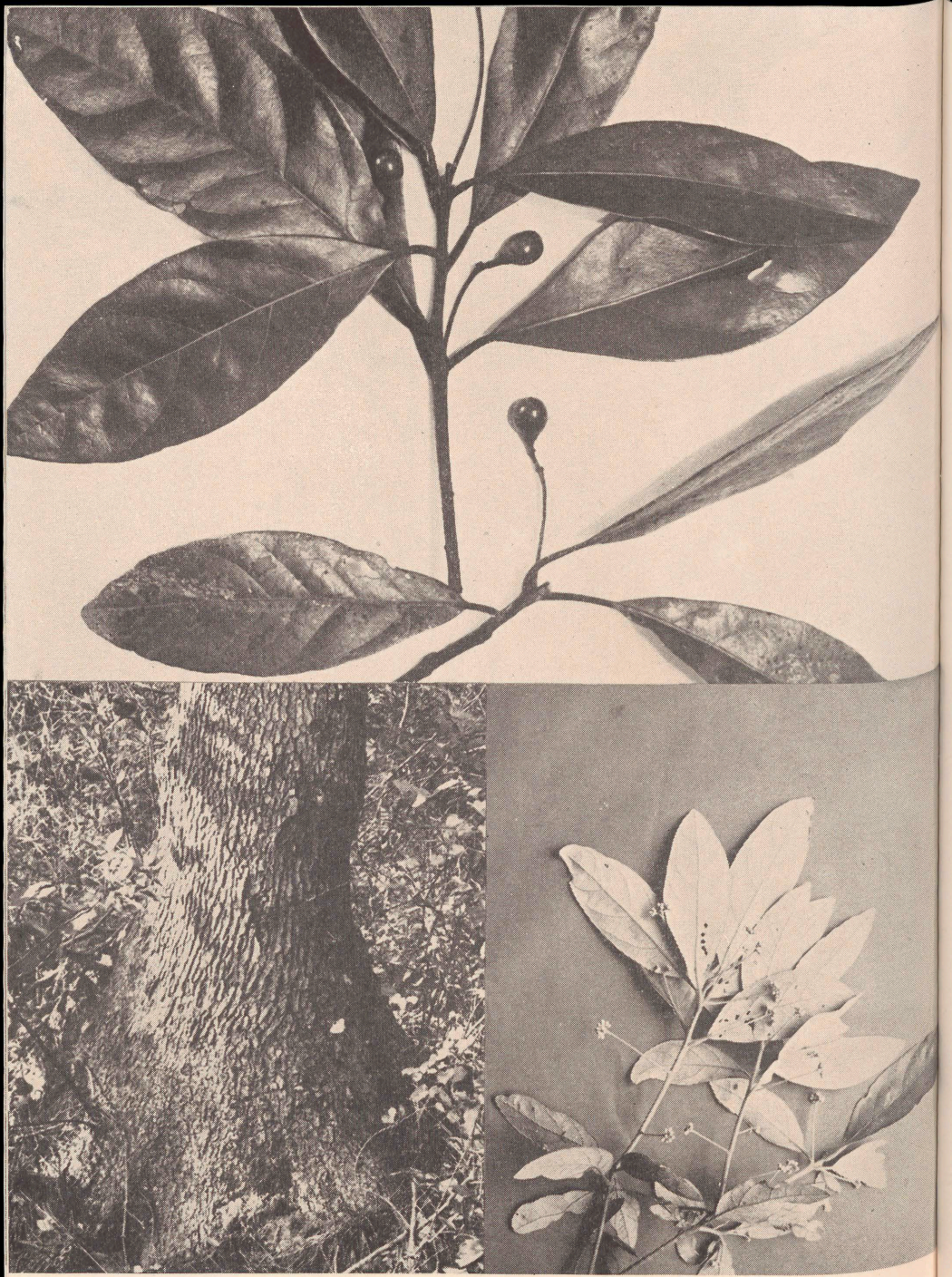
The Red Bays (*Persea*)

The woods were made for the hunters of dreams,
The brooks for the fishers of song;
To the hunters who hunt for the gunless game
The streams and the woods belong.

—SAM WALTER FOSS.

By S. A. Grimes

RED BAY (*Persea palustris* Sargent)
A good-sized red bay framed by slash pines in a Florida forest.



Leaves evergreen and aromatic with entire margins; fruits small, shining, dark blue berries; flowers are small, inconspicuous clusters; bark thin, dull brown with flat scales. Trunk photograph is of an unusually large red bay in Florida. (Red Bay.)

The red bays are small, slender, aromatic, evergreen trees found in the coastal region of the southern states, and are extremely abundant in most shrub bogs and pine-barren swamps. True laurels, belonging to the family *Lauraceae,* they are related not to the mountain laurel (which, however, isn't a laurel at all), but to the sassafras.

The common red bay, or swamp bay, occurs in the South Atlantic and Gulf regions from North Carolina to southern Florida, Alabama, Mississippi, and eastern Louisiana. In some places it grows almost to the exclusion of other plants.

Seldom does this tree reach more than thirty or forty feet in height, and the straight trunk only rarely exceeds a foot in diameter. The thin, dull brown bark, usually not over a quarter of an inch thick, is irregularly divided by shallow fissures, which break its surface into flat scales.

The wood is heavy, but soft and strong, and of orange color streaked with brown. When large enough for use it furnishes a beautiful close-grained wood for the cabinet-maker, or for interior finish; but the tree is usually so small that it has no commercial importance.

Perhaps the leaves are the most interesting thing about the red bay. One way to identify the tree is to crush them and note their fragrance. They are narrowly oval and equally pointed at both ends, three to six inches long, one to one and three-fourths inches wide, and rather leathery. Their margins are slightly wavy. The leafstalks are thick and covered with down of a rusty brown color; the conspicuous veins of the blade are also downy. According to Dr. B. W. Wells, in *The Natural Gardens of North Carolina,* "there is an aphid or plant louse which has the habit of making a gall on the leaf margin by causing an overgrowing and incurling in places. . . . Since hardly a tree escapes its attacks, these marginal galls help" in identifying the species.

The inconspicuous, creamy to white, small, perfect flowers are tiny bells growing in clusters along the side of the twig.

They bloom in June. The fruits are dark blue berries, about three-eighths of an inch long, with a hard seed and thin aromatic flesh.

The smooth red bay is a small tree similar to the red bay. It may be found in rich moist soil along watercourses. It seems to have a relatively narrow range along the coast from Virginia to Georgia, but is more widely distributed in Florida. It also grows in the Gulf region to eastern Texas, and northward through Louisiana to southern Arkansas.

The chief distinguishing point between the two trees is that this bay has leaves that are smooth beneath, giving the tree its common name. The leaves are also slightly smaller and narrower than those of the red bay.

The Pawpaw (*Asimina*)

The Pawpaw is a little tree,
A brave and lusty fellow,
Whose leaves in June are bottle green,
In autumn, rusty yellow.

It grows upon the river banks
Deep in the misty shade,
And lifts against the orange sky,
An emerald barricade.

—TRAVIS TUCK JORDAN.

"Wild banana tree" is what children sometimes call this, our lone representative of a large tropical family of trees bearing valuable fruits. It isn't of course, related to bananas at all, but belongs to the custard apple family—the *Anonaceae*. The scientific name *asimina* comes from our early French settlers.

This little tree, or shrub, is a good example of a "shade-tolerant tree"—a tree that can grow in the shade of other trees. After all, if it can't grow up tall to find room among the tree-tops of the forest, isn't it well that it should find a place for

By J. Horace McFarland

PAWPAW (*Asimina triloba Dunal*)

A small, shade-tolerant tree or shrub, rarely reaching this size. In the South it is more common in the piedmont than elsewhere.

Simple alternate leaves cluster near ends of twigs; solitary flowers are reddish-brown; fruits resemble stubby bananas and give tree its common name, "wild banana tree"; bark dark brown and close-fitting, slightly fissured, and often dotted with pale scattered blotches. (Pawpaw.)

itself in the "under-story"? Trees that cannot grow in the shade of other trees are called "intolerant trees."

So successful is this little tree or shrub that in the Mississippi Valley, where it is most abundant, it often forms immense thickets. Seldom does it grow over fifteen feet in height, or with a trunk diameter of over three inches, but occasionally, under most favorable circumstances, it does reach thirty feet and a diameter of eight to twelve inches.

In a way, perhaps, the pawpaw makes up for its very small size as a tree by its very large leaves, which are from four to twelve inches long and three to five inches broad. Simple, alternate, oblong, wider at the tip than at the base and with entire margins, they are dark green above and paler beneath. In autumn they turn rusty yellow.

Unusual Flowers and Fruits

The perfect, solitary flowers are more unusual than attractive. They are at first green, then reddish-brown in color and about three-fourths of an inch across. There are six rather thick petals, in two rows of three each, the outer row the larger and the inner row containing a drop of nectar. The blossoms come out in early spring, when the leaves are about one-third grown.

The fruits, resembling somewhat a small, imperfect banana, account for the name children occasionally call the tree. This fruit is three to five inches long, and the skin, at first greenish, turns a dark brown. When ripe the pulp is soft, very sweet, and rather custard-like—and also to some people rather tasteless, though others are quite fond of it. The wrinkled seeds are flat and oblong and about an inch long and half as wide.

Dark brown and close-fitting, the bark is slightly fissured and often dotted with scattered pale blotches. The trunk is very straight, and the pale, greenish-yellow wood is light, weak, soft, and coarse-grained. It is of no commercial importance.

Though the pawpaw is not very common east of the Alle-

gheny Mountains, it has a rather wide range, for it is found from New Jersey and New York westward to Michigan and even to Alaska, and southward to Florida and Texas. It is most abundant on the river and stream banks of the Mississippi Valley.

THE SWEET GUM, THE WITCH HAZEL, AND THE SYCAMORE

The wind is wearing a wistful hint
Of autumn perfume today;
And the sweet gum tree on her green leaf gown
Has pinned a scarlet spray.

—LUCY CHERRY CRISP.

THE SWEET GUM (*Liquidambar*)

"A TREE WITH WINGS" sounds a bit like a fairy tale, or something Alice might have found through the looking-glass or down the rabbit-hole.

But a modern Alice need not go to either place in search of such a tree, instead only out to a nearby meadow, swamp, or ravine. And there, the little balls dangling as though they were dancing with a tambourine, may be a sweet gum tree. If Alice looks at the tree closely, she may see the corky wings which are often attached in plates edgewise to the small branches and twigs of the tree. Not always, however, for though this is usually an identifying characteristic of this species, not all of them have the "corky wings."

As a rule, says Sargent,* they develop in the second season on the upper sides of lateral branches, and irregularly on all sides of the vertical branches. These corky layers increase in width and thickness for many years, sometimes becoming two or three inches broad and an inch thick. The only other tree of the South which has similar "wings" is the winged elm, and its "wings" as well as the twigs and buds, are much finer,

* *Manual of The Trees of North America.*

so there is no confusing the two trees. The bur oak also has "wings," but it is found only in the more western of the southern states.

Another identifying mark of the sweet gum is the little balls, brown in the winter, which hang on long stems, dangling in the same merry way as do those of the sycamore. Though rather similar in size and color to those of the latter tree, they are far different in texture. The sweet gum balls are spiny—a sort of Mother Nature's perforated rattle; the wind shakes them and out dance the very minute winged seeds, not unlike those of the pines in shape, though not in size. These balls also serve as aerial lunch counters for wandering troops of goldfinches and other hungry birds.

Sheds Balls Earlier Than Sycamore

Though from a distance their hanging balls are somewhat similar, there isn't much chance of mistaking the sweet gum tree for the sycamore, for the former has a habit of shedding its outer, loose bark and showing the whiter layer inside. At close range the balls, too, are quite unlike, for those of the sycamore are smooth and fuzzy in texture, while those of the sweet gum are prickly and, when ripe, show openings where the seeds have been discharged.

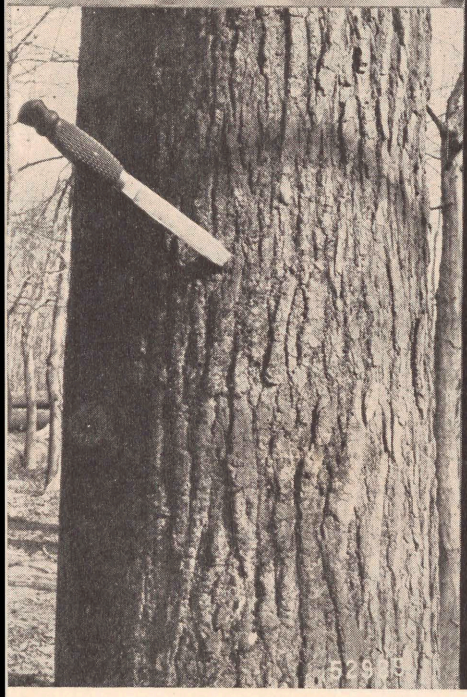
There are so many ways of identifying a sweet gum that no one should be without this interesting acquaintance, which is one of our most valuable, large forest trees. It is found in rich bottomlands, swamps, and low swales subject to frequent overflow, and occurs also on drier uplands. Though it is absent in the higher mountains, it does grow along streams of the lower mountains. Its range is from Connecticut westward to Arkansas and southward to Florida, and even through the mountain ranges of Mexico and Central America. However, it is rare in the northern part of its range and is distinctly a southern tree.

A handsome tree, in fact, one of the fairest trees of the South,

By L. W. Brownell

SWEET GUM (*Liquidambar Styraciflua* L.)

A green starred nymph in summer, a gaily bedecked gypsy in autumn.



Star-shaped leaves; queer erect male flowers; small female hanging ball flowers; bark light gray, deeply furrowed; corky layers or "wings" grow on twigs and branches of most sweet gums. Note previous year's prickly seed ball; it is perforated and contains tiny winged seeds. (Sweet Gum.)

the sweet gum sometimes reaches a hundred and forty feet in height, with a trunk diameter of four feet. It comes back easily as second growth in old fields and in cut-over woods. The heavy and moderately hard, close-grained wood—with whitish sapwood and reddish-brown heartwood—is extensively used in the manufacture of furniture, especially for veneering. It takes stain well, and is often used for cabinetwork in imitation of oak, maple, cherry, and mahogany. In the past, hard wooden blocks of sweet gum were used in street paving.

The bark, lightish gray, tinged with red, becomes deeply furrowed as the tree gets older. The sharp-pointed winter buds are orange-brown, one-fourth inch long. The inner rows of the scales enlarge with the growing shoot and become nearly an inch long. Mother Nature, apparently wanting to hasten the coming of spring, gets out her paint-box and touches up the tips of these with red.

Star-like Leaves

The simple and alternate leaves, from three to five inches in size, have five to seven lobes or "star-points," with finely-toothed margins. Some people confuse them with maple leaves, but maple leaves are always opposite. When the leaves of the sweet gum first come out they are pale green and downy; when full grown they are smooth, shining green above, paler below. And in the autumn—well, in autumn they "run the gamut of Nature's palette"—yellow, ochre, burnt sienna, wine, crimson, purplish-blue, lavender, indigo, and cobalt.

The leaves are about half-grown when the flowers come out, and too few people know these lovely flowers. There are two kinds on the same tree. The pollen-bearing ones are in terminal erect racemes; the seed-producing ones are solitary heads that develop into the prickly balls.

The scientific name for this tree is *Liquidambar styraciflua*. The "ambar" refers to the fragrant balsamic resin. This "sweet gum" which oozes from the tree, gives it its common name.

It is not so noticeable in the trees in the North, but the flow increases in trees farther south. In our section children chew it for gum. In Mexico this gum is an article of commerce, obtained by wounding the bark of the trees. It is used for medicines, perfumes, and incense. Tradition says it was used as incense in the religious ceremonies of the Indians of Central America.

Though sweet gums and sour gums are both common in the South, and may often be seen growing near each other, they are not in any way related. Strange though it may seem, the sweet gum belongs to the witch hazel family, *Hamamelidaceae*.

The Witch Hazel (*Hamamelis*)

Witch hazel bough! witch hazel bough!
Strange time it seems to blossom now!
The sky is gray; the birds have flown;
With rustling leaves the ground is strown;

. . . . . .

But now, when woods and fields are bare,
And chill with coming snow the air,
All wreathed with springlike bloom art thou,
All decked with gold, witch hazel bough.

—MARION DOUGLAS.

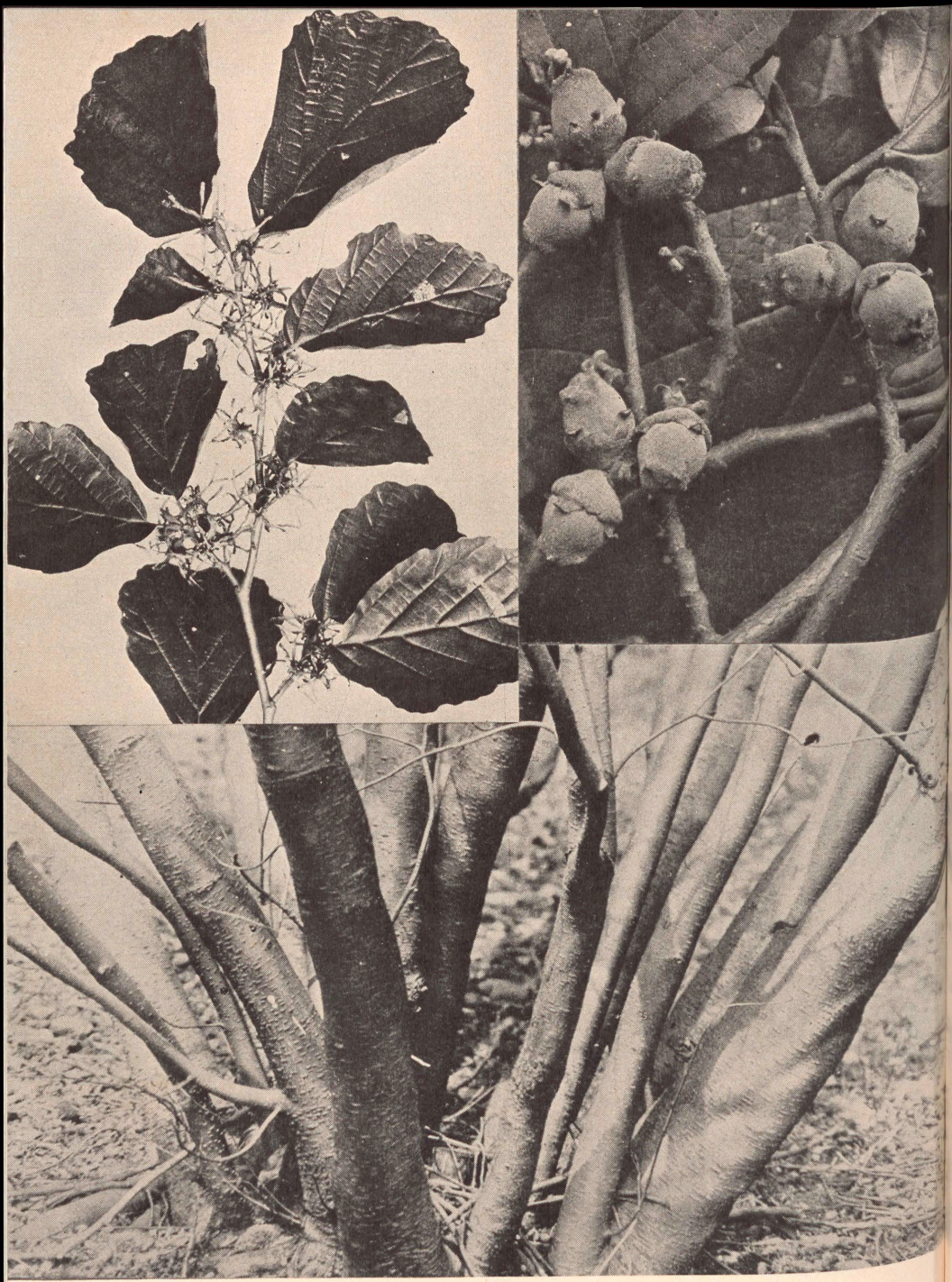
A shrub or small tree that blooms in November or even December! Surely it must have become mixed up on the seasons, or perhaps, like Rip Van Winkle, it went to sleep and wakened to strange things. What a queer woodland world the blossoms of the witch hazel look out upon! Some of the trees are wearing sere, brown leaves; others are decked out in brilliant colors, while still others are bare; but no other tree has flowers. Squirrels are scampering about gathering nuts, and sometimes there is even snow on the ground.

But the witch hazel blooms on, its starry flowers adding their bit of color to lighten the wintry landscape. Nor are fall flowers all that is odd and interesting about this shrub or tree.

By J. Horace McFarland

WITCH HAZEL (*Hamamelis virginiana* L.)

A November bloomer. In our mountains it becomes a small tree.



Leaves unequal at base with wavy margins; petals long, narrow, and crumpled; fruits two-valved woody capsules that pop open and "shoot" the seeds; numerous diverging stems instead of single trunk, with scaly bark. Flowers come out very late in the fall. (Witch Hazel.)

Rambling through the woodland you might suddenly feel a nip or sting on your face or hand—or even hear a faint report. Glancing around, you would see nothing unusual, and might begin to wonder whether woodland elves were playing an elfland game of bean-shooting—or perhaps bombarding an enemy. But if you were to watch patiently, you might perhaps solve the mystery, for these tiny woodland shots are the witch hazel's way of scattering its seeds.

These seeds come from a fruit which, when ripe, is a dry brownish capsule, thick and woody. The "shooting" is caused by a contraction of the horny lining of the capsule upon the smooth, hard polished seeds. This contraction continues until the enclosed seeds are explosively discharged, somewhat as we "shoot" a slippery lemon or apple seed by pressing it between thumb and finger.

Witch hazel seems to require a frosty spell or night to open the husks, and a dry warm day to do its "shooting." Those are the days to go "witch hazeling" in woodlands and ravines. Once, on a field trip, some school children and I were sitting quietly watching a bird, when suddenly we saw a "shooting seed" hit a gray squirrel right on the nose! And did that squirrel run! He fairly flew!

"Witch Hazel Arithmetic"

Each fall the children would bring branches of this shrub into the schoolroom. How anxiously we would watch for their popping, and how carefully we measured the distances the seeds had been shot! Even the small children liked this kind of arithmetic and would carefully figure distances. Linear tables, yards, feet, inches—even fractions—did not seem such a task then. We never had any that "shot" more than fifteen feet, but a New England naturalist, studying this shrub, once recorded an actual distance of forty-five feet.

Though usually a shrub from six to twelve feet high in most places, the witch hazel becomes a small tree on the slopes of

the Allegheny Mountains, especially in the Carolinas and Tennessee. Occasionally it reaches twenty-five or thirty feet, with spreading, crooked branches and a short, scaly-barked trunk twelve to fourteen inches in diameter.

The leaves, nearly as broad as long, vary from three to six inches in diameter, with sides unequal and margins roughly scalloped. The veins are most prominent on the under side and are much lighter in color than the rest of the leaf.

Galls—Apartment Houses for Insects

Most people are first puzzled by, and then interested in, the tiny spur or horn-like projections on the tops of many of the leaves of witch hazel. These are galls, homes of insects. So cleverly are they made that "each has a tiny door opening on the under side of the leaf." * They are occupied by aphids, or plant-lice.

The flowers appear in the axils of the leaves, or, if these have already fallen before the blossoms appear, just above the leaf-scars. Usually these perfect flowers are in clusters of threes, occasionally more. The four pale or golden yellow threads are the petals, so airy and graceful they might be ribbons for tree-fairies—if tree-fairies ever wear ribbons. While in the bud these petals are "rolled inward in a close spiral, like a watch-spring." So tightly are they coiled that each bud is a solid little round ball, and when the petals do unroll they remain crumpled and wavy.

After these golden petals fall, the calyx forms a beautiful little green urn which holds the slowly-developing seed. As the flowers bloom so late, they cannot form fruit the same season, but take a full year to mature. Thus the seeds of this year's blooms will be "shot" *next* fall.

In spring, when most other trees and shrubs are on blossom parade, the witch hazel might not seem particularly attractive or interesting to the uninitiated. But, if you are like the

* Anna B. Comstock, *The Handbook of Nature-Study.*

elephant's child, full of " 'satiable curiosity," like him you'll go poking your nose into all sorts of things, asking questions and seeking answers about everything. And many of these questions you can ask, and then answer for yourself. And so, some day in the spring, if you'll look closely at the new shoots and at the bases of the leafy spurs, you'll find several green knobs, so tiny they will be missed if you are not chuck full of that " 'satiable curiosity!" These little green knobs are the "shooting" seed-pods of the following fall.

The tough and fibrous wood is white, with a light reddish-brown heart. Commercially it has no value, and the tree's real worth is in ornamental planting. In the past an extract distilled from the leaves and branches has been used for cuts, bruises, and inflammation, as the Indians early taught the white man to use it. Though it is now claimed there is no medicinal value to it, old beliefs often die hard, and witch hazel extract is still rather common in home medicine closets.

Another early use of the witch hazel was for divining rods to locate water, valuable minerals, or even coal deposits. According to the tradition, a forked twig whose "Y stands north and south must be chosen, for the rising and setting sun must have sent its rays through the prongs as it grew." The "diviner" carries the forked twig just so in his hands, the stem thrust forward, while he walks slowly backwards and forwards. If the wand points downward, water, or whatever is being sought, is supposed to be in the ground beneath. In some of the remoter parts of the country this custom still lingers.

The witch hazel group is confined to eastern North America and to eastern Asia, the latter locality having two or three varieties while we have but one. The range of the witch hazel in this country is from Nova Scotia and the valley of the Saint Lawrence River southward to northern Florida and eastern Texas. In all of its range it prefers edges of woodlands or rocky banks of streams or ravines. In the South it attains tree size only in the mountains, but as a shrub it is common along

streams and moist woods through the piedmont, and less frequent through the coastal region.

The Sycamore (*Platanus*)

Clear are the depths where its eddies play,
And dimples deepen and whirl away;
And the plane tree's speckled arms o'ershoot
The swifter current that mines its root.

—WILLIAM CULLEN BRYANT.

One of the easiest trees to distinguish, especially in the winter landscape, is the sycamore, also called buttonwood, or plane tree (*family Platanaceae*). This tree "sheds its bark as well as its leaves," and from a distance may be so glistening white as sometimes to be mistaken for a white birch. But the latter, we remember, is not native to the South.

Trees have characteristic barks which differ not only in texture and surface appearance, but in the manner in which they are shed. The bark of the shagbark hickory, the red cedar, the arborvitae, the southern white cedar, and the bald cypress comes off lengthwise in long strips; that of the birches peels off crosswise; but the bark of the sycamore is cast off "just any old way."

All trees must shed their bark to some extent. It is a necessity of their manner of growth, their way of yielding to the growing part of the wood beneath the bark. If a tree were like a grasshopper, for instance, it could shed its bark, or outer covering all at once, then grow a newer larger "skin." It could do this several times during its growth period, and each time the new covering would be larger. But since a tree isn't built that way, it must shed its old coat as best it can, in strips, or flakes, or scales in varying sizes and shapes. This shedding is more noticeable, however, in the sycamore than in any other tree. It is because its bark is so rigid there is no "give" to it, as there is in the bark of some trees—the beech, for example.

Courtesy U. S. Forest Service

SYCAMORE (*Platanus occidentalis* L.)

In Natural Bridge National Forest, Virginia. Sycamores always grow along streams or in low, moist places. Note stream at left of tree.

Flowers of two kinds on same tree. Note flowers and opening leaves (lower right); hanging seed balls composed of numerous single seeds with tufts of hairs; leaf petiole with enlarged hollow end which fits snugly over next year's bud. Mottled trunk shows where bark has been shed. (Sycamore.)

The surface thus exposed in the sycamore is a mottled greenish-white or grayish-brown-white, which from a distance appears to be a dead white. The tops of the trees show this whiteness most, for they retain far less outer bark than the lower parts of the tree. Sometimes practically all of the bark seems to have been shed from these upper branches. As the tree grows older, the shedding stops on the lower part of the trunk, which becomes covered with fine-checked plates of rusty brown.

Our Largest Hardwood Tree

Common throughout the South, the sycamore is found in every state east of the central prairies, and is considered the largest of the hardwood trees. It likes the borders of streams, lakes, ponds, and marshes, and thrives in rich bottomlands. It is most abundant and of largest size on the bottomlands of the streams in the basin of the lower Ohio and Mississippi rivers.

At maturity this tree occasionally attains a height of one hundred forty to one hundred seventy feet and a trunk diameter of ten or eleven or even more feet. The spreading limbs near the top make an irregular head, sometimes with a spread of a hundred feet. In old age the massive trunk is inclined to become hollow. Before the coming of the white man to this country, swifts used to nest and roost in hollow trees. John James Audubon, the great bird man, writing of his trips in the wilderness, told about finding an unusually large hollow sycamore, in Kentucky, in which he estimated there must have been nine thousand swifts roosting.

Another characteristic of this tree is its occasional fondness for forking into several large secondary trunks. This makes it a most graceful tree. At the edge of the meadow just beyond our woodland is a small ravine containing my favorite sycamore, a perfect four-trunked one. The main trunk divides about a foot from the ground, and towers upwards in a graceful

clump. The branches are unusually white, and the tree, lifting its great arms into the blue sky, creates an artistic picture. In front is a low-growing dogwood which, in autumn coloring, is a flaming scarlet against the glistening ivory of the larger tree. In spring, when the dogwood is a mass of white bloom, the two trees are a symphony in white flecked with jade-like green.

Puzzle—Find the Winter Buds

The leaves resemble somewhat those of the maples, but are larger and more deeply lobed, and their width is greater than their length. They are simple and alternate, four to nine inches long, and when full grown are a bright green on the upper surface and paler beneath.

We have already learned that each leaf has a baby bud to which it acts as a protector. But, where *are* the buds of the sycamore? The search for them can be turned into a puzzle game that may create a lot of fun before they are found. Eventually they will be discovered—snugly concealed beneath the enlarged base of the petiole. The stipules, which occur at the base of the petiole and in this case are grown together, look like a fairy edition of the regular leaf, and help to identify this tree.

In winter the smooth, reddish-brown, pointed buds are each *surrounded by* a leaf-scar. And, if the stipules are gone, the stipule scar, which encircles the twig, also tells the tree's name, as plainly as though it were written on it. The flowers, of two kinds, are on the same tree, often the same branch. They are not very showy, and as they come out in April about the time the leaves begin to develop, many people never notice them at all.

Mother Nature must also love the striking effect of her sycamores in her landscape panoramas, for she has evolved a clever way to scatter their seeds long distances. Their one-seeded fruits are grouped in balls about an inch in diameter,

which hang tenaciously from the slender three-to-six-inch stems. In a light breeze these balls sway gently, but in strong winds or storms they often whip against a twig or branch violently enough to loosen the fruits, or *akenes*. Each akene has a tuft of hairs at the base which acts as a sail, enabling the seeds to ride long distances on the winds. And so it is that young sycamore seedlings often spring up far from the parent tree. But they are seldom far from water, or from a low, moist ravine. A seedling, or young sycamore, may be transplanted to a street, upland meadow, or hill; but the seeds themselves take root less readily in such a place.

The wood, though it decays rapidly in the ground, is otherwise hard and moderately strong, and has many uses. Due to its evenly spaced, small medullary rays, it has an exceedingly beautiful grain. It is therefore used to some slight extent for furniture and interior finish. And because it is odorless, and thin pieces can be nailed together without splitting, it is often used for tobacco boxes. Some of the larger logs, because of their great size, are cut in sections for butchers' blocks—a sad ending for monarchs of the forest!

THE ROSE FAMILY

(ROSACEAE)

Some beside the zigzag fence
Lean their foreheads, white and pure;
Some above the broom-sedge dense
Reach white arms in spicy lure,
Like fair Naiads breathing balm
Of the mellilite and palm.

When the bands of wild bees come
Swooping down like buccaneers,
Heedless of their tropic hum
Every blossom laughs, nor fears
Aught such tiny foes can do,
Brigands of the breezy blue.

—SAMUEL MINTURN PECK.

PLUMS, cherries, apples, crab apples, hawthorns, June-berries, peaches, and pears, as well as the common rose, and the strawberries, raspberries, blackberries, and dewberries, belong to this family. No wonder it is one of the largest and most important in the world, with some species cherished because of their delicious fruits, others because of their beautiful flowers.

In this family the leaves are more often simple than compound. They are never opposite. The flowers, appearing in early spring or summer, are almost always showy and often fragrant. And they are nearly always perfect.

THE WILD PLUMS (*Prunus*)

Wild plum thickets! One should have had pioneer ancestors on the western prairies to appreciate fully what the fruit of

these plums meant. One of my earliest recollections is of a family picnic and "plum picking" on a small river bank on the Iowa prairie where I lived for a few years as a child.

At that late day Iowa had plenty of fruit trees. But my great-aunt had been a pioneer, and the "old settlers" still liked to go and gather "wild plums"—perhaps for sentiment's sake. For in the old days, before the cultivated fruit trees were large enough to bear, wild fruits and berries and nuts were eagerly sought. And even in later days, plum butter, spiced plums, and plum preserves had an honored place on every good housewife's shelves. These plums had a wild, sharp, tangy flavor that the cultivated fruit lacked. And how good they were with meats, on some winter day when blizzards howled across the bleak prairies!

Our wild plums are real Americans. Long before Columbus, or even the legendary Norsemen, set foot on these lands the Indians were gathering their fruits. They even dried large quantities of them for a winter fruit supply.

Other northern lands besides our own have these plums also, for they are well distributed throughout the whole northern hemisphere. In North America there are several native plums, but only a few of them reach even small tree size. Nearly every section of the country has its own kind, sometimes several kinds and each can be improved with cultivation. Not only can they be improved themselves, but our native wild plums are of such sturdy stocks that they have been widely used to infuse new life and hardiness into the cultivated plums which came to us by way of Europe. Through cross-breeding these native plums with the cultivated ones, plant-breeders have combined the hardy, self-reliant, disease-resisting qualities of the former with the improved flavor, texture, and size of the latter. There is much variability in the size, quality, and profusion of bloom of our wild plums.

The River Plum

The wild red, or yellow plum is known in the South as the river plum since it is often found along streams in the piedmont and lower mountains, and beside the larger rivers of the coastal plains. Though it ranges from New York west to the Rocky Mountains and south to the Gulf, it is generally recognized as a southern plum. The more northern form is called the Canada plum.

In our territory this river plum is a somewhat thorny tree reaching twenty to thirty feet in height, with usually not more than a six- or eight-inch trunk diameter. It reaches its largest size and is most abundant in southern Arkansas and eastern Texas.

At the arboretum at Chapel Hill, North Carolina, there is a row of these river plums by the stone wall and many others on the university campus. So fragrant and exquisite are they in bloom, verging from nearly white to a delicate pink, that they deserve a special pilgrimage of all beauty lovers. Dr. W. C. Coker, director of the arboretum, believes that some of them rival, or even excel, the far-famed Japanese cherry in delicacy and beauty. As an ornamental tree the river plum should be developed and used more in artistic plantings.

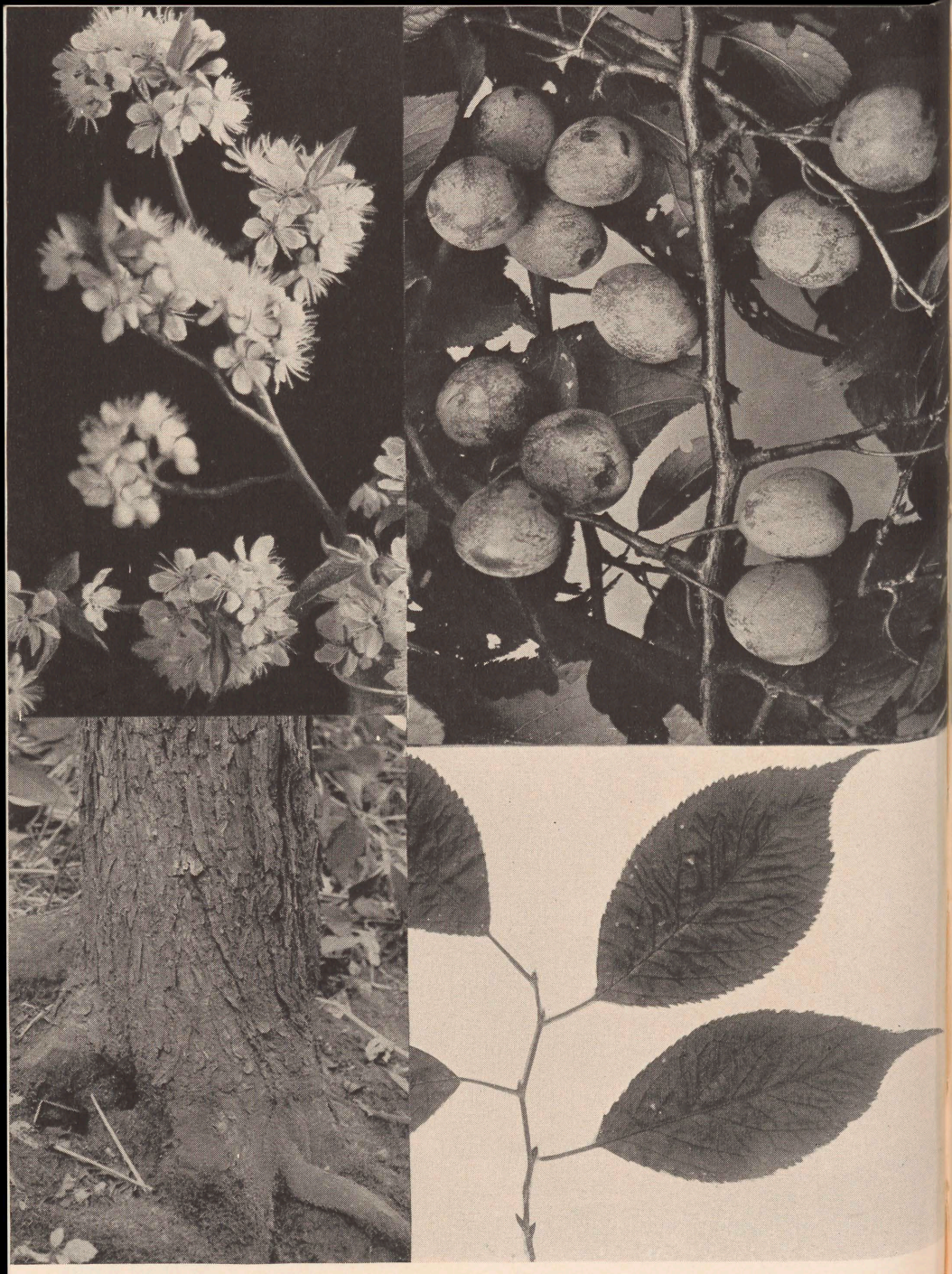
The leaves of this plum are oval, two and one-half to four and one-half inches long, one-half inch wide, and taper-pointed. At maturity the leaves are a lovely dark green above, paler beneath. They are about half-grown when the flowers come out. Their margins are sharply but finely toothed.

The fruits, which vary from yellow to bright red and dull purplish red, are a little less than an inch in diameter. They are probably less edible than the variety on the western prairies; nevertheless they can be used for making delicious preserves. Though they begin to ripen in August, some may usually be found still on the trees considerably later. At times, and in certain lights, these plums can glow like jewels. One

By Bayard Wootten

RIVER PLUM (*Prunus americana* Marsh.)

Row of river plums by the wall of the Coker Arboretum, Chapel Hill, North Carolina.



Blossoms variable, ranging in color from nearly white to delicate pink; bark gray, scaly, and picturesque; fruits vary in color from yellow to bright red to dull purplish-red; leaves sharply, finely toothed. (River Plum.)

summer day in a Pinehurst garden I saw a group of cardinals, three males and two females, feasting on them. The plums, varying in color from opaque yellow to red, seemed almost to repeat the color scheme of the birds.

This river plum develops a graceful, broad or rounded top of spreading thorny branches, and a short trunk with gray bark, which separates into large thin clinging plates. Though the wood is heavy, hard, close-grained and strong, it is of no commercial importance. The value of the tree is for use in grafting to improve cultivated stock, and as an ornamental tree in Nature's gardens.

The Chickasaw Plum

It is this plum, the plum of the "thickets" that is most familiar in the South, and that is one of our earliest harbingers of spring. About February or March I begin to long for plum blossoms and go hunting them; and, on a protected hillside facing the south, usually find some with swelling flower buds. This plum flowers before it puts out any leaves. A few dark, thorny branches, full of buds, arranged in a dull blue or gray pottery jar make an artistic Japanese arrangement.

The Chickasaw is smaller than the river plum and, spreading by its numerous suckers, forms the plum thickets so common on the edges of fields and in waste places from the coast to the foothills in all our southern states. Its small, narrow, shining leaves are strangely trough-like instead of flat. The margins are very finely toothed. The fruit is red or yellow, sweet and edible, and like that of the river plum, makes fine preserves.

Wild Plum Thickets and Old Zigzag Fences

On a recent trip through the country I was struck by the beauty of old silvery zigzag fences, several of which had for backgrounds clumps of wild plums just breaking into bloom.

Why, I wondered, doesn't the South, and every other part of the country fortunate enough to have these old fences, realize their beauty and save them? In some places they are being bought up and removed to enclose great estates. It is a loss to any field or roadside to tear them down, or to allow them to be moved. Because they add picturesqueness to the countryside, they are an asset to the South. More than that, they furnish the setting for many a natural garden, and provide home sites for many a small bird and animal. Because they attract birds, many of which are insect and weed destroyers, neighboring fields and orchards usually are the better for their presence.

Chickasaw plums seem particularly to like to spring up about these old fences. True southern trees, they are widely scattered, ranging now from Delaware and Kentucky southward, along the margins of fields and other waste places. Their real origin is uncertain; but there is an ancient Indian tradition that they were brought from beyond the Mississippi by the Red Man's forbears. For the Indians, too, appreciated the glowing red fruits.

How much they add to the landscape, these wild plums of the South! In spring the dark thorny branches with their profusion of bloom resemble a Japanese water color; in summer the delicate foliage is a cool rift of green; in autumn the greenish-brown leaves are a mosaic in bronze; and in winter the bare, dark thorny branches are black etchings against wintry skies.

May every Southerner spare his wild plum thickets!

The Wild Cherries (*Prunus*)

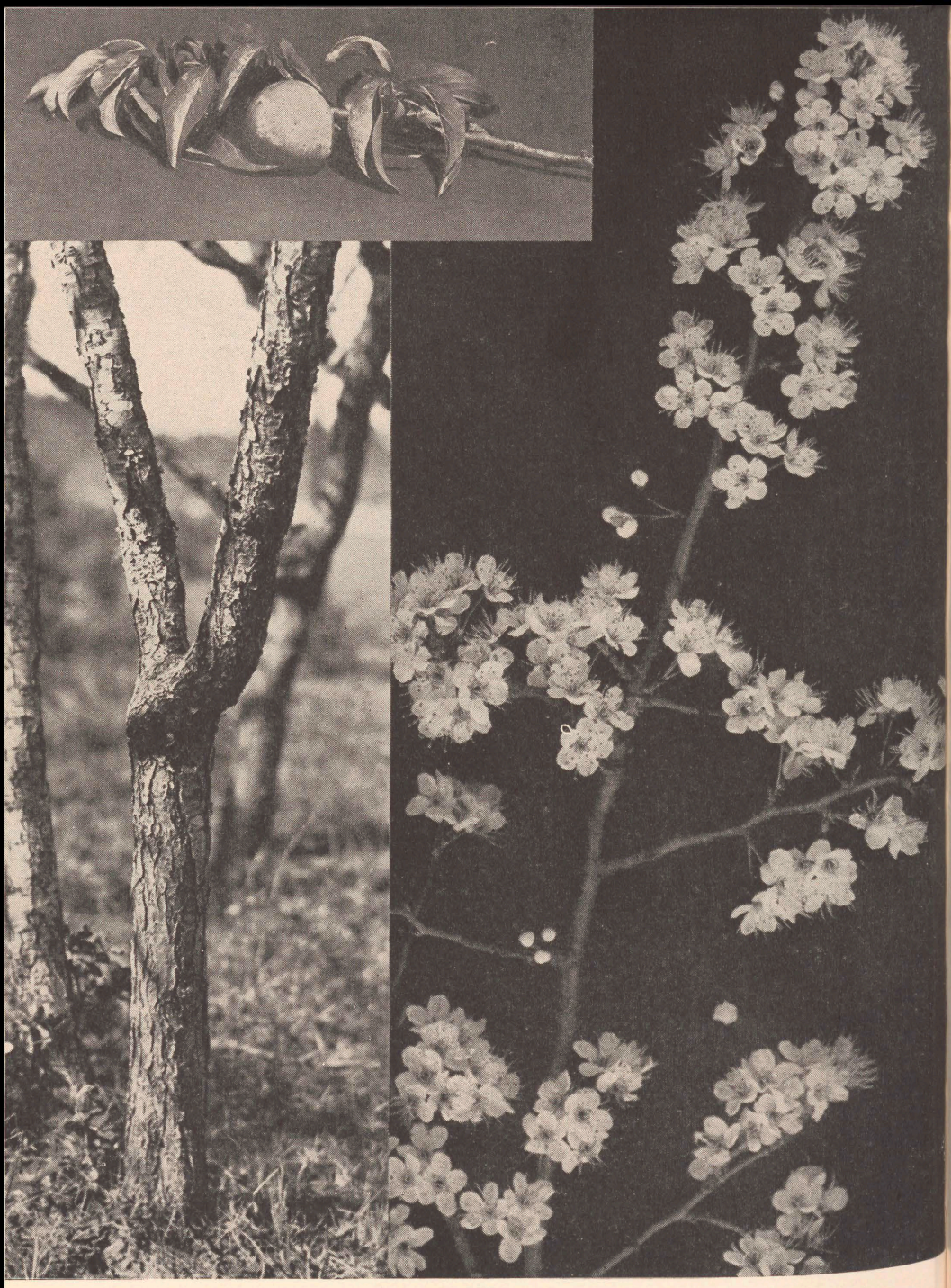
I think of the garden after the rain;
And hope to my heart comes singing,
"At morn the cherry blooms will be white,
And the Easter bells be ringing."

—EDNA DEAN PROCTOR.

Courtesy Arnold Arboretum

CHICKASAW PLUM (*Prunus angustifolia* Marsh.)

Occasionally small tree-size, but more often a shrub, these trees form the tangled wild plum thickets that add so much to the southern countryside.



Perfect flowers having the five petals typical of the rose family; leaves small, narrow, trough-like, with finely-toothed margins; fruit red or yellow; bark reddish-brown and slightly furrowed. This plum furnishes some of our earliest blooms of spring, in February or March. (Chickasaw Plum.)

"Spring is the season of the eye," says a Japanese poet. No other people have made so much of spring as the Japanese. To such an extent have they developed the beauty of their flowering trees, especially their cherries, that visitors from all over the world journey to Japan to attend the Cherry Blossom Festival.

Throughout all Japan these cherry trees are planted—in sacred temple grounds, in palace gardens, in parks and public places, around humble homes. They line country roads and city streets until the whole countryside looks like a flowering garden. In the vicinity of Tokyo alone there are fifty thousand of these trees.

For centuries, some claim for thousands of years, the Japanese have developed the cherry tree, not for its fruits but for its beauty. With an artistic skill and patience unknown to western peoples, they have worked towards their ideal. Not for flowers only, but for color, texture, leaves, branching, bark —for the perfection of the tree as a whole.

Most of us are familiar with this Japanese cherry. There are many of them on the campus and in the arboretum at Chapel Hill, North Carolina. For several years pilgrimages have been made to Washington, D. C., when the cherry trees there are in bloom; for the largest and best collection of these trees in this country is in Potomac Park, in our national capital. Back in 1912, during the presidency of William Howard Taft, the city of Tokyo presented to the city of Washington two thousand flowering cherry trees.* Of these, eight hundred were planted around the Tidal Basin, and the rest along the East and West Drives. There are over three miles of these beautiful trees.

Walking under them, seeing their colorful reflection in the

* In his autobiography, *The World Was My Garden,* Mr. David Fairchild, plant explorer for the United States Department of Agriculture, states that in 1915 and 1917 several hundred flowering dogwoods and a large quantity of dogwood seed were sent as a return courtesy from the Department to the city of Tokyo. They began blooming in 1918. (P. 414.)

water of the Basin, it is easy to imagine one's self in the Flowery Kingdom. Overhead the blue sky, underfoot the velvety greensward, shut in by a world of blossoms—and on the topmost spray a brown thrasher singing a song of spring!

Our Own Wild Cherry

Though our own wild black cherry lacks the exotic beauty of the Japanese flowering ones, it is a beautiful tree as well as a valuable hardwood. It is our only native cherry to become a large tree. Often it attains seventy-five feet, and under favorable circumstances may reach one hundred ten feet in height, and a diameter of three or more feet. We saw several that size on the slopes of the high Allegheny Mountains from West Virginia to Georgia and Alabama.

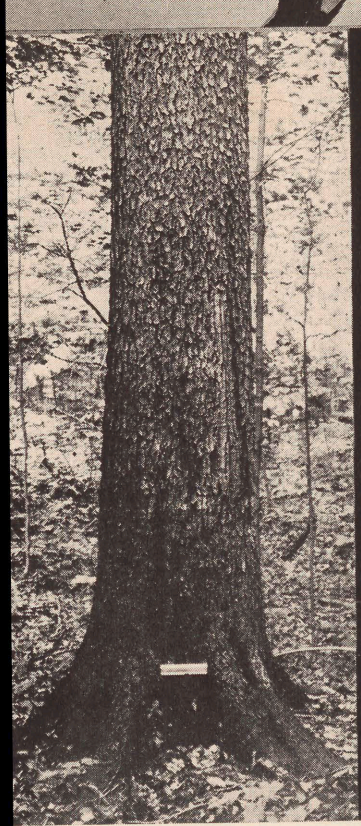
As a shade and ornamental tree the black cherry is often charmingly unconventional, sometimes growing into the "crooked tree" so loved by artists. Such a one we have in our own front yard and it is a joy the year around. Through the winter we love the artistry of its wayward, crooked trunk and branches. In spring the white clusters of flowers form almost a canopy, while the young leaves are still rather wine-colored, like a rose-hued undergarment beneath a white lace dress. And in the summer, when the cherries are ripening, what a joy the tree is to the birds. How they do love the dark juicy fruit!

He who would be landlord to the birds will find a wild black cherry one of his greatest attractions. Long before the cherries begin to ripen the birds impatiently start feeding upon them. And what good foresters they are! Many a wild cherry tree has grown from the seeds dropped by birds. Brown thrashers are particularly fond of wild cherries, and wherever one nests in our woodland acre, there, beneath the nest, is sure to be a small plantation of cherry seedlings the following year.

Courtesy E. J. Palmer, Arnold Arboretum

WILD BLACK CHERRY (*Prunus serotina* Ehrh.)

Our only native cherry attaining large size. In most parts of the South it is a small tree, but in our mountains it sometimes reaches a height of one hundred feet and a trunk diameter of from two to four feet.



Flowers perfect, in drooping racemes; cherries black, juicy, and bitter, but beloved by birds; leaves long, narrow, and toothed; bark on young trees and branches smooth and satiny, with horizontal lenticels showing; on old trunks blackish and rough, broken into small scales. (Wild Black Cherry.)

Lenticels—"Breathing Pores" of the Tree

Our wild black cherry has a different bark from that of all other trees, though in some respects it resembles that of the black, or cherry, birch. Dark brown and shiny, satiny smooth on the branches, on the trunks of old trees it breaks into rough, square plates which curl horizontally at the edges. On young trees, and on the smaller branches, the reddish-brown satiny bark is distinctively marked with whitish lines. These are the *lenticels,* the "breathing pores" of the tree. On the young twigs they are roundish; with age they become horizontally elongated.

One way of identifying this tree is to taste the bark or the twigs, which have a characteristic bitterness. They were long used in making home-made remedies—spring tonics, cordials, and bitters. Indeed, we still use wild cherry extract sometimes in cough syrups.

The leaves, alternate, simple, long and narrow and tapering at the end, are from two to five inches long. Above they are dark green and shiny; beneath paler, and the margins are finely toothed. On the under surface, along each side of the midrib from the base to about half-way up, there are brown hairs.

This important timber tree is widely distributed, ranging from Nova Scotia west to the Dakotas, and southward to Colombia and Peru. It is usually found in rich, moist soil and on the fertile slopes of mountains. Unfortunately, it is nowhere plentiful. Under virgin forest conditions it grew chiefly in good soils. These, of course, were the lands first cleared by the early settlers, and so the trees were sacrificed. Again, later, as the high commercial value of the wood was recognized, the trees were eagerly sought by lumbermen. And so, today, in spite of those good winged seed-carriers, the birds, the species is somewhat scarce. However, human foresters are keenly aware of its value and are not only protecting it, but in many sections of the country are planting it. There are many factors to make

this work worth while. It grows rapidly, sprouts freely, and the seeds are widely scattered by birds, so, where given a start, the tree will come back by itself to a certain extent.

There is just one thing against this tree. Almost always it is host to the tent caterpillar, which disfigures the top with its unsightly webs or tents.

The hard, reddish-brown wood is very strong and fine-grained, and takes an excellent polish. It is in great demand for cabinetwork, interior finish, and musical instruments. Its rich, lustrous, red-brown tint deepens and becomes richer with age. Because of its similarity in color and grain it is often sold as imitation, sometimes as real, mahogany. So costly has it become, and so small is the supply, that it is now used chiefly as veneering rather than as solid lumber.

The Choke Cherry

Of no particular importance except to the birds, and to mankind during the brief period of its profuse bloom, the choke cherry has an unusually wide range. It is found from Labrador and Hudson Bay west to the coast and south, along the mountains, to Georgia.

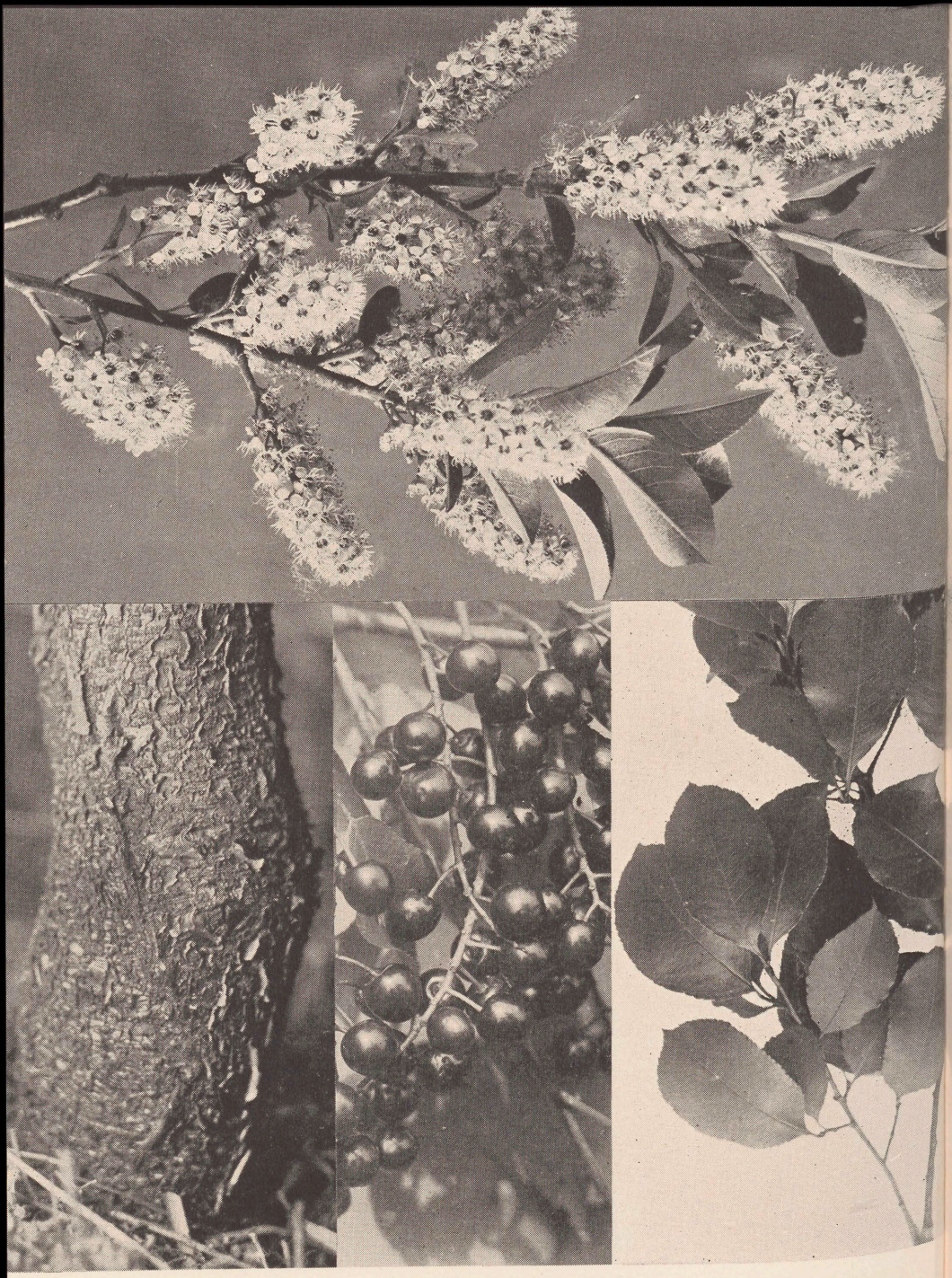
In our section this species is found in the mountains and upper piedmont from Virginia to Georgia. Only rarely does it become a tree, and then seldom over twenty-five feet in height and six inches in trunk diameter. It grows in dense thickets along fence rows, creeks, roadsides, and waste places.

Both leaves and flowers are rather similar to those of its near relative, the wild black cherry. The leaves are thinner and broader for their size, usually measuring about three-fourths of an inch to four inches long and one-half inch to two inches broad. The teeth along their saw-like margins are slender and sharp; those of the wild black cherry are glandular-tipped. During its blooming period the tree is exquisite with its many white drooping racemes of flowers.

By L. W. Brownell

CHOKE CHERRY (*Prunus virginiana* L.)

A small tree, it is widely distributed, but in the South native only in the mountains and upper piedmont.



Flowers in full, graceful racemes; fruit harsh and puckery; bark and crushed leaves have disagreeable odor; leaves thinner and broader than those of wild black cherry; bark grayish-black spotted with lenticels, but more scattered than those on the wild black cherry. (Choke Cherry.)

The fruits are more reddish than those of the wild black cherry, and much more puckery, harsh, and bitter. In trying to eat this cherry one is likely to choke, and so the tree received its common name of choke cherry. The birds, however, find these cherries most attractive.

The bark is grayish-black spotted with lighter colored oval dots, the lenticels. These are not elongated, and are more scattered than in the black cherry. The tree is too small for the heavy, hard, close-grained wood to be of any importance. Its chief value is its tendency to prepare the way for other, more valuable trees by serving as a good "nurse tree" for their seedlings.

The Wild Red, Bird, or Fire Cherry

This small, useful tree might claim still another name, that of "nurse-tree cherry." Often but a shrub in the North, it invades the South by way of the mountains, being found along them as far as northern Georgia. Although it is considered a northern species, ranging from Newfoundland to British Columbia, it finds conditions for its growth so favorable in our southern mountains that it attains its greatest size on the western slopes of the Big Smokies in Tennessee. There it sometimes reaches a height of forty or forty-five feet.

It is a cherry that is easy to recognize the year round. In winter the terminal buds are usually more clustered than are those of the other wild cherries. In spring the garlands of white flowers, which appear when the leaves are about half grown, profusely bedeck the tree, and resemble a fluffy white cloud flecked with cool green. The perfect flowers are borne in three- to five-flower *umbels,* or clusters. A little later, when the fruits appear, they too, of course, are in clusters, somewhat like those of the cultivated cherries. Thus both flowers and fruits differ from those of the other wild cherries, which are in long racemes.

Even the leaves are somewhat different from those of our

two other important wild cherries. In proportion to their length, they are wider at the base, much more slender and tapering at the tip, and are finely and sharply toothed along the margin. They are from two to six inches long, from three-fourths to one and three-fourths inches wide, and are smooth and shining green above, paler below.

Where Birds Hold High Carnival

The glowing, ruby fruits are most popular with birds and small animals, but especially with birds, whose liking for the fruit has given the tree one of its common names, that of bird cherry. Wherever this tree is in fruit you may almost always count on seeing—and hearing— a happy "bird fiesta." And the birds repay their namesake tree by scattering its seeds far and wide.

Nor is the beauty of this wild cherry limited to its flowering and fruiting period with its nimbus of winged visitors holding high carnival. The dark red-brown satiny bark of the branches, conspicuously marked with orange-colored long lenticels, is always attractive. On older trunks the bark separates into dark red, broad, papery plates.

But the tree does more than furnish food for birds and small animals and add beauty and interest to the countryside. In all of its territory, whether shrub or small tree, it is the first to reforest cut-over or burned areas. Thus, furnishing shade and protection, as well as providing some humus, it acts as "nurse-tree" for slower-growing though more valuable hardwoods and conifers. In our own mountains such areas that have recently been thus reforested can often be identified, even at a distance, as the lighter, yellowish-green patches among the darker green of unburnt regions.

The ability to reforest such areas is, according to *Garden and Forest,* due to several things: the ease with which the seeds are scattered by birds and mountain streams; their vitality and power of germinating in burned-over soil; and the rapid growth

of the young plant. Thus they soon form a covering for other trees.

And when they have served their usefulness and are no longer needed, these fast-growing but short-lived "nurse-tree cherries" die out, making room for the more valuable trees. Thus they perform a useful function in the forest, and indirectly serve mankind.

The Service Berry or Shad Bush (*Amelanchier*)

There is no tree that blossoms
But prays that it may be
As fair, as strong a sapling
As the Garden of Eden Tree.

—FANNY DE GROOT HASTINGS.

One of the first of the "fair trees to bloom in white" is the service berry, or shad bush. Because this dainty little tree happens to bloom along the banks of our tidal rivers about the time the shad come up to spawn, the early settlers named it shad bush. And because the luscious berries serve man, bird, and beast, it is also commonly known as service berry, or, locally, as just plain "sarvis."

Clouds of small white flowers, each a five-pointed, thin-petaled star, gleam like a soft mantle of newly fallen snow over the wine-brown opening leaves. They are in loose, erect or drooping clusters. Each flower is nearly an inch across.

Though this is one of the most conspicuous and beautiful of the small flowering trees of early spring in the forests of eastern North America, it is nowhere very abundant, and is usually found growing singly. It has, however, a wide range, from Newfoundland and Ontario west to Kansas and south to the Gulf. The more western states have a very similar species.

The fact that it is not common anywhere causes it to be less well known than it might otherwise be; but wherever known, it is greatly loved. Its white blossoms, standing or drooping

foam-like against the background of soft jade green of unfolding leaves of other trees of the woodland, lighten up the forest edge.

Largest in Our Mountains

A small tree, only occasionally more than twenty-five feet in height, and usually much less, the shad bush has a trunk diameter of six to twelve, very rarely eighteen, inches. It reaches its best development on the mountain slopes of North Carolina and Tennessee. Very often, however, especially in the more eastern parts of its range it is only a low shrub.

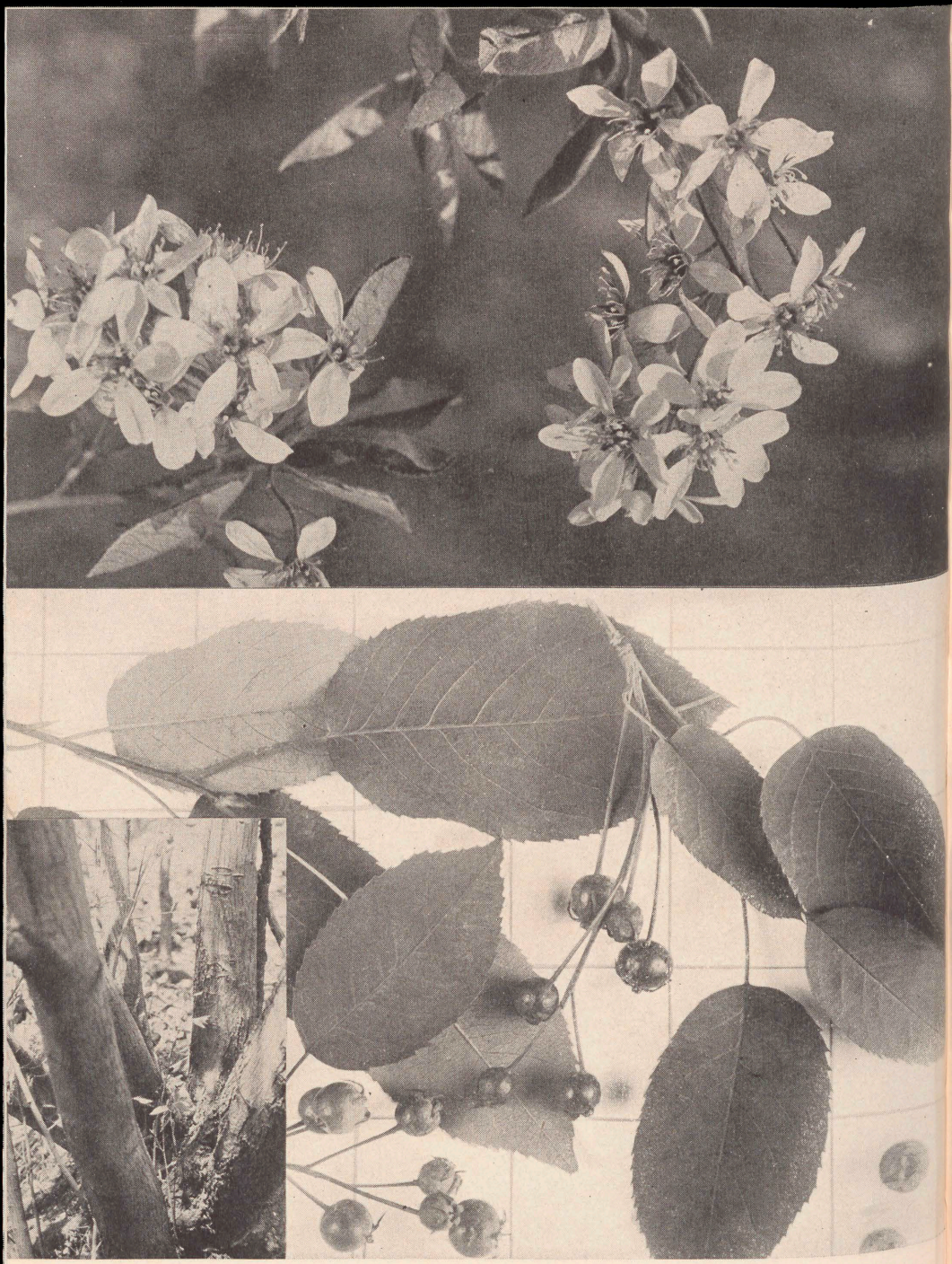
The trunk, usually straight and sturdy, has a tapering tendency, and the top is narrow and rounded. In winter the tree is easily recognized by its smooth, grayish bark which breaks into shallow fissures and is sometimes marked with black streaks. The dainty and unique winter buds help more than anything else in identifying the tree. Long and slender, they resemble a little those of the beech, but are smaller and not so golden-brown. And always they have a faint line of fine, silvery hairs along the edges of the bud-scales, which those of the beech do not have.

The dainty, but not particularly distinctive leaves look somewhat like those of its relatives, the pear and the apple, but are finer and more delicate. They are slender, alternate, oval-shaped and pointed, with a fine-toothed margin, and are from two to four inches long. They come out of the bud a purplish-brown or a deep dull wine color, and covered with scattered silky hairs that give them a faint silvery bloom; and thus they remain until nearly mature. When full grown they are deep green above, paler beneath. The midrib is grooved above and very prominent below. In autumn the leaves turn a bright yellow.

By early June the lovely white flowers have developed into the luscious and edible berries which give the tree still another name, that of June berry. They are about a third of an inch

Courtesy U. S. Forest Service

SERVICE BERRY OR SHAD BUSH (*Amelanchier canadensis* Med.)
What could be lovelier than service berries in bloom with rounded hills for a background?



Leaves resemble those of apples, but are of finer texture; dark purplish sweet berries, beloved by birds and man; white flowers on loose erect racemes, the five petals of individual flower also typical of rose family; bark smooth and grayish, sometimes marked with black streaks. (Service Berry.)

in size, with a delicious juicy pulp and small seeds. If the birds leave them on the tree long enough to ripen, they become dark purplish-red with a slight bloom. Birds, boys, and even bears, adore them. As one tree-lover expresses it, there is only one objection to these berries—and that is that there are so few of them! The trees never bear a good-sized crop; even the largest ones rarely produce more than a quart.

On the famous Lewis and Clark Expedition into the Pacific Northwest, according to the *National Geographic Magazine,* the members eked out an existence with the help of these berries when their own food gave out. The Indian "pemmican" was made of the dried berries mixed with dried and powdered buffalo meat. The mixture was boiled in fat and, when cold, shaped into cakes that could be easily carried.

Modern man, too, takes a fancy to this fruit, and people have been known ruthlessly to cut down a tree simply to gather it. Japan, whose plant life resembles our own in many respects, has a very superior service berry tree which is said to bear more heavily. It has already been introduced into this country, and may in time become more common as a fruit tree.

Aesthetic Value Important to South

Because of its small size and the fact that it is nowhere very abundant, the tree is not commercially important, although the wood is used to a slight extent for tools. It is sometimes called "lance-wood" and makes excellent fishing poles. The Indians, it is said, used it somewhat for bows and arrows. The dark brown wood is heavy, exceedingly hard, strong, and close-grained.

Of course, the tree's real value—and this is very great—is aesthetic. It should be protected everywhere as a floral asset to the countryside. If it were widely planted it would do its bit towards carrying on the ideal of Dr. Clarence Poe, of *The Progressive Farmer,* of making Dixie a "Land of Beauty."

Such a tree growing near an old gray zigzag fence, or above

an ancient stone wall, with, perhaps, cattle grazing in near-by fields, makes a picture worthy of a master's canvas.

The Hawthorns (*Crataegus*)

"Mark the faire blooming of the hawthorn-tree,
Who finely clothed in a robe of white,
Fill full the wanton eye with May's delight."

Probably the very name "hawthorn" conjures up in most minds an English country lane in May, the hedgerows white with bloom, and linnets and skylarks singing. For the famed English hedgerows are usually of hawthorn.

And yet, borrowing from the famous "Believe it or not," eastern North America is the center of abundance of the hawthorns. We have many more kinds than has any other part of the world—but we have never made much of them. Europe, on the other hand, has imported and cultivated many of our own native hawthorns. We, too, should use them more, for they are picturesque throughout the year. They do well in clay soils and should be planted in the South.

There are so many, many different kinds of hawthorns in this country, and they are so closely related and have so many characteristics in common, that we are not attempting to describe the different kinds. Not even the highly trained botanists are agreed on how many different species there are.

All the hawthorns are small trees or shrubs with zigzag, thorny branches. Even under the most favorable conditions they rarely grow over thirty feet in height. Most of them have white flowers and scarlet fruits. Always they are beautiful and interesting. In April they wear a mantle of white bloom; in summer, cool green foliage; and in autumn many of them don brilliant raiment. In winter their bare, fine interlacing twigs, picturesque thorns, and scarlet haws add color and interest to the fields and waysides.

By Bayard Wootten

PARSLEY HAW (*Crataegus Marshallii* Eggl.)

Though we hear so much of the English hawthorn, the real center of abundance of the hawthorns is in the eastern United States. We have, however, strangely neglected these attractive small trees or shrubs, of which we have innumerable species.

The fruiting branch is the Washington thorn, found in our mountains south to Georgia. The flowering branch is a species growing in Florida. All the hawthorns native to eastern North America have white blooms, and in winter display the picturesque thorns and characteristic red haws.

Hawthorns in Pastures

Though these trees thrive in rich, moist, alluvial soil, they are also able to grow equally well in higher, stonier fields, both alone and in thickets. Hawthorns and pastures seem to go together. Who does not recall a familiar pasture dotted with thorn bushes?

In this situation they are a fine example of the survival of the fittest. Other seedlings may also take root in pastures—ashes, oaks, maples, willows—but they are usually killed by browsing cattle. The hawthorns, however, are immediately on the defensive. So sharp and strong are the thorns that the tree has a chance to grow; even the hungry cattle avoid them. These same thorns make the trees or shrubs favorite nesting places for many species of birds, who can slip through the thorny branches which would pierce their larger enemies. On different species these thorns vary; on some they are much longer; on some, much more abundant.

Hawthorns belong to the rose family and have the rose type of five-petaled flowers. The flower has been described as a "miniature white single rose." In bloom they furnish a popular "wayside inn" to the bees, who are attracted both by their beauty and by their almond-like fragrance. In the center of the blossom is a large green surface which secretes nectar.

On all of the hawthorns the leaves are attractive. They are small, simple, and alternate, with toothed margins. In many species they are more or less lobed. All of the haws, as the fruits are called, resemble tiny apples. Some of them are good to eat. I recall with pleasure how we used to love to nibble on those of the old crooked thorn tree by the lake where I played as a child. In general, the seeds are large in proportion to the size of the fruits. These seeds are bony nutlets, often ribbed.

Usually the haws are scarlet, in some species they are orange, in a very few, yellow, and in one species, blue. Often they remain on the branches throughout most of the winter, lighting

up the landscape and offering food to the birds. In some countries a large crop of haws is supposed to presage a cold winter to come. The Scotch have a brief but descriptive saying,

"Mony haws,
Mony snaws."

The two best known thorns in the eastern part of the country are the cockspur thorn and the scarlet thorn, but they are both more common in the North than in the South. The scarlet thorn has long been a favorite in New England gardens, and is one of the oldest of our native thorns that has been cultivated. It is often found in rocky woodlands and in old fields as far south as North Carolina.

Another of the more common hawthorns of the South is the parsley haw. Coker and Totten describe it as growing on the borders of swamps and streams and in pine barrens through the coastal region, and in both low and upland woods in the piedmont from southeastern Virginia to northern Florida.

This haw is easily distinguished from the others by its woolly flower clusters and young twigs, and by the deeply cut leaf blades, in which the strong veins extend to the bottoms of the notches. The bright red, oblong haws are very small, about one-third inch long, and are very shining.

Under cultivation this, one of the most handsome of our hawthorns, has a graceful, broadly rounded form and remains attractive throughout the year. "In winter," according to Coker and Totten, "its many small branches are almost lace-like; in spring it is covered with a cloud of small flowers, in summer with small deeply cut leaves and in fall with scarlet fruit."

The wood of all thorns is very hard and strong. Indeed, so hard and tough is it that in Ireland the wood of a certain species known as black thorn is often chosen for the famous Irish cudgel, the "shillelagh."

The Wild Crab Apples (*Malus*)

The yellow jasmine and lush muscadine
With crab and honeysuckle intertwine,
And thousand odors sweet confederate,
And clear, cool air so interpenetrate,
That sky above and blooming earth beneath
Seem to exhale a long delicious breath!

—ZITELLA COCKE.

Coronaria—"fit for crowns and garlands"—was the scientific name given to our wild crab apples by Linnaeus, the great Swedish botanist who named so many of our plants. What a lovely name! Yet in all probability Linnaeus never saw more than a dried specimen which Kalm had sent him.

Peter Kalm was one of the group of men whom Linnaeus called his "twelve plant apostles," who went forth to explore the plant world for new specimens. Several of them came to America, that new land which was so rich in strange plants and animals.

Wild sweet crab apple thickets! Are they any lovelier than those of the wild plums? Perhaps, at least in color and fragrance, though the plums come earlier, in February or March when we are more blossom hungry. And like the wild plums, there is a wild crab for nearly every section of the country.

Along the edges of woodlands, in rustic fence corners, and in open pastures the sweet wild crabs grow, spilling their spicy fragrance on the earthy air. Their rift of deep pink glows under the blue skies of spring, or becomes opalescent under the misty dews of early morning.

Small trees, more often only bushy shrubs, crabs rarely exceed twenty feet in height. Even in winter they are picturesque with their dark, contorted, thorny branches. Toward spring the twigs take on a silvery appearance, and the deep pink buds and soft green of opening leaves are like coral and jade scattered carelessly on a silver chain.

But, unlike the apple of the poem, the fruit of the crab will not be for you "next wintertime," unless you are a bird, perhaps, or have it served as jelly. The hard, knobby, harsh-tasting little apple, when made into jelly, has a delicious wild spicy tang that is entirely lacking in the jelly made of the more prosaic, cultivated apple.

Ancient Ancestry

Yet it is from the wild crabs of Europe and Asia that our hundreds of varieties of apples were derived. Not so long ago a horticulturist counted over three hundred kinds that are directly descended from the wild crab of Europe.

How long ago man first began cultivating the apple no one knows. When he first emerged from the dim mists of history, he had the apple. It has played a part in our racial history; a part in our oldest legends; a part in mythology.

Until recently *coronaria* included a highly variable group of most of the crab apples of the eastern part of the country, but, as with the hawthorns, more recent botanists have been separating members of the groups into different species and varieties. For most of us, however, it is enough to know that the small tree or shrub is a wild crab.

The typical form of what is today called *coronaria* is found from Ontario west to Michigan and in the South along the mountains to North Carolina and Tennessee. The leaves are toothed, sometimes doubly so, and on young shoots may be lobed somewhat like those of a red maple.

Along the coast from New Jersey south to Florida is another common form, called the narrow-leaved crab apple. It is usually a smaller, more thorny tree, with narrow, leathery leaves that are almost evergreen in appearance. They are slightly toothed along the margin, blunt-pointed at both ends, and dull and fuzzy on the under side. Its characteristic leaf, which has given this crab its name, helps to identify the tree, or shrub.

By J. Horace McFarland

WILD CRAB APPLE (*Malus coronaria* Mill.)
The specimen shown is a cultivated, double-flowered variety.

Flowers of the wild crabs resemble those of the cultivated apples, but are a deeper pink and more fragrant; fruits usually harsh and bitter, hanging on tree far into the winter; leaves singly or doubly toothed, and on young shoots often lobed like those of red maple. (Wild Crab Apple.)

The Mountain Ash (*Sorbus*)

The mountain ash,
Decked with autumnal berries that outshine
Spring's richest blossoms, yields a splendid show
Amid the leafy woods; and ye have seen,
By a brookside or solitary tarn,
How she her station doth adorn; the pool
Glows at her feet, and all the gloomy rocks
Are brightened round her.

—WORDSWORTH.

From Europe came the many superstitions which cluster about the mountain ash, or rowan-tree. This is the European tree, but most of us are more familiar with it than with our own native mountain ash, for the European tree is more widely used in ornamental planting. The two trees are closely related and rather similar in appearance.

These superstitions were brought to our own land by immigrants, and promptly transferred to our native tree. As a small child I recall the old German laundress who used surreptitiously to pin a spray from the mountain ash in the yard to our coats to protect us from evil spirits. And often, in passing the tree she would break off a branch to put over her own door, or over the barn door, to "keep out the witches." It all seemed very real and necessary to us, as we listened wide-eyed to her old-country tales of witches and "hexes."

Our own mountain ash is found from Newfoundland to Manitoba and Iowa, and south along the mountains to North Carolina and Tennessee.

Not a True Ash

Although this tree has pinnately compound leaves, they are alternate, not opposite as they are in the true ashes. For this tree is not in any way related to the ashes. Instead, it belongs to the rose family, and is more closely related to the rose in the garden than to the white ash that may be on your lawn.

The leaves, which resemble somewhat those of the sumachs, have nine to seventeen leaflets, each one from two to three inches long. The whole leaf is from six to ten inches long. The leaflets are sharply toothed along the margins, and have tapering tips.

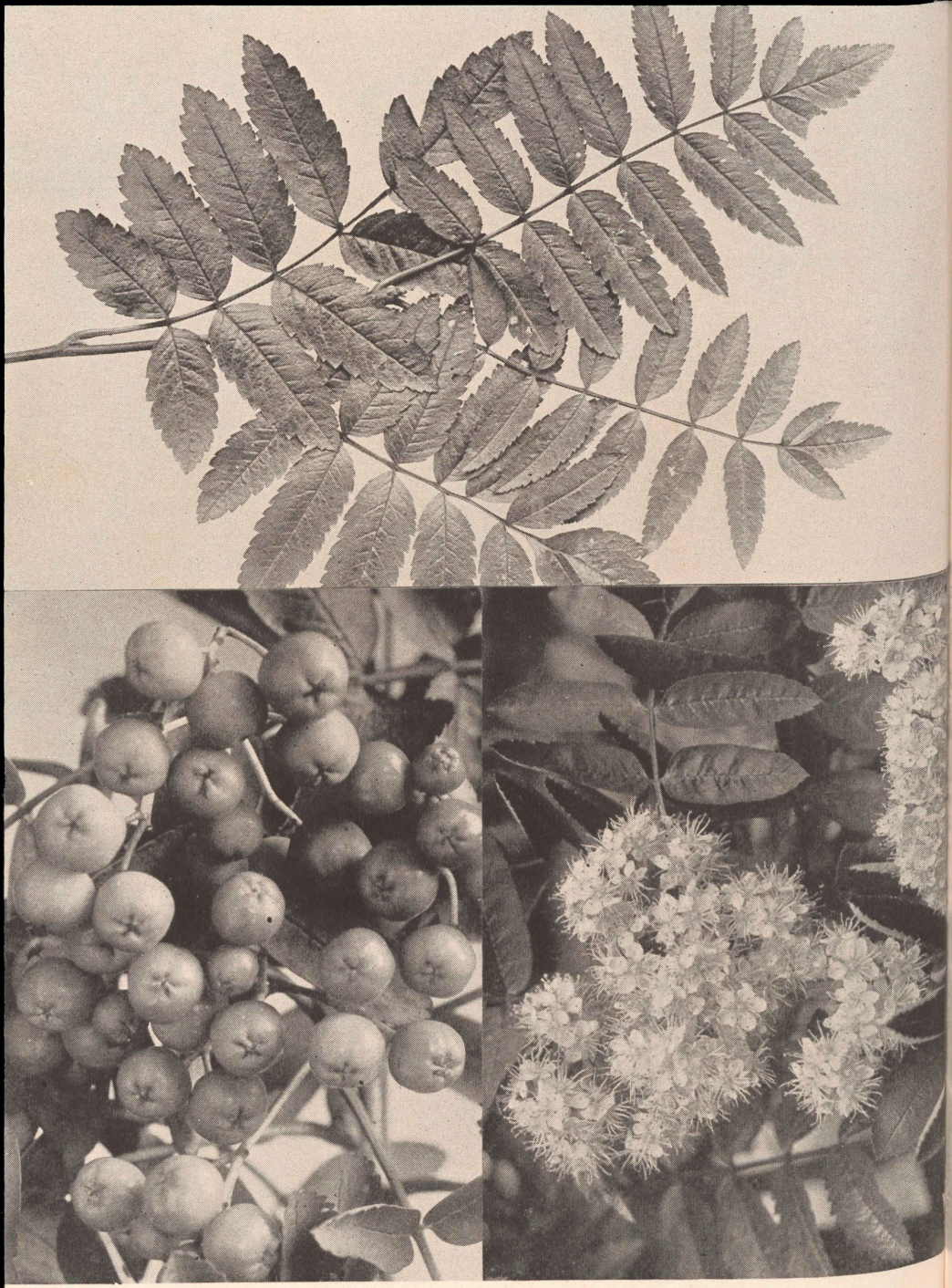
The creamy-white flowers are in flat-topped clusters from three to four inches across. The individual flower has the typical five petals. The fruits, also in flat-topped clusters, are bright orange-red "berries" with thin skins and bony seeds. Though they are bitter, the birds, especially cedar waxwings, eat them when other fruits are scarce. And probably in whatever lands mountain ashes grow little girls make "coral jewelry" of these brightly glowing berries. They string easily into necklaces and earrings, bracelets and coronets.

In winter the tree can be identified by its stout, grayish twigs and smooth, brown-gray bark with large lenticels like those on its cousins, the cherries. The light, close-grained wood is pale brown and soft and weak. However, the tree, or shrub, is usually too small for the wood to be of any importance commercially. Its chief value is for ornamental planting.

Courtesy U. S. Forest Service

MOUNTAIN ASH (*Sorbus americana* Marsh.)

This small tree or shrub, belonging not to the ashes but to the rose family, is native in our section only in the mountains of the Upper South.



The beautiful compound leaves of this so-called ash are not opposite, like those of the true ashes, but alternate, and contain from nine to seventeen leaflets; white flowers arranged in flat-topped clusters; bright red berries remain on tree throughout the winter. (Mountain Ash.)

CHAPTER XVI

THE PULSE, OR LEGUME, FAMILY (LEGUMINOSAE)

The Locusts (*Robinia*)

Ope your doors and take me in,
Spirit of the wood,
Wash me clean of dust and din,
Clothe me in your mood.

Lift your leafy roof for me,
Part your yielding walls;
Let me wander lingeringly
Through your scented halls.

Ope your doors and take me in,
Spirit of the wood;
Take me—make me next of kin
To your leafy brood.

—ETHELWYN WETHERALD.

Locusts belong to one of the most important and widely distributed plant families of the world. This is the great leguminous, or legume-bearing, family. Strange as it may seem, this pulse family, as it is generally called, includes, as well as the locust and many other trees, beans, peas, lentils, clovers, alfalfas, and peanuts.

Botanists point out that only one other family is more important to mankind. It is the grass family, which includes the forage and grazing plants, the grains and the sugar canes. As we have said before, plant relations may seem queer, for they are based, not on general appearances, but on certain botanical

structural similarities. And so the locust trees are much more closely related to the garden bean or pea—or even the peanut—than to the catalpa, for instance. And yet the catalpa also has a long, dry seed-container or pod which opens to discharge its seeds from a single, central chamber. But the catalpa's fruit isn't a true legume.

In our North American forests there are over thirty species of trees belonging to this pulse family. All but one, our well known and much loved southern redbud, have compound leaves—and the redbud did "once upon a time," it is claimed. In most cases the flowers are showy and fragrant, and the flat seed containers, ripening through the summer, add a striking decorative quality to the trees.

The Black, or Common, Locust

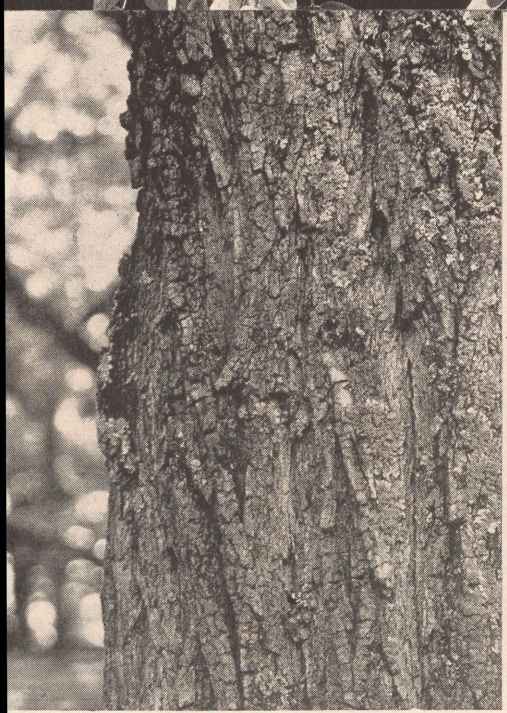
Because the Indians of Virginia understood well the value of wood, they often used that of the black locust for their bows. And this use of the wood gradually spread the tree's range eastward to the coast.

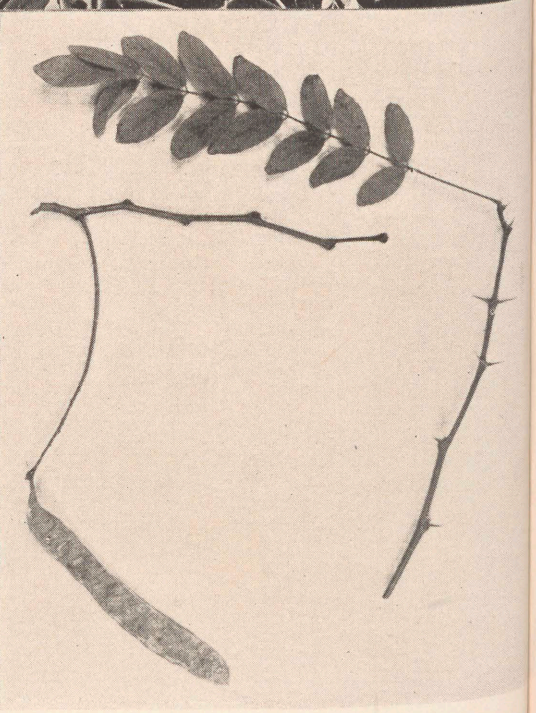
The natural home of the black, or common, locust is thought to be limited to the Allegheny Mountains from Pennsylvania south to northern Georgia. But the tree appears to have been in the neighborhood of the coast long before white men first came to Virginia. The colonists also made use of these trees; for an old historical account, by Mark Catesby, tells that those first cabins, so hurriedly erected, were "set on four locust posts driven into the ground to support the four corners." Long afterwards, some of these posts, still in the ground, were found to be in good condition.

In spite of its limited natural range, the black locust is probably the best known of the group. In many sections of the piedmont it has become naturalized in thickets and waste places, along fence rows, and about deserted homesteads. This

Courtesy U. S. Forest Service

BLACK, OR COMMON, LOCUST (*Robinia Pseudoacacia* L.)
In George Washington National Forest, Virginia. In the South this locust is native only in the mountains, but it has become extensively naturalized in the piedmont.





White, fragrant flowers are borne in wisteria-like clusters; leaves compound with stipular spines and seven to nineteen leaflets; small pods contain from four to eight seeds; bark rough and dark gray, divided into furrowed strips as tree grows older. (Black, or Common, Locust.)

is because the shallow roots creep along just under the ground and the tree often spreads by suckers rising from them.

Though nowhere very common, this locust occurs as a naturalized tree throughout much of the South, and seems to be at home in all soils except those of swamps. Its preferred habitat, however, is gravelly soil on mountain slopes. Formerly it was much planted as an ornamental and timber tree.

In youth the black locust is rather beautiful, but in old age it acquires an unkempt appearance. The raggedness of the crown is partly due to the attacks of the locust borer. Moreover, the twigs and branches are very brittle and are easily broken by wind, storm, snow, and sleet; thus the symmetry of the crown is soon lost. For over half of the year an old black locust is a somewhat dreary, dead-looking object. Even the twigs bear no sign of life-giving buds, for these are almost concealed in the wood.

But in spring—ah, in spring does the black locust come into its heritage of beauty; and, seeing it then, no one would be without it. The foliage first appears as a delicate silvery sheen with frostwork glitterings, created as from some fairy artisan's dream. But only the tree-lover, aware of every mood of a beloved tree, watching its every development, is likely to catch the tree in this frosted filigree period; for this is elusive, and lasts, seemingly, but a few breathless hours.

Wisteria-like Flowers

As this fairy silver is transmuted into a mass of cool, dark green emerald foliage, the creamy-white, fragrance-laden flowers come cascading out. And then the air all about the tree is heavy with perfume and noisy with the dull droning music of an orchestra of hundreds of bees.

Past such a group of trees I walked along a country dirt road in my high-school days. That was before school busses were in use and when our own legs furnished transportation. Even today I would prefer such a walk, full of good country sights

and sounds and odors, to a bus. The country child who lives too far away to walk to school misses much first-hand knowledge of nature.

An interesting trait of the black locust, and of many others of the group, is the folding of the leaflets towards dusk or before a rainfall. It is thought that this habit has been acquired as a means of avoiding too great loss of moisture and heat. "Going to bed with the locust leaves" was a familiar saying in my childhood.

The pinnately compound, alternate leaves of this locust are from six to ten inches long with seven to nineteen thin, oblong, smooth-margined leaflets. Each leaflet is from one and one-half to two inches long and has a rounded tip. In fall these leaves turn yellow.

Though the flowers are the tree's chief beauty, the fruit pods, three to five inches long and containing four to eight little dark seeds, are also interesting. In winter they split open and discharge some of the seeds, though others remain attached to each half of the pod. The dried pod acts as a wing, and so in time the seeds may be carried long distances by the wind. These pods usually remain on the tree, however, until late in the winter, and they keep up continuous little rustlings, a delightful sound to ears attuned to outdoor music.

Rough and dark gray, the bark of the black locust divides into furrowed strips as the tree grows older. The twigs and branchlets are armed with straight or slightly curved, paired prickles or spines (really modified stipules), which may be very small, or over an inch in length. They remain a part of the outer bark for several years and help identify the tree in winter.

Timber Once Valuable

Were it not for the locust borer which attacks it, the black locust would be one of our most valuable timber trees. It grows rapidly, is adaptable, and spreads by shoots as well as by

seed. The wood is exceptionally strong and durable, especially in contact with the soil, and has many uses: for fence-posts, poles, cross-ties, and tree nails. But when once the locust borer has attacked it, it is valueless for timber, and, unfortunately, there seems to be no known means of control of this pest.

Yet something over a hundred years ago this timber was considered of such value that plans were made to introduce the tree on a large scale in Europe, for timbers for the British navy. These plans were never fully carried out; but the black locust is still one of the most common of American trees in Europe, where it seems to be comparatively free from insect injury.

The Honey Locust, or Honey Shucks (*Gleditsia*)

There are several ways to distinguish this from the black locust. Its leaflets are smaller, the thorns and the pods are much, much larger, and the flowers are greenish, inconspicuous, and lacking in fragrance.

In winter the honey locust is a far handsomer tree than its cousin. The bark is browner and fresher looking, and the thorns are at least interesting and picturesque. It is found scattered in waste places throughout the South. Like the black locust, its natural habitat is west of the Allegheny Mountains, but it, too, has become thoroughly naturalized. Though it sometimes occurs in the forest, it is more likely to be found in waste places and fields. One book on Southern trees describes it as rather small in our region, but in other parts of its range it often attains a height of seventy-five feet and a trunk diameter of thirty inches, and even larger trees may be found.

"A Tree No Boy Ever Climbed?"

On old trees the bark is dark gray, divided into thin, tight scales. It is the sharp, strong, wicked-looking thorns, often set like bristling bayonets around the trunk, which attract one's attention. And these are real thorns, not spines or prickles.

There is a distinct difference. The spines of the black locust are, as we have mentioned, modified stipules, that is, parts of leaves, and are located only at the leaf bases, ordinarily in pairs. The prickles of the rose are scattered outgrowths of the bark, and, being only "bark-deep," easily come off if tipped to one side. But real thorns, such as those on the honey locust, are parts of the woody growth of the twig or branch. These particular ones are often three-pronged, and may be an inch or even a foot long; and they remain on the tree indefinitely. Sometimes they are in clusters, encircling the trunk. Occasionally a leaf appears on the side of a young thorn, probably trying to demonstrate the fact that the thorn is an abortive branch. Their vicious points protect the tree from browsing cattle who are very fond of the tender young foliage. Do they perhaps prevent raccoons, opossums, and bears from climbing the trees and devouring the sweet seed pods? And has any boy ever climbed the honey locust? Not unless it is a thornless form, we'll wager!

In the sunlight the feathery foliage takes on clear, intense emerald lights. The once or twice compound leaves have leaflets that are much smaller and glossier than those of the black locust. Also, these leaves usually have an even number of leaflets, from eighteen to twenty-eight, whereas the black locust generally has an odd number.

For a member of the pulse family, the flowers are unusually insignificant, and are not even pea-blossom-like. The pollen-bearing and the seed-producing flowers are separate and may be on the same or on different trees.

"St. John's Bread"

But, if the flowers are insignificant, the fruits make up for it! By mid-summer these large pods, often eighteen inches in length, and inclined to be S-shaped, have begun to take on exquisite rose-shaded tints. They are beautiful in form, color, and texture. At this period of growth they contain a sweet,

Courtesy U. S. Forest Service

HONEY LOCUST (*Gleditsia triacanthos* L.)

In George Washington National Forest, Virginia. Thorns and feathery foliage make this a particularly graceful and interesting tree.

Two kinds of flowers, small, greenish-yellow, inconspicuous, and lacking in fragrance; leaflets smaller than those of black locust leaves, and once or twice compound; seed pod large and twisted; thorns large, sharp, and strong, sometimes branched; bark dark gray and scaly. (Honey Locust.)

edible pulp. It is this sweetish, gelatinous pulp and not the flowers which gives the tree its common name of honey locust. A similar pod of an Old World locust is called "St. John's Bread." Its pulp is supposed by some to have been the locusts eaten by John the Baptist in the wilderness.

As a rule these pods do not split open. The seeds—there may be as many as twenty—are very hard and each one is separated from the others by the pulp. Animals eat the pods, and thus many of the seeds, as they are too hard to digest, are widely scattered far from the parent tree. Too, the fantastically twisted pod acts as a sort of spiral spring, and often travels great distances on the ground, rolling or sliding over crusty snow or ice. In winter many of the pods remain on the tree, and rustle merrily with every vagrant breeze.

Though coarse-grained, hard, strong, and moderately durable in contact with the soil, the wood of this tree should not be confused with the more durable wood of the black locust. It is used for much the same purposes, namely, for fence-posts and cross-ties.

The Kentucky Coffee Tree (*Gymnocladus*)

Another of the leguminous trees, native to the more western group of the southern states, is the Kentucky coffee tree. It is one of our rarest forest trees, scattered sparingly from western New York to southern Minnesota and south to western Tennessee and Oklahoma. In other regions, where it has been planted, it has escaped to a slight extent.

This tree has very stiff and coarse branching, and shows up this characteristic particularly in winter, when the stout, ungainly twigs are not concealed by foliage. The exceptionally large leaves are from one to three feet long and sometimes up to two feet wide. They are usually twice compound, sometimes *thrice* compound. However, though they are so large, there are fewer of them; and so the general foliage effect is sparse, letting

through mottled patches of sunlight instead of casting a dense shadow. A peculiarity of this tree is that the buds are small, and either completely, or almost completely, buried under the bark. Think of it! One of the largest of tree leaves, already completely formed, yet packed away in such a tiny bud! *Some* packing Mother Nature can do when she wants to.

In this locust the two kinds of flowers are *always* on separate trees, and therefore not all of the trees bear the thick, stubby fruit-pods.

The Yellow Wood

A perhaps even rarer tree of this family is the yellow wood, of Virginia, which is limited to a few rich coves in the mountains of extreme western North Carolina and Tennessee, central Kentucky, and northern Alabama. It is hardy as far north as New England, and is occasionally planted as an ornamental tree. The only other known member of the group is in—Manchuria! In bloom this tree's beauty is surpassed by no other. The flowers, resembling somewhat those of the black locust, are white, fragrant, and are arranged in long, loose, wisteria-like clusters at the ends of the twigs. But the tree is far from being prodigal with so much beauty. It rarely blooms in two consecutive years, and as a rule it has profuse flowering only a few times in a decade.

The yellow wood also has compound leaves, but whereas the leaflets of most of the locusts are opposite, those of this tree are decidedly alternate. There are five to eleven of these leaflets. The bud is concealed under the enlarged leafstalk base, as in the sycamore. The fruits are small flat pods, three to four inches long, containing a few flat seeds.

The branches are thornless. The smooth gray bark resembles that of the beech. The wood is yellow, which gives the tree its common name. A yellow dye is obtained from it.

The Redbud (*Cercis*)

Green April put her slippers on
And climbed the windy hill,
She stopped to place a yellow hood
Upon the daffodil.

She flung a scarf of heliotrope
About the Judas tree,
And left upon the lilac bush,
A beaded rosary.

—TRAVIS TUCK JORDAN.

In ancient times, when legends gathered about anything that was unusual or not understood in nature, a redbud tree, with pinkish-purple of rose flower buds, was named the Judas tree. Its flowers appeared in the axils of the leaves, along the bare branches, and sometimes even on the trunk itself. This Judas tree, very similar to our own, is common in certain parts of Europe, Japan, and southeastern Asia. It also grows in Judea.

The tree was given this infamous name because it was said to "blush for shame" because it had allowed Judas Iscariot, the traitorous disciple, to hang himself upon it. The fact that the tree is seldom large enough for this to be possible was overlooked. Tradition seldom concerns itself with accuracy.

That one of the loveliest trees of our southern countryside should bear this name of reproach is a shame in itself. Personally I refuse to use it, and always call it by the more attractive and appropriate name of redbud.

The redbud, then, is a small, sturdy irregular tree dividing into several branches that usually spread to form a wide, flat head. Though its range is from Ontario westward to Minnesota and Arkansas, and south to Florida and eastern Texas, it is natively rare in the North. It is, however, hardy when planted, and is occasionally seen on northern lawns and parkways. As with the dogwood, one must come South to see this tree in an abandon of wild woodland beauty.

In the South, say Coker and Totten, the tree is found in fertile, well drained upland woods, hillsides, and valleys. "It is common in the piedmont, sparingly scattered in the [lower] mountains . . . and rarer in the coastal plain, where it is scarcely ever found except in the vicinity of larger streams."

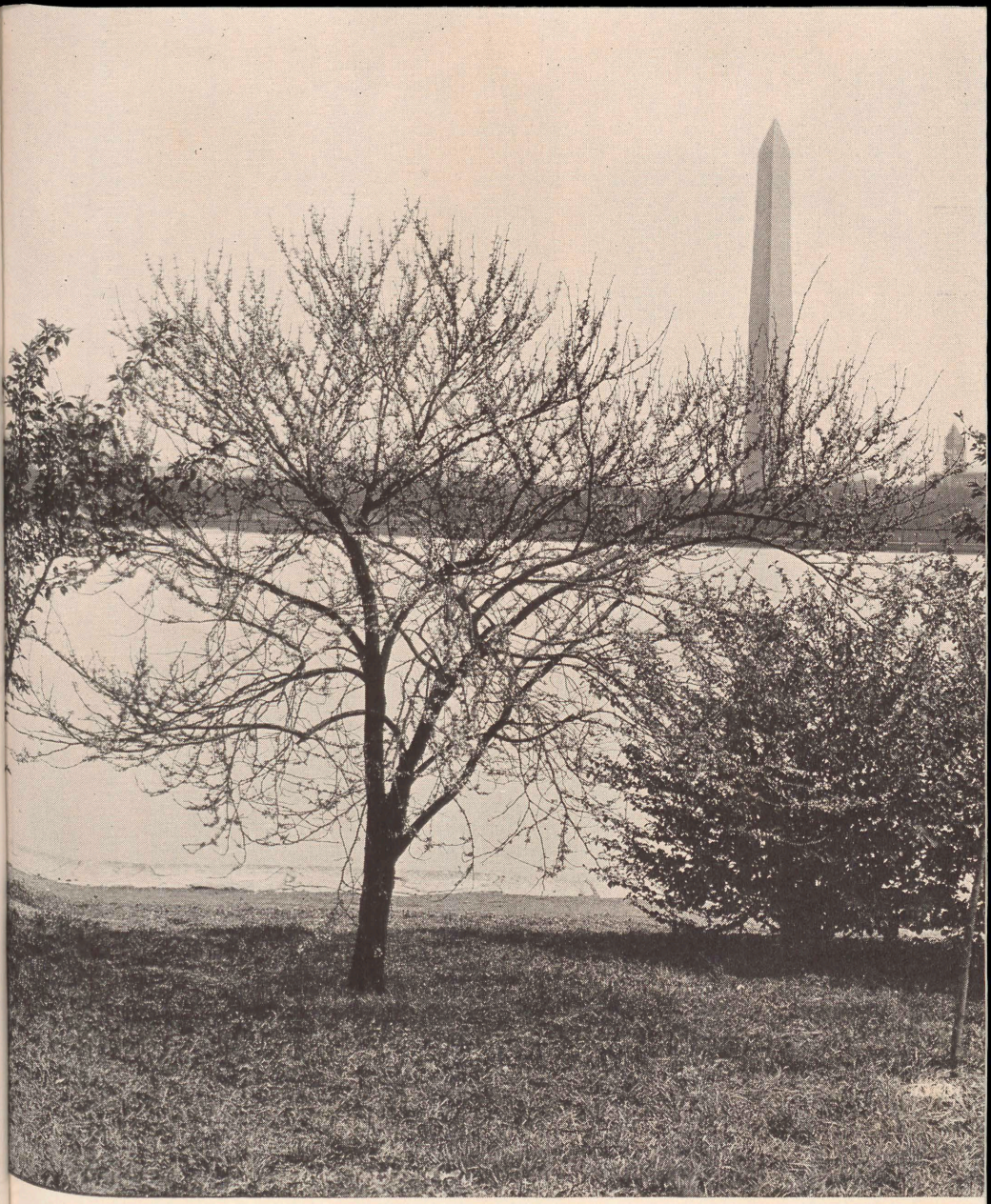
Though the redbud may attain a height of from twenty-five to fifty feet and a diameter of six to twelve inches, it is usually a small tree of the under story. In some localities it forms thickets, and the trees are so abundant that, from a distance, when in bloom they resemble a great irregular wave of rose. They form an exquisite and conspicuous part of the southern landscape in spring.

Here in the Upper South the small, pea-blossom shaped, rose-purple flowers come out usually in March, though sometimes not until April. As a rule they usher in the South's spring blossoming festival slightly ahead of the dogwoods, the service berries, and the fringe-trees. The close-set clusters of four to eight flowers each may be borne along the twigs, on small branches, or even on the trunk, and may appear before or with the leaves. Once seen in bloom, this tree is never forgotten.

Leaves At One Time Compound

The unusual leaves are heart-shaped, simple and alternate, from three to five inches long and wide, and are a glossy green in summer, turning to a bright clear yellow in autumn. The new leaves, when emerging from the buds are folded along the midrib. Unlike most leaves, they have several conspicuous ribs beside the main one that branch from the base of the leaf. The ribs are deep sunken, and so are prominent beneath. Scientists tell us that long, long ago these simple leaves were probably compound. They believe this because of the cushion-like enlargement at the base of the leaf, and again at the base of the leafstalk, or petiole.

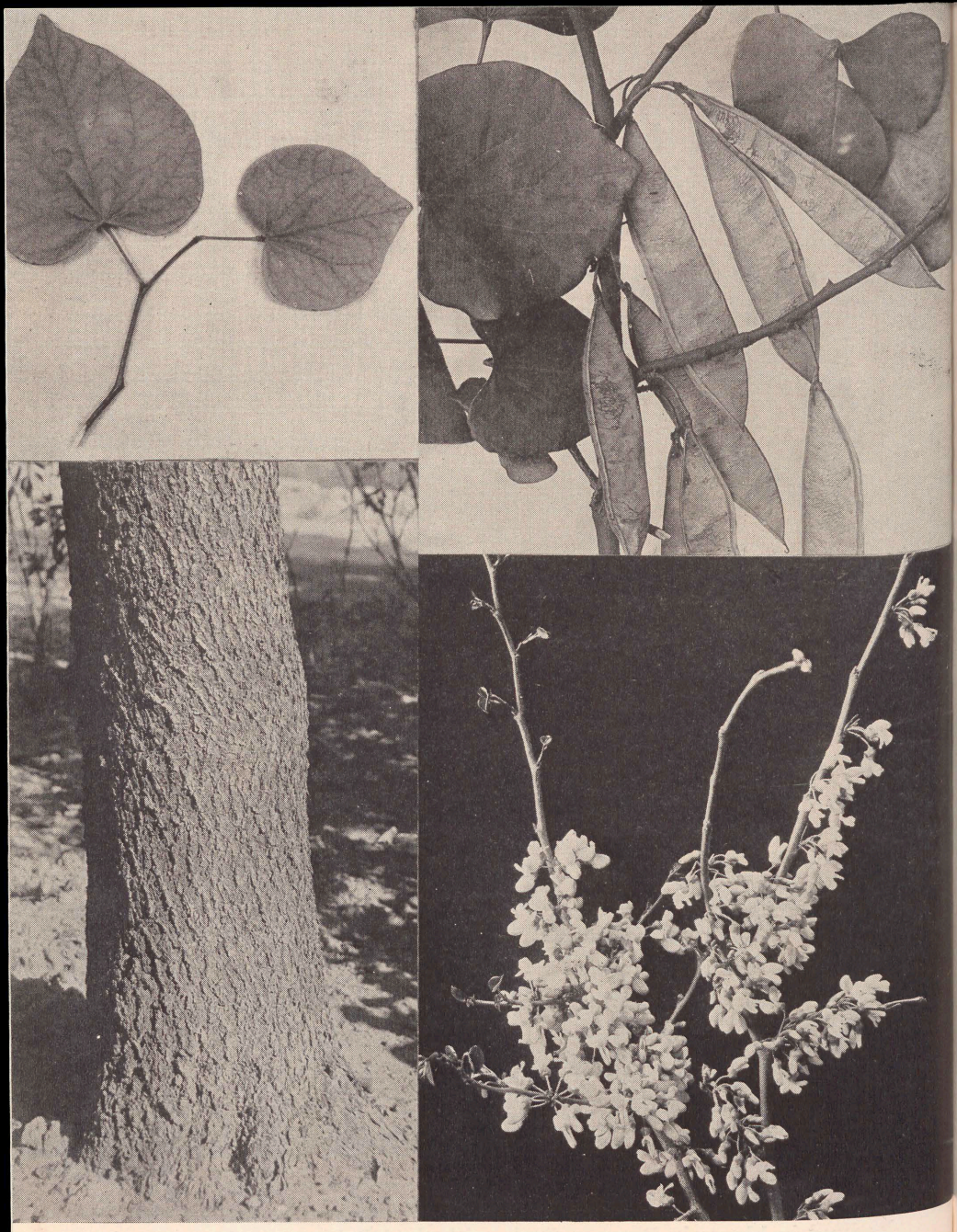
The flowers, shaped like pea-blossoms, are succeeded by small, flat, oblong pods from two to four inches long, which



Courtesy U. S. Forest Service

REDBUD (*Cercis canadensis* L.)

Redbud in bloom in Potomac Park, with the Washington Monument in the background.



Small, rose-purple flowers may grow on twig, branch, or even on trunk; thin pods contain several hard seeds. Note heart-shaped leaves with palmate veining and enlargements at base of leaf and base of petiole. This, some botanists believe, proves the leaf was once compound. (Redbud.)

contain many seeds. They reach full size by April. They have a tendency towards soft rose shades, later turning brown and remaining upon the tree until into the winter. On some trees the flowers wither and drop off without forming any fruits.

The light and smooth bark, which tends towards a red-brown color, is in long, narrow plates that separate into thin scales. The wood is heavy and hard, though not strong, and is rich dark brown. Fortunately it is of little commercial importance, enabling us to preserve the redbud for its chief value, which is as an ornamental tree. As such it has many favorable qualities: it is adaptable, flowers when quite young, and is not easily subject to disease. Seldom does it grow so large as to be out of place in shrubbery plantings. Too, growing often in the shade of taller trees, it does especially well in ornamental landscaping, filling the space between low shrubbery and tall trees which branch high.

It is both beautiful and interesting at all seasons—in its airy rose robe of spring, its cool green one of summer, and its flame-yellow one of autumn. In memory I retain a picture of a walk in a misty, silvery April rain, past a redbud entwined with golden buds and bells of yellow jessamine. And resting for a moment in the tree were a pair of bluebirds. What color in an April shower!

The Mimosa, or Silktree

The wide, benignant branches spread
Like cool pavilions overhead,
And twinklingly at every turn
The little rose-tipped torches burn.

The thrushes do not need a stair
To take their guileless music there;
And what more gracious place to house
A symphony—than these green boughs?

—ANNE BLACKWELL PAYNE.

A tree foreigner from distant lands that has become an adopted Southerner is the mimosa, or silktree. Silktree seems to be the name now preferred by most foresters and botanists, but to the Southerner the tree will always be the mimosa.

Even though it is not native, the leaves and pods prove it to be a relative of our familiar locusts. Seldom thirty feet in height, it is a lovely, graceful, though irregularly shaped shrub or small tree with a broad head.

The dainty looking leaves are actually quite large. They are alternate and pinnately twice-compound. Each *pinna,* or section of leaf along the main leafstalk, or *rachis,* has itself from forty to fifty or even sixty small, sickle-shaped, one-sided leaflets with tiny hairs on their margins. The individual leaflet is usually about half an inch long, and has a peculiarity which will always identify it. *The midrib isn't in the middle at all, but far to one side, so that the leaflet appears very one-sided.*

These leaflets are particularly sensitive and, like those of the locust trees, fold upward together in pairs at night. They will also close during showers, and while young if touched firmly. Even when fully open, the leaflets are so fine and feathery that the whole foliage mass does not cast a deep shade.

Long Flowering Period

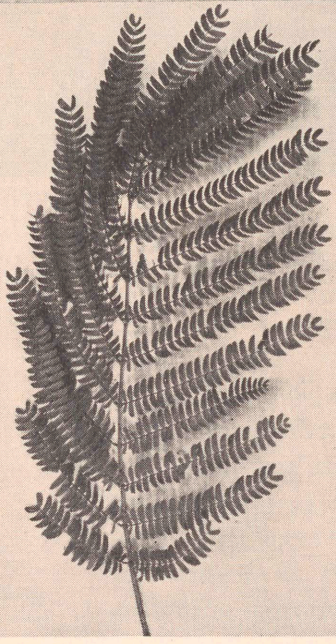
Unusual but beautiful, too, are the flowers, which vary considerably in color from light yellowish-pink to a deep, almost coral pink. They are small and sweet-scented, and clustered in round heads about two or two and one-half inches in diameter. In the Upper South flowering begins about mid-June, sometimes even earlier, and continues almost until August.

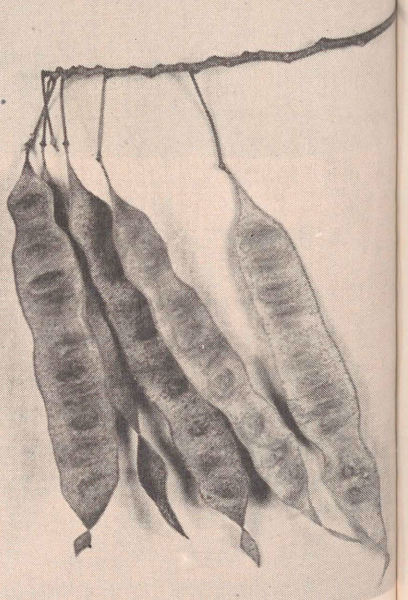
The fruits of the mimosa are flat pods two or three inches long, containing several small oval seeds. After the flowering period they seem to develop rapidly, but take their time about maturing fully. When ripe they are curiously twisted and curled. In most cases they do not split open until the pods fall

By William Daniel

MIMOSA (*Albizzia Julibrissin* Durazzini)

A tree-stranger from the Orient which has become an important ornamental tree in the South.





Flowers vary in color from light yellowish-pink to deep, almost coral, pink, and are sweet-scented; delicate, feathery, twice-compound leaves have unusual one-sided leaflets which fold together at night; flat pods contain several seeds. (Mimosa.)

from the tree, and then they may be blown some distance away. In this way the mimosa spreads far more rapidly than either the Chinaberry or the crape myrtle, two other introduced, but popular trees.

Asia, from Persia to China, is the real home of the mimosa, but it has been naturalized in most of the tropical and subtropical regions of the world. It was introduced into this country as far back as 1745, and has steadily gained in popularity. Besides the tree's exotic attractiveness, it has many other things in its favor. It is extremely hardy, growing as far north as Philadelphia; it is unusually free from disease; and it is remarkably resistant to drought, probably more than any other of our small trees either wild or cultivated. Its growth, too, is rapid.

THREE STRANGERS FROM DISTANT LANDS THE AILANTHUS, THE CHINABERRY, AND THE CRAPE MYRTLE

The kindliest thing God ever made,
His hand of very healing laid
Upon a fevered world, is shade.

Green temples, closed against the heat
Of noontime's blinding glare and heat,
Open to any pilgrim's feet.

The white road blisters in the sun;
Now, half the weary journey's done,
Enter and rest, O weary one!

—THEODOSIA GARRISON.

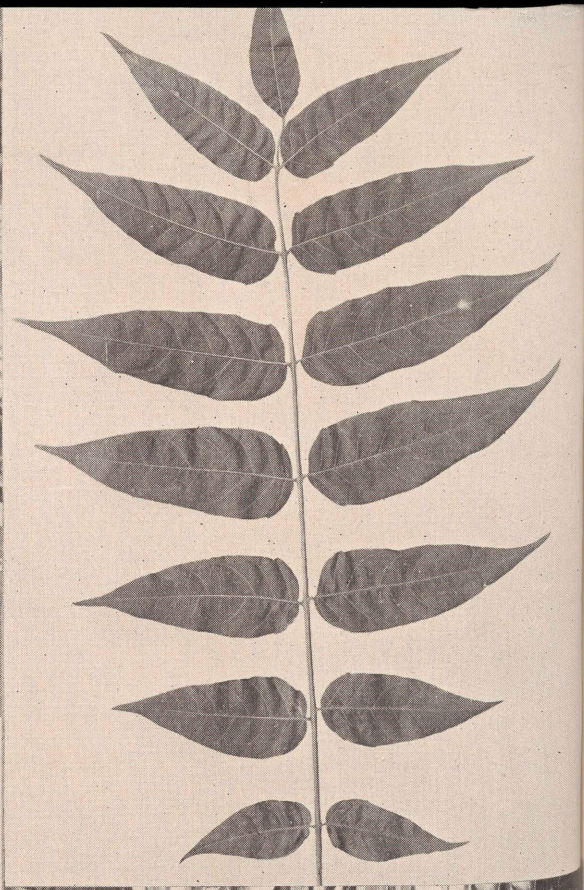
THE AILANTHUS—"TREE OF HEAVEN" (*Ailanthus*)

A CHINESE immigrant tree that came to this country by way of Europe is the ailanthus, or tree of Heaven. Jesuit missionaries brought it into Europe in 1751, hoping that it might help to establish the silk industry on the continent. For in China and Japan, its native home, an excellent quality of silk was made from the cocoons of the worms that fed upon its luxuriant foliage.

The hoped-for silk industry failed; but soon in Europe, and later in America, the tree became popular in its own right. And then, as sometimes happens with both trees and people, this popularity waned. Everywhere the ailanthus was cut down. By this time, however, the tropical looking tree from the Orient

Courtesy U. S. Forest Service

AILANTHUS OR TREE OF HEAVEN (*Ailanthus altissima* Swingle)
No yard is too small or too bare for an ailanthus to gain a foothold. The trunk of this tree is growing around the iron fence in a front yard in the national capital.



Flowers of two kinds on separate trees; compound leaves large and on both edges have notches on the underside of which are dot-like glands, an unfailing means of identification; each seed of seed-cluster is in the middle of a twisted wing, which keeps it afloat; bark brownish-gray. (Ailanthus.)

had established itself—had become naturalized in waste places, in odd nooks and corners.

And then once more opinion changed, more slowly this time. Gradually people began to realize that the good qualities of the tree more than offset its bad ones and, even more, that its bad qualities could be controlled. This "tree of Heaven" will grow in barren, sterile soil where little or nothing else can gain a foothold. It will withstand soot, dust, smoke, and grime to such an extent that it has been able to transform many an unsightly dump-heap and ugly back-alley into a "green temple closed against the heat." And many a weary pilgrim's feet have sought its cool shade as the one restful spot within miles of hot, blistering pavements. No crevice or cranny, no sun-baked tenement yard seems too barren for it to gain a foothold.

Frond-like Leaves

Interesting and strange looking is this tree of Heaven. A glance tells us it must be a "stranger from distant lands." Its large, graceful, tropical looking, pinnately compound leaves measure a foot or two, sometimes even three in length. Once I brought home a five-foot leaf from a shoot growing in a dump-heap, just outside of Raleigh, North Carolina. Each leaf is made up of eleven to forty-one narrow-pointed leaflets. The margins of these leaflets are entire except for a coarse tooth or two near the base. Near these teeth, on the lower surface of each side of the leaflet, are tiny dot-like glands which make identification positive. What their purpose is no one seems to know, but they are *always there,* a sure means of identification.

Everyone who lives near this tree should watch for the unfolding of the leaves, a miracle of springtime that no tree-lover should miss. Bronze greens, silvery greens, soft browns, coppery lights—colors which glow like jewels seen through a misty veil.

When the flowers of the male tree open, we realize the cause of the tree's unpopularity, and the reason many of them have been cut down. For the odor is overpowering and far-reaching,

enough so that it has given the tree the unpleasant name of "stink tree." The yellowish-green flowers are borne in upright clusters. The female, or seed-bearing, flowers do not have an unpleasant odor. Now people are propagating the female trees from cuttings, and so are avoiding the male trees with their disagreeable smells.

Another unfortunate quality of the tree is the tendency of its fast-growing roots to heave sidewalks and to penetrate basements, wells, and cisterns. The roots give an unpleasant taste to water.

The fruits of this tree are unusual and beautiful. Considering that it is called "tree of Heaven," it may seem appropriate that its seeds are winged. Each tiny, dark seed is attached to the middle of a reddish or yellow-green, slightly twisted, papery wing that is about an inch and a half long. These fruits, sometimes known as *samaras,* are produced in characteristic clusters on the seed-bearing trees, and greatly aid in identifying the tree in autumn and early winter.

And how far a strong wind can carry these winged seeds! It would almost seem as though the tree were trying to obey the Biblical injunction, "Be fruitful, and multiply, and replenish the earth."

In winter the ailanthus may also be easily recognized by the coarse twigs which always extend upward. They are covered with fine down and dotted with small breathing pores, or lenticels. My country school children always liked this tree for twig study. The large, irregular heart-shaped leaf-scars are very characteristic and help in identification.

In the notches at the upper parts of these leaf-scars are the downy buds. So small are they that one wonders how such great, long, compound leaves could already be made up, in miniature, in these fairy "bud-boxes." Surely the Queen of the Tree Fairies must wave her magic wand to make these tiny buds evolve into such great compound leaves! Again, who said there isn't tree magic?

The bark is brownish-gray, with shallow fissures. The wood is hard, fairly fine-grained, and satiny. In the Orient it is much used for cabinetwork. Unfortunately the tree is short-lived, the trunk soon becoming hollow, so that the tree goes down easily before a storm.

Why "Tree of Heaven"?

This distinctive, rapid-growing tree is ordinarily around fifty feet in height, though occasionally it may reach a hundred. As it usually starts branching rather low down, it produces an irregular, picturesque head. The twigs are stout and coarse. This, we remember, seems to be a common characteristic of all trees with large and long, compound leaves. A mass of fine twigs could not hold such great leaves out to the sunlight. And the twigs of this tree always grow upward, as though reaching toward the sky. When I first began studying trees I wondered if that were why this particular tree was called tree of Heaven. Was it because the twigs were looking heavenward? Perhaps—but later I believed I discovered a better reason for such a name.

It was on a misty day in late May. Early that morning I had gone out to the apple orchard, an ancient orchard that crept close to the old farmhouse, spilling its fragrance all through the rooms. Out among the trees bluebirds were nesting and warbling their joyous *tru-al-ly-spring-is-here-tru-al-ly*. A misty rain—bluebirds caroling—the air fragrant with the perfume of pink and white apple blossoms—the dull droning buzz of thousands of bees garnering nectar. Surely, God's green earth was a good earth to be alive in!

And then I had to leave for a long trolley ride to a distant city. An hour or more through green fields and pleasant countryside, then dreary miles of sordid, unkempt tenement districts of a great industrial metropolis. Gone now the cool misty rain of the morning. A hot sun beat down mercilessly on this city of dreadful streets. No bit of cool restful green anywhere.

Foreign children played in smoke-begrimed gutters and back alleys. And then just a fleeting glance. In a tiny tenement yard, hardly large enough for a tree to gain a foothold, an ailanthus spread its luxuriant foliage. In its cool green shade a sloe-eyed mother crooned to her dark-haired, dark-eyed babe, and other children tumbled about beneath the waving fronds that stretched overhead. In all the grime and dust and smoke of that dreadful, crowded, tenement district the tree seemed to say "Enter and rest, O weary one."

And suddenly I thought I knew why the ailanthus was called tree of Heaven.

The Chinaberry Tree (*Melia*)

The Chinaberry tree lifts high
Dark emerald leaves against the sky,

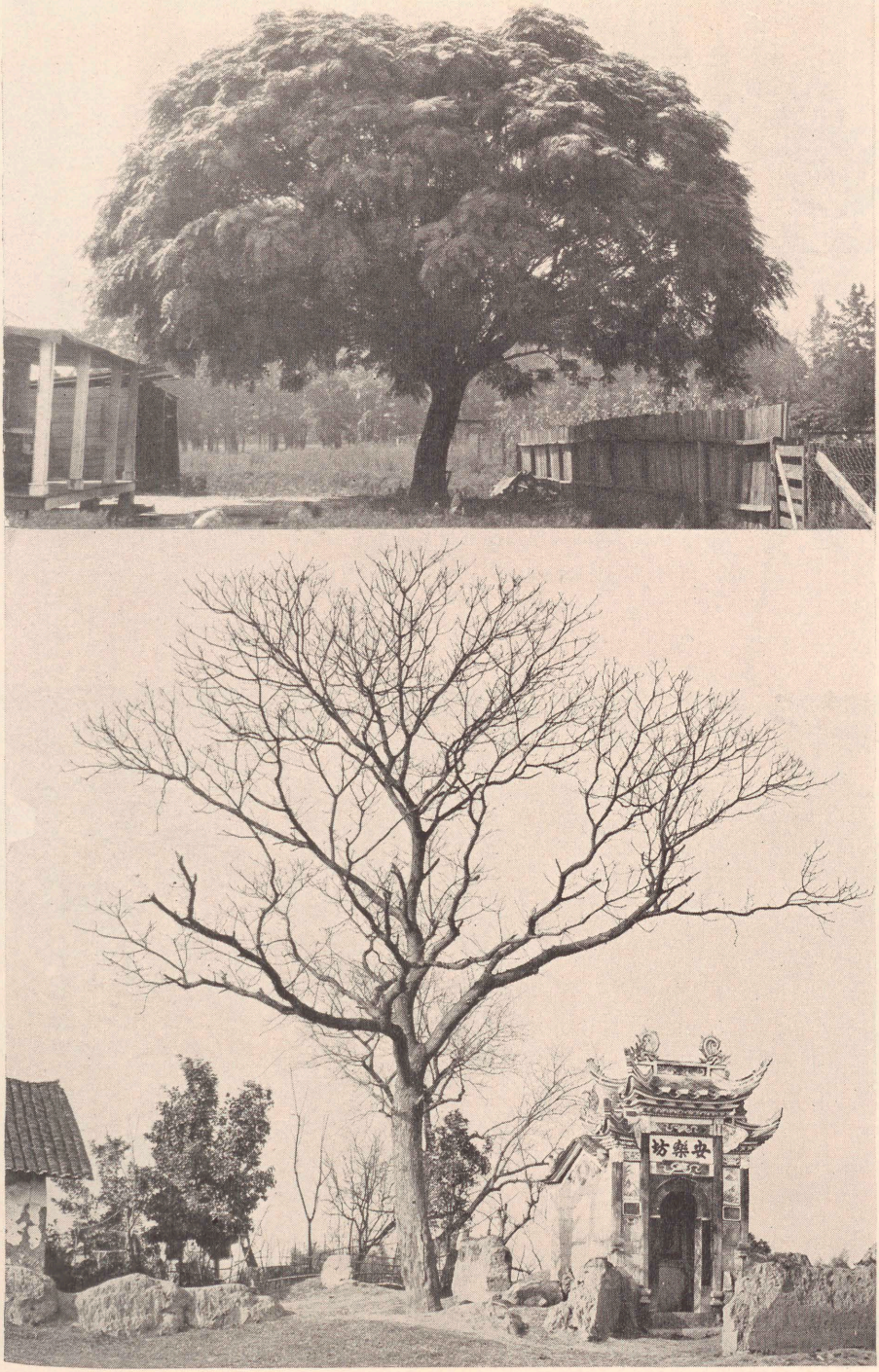
And blossoms pale as amethyst
Gleam lilac-blue within the mist.

But after showering petals fall,
And purple-stain the garden wall....

—TRAVIS TUCK JORDAN.

From the Orient to Dixie comes this tree that is now so common around cabins and along roadsides in many sections of the South. It seems to be a native of the Himalayan regions of India, where it grows at elevations as high as 6,000 feet or more. It has probably been in cultivation since the sixteenth century, says R. S. Troup in *The Silviculture of Indian Trees,* and is now grown in all tropical and semi-tropical countries. In India it is also known as pride of India, Persian lilac, and bead tree.

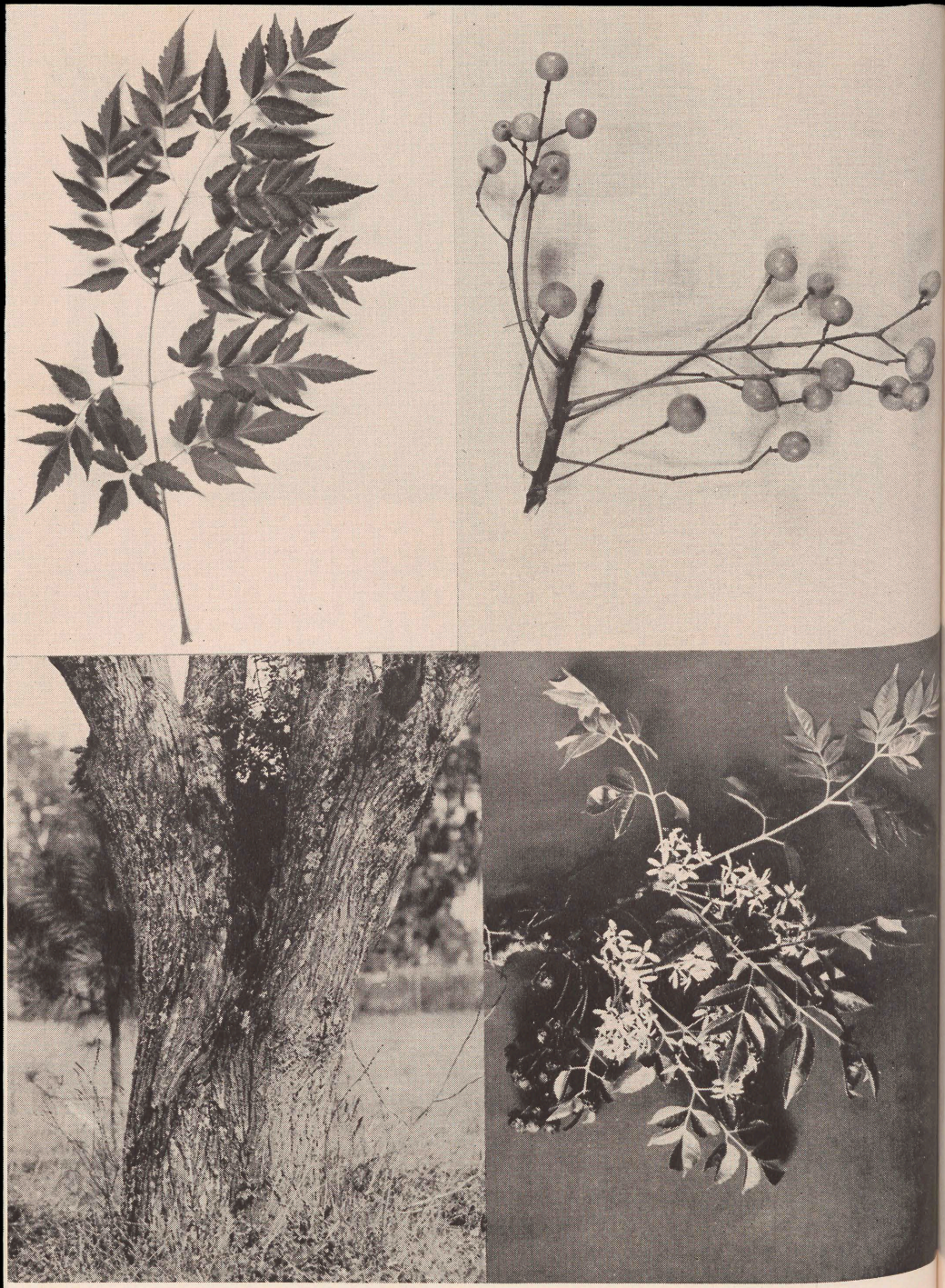
In India and various parts of Burma it is commonly planted for its handsome flowers and shade as a roadside tree. And in China it is also a great favorite. In fact, were we to take a trip in a river-boat up the Yangtze River, we should probably see



Upper, courtesy U. S. Forest Service Lower, by E. H. Wilson; courtesy Arnold Arboretum

CHINABERRY TREE (*Melia Azedarach* L.)

Another tree-stranger from the Orient which has become a common tree of the South. Upper, by a Negro cabin in the South; lower, by a Chinese shrine in its homeland.



Dainty, blue-lavender flowers are like a mosaic among the green leaves, which are twice compound; trunk sturdy, often branching low; yellow berries sometimes eaten by birds, but are not popular; bark dark gray with shallow furrows. Upper left, a single compound leaf. (Chinaberry.)

so many Chinaberry trees and crape myrtles that we would feel quite at home.

No one seems to know definitely the date of the Chinaberry's introduction into this country, but apparently it has been here for a long time. It has become naturalized to some extent, though not as commonly as has the mimosa. It is the favorite shade tree around cabins in certain sections of the South.

It is not a large tree, for it seldom attains more than forty or fifty feet in height, and often it is much less than that. It has a short trunk and a spreading crown. The bark is dark gray with shallow, longitudinal furrows. In the Orient, especially, the wood is used to some extent in cabinetmaking. The tree belongs to the mahogany family, the *Meliaceae*.

Unusual Leaves

The unusual leaves are the tree's chief beauty. They are large and twice- or sometimes thrice-compound, with numerous leaflets. The margins are toothed and the terminal leaflets are often lobed. In summer the leaves are a lovely cool green; in autumn they turn yellow and fall early.

The flowers, which appear in late April or May, are also unusual. They are pale purple or lavender and have a rather strong scent. As they come out after the leaves are well grown, the loose clusters are half hidden in the green foliage. Together leaves and flowers form a delicate mosaic of green and lavender.

The fruits are pale yellow drupes, commonly called berries, and hang in loose clusters. At first they are smooth; then they become wrinkled and hang on the tree very persistently through the winter and often into the following spring, a few remaining on through the summer.

Birds do eat these fruits, but apparently not to any great extent. They are never seen in great flocks feasting on them, as they so often feast on the berries of the holly, and dogwood, and cedar. Even in severe winters when food is difficult to secure, the Chinaberry cafeteria is never overly popular.

Robins probably feed on these berries more than any of the other birds—and sometimes, apparently, they get intoxicated from them.

The berries are considered poisonous for mankind, yet they are used as a medicine to expel worms from cattle. In China they are employed as a fever medicine and as a disinfectant. There, too, in spring an incision is made just under the bark and the sap is collected for cooling drinks.

Mystery Tree

The photograph of the Chinaberry tree by the Chinese temple was taken by E. H. Wilson, plant explorer, who spent many years in the Orient, especially in western China. Why are there no berries on this tree? No botanist I have asked has been able to answer the question, and Mr. Wilson is no longer living. Even in India, according to Troup, the fruits remain persistently on these trees into the following flowering season; and so it would seem as though they must in China, also. It may be, suggests one botanist, that this particular tree had a peculiar characteristic of shedding its berries early. In China, too, the tree sometimes attains a larger size. Mr. Wilson writes of seeing one fine specimen that was seventy feet in height and ten feet in circumference.

In many countries the stones, or pits of the berries, are used for beads or rosaries. The ridged stone is very hard and usually contains five seeds. When in the ground it splits longitudinally in two pieces, and from each stone one to four seedlings may emerge, the seedlings thus appearing in small groups. The tree also sends up root-like structures, especially where the roots are exposed or injured.

Perhaps the more common form of the Chinaberry in many sections of the South, is the umbrella tree, which originated in Texas as a variety, or sport, of the introduced tree from the Orient. It has a short, umbrella-like crown, which gives the tree its common name, and seems to be very popular as a shade tree

around cabins. This, of course, is in no way related to the magnolia that bears the same name.

The Crape Myrtle (*Lagerstroemia*)

TO AN OLD CRAPE MYRTLE

You bow so graciously as I go by—
I wonder why.
Is it but strategy to keep from me
A glimpse of bent, gray form? Would an old tree
Attempt, as foolishly, some woman might,
To hide the mellowed charm of years from sight
Beneath gay, nodding plumes upon her hat?
Could it be that?

—PEARL COUNCIL HIATT.

The crape myrtle is becoming to the South what the lilac is to the North and New England—a shrub or tree of nearly every yard or garden. Strange as it may seen, neither tree is native where it is so popular; each is a stranger from distant lands.

As long ago as 1759 the crape myrtle was first introduced into this country. Its native home is in the Orient, probably China, but it is also widely planted in India, the Philippines, Africa, and all tropical and subtropical countries.

In the South the crape myrtle has been planted, and has sparingly escaped, throughout most of the section. Many southern cities have adopted it as a "plant personality" for the entire community, and it is being used in great profusion along highways and city streets as well as in adjacent yards.

There are many reasons for this colorful tree's popularity. It is easily cultivated, does well in almost any soil, is remarkably free from insect or fungus diseases, and is long-lived. It grows well from either seeds or cuttings, and will even bear blossoms the first year it is planted from seed! Has any other tree or shrub such a record? And what gay, profuse bloom,

over such a long period! For it begins flowering in late June or July—even earlier in the Deep South—and continues until September.

The crape myrtle is never a large tree, though it occasionally reaches thirty-five feet. Often it is only a shrub with several trunks, or stems. The grayish-brown bark is exceptionally thin, and is inclined to crack, peeling off the trunk and leaving a smooth, clean, polished-like surface. The twigs are four-angled —that is, the four sides show plainly. As the shrub or tree grows older, the stems, which may occur singly or in clumps, often become fluted and twisted, rather suggestive of premature old age; but the blooms seem then to become increasingly profuse. It is this appearance of old age which reminded the poet of a little old lady under a hat of gay nodding plumes.

Colors Should Have Chinese Names

The individual floweret has crinkly petals which are as unusual as they are beautiful. The pink ones run the whole gamut of shades—rose, damask, ruby, claret, coral, flame. They remind one of Chinese descriptions of color—of "Dawn on the Mountains of Eternal Peace"; of "Springtime in an Orchard"; of "Wings of a Singing Bird." Truly, such a lovely Chinese flower can only adequately be described in the poetic terms of the Chinese.

Varieties bearing lavender, purple, and white flowers have also been developed. The flowers are in upright clusters, and the long blooming period can be increased by cutting back so that fresh growth is secured.

The fruits are roundish capsules, rather leathery, and three-to-six valved. The enclosed seeds are very small and flattened, and are winged above.

Rather small, dark green and slightly leathery, the oval leaves, which have entire margins, are about two inches long and have little or no petiole. They are usually opposite, but the upper ones may be alternate—an unusual characteristic in

Courtesy Fruitlands Nursery

CRAPE MYRTLE (*Lagerstroemia indica* L.)

Another tree of the Orient that has become a popular plant personality in many parts of the South.

Clusters of crinkly flowers in great profusion; flowering season begins in late June and lasts until September; twigs four-angled; leaves small, oval, generally opposite, but upper ones may be alternate; fruits in woody capsules; bark becomes smooth and glossy. (Crape Myrtle.)

leaf arrangements. At maturity they are dull green; in autumn they turn a burnished copper and linger long on the trees.

In many an old southern garden are ancient crape myrtles, still blooming, that were planted by hands long forgotten. Stratford Hall, Robert E. Lee's birthplace in Virginia, has a fine old crape myrtle; and at Andrew Jackson's home, the Hermitage, near Nashville, Tennessee, we were told the crape myrtles in the old garden had been planted by his wife, the beloved Rachel.

There are records of these trees being two hundred years old. In a temple courtyard in China are two fine specimens of crape myrtle that are pruned to represent fans. They overlook the valley and the work of Li-ping and his son, great engineers of irrigation in China centuries ago.

With their vivid coloring, it is most important that crape myrtles should be given a correct background. Placed against a red brick wall or building they clash harshly; but against silvery-gray or white, or with a background of green foliage, they are always beautiful. Perhaps one of the most picturesque backgrounds for this tree is that of a live oak draped in swaying gray moss.

CHAPTER XVIII

THE SUMACHS AND THE HOLLIES

I am alone with Nature,
With the soft September day;
The lifting hills above me,
With goldenrod are gay.
Across the fields of ether
Flit butterflies at play;
And cones of garnet sumach
Glow down the country way.

—MARY CLEMMENS AMES.

THE SUMACHS (*Rhus*)

WERE you a Japanese or Chinese, with a beautiful lacquered box in which to keep your treasures, you would probably know that the lacquer was made from the juice or sap of a "lacquer tree." That Oriental lacquer tree is a sumach, closely related to the sumachs that grow by our roadsides and gravelly banks, often beautifying waste lands and railroad cuts.

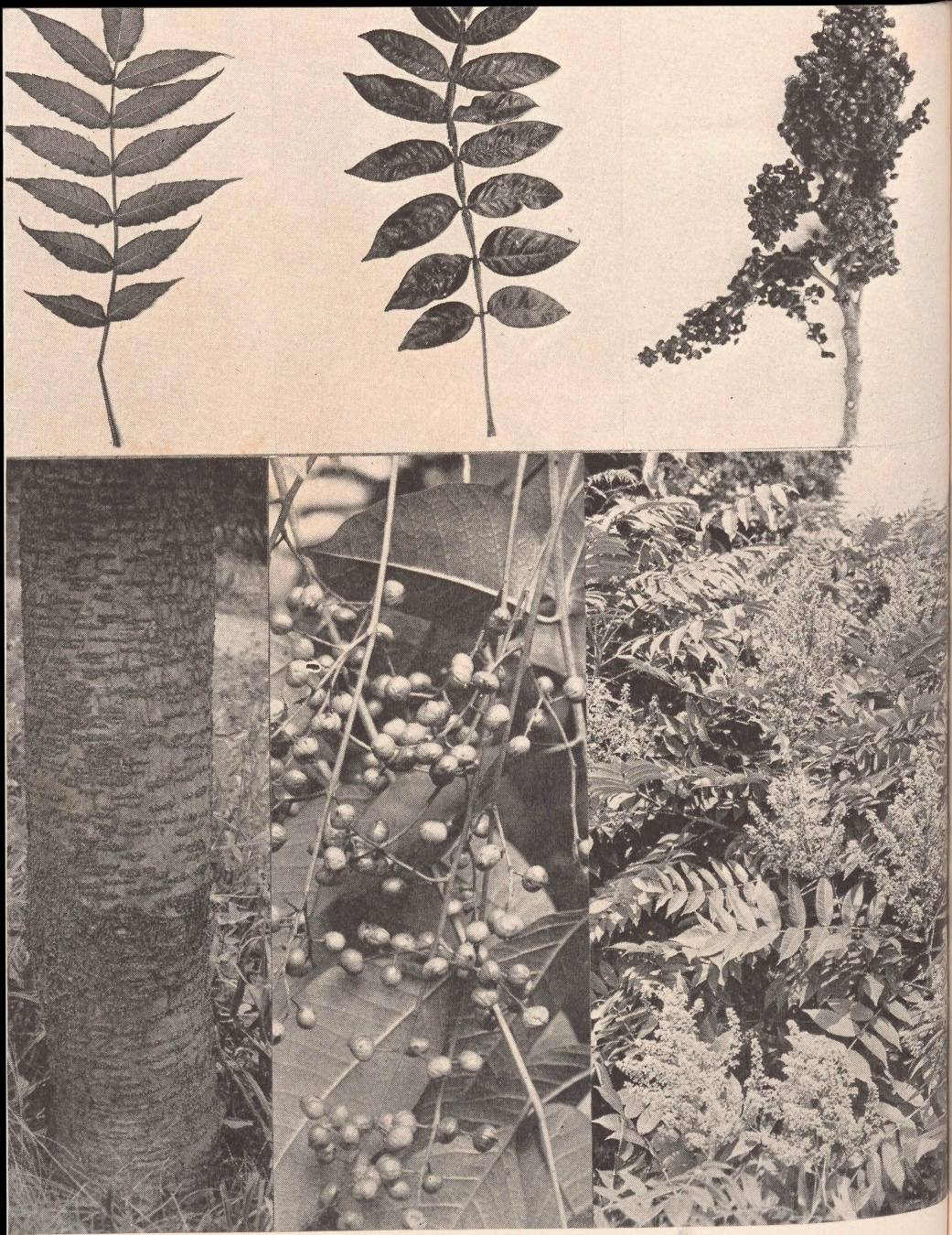
The sumachs belong to a large and interesting family containing more than a hundred species, widely distributed in the temperate regions of the Americas, Europe, Asia, South Africa, Australia, the Indian Archipelago, and our own Hawaiian Islands. Besides the lacquer tree of the Orient there are included in this family such interesting and close relatives as the mango tree, the pistachio-nut tree, and the turpentine tree of southern Europe.

The common name of this group, sumach, comes from the Arabic name of the plant, *summaq*. The scientific family name is the very long one, *Anacardiaceae*. In North America the

By L. W. Brownell

SUMACH (*Rhus hirta* L.)

For ornamental planting the sumachs are colorful and unusual. In the South this species is a small tree native only in the mountains.



Compound leaf of smooth sumach (note toothed margins of leaflets); leaf of dwarf, or winged, sumach (note "wings" along rachis between leaflets); fruit "bob" of dwarf sumach; trunk of staghorn sumach; leaves and clusters of drooping white fruits of poison sumach; flowers of smooth sumach.

range of the sumachs is from Canada to southern Mexico and from the Atlantic to the Pacific, with sixteen or seventeen species within our own borders. Of these, four attain the size and habits of small trees.

The Staghorn, or Velvet, Sumach

The largest of our sumachs (which looks very much like the Chinese lacquer tree) is the staghorn, or velvet, sumach, in the South native only in the mountainous regions from Virginia to Georgia and central Alabama and Mississippi, but common in the North at lower elevations. In cultivation, it is found in parks, gardens, and other ornamental plantings, where it always adds a graceful and colorful note, especially in summer and autumn.

Its scientific name, *hirta,* meaning hairy, is appropriate, for the twigs and forking branches are velvety to the sight and touch. Some explain the name of staghorn as coming from the fact that the forking leafless branches of winter resemble a stag's horn. Others claim that the soft velvety down on the growing shoot resembles that on a young stag's horn when it is "in the velvet."

The bark of this sumach is thin and smooth, dark brown, occasionally becoming scaly. The wood is orange colored, streaked with green, with thick, whitish sapwood. It is light, soft and brittle, coarse-grained, with a satiny surface. In early days in the "maple sugar country" the pithy young shoots or branches of this tree were cut and, after the pith was removed, were used as hollow pipes to drain the sap from the tree trunks. Bark, roots, and leaves are rich in tannin.

The main beauty of sumachs is in their foliage, which, in most species, is graceful and fern-like. The leaves of the staghorn are long and pinnately compound, sometimes reaching two feet, and are borne alternately in tufts at the ends of the branchlets, with the leaflets hanging downward. As one

watches them lifting and swaying with every vagrant breeze, they seem very airy and beautiful.

When the sumachs are in bloom we see in every clump of them some with whitish pyramids, and others with pinkish "bobs" as children call them. For sumachs have two kinds of flowers, on different trees; but both kinds of trees are usually in the same clump. The structure of the pollen-bearing flowers and the seed-producing ones is very similar, except that the former, the white ones, are more loosely arranged and more widely spreading.

It is the fruit of the sumachs with which everyone is most familiar. The bare branches holding the red "bobs" aloft—so common a sight in winter—are like great woodland candelabras lighting up the countryside.

The Winged, or Dwarf, Sumach

Outside of the mountains, the South's most common sumachs are the winged, or dwarf, and the smooth. Both are usually classed as shrubs, but in the mountains of North Carolina and Tennessee they become tree-like, sometimes with a height of thirty feet and with a short trunk occasionally eight to ten inches in diameter. We have a winged sumach at Greenwood, in the suburbs of Raleigh, that is over fifteen feet in height and has a trunk diameter of three and one-half inches. Of these two sumachs the winged is the more common, though both species are likely to be met in any outdoor ramble. Along a dusty side-road beyond our woodland we have both sumachs growing side by side.

The winged is one of the most beautiful and interesting of the group. Next time you see a clump of sumachs, look carefully at the compound leaves. If it is the winged, they are not as large as those of the staghorn—but then you won't be seeing that one unless you are in the mountains or the tree has been planted. The leaves of the winged are six to twelve inches

long, with nine to twenty-one leaflets whose margins are usually entire except for a few teeth at the tips.

If you have been looking at these leaves closely you have probably found out for yourself something that's unusual. A leaf with wings! For the main leaf axis, or *rachis,* of the compound leaf has wings on either side, between the leaflets. And they are the same color and the same texture as the leaflets themselves! Do you suppose you could find *that* on any other compound leaf?

Yes, for eyes that see and an inquisitive mind there are all kinds of fascinating secrets revealed by the trees! I really believe they must have started all this puzzle business. Can't you imagine those woodland nymphs whom the ancients believed lived in trees, laughing at us when we search and puzzle out their mother-tree's secrets and puzzles—like the hidden bud of the sycamore, for instance? For that matter, so are the axillary buds of one of these two sumachs hidden in somewhat the same way. Which one? Well, *that's* a tree-puzzle for *you* to work out.

In most of the sumachs—and notice, I said *most*—the flowers and fruits are somewhat alike. The winged is the latest one to bloom, and the heavy fruits, or "bobs," are inclined to nod from their great weight. Often they hang on the bare branches until the beginning of the next summer, although the birds feed on the berries during the latter part of the winter.

Because of its small, graceful leaves and rich scarlet and purple autumn coloring, the winged is one of the best of the sumachs for ornamental planting. Even Nature seems to realize this and many a bare, unsightly spot is covered with clumps of it. As it spreads by root-stocks, or suckers, it can soon cover a fair-sized area. Sometimes it likes to climb gravelly hills, or mountainsides, where

> "Like glowing lava streams the sumach crawls
> Upon the mountain's granite walls."

In some parts of the South the leaves of this sumach, which are rich in tannin, are gathered and dried and then ground and used for curing leather. A yellow dye-stuff is also extracted from them, to be used in some of the exquisite handicraft work of our native dyers and weavers.

Less common is the smooth sumach which is also usually a shrub. Like the staghorn, the largest of the species, it has toothed leaflet margins—but, unless you live in the mountains you won't get confused, for the staghorn, remember, is not native anywhere else in the South. And as the leaf of the smooth sumach is not winged, it cannot be confused with the dwarf species. It is an early bloomer, the pyramidal erect clusters of greenish-white flowers coming out in spring. By July it is rearing aloft its handsome "bobs," great matted clusters of deep wine-red velvety berries. At the same time, the winged sumach which may be growing by its side is just flowering. It is one of the best of the species for landscape planting, the foliage turning to brilliant colors in the fall. In fact, both the winged and the smooth blend well together, as is shown by many of Nature's artless but artistic arrangements. The berries of the smooth sumach last well into the winter.

But—White Berries! Beware!

And now we come to a beautiful and, fortunately, much rarer sumach, our only poisonous one. It is more to be dreaded than poison ivy, and some persons say that its poison is three times as bad. However, though widely distributed, the poison sumach is not common in most places.

It is met with not infrequently, however, say Coker and Totten, in the coastal plains bays and in the marshy, open valleys in the lower mountains. Usually it is only a shrub, but occasionally it becomes a small tree. Happily, it is easily distinguished from all the other sumachs. It is the only white-

berried one (if we except the poison ivy, which is really a member of the same genus), and its fruits, instead of growing in more or less thick, erect "bobs," are in loose, drooping clusters.

Too, this sumach is always found in, or on the edge of, a swamp. Though the leaves are beautiful, especially in autumn, remember to *beware of whitish, drooping clusters of berries growing in a swamp!* Also, instead of being fuzzy, as are those of all the other sumachs, these berries are smooth and shiny.

Tree Geography

We might borrow an imaginary Magic Carpet of Bagdad and journey over land and sea to Japan. There we could see how the famous lacquer is obtained from the Oriental sumach or lacquer tree—the lacquer which has made the cabinet-work of the Japanese and the Chinese famous for centuries, or perhaps, as some claim, even for 2,000 years.

According to Sargent,* these lacquer trees are cultivated in many parts of the Japanese Empire, especially on the main island of Nippon. In certain localities villages are embowered in groves of the trees. As they can be propagated by both seeds and cuttings, they are grown commercially on a large scale. The age at which the trees are tapped varies in the different provinces; the operation is begun sometimes when they are only four years old, but the majority of the cultivated trees are allowed to grow for ten years untouched. The older trees produce the best sap, which is collected separately and of course brings the best price.

The trees cannot be tapped year after year without injury, as can our sugar maples. The operations of one season last from June until November. Small horizontal incisions, about an inch long, are made with a sharp knife every six inches on the trunk and larger branches, and the sap oozes out and is collected. Every few days a sharp knife blade is run under the

* C. S. Sargent, *The Silva of North America.*

bark along the edge of the cuts to insure a free flow. Lastly, all the branches are cut off and soaked in water. The yield is small, only two or three ounces to a single tree, and the operation soon kills the tree.

However, in the Orient everything is made to count. Nothing seems to be too much trouble, or too small or insignificant to be of value. There are said to be something like 1,500,000 lacquer trees tapped each year in the different lacquer districts of Japan. A skillful "tapper" is supposed to "work" on an average 1000 trees a season, and each year over 500 tappers are sent out from one province. Of course, with this much tapping going on, and since the trees are destroyed by the process, new plantations or groves of lacquer trees must constantly be set out.

Experiments have been tried with the sap of our poison sumach, which will also make a lacquer, or varnish, but it seems doubtful whether this process will ever be carried out on a commercial scale. The value of our native sumachs is in the color and interest they add to our roadsides and waste places.

The Hollies (*Ilex*)

How their scarlet brightness shone
In the morning's airy tracks!
Nature is a wise old crone;
She knows what a picture lacks.
Winter lost its melancholy,
Christmas laughed to see the holly.

—SUSAN HARTLEY.

The using of holly, mistletoe, and other greens for decorative purposes at Christmas time is a custom dating back into long-forgotten times, and is mentioned in the history of nearly all the countries of Europe.

The druids of ancient Britain in their pagan rites, the

Romans in their Saturnalia—the "turning of the Sun" festivals —and the early Teutons all used holly and other plants at this season. The Teutons hung the interior of their dwellings with evergreens as a refuge for sylvan spirits from cold and storm.

Gradually many of these customs were carried over into the early Christian Church—and wisely, perhaps, for it cannot be otherwise than good to retain some of the beauty and symbolism of other and older religions. And so, as Loudon points out,* in time what we today know as holly was called the "holy" and later, as a corruption of the word, the "holly" tree. The German name *Christdorn,* the Danish *Christorn,* and the Swedish *Christtorn,* all seem to bear out this belief.

The holly of legend and story, of troubadours' songs and of ancient myths, is the English, or European, holly. But our knowledge that it was this foreign holly that was connected with the Christmas seasons even back through the Middle Ages, and with still earlier pagan ceremonies, has only increased all the more the esteem in which we hold our American holly, to which, on coming to this country, our forefathers transferred their affection.

It is generally conceded that the English holly (of which there is but one species, although it has been highly developed into many varieties) is more beautiful than our own. The leaves are brighter, glossier, and more deeply cut, and the berries are more vividly scarlet. However, all who have tramped the fields and woodlands of the South and gloried in the glossy leaves and gleaming berries of our own holly grant that it is beautiful enough.

In England the holly is often used in hedges to enclose gardens and yards. And the shining leaves and scarlet berries must surely add a note of color and cheer to many a dull gray, foggy English day. The custom of using holly hedges around gardens was brought to this country by the English colonists, and some of our early colonial gardens had holly in place of

* *Arboretum et Fruticetum Britannicum.*

boxwood. A few of the restored gardens in old Williamsburg, Virginia—the reconstructed colonial village—have been bordered with holly, and on a snowy winter day, when I visited one of them, it was indeed beautiful.

The American Holly

Our American holly is native from the Massachusetts coast to the Gulf. In most of the more northern stands it is rare and stunted, though I have seen some beautiful specimens in New Jersey and Pennsylvania. To see the holly in its full glory one must know it in the southern countryside in winter. It is a typical southern shrub and tree, reaching its greatest size in the rich bottomlands of southern Arkansas and Texas. There it sometimes attains heights of fifty or more feet and a diameter of two or even three feet. Ordinarily, however, it is seldom that the tree exceeds thirty feet in height, or more than twelve inches in diameter.

Though this holly grows slowly, it is tolerant as to soils and conditions. It is at home in rich, swampy lands; yet it even grows sparingly in the mountains. Perhaps this tolerance explains why such a typically southern tree has gradually extended its range farther and farther north, helped mainly by those winged seed-bearers of Mother Nature, the birds.

Joseph Illick tells an interesting story of this tree migration. "The original range of the tree was restricted to the southern states, but for centuries it has been pushing forward. Each step forward meant the sacrifice of many individuals not hardy enough to withstand the cold of the North Woods, but among each generation came a few select specimens hardier than the rest. As these grew up their seeds were carried still farther north by the birds, so that each generation became better fitted to endure the cold." *

And so, after many centuries of struggle, the holly gradually

* *Tree Habits.*

Courtesy U. S. Forest Service

AMERICAN HOLLY (*Ilex opaca* Ait.)

Familiar to all southerners is this tree, but it needs a measure of protection.

Flowers of two kinds on separate trees; leaves thick, spiny, and evergreen; berries vary in size, shape, and color; bark smooth, gray, and often dotted with warts. The flowering branch is from a male tree, which would not have berries. (American Holly.)

gained a foothold farther and farther north—and thus furnished another example of a "migrating tree."

Combined with its berries, the leaves give the holly its main beauty. They are evergreen. They remain on the tree for three years and finally fall off in the spring. Simple, alternate, glossy, with wavy margins and spiny teeth, they are always attractive.

Holly trees are male and female, and of course only the latter have berries. The small, greenish-white flowers of both sexes are inconspicuous, yet attractive when examined closely. Unfortunately, in securing a young tree to set out, unless it has been propagated by a cutting taken from a female tree, it is impossible to know which sex one is getting. A tree with leaves only is attractive, though most of us want one that will have berries. Years ago, in a field in Falls Church, Virginia, there were two fine specimens of holly growing close together. One bore berries; the other did not. Whenever I took my fifth-grade school children on a field trip, they always asked particularly to go by these trees, which they had named "Mr. and Mrs. Holly."

Holly trees show great variety in texture, color, leaf type, shape, and growth. There is also much variety in the berries, which range from yellow through orange to red, and from round to egg-shaped.

The bark is light gray to almost white, and is often roughened by wart-like excrescences. The wood is nearly white, with darker heartwood; it is light, tough, but not strong, and takes a brilliant polish. Resembling ivory somewhat, it is valued for engraving blocks, wood-turning, and cabinetwork. For this purpose many of the larger, finer trees have been cut and marketed.

Family Has Wide Distribution

There are more than one hundred and seventy-five species of *Ilex* (the scientific name) now recognized, with an almost world-wide distribution. Strange as it may seem to us, the cen-

ter of abundance is not in our own South, but in South America, particularly Brazil and Guiana, where some sixty-seven species are known. Eastern North America has thirteen species, of which six are small trees.

The famous *maté,* or Paraguay tea, comes from members of the holly group. The species from which it is obtained, therefore, are perhaps the most useful of all, though nature-lovers are loath to think any commercial value as great as an aesthetic one. *Maté,* made from two species of South American hollies, is a stimulating beverage which makes possible sustained physical and mental endurance. Its use is said to grow to be a habit that, once acquired, is not easily given up.

Yaupon

The one of our hollies that is most closely related to those producing *maté* is the yaupon, which grows in a limited area in a narrow strip along the coast from Virginia to the Gulf. It is often the dominant shrub in the tangled growth behind the sand dunes. It is a small, evergreen tree, with oval leaves about one-half an inch to nearly two inches long, with a smooth surface and small round-toothed margins. The small, bright red berries are often more abundant than those on our more common American holly, but the plant is stiffer and cannot be arranged in as graceful sprays. This holly does well in cultivation as far inland as Chapel Hill in North Carolina.

Yaupon has been likewise made into a tea; and some believe that if we had not become accustomed to Chinese tea, this might be more generally used. The Indians, who believed in its medicinal value, called it "black drink," and brewed strong infusions of it. It is said to have been a nauseating mess; but the Indian was a stoic. He believed the whole system was thoroughly cleansed by its action and that this was followed by a spiritual purification. Whole tribes, therefore, sometimes traveled long distances to indulge in these drinking ceremonials.

By S. A. Grimes

YAUPON (*Ilex vomitoria* Ait.)

This small tree or shrub is a conspicuous part of the tropical growth behind the sand dunes in the coastal regions of the South.

Leaves evergreen but not spiny, margins toothed; berries small, bright red, very abundant, but less gracefully distributed than on American holly; bark thin and broken into minute scales. The flowering branch above is of the pollen-producing type. (Yaupon.)

The Deciduous Holly

Another of the better known hollies is the deciduous holly, sometimes sold at Christmas time as "swamp dogwood." This is a small tree or large shrub with several stems and stout, spreading branches. Common from southern Virginia to western Florida, it grows on borders of streams and swamps, and also on hillsides. It even extends into the lower mountains. In the coastal plain it is common in the deep swamps of the larger rivers and watercourses. The specimen in the picture is in the meadow beyond our woodland, a holly that I have been on intimate terms with for several years.

The leaves of this deciduous holly are small, thin, narrow, finely-toothed, and *not* evergreen. They fall early, leaving the red berries strung thickly along the branch (but *not* to the ends of the twigs)—a sort of "woodland rosary" by which winter ramblers can tell their beads. Though it is very lovely, because of its bare branches it does not look as we ordinarily think a holly should look. The flowers are small, whitish, and of two kinds on separate plants.

The winterberry is another of the shrubby hollies that is *not* evergreen, and which occasionally reaches small tree size. In appearance it is very similar to the deciduous holly, but its berries grow nearer to the end of the twig.

Other hollies of the South are the dahoon holly of the swamp margins and the damp sand dunes, and the myrtle-leaved holly, a small, straggling evergreen of low, wet woods. The former of these may have spiny leaves. There is also the mountain holly, found from the piedmont to the high mountains from Virginia to Georgia. The leaves of this holly are also *not* evergreen; they are thin, dark green, and finely toothed.

Holly Vandalism

Vast amounts of all these hollies, but especially of the better known and more common American holly, are shipped north and west each year. Large lots are also gathered and sold locally in the South, and the supply is rather rapidly declining. The American holly, in particular, is a slow grower. As no concerted attempt is being made to replace it, the tree may eventually be doomed if not to extinction, then certainly to rarity.

From time to time garden clubs have tried to discourage the use of holly for decorative purposes. But a custom that has lasted for thousands of years and is deeply ingrained in the hearts of a people is not easily discouraged. A campaign which should bring better results is to discourage, by heavy fines if necessary, vandalism in the gathering of our native holly, mistletoe, and other greens. Holly is and should be a Christmas money crop to our farmers. Often, so farm women have told me, the money brought in from the sale of holly wreaths, trees, sprays, and other decorations is all they have for Christmas spending and the children's "Santa Claus."

Yet for days before Christmas, especially the Sunday—Christ's Day—before, car after car goes out to the country and its occupants help themselves to the farmers' holly and pines and cedars.

If this could be absolutely stopped, and if the farmers, for their own good, would adopt approved methods of cutting and pruning holly, their income would be continuous from year to year, yet the supply would not be exhausted.

And then, in the future as well as in the past, the verse might still be appropriate, though the setting would be modern.

> The mistletoe hung in the castle hall,
> The holly branch shone on the old oak wall;
> The baron's retainers were blithe and gay
> A keeping a Christmas holiday.
>
> —THOMAS H. BAYLEY.

By William Daniel

DECIDUOUS HOLLY (*Ilex decidua* Walt.)

This holly is found on river banks, flats, or even on hillsides.

Flowers similar to those of other hollies; leaves small, thin, narrow, and *not* evergreen; bark thin and warty; small, bright red berries on the bare branches are very decorative and remain on the tree through most of the winter. (Deciduous Holly.)

THE MAPLES
(ACERACEAE)

The maple puts her corals on in May
While loitering frosts about the lowlands cling,
To be in tune with what the robins sing,
Plastering new log-huts 'mid branches gray;
But when the autumn southward turns away,
Then in her veins burns most the blood of spring,
And every leaf, intensely blossoming,
Makes the year's sunset pale the set of day.

—JAMES RUSSELL LOWELL.

The Orient the True Home of the Maples

THERE are about sixty or seventy kinds of maples in the world, and they are especially abundant in Asia. China and Japan together have over thirty species, whereas we have but thirteen in America. Indeed, the Orient is considered the true home of the maples, although there are also some maples in Europe. Only one species is found growing south of the equator.

Maples are among the most valuable trees we have. Like the oaks, their leaves are distinctive, as are their fruits, the winged "samaras," which, united, form what is called a "maple-key." All maples have buds, leaves, and twigs arranged according to the opposite, rather than the alternate, plan.

Another noticeable feature of the maples is that because the foliage is so dense, the leaves have an interesting arrangement which enables them to reach out to the sunlight. The stalks of some leaves lengthen and push their blades out where they will not be shaded by the others. The whole spray makes a

graceful mosaic. Several other trees, notably the redbud, have this same arrangement.

The Red Maple

In the South, the red maple "puts her corals on" in March, sometimes in February, or even as early as January! This maple, the most abundant one in the South, usually flaunts the color which gives it its name *somewhere* throughout all the seasons. In winter the buds are like glowing rubies strung along the twigs, and before the leaves come out these twigs are aflame with flowers, usually, though not always, red.

It is these flowers which gave the tree the Indian name of *A-weh-hot-kwah*—the red flower. They are of two kinds, and may be on the same, or on different, trees. The twigs and leaf-stalks are also reddish, as are, usually, the fruits, the "maple-keys." Sometimes, however, these last are brownish or greenish. About an inch in length, they are borne on drooping stems three to four inches long. They ripen in spring or early summer, and germinate soon after the seeds fall to the ground. You can plant some and have tiny seedling maple trees before winter.

In autumn the leaves turn a brilliant scarlet, lighting up, like a living flame, the roadsides, swamps, and forests. These leaves are simple, with palmate veining, three- to five-lobed, with margins doubly toothed. In summer they are dark green above, paler beneath. The clefts, or sinuses, of the red maple are always sharp V-shaped, while those of the silver maple are U-shaped—an unmistakable means of identification for both trees.

Red maple leaves vary greatly in size, shape, and texture. Two trees may be rather close together, and one may have leaves four inches long, with five-pointed, saw-toothed lobes, and the other may have small leaves with but three lobes. Sometimes there is great variation even on the same tree.

Courtesy U. S. Forest Service

RED MAPLE (*Acer rubrum* L.)

The most familiar maple of the South. This photograph was taken just before the foliage appears, just after the blossoms have fallen and the fruit is forming.

All maple leaves, flower clusters, and branches are opposite; flowers of red maple appear before leaves; at left above are pollen-bearing ones, at right seed-producing, both on same or on different trees; "maple keys" or fruits mature in early summer. Note V-shaped sinuses in leaf. (Red Maple.)

"Picture-Bark"

On older trees the bark is dark gray and rough; on younger trees it is smooth and lighter, often with beautiful and fantastic markings. On a hill beyond our home is one of my special "tree friends," a young red maple with "picture-bark" in varying shades of gray. In imagination one can trace on it broad, winding rivers, temples, and white-capped Fujiyama-like peaks. A spray of its brilliant scarlet and orange or crimson leaves against this exquisite bark creates a most unusual and beautiful autumn picture.

In winter the bark, together with the smooth grayish branches and red twigs heavily dotted with lenticels, and the red buds strung oppositely along the branches, identify the red maple.

The wood of this maple, commercially known as soft maple, is light brown tinged with red, and is close-grained, but not very strong. It takes a smooth, satiny finish and is used somewhat for cabinetwork, in the manufacture of turnery, woodenware, and also for fuel.

The Sugar, or Hard, Maple

"On sods of turf sat the soldiers round;
A maple throne, raised high above the ground,
Received the Trojan chief; and o'er the bed,
A lion's shaggy hide for ornament they spread."

Such was the throne on which Evander seated Aeneas, the Trojan founder of the Roman race, according to Virgil's *Aeneid.*

Because the wood of certain maples is extremely hard, the Romans and other ancients prized it very highly, using it for various implements, including their famed pikes and lances. *Acer,* meaning hard or sharp, is the scientific name for this family. The Romans also prized this wood for fine cabinet-

work, and tables inlaid with curious portions of maple sometimes brought their weight in gold.

As we come down through the ages to our own colonial days, we find that "the old spinning wheel in the parlor" was often made of the wood of the sugar maple, also called hard, or rock, maple. Other things made of this hard, heavy, strong wood include flooring, furniture, tools, wooden dishes, croquet balls and mallets—even the rolling pins Maggie so constantly uses on Jiggs, and—a much better purpose—the backs and sides of violins.

The sugar maple is one of the most common and widely distributed trees in eastern North America. It occurs from Newfoundland to Manitoba and southward, at lower levels through the northern states and then along the Allegheny Mountains to northern Georgia; westward to Dakota and Texas. It is found in every state east of the Mississippi, but is not common in the South. Its finest and most abundant growth is in the New England and Lake States.

Trees on "Color Parade"

Because of their long life, stately beauty, and rugged strength, sugar maples make excellent shade trees for planting along country roads and village streets, especially in the North, or in our mountain towns. In summer they form a dense shade, in autumn they are a pageant of color. No medieval European army in all the glory of gorgeous uniforms could compare with the "color parade" the maples put on in an autumn in the North or in our own mountains.

I recall a country road along which I used to walk to a rural school I once taught. For over two miles this road passed beneath an arch of sugar maples, and in autumn they were a riot of red, scarlet, orange, crimson, yellow, and burnt sienna. It was an old, old dirt road running along the edge of a hill overlooking a lake. To drive or walk along this scarlet lane, smelling the fragrance of ripening grapes, and to look beyond

Courtesy U. S. Forest Service

SUGAR OR HARD MAPLE (*Acer saccharum* Marsh.)

King of the maples, it yields excellent lumber, is long-lived, a fine shade tree, handsome, and holds a hidden store of sweetness, which the Indians had learned to make into sugar long before the white men came.

Pollen-bearing flowers appear with the leaves, and are in long drooping clusters; sometimes both kinds of flowers occur in same cluster; leaves come out later than those of the other maples; "keys" do not mature until fall; bark granite-gray and deeply furrowed. (Sugar, or Hard, Maple.)

to the fields and cross-roads bordered with goldenrod and blue chicory, with the blue lake in the distance, was like wandering through fairyland. It reminded one of the mystical country of a vast Maxfield Parrish painting, a sort of "earth's canvas."

Trunk a Granite-gray Column

The trunk of the sugar maple is a granite-gray column with deep furrows. The winter buds are purplish in hue and a quarter of an inch long. The simple leaves, three to five inches long and of even greater breadth, have pointed lobes, each lobe containing a primary vein, and the margins are sparsely toothed. In summer they are dark green above, paler below.

Unlike the red and silver maples, which bloom early, before their leaves are out, the flowers of the sugar maple appear with the leaves. The pollen-producing ones are in separate clusters, usually on the same tree with the seed-producing ones, but occasionally on separate trees. Small, insignificant, greenish-yellow in color, they are, however, rich in honey, and the bees find them most attractive.

Like those of all maples, the fruits are samaras, or "maple-keys." Generally but one fruit of the key is perfect and will grow. The keys are usually found in clusters at the tips of the twigs, often remaining on the tree over winter. In this they differ from those of the red and silver maples, which generally appear on the sides of the branches, ripen in the late spring or early summer, and fall quickly.

The Southern Sugar Maple

This maple is a close relative of the sugar maple and is found in parts of the South from Virginia to Florida, Louisiana, southern Arkansas, and eastern Texas. In habit and appearance it is quite similar to the northern tree, but is smaller, more spreading, and usually grows along streams and swamps. The yellowish flowers appear with or before the leaves.

Fruits or "maple-keys" are small and may be either hairy or smooth when ripe. The leaves are also smaller, ordinarily three lobed and less definitely toothed. They are pale and somewhat hairy on the under side. In fall they turn yellow, lacking the brilliant coloring of the northern sugar maple. In localities where both the northern and the southern sugar maples are planted, the latter usually flowers about two weeks earlier than the former, but the autumnal change of color is about two weeks later.

Maple Sugar—Our Heritage from the Indians

One of the many contributions which the American Indian gave to husbandry was maple sugar. For the sugar maple has an imprisoned store of sweetness in the great quantities of sugar in its sap.

In Europe honey had long been used for sweetening, but honeybees are not native to America; they were brought here by the early colonists. (The bees of our familiar "bee trees" are honeybees that have escaped and gone wild.) And so, not knowing anything about honey, the Indians, some of whom were really very clever agriculturists, long ago discovered how maple sugar could be obtained from the sap of some of the maple trees, especially from the sugar maple. This was all so long, long ago in their history that no one knows just when it was.

Our early colonists found the Indian making this sugar, and first adopted, then improved upon, his methods, for the Indian's way of making it was very crude. With his tomahawk he—or more likely his squaw—gashed the trunk and inserted a piece of bark or a hollow reed. The sap was caught in a dish or bowl of bark, in bark buckets, or in gourd shells, then emptied into large troughs or vats built of elm bark, or into the hollowed out trunk of a tree.

As the Indians had no iron or copper vessels which would stand fire, they either let the sap freeze, and took off the ice

at the top time after time, which left the syrup at the bottom, or they boiled it by dropping red hot stones into the troughs of sap. The sugar was stored for future use in "bark boxes." On the frontiers, a hundred and more years ago, such "barks of sugar" were articles of trade brought in by the Indians.

The Ash-leaved Maple or Box Elder

Differing from all the other maples, the ash-leaved maple, or box elder, has compound leaves of three to five leaflets. These leaflets, two to four inches long and two to three inches broad, are somewhat oval-shaped, and coarsely and irregularly toothed, often with a tendency towards lobing. The odd, or terminal leaflet, is more likely to be three-lobed than simple, at times resembling somewhat the three-lobed form of the red maple. When full grown the leaves are a bright light green above, paler beneath, and in autumn they turn a pale yellow.

Even in winter this maple is easily distinguished from the others by its olive-green, coarse twigs covered with a powdery coating that can be easily rubbed off. The winter buds are large, oval, and downy, occurring opposite each other, and usually grouped in small clusters. Just beneath them are the conspicuous leaf-scars, which completely encircle the twig.

In still another way is this maple different from the others. They may have two kinds of flowers on the same tree, sometimes on different trees, but the ash-leaved maple *always* has them on separate trees. They are small, yellowish-green, and appear just before or with the leaves. The "keys" reach full size by early summer, and are in long, hanging clusters, sometimes a dozen or more on a single stalk. They often remain on the tree until late winter, to be whipped off one or two at a time and borne away on the wind.

Popular Shade Tree for Prairies

This handsome tree may attain a height of fifty to seventy feet and a trunk diameter of two to four feet. Often its trunk divides near the ground into a number of wide-spreading branches. It grows rapidly, is tolerant of climatic changes, and has an ability to do well in high or low altitudes, or with much or little rain. And so it was planted in vast numbers by the tree-hungry pioneers on the treeless prairies, who wanted shade and "wanted it quick." However, like many quick-growing trees, it is not as long-lived as hard maples.

This maple has a natural range equalled by few others of our native trees. It grows from Canada to northern Florida and west to the Rocky Mountains. In the South, according to Coker and Totten, it is a rather small tree, scattered in the valleys of the lower mountains, rather common along the sandy banks and bottoms in the piedmont, and extending along the larger rivers of the coastal plain as far south as northern Florida.

Its bark is pale gray or light brown, deeply divided into hard ridges, separating into thick scales. The creamy-white wood is light, soft, close-grained, and not strong. It is used for woodenware, lumber for interior finish, and pulpwood. In its northwestern range it is said the Indians tapped this tree for sap for sugar making.

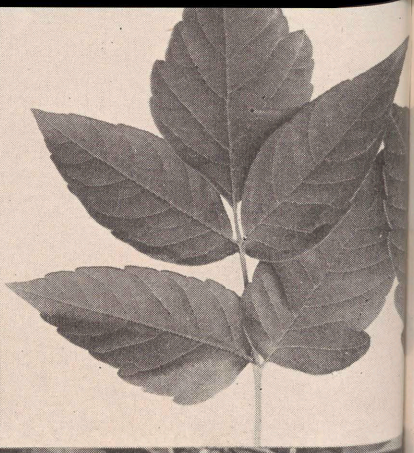
Other Maples of the South

In most of the South the silver maple is better known as a planted tree than as one growing wild; for it is only rarely found in a few coves in the mountains, in certain rich woods in the upper piedmont, and in a few other scattered places.

But wherever the tree is, and whether planted or native, it is easily recognized by its graceful, deeply-cut, silver-lined leaves, which give the tree its common name. The sinuses of the leaves are always U-shaped, and help to identify the tree.

Courtesy U. S. Forest Service

ASH-LEAVED MAPLE OR BOX ELDER (*Acer Negundo* L.)
Tree in Monument Grounds, Washington, D. C. Our only native maple with compound leaves.



Opposite compound leaves with from three to five leaflets, the terminal one often lobed; flowers appear with the young leaves; "keys" mature in late summer, but remain on tree well into winter; trunk often divides near ground; bark pale gray or light brown and deeply ridged. (Box Elder.)

Courtesy U. S. Forest Service

SILVER MAPLE (*Acer saccharinum* L.)

Tree in central Maryland. Note tendency of branches to droop, then turn upward. As a wild tree this is rare and local in the South, but is often planted as an ornamental tree.

Leaves deeply cut and toothed, paler below, giving tree the name of silver maple; flowers appear before leaves and fruits fall off in April and May; silver maple fruits and "keys" are largest of those of our native maples. Note U-shaped leaf sinuses. (Silver Maple.)

Another way to identify the silver maple is by the upward-arching branchlets.

This maple has its flowers *before* it opens its leaves. They are greenish and the two kinds may be on separate trees, on the same tree on different branches, or even on the same twig. The "keys" are the largest of any of those of our native maples, and have a wide wing-spread.

Though a beautiful tree, especially when the wind is rippling the leaves causing them to show their silvery linings, its branches are brittle and are often broken off, causing it to become frequently disfigured.

The Striped Maple

In the mountains of the South are two of the smallest, yet most interesting and beautiful species, the striped and the mountain maples. Though of no importance commercially, they are of great value aesthetically, for they add greatly to the beauty of our mountain stream banks and ravines. They are also important economically because they hold the soil and protect the banks of steep, rocky slopes.

All tree lovers feel a thrill when they recognize the queer, artificial-looking bark of the striped maple. The striping, which gives the tree one of its common names, is caused by the breaking of the outer bark as the twig grows, and the showing of the white layer underneath. No other of our native trees has this peculiarity exhibited in the same way. And because in the North moose are particularly fond of feeding on the branches and sweet, juicy twigs of this maple, it is also called "moosewood."

In the South this tree is found in cool, damp soil of the higher mountains as far southward as northern Georgia. The leaves, the largest of any of our maples, are from five to six inches long, and are three-lobed, with very fine-toothed margins. In summer they are a bright green above, paler beneath.

In autumn they turn a clear, bright yellow. In spring, when it is first clothed in a "misty, rosy sheen of buds and opening leaves," the tree is a "woodland dryad," well worth a trip to the mountains to see.

The Mountain Maple

Another shade-loving tree, content to grow in the under story of the forest, is the mountain maple, which is more often a shrub than a tree. In our southern mountains it is found only at high altitudes, and, like the striped maple, ranges as far south as northern Georgia.

The leaves of this tree are more graceful and airy-looking than those of the striped maple; they are three- to five-lobed, the margins are doubly toothed, and their surface is very conspicuously and finely veined. In autumn they turn a glorious orange and scarlet. This is our only maple which has an upright cluster of flowers, which come out after the leaves are full grown. After the flowers have developed into the "keys," the cluster becomes drooping, and in late summer or early fall these keys often turn to a beautiful scarlet, a brilliant bit of color in the sombre forest.

THE BUCKEYES, THE BASSWOODS, AND THE LOBLOLLY BAY

THE BUCKEYES (*Aesculus*)

There by the blacksmith's forge, beside the street,
Its blossoms white and sweet
Enticed the bees, until it seemed alive,
And murmured like a hive.

And when the winds of autumn, with a shout,
Tossed its great arms about,
The shining chestnuts, bursting from the sheath,
Dropped to the ground beneath.

—HENRY W. LONGFELLOW.

BECAUSE long, long ago someone thought the soft brown nuts marked with a white spot resembled the eye of a deer, perhaps a buck, certain trees that bore them were called "buckeyes."

Although the buckeyes are known on every continent in the northern hemisphere—in America, in Europe, and in Asia—they are nowhere very numerous. In eastern North America there are two common ones that become fair-sized trees, the more southern yellow buckeye, and the Ohio buckeye. A third, which is not native, the horse-chestnut, is widely planted.

Buckeyes have many distinctive characteristics. They have large, showy, pyramidal flowers, and large, glossy brown nuts enclosed in thick, three-valved husks which in some species are smooth, in others, spiny. The winter buds are very large; in the horse-chestnut they are varnished. But the most important characteristic is the leaves. No other tree has leaves that

could be confused with them, for they are opposite, and palmately compound.

Only a few of our native forest trees have opposite leaves. Besides the maples, they are the buckeyes, the ashes, the dogwoods, sometimes the catalpas (usually their leaves are in whorls of threes), the elders, and the viburnums. The last two are only shrub-like in the South.

Of these, only the buckeyes and the ashes, and one maple, the box elder, have compound leaves. So a large native tree in the South that has opposite, compound leaves is sure to be one of three—a buckeye, an ash, or a box elder. The leaflets of the ashes and of the box elder are always arranged pinnately—that is, in pairs along the side of the main leaf axis. Those of the buckeyes are all bunched, fan-like, at the end of the leafstalk. And there you have a very simple and easy way of identifying these opposite-leaved trees. It is a good start in tree identification.

The Sweet, or Yellow, Buckeye

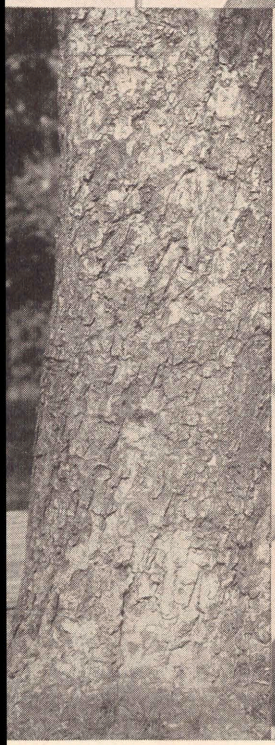
Largest of the native American buckeyes is the sweet, or yellow, buckeye which sometimes reaches a height of ninety feet and a trunk diameter of two, three, or even four feet. This maximum, again, occurs in the South, in the Allegheny Mountains of North Carolina and Tennessee, where so many of our native trees reach their greatest size.

Its natural range is from western Pennsylvania to Iowa and Oklahoma, south along the mountains to Georgia and northern Alabama, and west to Texas. It prefers the rich soil of bottomlands in mixture with other hardwoods, for though it does occasionally occur in small patches, seldom is it found growing in groves. It is much better known as a solitary tree.

The palmately compound or "fan-like" leaves of the sweet buckeye are large, each one made up of five or seven oblong, sharply pointed leaflets three and one-half to eight inches long.

By L. W. Brownell

SWEET, OR YELLOW, BUCKEYE (*Aesculus octandra* Marsh.)
A tall slender tree that grows in the higher mountains of the South.



Leaves palmately compound, with five to seven leaflets; round and smooth fruits contain from one to seven seeds or "buckeyes"; yellow flowers in large pyramid-shaped clusters at ends of branches; bark gray-brown and somewhat broken into thin, irregular scales. (Sweet, or Yellow, Buckeye.)

They are dark green and smooth above, except for the midrib and veins, which are sometimes downy. The margins are finely toothed, and the petiole is about as long as one of the leaflets.

Opening when the leaves are about half grown, the showy yellowish blossoms are arranged in spikes which stand erect at the ends of the branches. They are five to seven inches high and two to three inches wide.

The thick-shelled husk, smooth, round, rusty brown in color, encloses one to three round, brown chestnuts or shiny seeds called "buckeyes." Each one is about an inch or an inch and a half in diameter, and has a pale spot on the side, which is the scar where it joined the husk. This sweet kernel, some believe, gives the tree its common name; others think the name comes from the fact that the bark is less fetid than that of the other buckeyes. The seed is eaten by hogs and cattle.

The gray-brown bark of the sweet buckeye is smooth but breaks up to some extent into thin, irregular scales. In winter the tree is easily recognized by its opposite, long, brown buds (which, unlike those of the horse-chestnut, are *not* varnished) and by the leaf-scars. These are in the shape of a horseshoe (and the bundle-scars are the tiny "nails"), but the shape is not as pronounced as it is in the horse-chestnut.

The creamy-white, light and soft wood decays rapidly when exposed to the weather. Since it is too limited in distribution and abundance to be important commercially, its use is restricted to the manufacture of woodenware, artificial limbs, veneer, and paper pulp.

The Ohio, or Fetid, Buckeye

The other tree of this genus which grows native in eastern North America is the Ohio, or fetid, buckeye. It is this tree which gives the name "Buckeye State" to Ohio; not that the tree is common there, but because it was once more abundant there than elsewhere.

Today this tree is much rarer, partly, perhaps, because its bark when injured has a disagreeable, fetid odor which many people dislike, causing them to get rid of the specimens round their homes. It is this odor which gives the tree one of its common names, fetid buckeye.

Much rarer in the South than the sweet buckeye, and not present in the coast states, the Ohio buckeye is occasionally found in the higher mountains. It is a smaller tree than its cousin, and though its yellow flowers are somewhat similar, the husk of the fruit is prickly, not smooth. The leaves are smaller, usually with but five leaflets, whose margins are much more finely toothed.

There are also some smaller, shrub-like buckeyes which occasionally attain tree size. These include the red buckeye, generally found near the coast, and the dwarf, or Georgia, buckeye.

The Lindens, or Basswoods (*Tilia*)

If thou lookest on the limeleaf,
Thou a heart's form will discover;
Therefore are the lindens ever
Chosen seats of each fond lover.

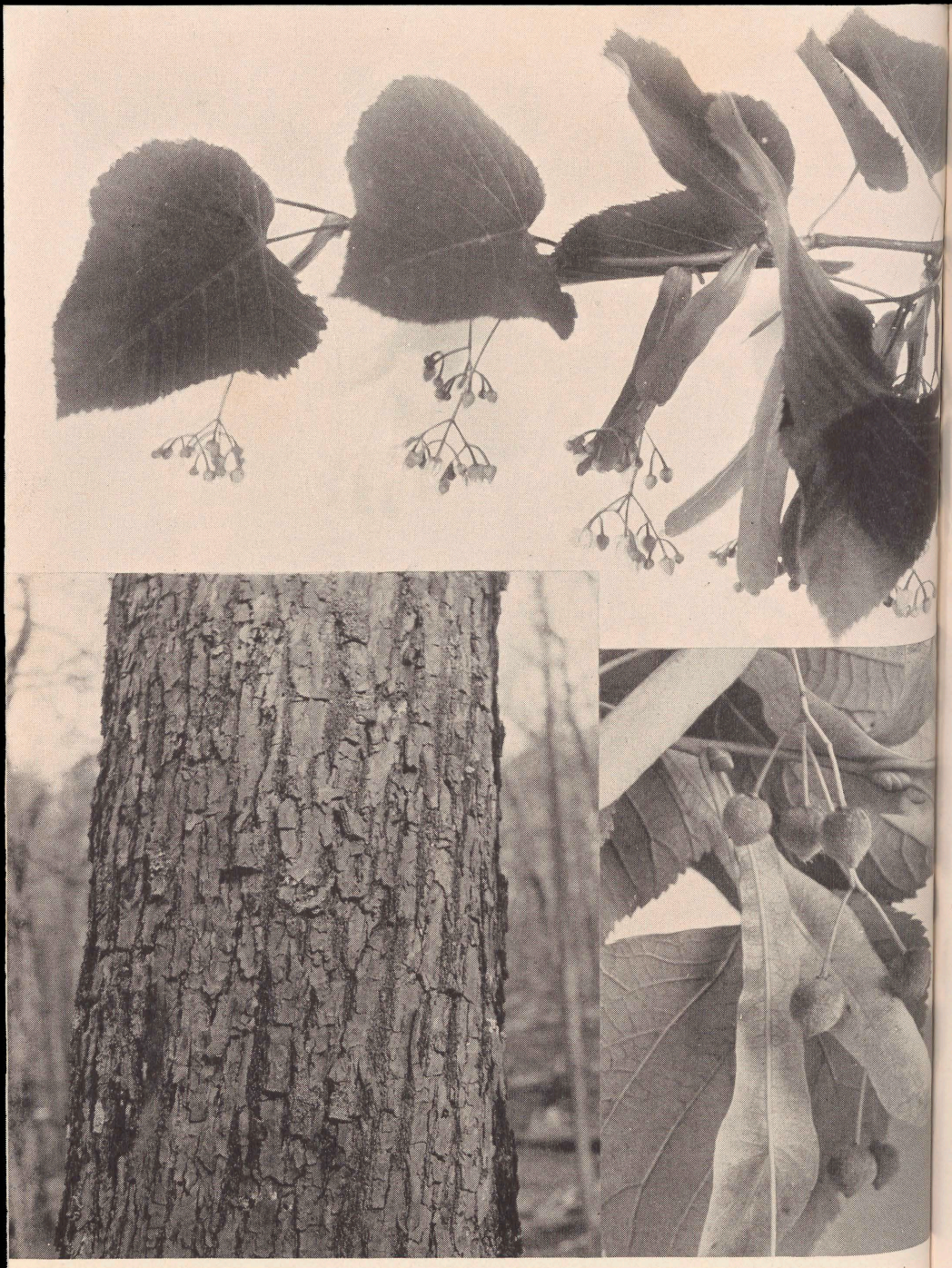
—HEINE.

A tree that had the honor of serving as the family name of one of the world's greatest scientists is the linden, or basswood. Often the letter *L.*, or some other letter, comes after the scientific name of a plant or animal. The *L.* so frequently used stands for Linnaeus, the great Swedish botanist who is known as the father of the modern system of classifying plants and animals.

Most of us, of course, prefer to know a plant or animal by its common name. But often a certain one will have several common names (the shagbark hickory, for instance, has at least fifteen common names), and that leads to confusion. Too, we need a name that would be recognized by all nationalities.

Courtesy U. S. Forest Service

LINDEN OR BASSWOOD (*Tilia heterophylla* Vent.)
Tree in Williamson County, Tennessee. Basswoods are popular trees with the bees when the blossoms are in bloom.



Leaves broad, uneven at base, with finely toothed margins; flowers perfect, creamy-white, and fragrant; bark light brown; winter buds bright red and lop-sided; flowers and later seeds hang on queer pale green, leafy bracts. When seeds fall, bract is carried along and acts as wing. (Linden.)

Therefore a scientific name, usually in Latin, has been decided upon by international rules made by scientists. And so, if an American, an Italian, a Frenchman, a Dane, or even a Japanese uses the scientific name of a plant or an animal we know exactly which one is meant, whether we are in Tallahassee—or in Timbucktu.

How the great Swedish botanist came to have the name of the linden tree is an interesting story. His father was a peasant, and in Sweden in those days (the seventeenth century) most peasants had only their Christian, or first, names. But, as Mrs. Keeler points out, Nils the peasant had, by his own efforts, raised himself to the position of pastor in the village where he lived, and so he adopted the old custom of taking a surname.

Near his home was a beautiful linden tree, and as Nils loved trees and was interested in them, he called himself Nils Linné. Now this Nils Linné had a small son named Carl who later became the renowned botanist. When Carl grew up and went to teach at the world-famous University of Upsala his name was latinized into Linnaeus, as we know it today.

Trees of many names are these lindens. Some of these names are basswood, lime tree, linn, whitewood, spoonwood, whistlewood, wahoo. Lindens are fairly common over much of the northern hemisphere, and in Europe, especially, have long been loved and honored. The early Greek and Roman poets sang of them and celebrated their many virtues.

Easily Recognized as a Group

As a group the lindens are very distinct, but as individual species they are very confusing except to trained botanists, and even these scientists do not always agree concerning them. Most tree-lovers are content, as we shall be, to know that a certain tree is a linden. Indeed, so similar are the various species that their chief characteristics are the same, whether the tree is a linden in America, in Germany, Greece, Rome, or in the Orient.

Lindens all have light, soft wood that is easily worked and especially adapted for wood-carving. For that purpose the wood is second only to that of our tulip tree, and in most places it is far more easily obtainable. (For only eastern North America and certain sections of China, remember, have the tulip tree.)

Though some are larger than others, all linden leaves are heart-shaped and lopsided at the base, so uneven that the two halves could not be folded over on each other so as to fit. If you observe them closely you will note that nearly all the side veins, those branching out from the midrib, are themselves branched only on the lower side. This characteristic is noticeable in no other tree, yet all lindens, whether growing in Dixie or Denmark, have this same family trait.

Queer Flower and Seed Clusters

And all lindens have the same type of flowers—perfect, creamy-white, fragrant—full of nectar in blossom-time, as the bees will soon tell you. They are borne in thick, heavy clusters upon a flower stalk which is attached to the upper surface of a narrow, pale green, leaf-like bract. The weight of the flowers, and later of the fruits, pulls this down so that positions are soon reversed; the bract is above the cluster, its upper surface turned downward.

Late bloomers, the trees put forth their flowers in June after the leaves are full grown, and then the blossoms glow star-like against the dark green mass of foliage. Wherever there are lindens there are bees. No sooner are the flowers out than the tree seems converted, as if by magic, into a giant beehive. The air is heavy with a rich fragrance, and noisy with the droning hum of thousands of winged visitors. From ancient times linden honey has been highly valued.

All the lindens, everywhere, have small, nut-like fruits which look something like tiny peas hanging on delicate stems —these likewise attached to the curious looking bract. In real-

ity, the bracts are very useful parachutes and serve to scatter the fruits a long distance from the parent tree. For when they are mature, the whole cluster, bract and all, is blown off and glides away with a whirling motion which retards the fall for some time, thus allowing the seeds to find new worlds to conquer.

And new worlds they do conquer. In the days of virgin forests, in the lower Ohio basin where the lindens attained their greatest size, they greatly outnumbered all other trees. This is easily understood when we realize that the large numbers of sturdy seeds are borne far by the winds, those tireless seed-scattering agents. Too, the seedlings can grow in the shade; the trees also grow by suckers; and even a living twig torn off by the wind may develop roots and grow, provided it falls on good ground.

In winter the lindens can be recognized by the light brown bark, smooth on younger branches, but deeply furrowed on the trunks of older trees. More surely though, for the beginner in tree lore, can these trees be recognized by the bright red, lopsided buds. When the tiny leaves begin to unfold they are a vivid green. Tennyson described them as a "million emeralds breaking from the ruby-budded lime." For those interested in twig study, try cutting out a cross section. Look closely at the inner bark and note the dark, funnel-shaped areas alternating with those of lighter color. This is the quaint way the linden always writes its name.

In the northern section of the country the common linden is the smooth, formerly known as the American, linden. This refers to the underside of the leaf, which is smooth. The most common southern linden is a very close relative known as the white linden, or white basswood, which gets its name from the white coating on the lower surface of the leaf. Its branches are more slender than in the American linden, and its winter buds are smooth.

This large linden is found in moist soil or rich wooded slopes

from south central New York southward along the Alleghenies to northern Alabama. Its leaves are usually three by five inches, and their margins may be either finely or coarsely toothed. There are other close relatives of this southern form, and there have also been introduced some European species, especially the large-leaved and the small-leaved ones. It is this latter linden which is planted along the famous street of Berlin which takes its name, "Unter den Linden," from the trees.

In this country, where we have so many more kinds of trees than has Europe (we have more kinds of trees in our Great Smokies alone than there are in all of Europe, remember), the lindens have never been as important or as loved. In Europe there is scarcely a part of the tree that is not used. Charcoal is made from the fagots; fodder from the leaves, both fresh and dried; honey and perfume from the flowers. Even the seed balls are used to make an oil which is used as a substitute for olive oil.

There the wood is used mainly for the hand-carving which so many of the peasants do in winter. Russian peasants wear shoes made of the bark of these trees, and they make ropes, mats, and fish-nets from the tough "bast fiber" of the inner bark. In America the wood is used chiefly for furniture, woodenware, and pulpwood.

The Loblolly Bay (*Gordonia*)

The trees are God's great alphabet:
With them He writes in shining green
Across the world His thoughts serene.

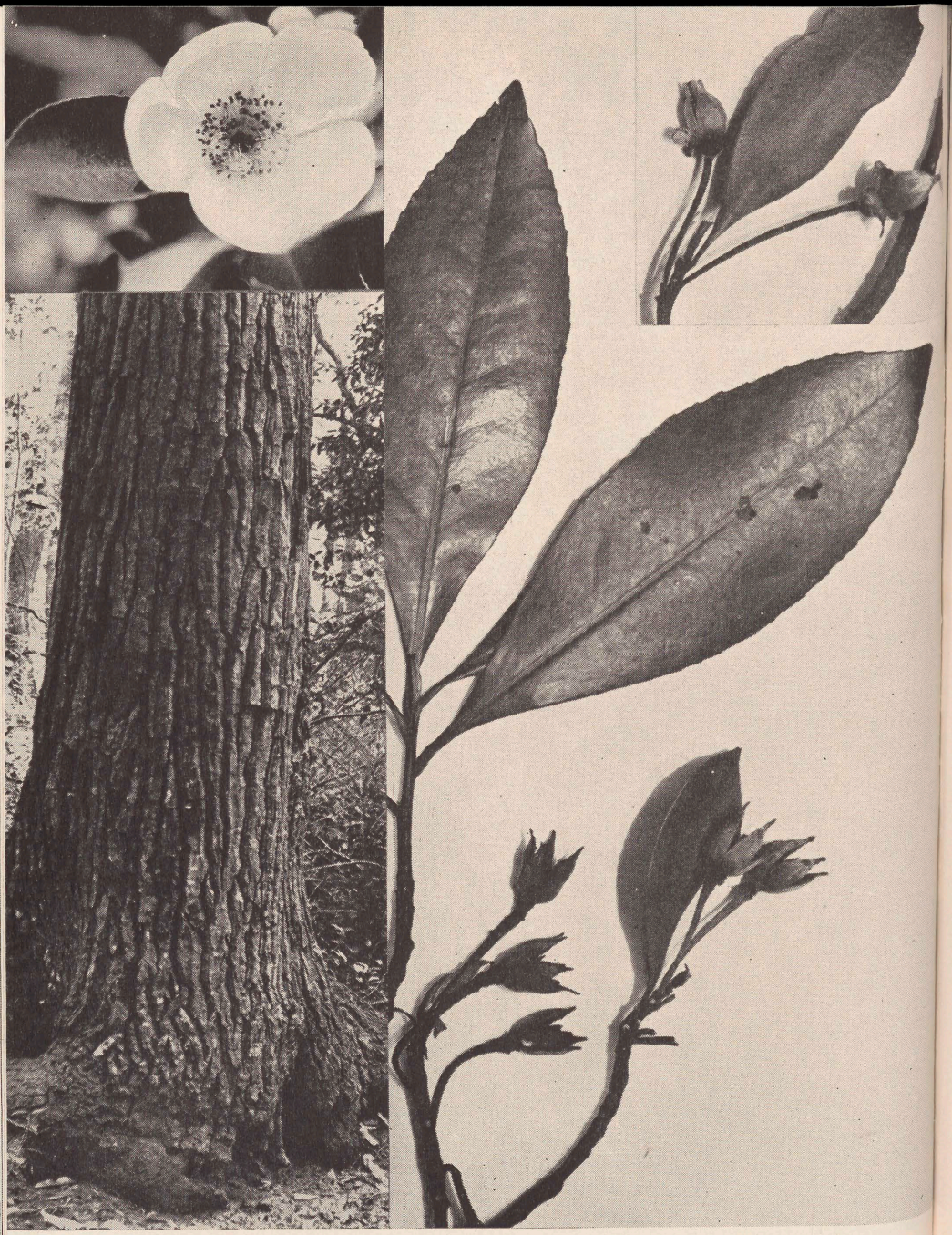
—LEONORA SPEYER.

One of the loveliest and most unusual of the small trees of the coastal region of the South is the loblolly bay. This graceful evergreen tree is found in swampy land from southern Virginia to the Gulf. In some sections it extends inward to the sandhills. It is tall and straight, and sometimes reaches

By S. A. Grimes

LOBLOLLY BAY (*Gordonia Lasianthus* Ellis.)

In the forests of Florida, on the edges of swamps, the loblolly bay (center foreground) becomes a tall, slender tree.



Leaves evergreen, shiny, and leathery; fruits dry, woody capsules containing small, winged seeds; fragrant flowers resembling great white roses bloom in July. Note how shallowly leaf margins are toothed along apex half, entire toward base—a sure means of identification. (Loblolly Bay.)

sixty or seventy-five feet in height, with a trunk diameter of eighteen or twenty inches. The small, upward growing branches form a narrow, compact head. The red-brown bark, which may be nearly an inch thick, divides into narrow parallel ridges separated by shallow fissures.

The lustrous, evergreen leaves are thick and leathery, from two to six inches in length and one and one-half to two inches in width. They are shallowly toothed along the margin and often entire towards the base. The white, fragrant, cup-like flowers are about two and one-half inches across, and in the upper South bloom in July and continue for several weeks. The fruit is a dry, woody capsule containing from two to eight square, winged seeds.

In beauty this tree ranks with the magnolias, especially the sweet bay, which it resembles, but to which it is not in any way related. Instead, it belongs to the *Theaceae,* or tea family, and is closely related to the cultivated shrub *Camellia japonica.* It is unfortunate that the loblolly bay does not transplant well, nor do well in cultivation unless the habitat is similar to that of its wild state. Always the tree is attractive, but especially during its blooming period, when the great blossoms are like dimly glowing candles against the dark green of the leaves.

"The Lost Franklinia"

There is a close relative of this tree—the lost Franklinia, the tree of mystery. John Bartram, the great plant explorer of the late eighteenth century, was wandering through the autumn woods of Georgia one day in 1765. Somewhere along the Altamaha River he found a beautiful tree still in bloom. The blossoms were gorgeous things, resembling those of the Camellia. Then, and in two later visits, he brought back seeds and plants and introduced the tree to his own famous garden in Philadelphia. Some he may have sent to Europe. The tree was named Franklinia after Benjamin Franklin, a friend of the explorer.

According to Coker and Totten, Dr. Moses Marshall found this small tree in the same place in 1790. Since that time, never again has the tree been found in the wild, though many have searched for it time after time. Apparently lost to the world as a wild growing tree, it is, however, still found in cultivation in certain gardens in America and Europe. These trees are all descendants of the seeds and seedlings collected by Bartram.

The "lost tree" is much like our common loblolly bay except that it sheds its leaves in winter. The flowers of the two resemble one another closely.

THE DOGWOOD FAMILY

(CORNACEAE)

THE DOGWOODS (*Cornus*)

In winter time the dogwood tree
Sleeps in the woodland quietly,
It stands alone, leafless and bare,
As silent as a nun at prayer.

But at the sound of whip-poor-will,
The dogwood blossoms on the hill,
Come fluttering on the April skies,
Like hosts of white-winged butterflies.

—TRAVIS TUCK JORDAN.

IN THE spring of the year in the South, if one is observant when walking or riding through the countryside on a Sunday in particular, he may see two pictures. The early morning one might be called "The Beauty of Blossoming Woodlands" for the dogwoods, the redbuds—almost through blooming, and the fringe-trees—just coming into bloom, are adorning the roadsides, woodlands, and thickets.

The white blossoms of the dogwoods "star the twilight of the pines"; the redbud blushes at her own lovely reflection in the still pool beneath her; and the fringe-tree, like a lovely little old lady, gathers her lacy green and white shawl about her. Birds flit from branch to branch singing. Perhaps some of them are building real "castles-in-the-air."

By eventide the tragedy of springtime has been enacted. This second picture might be entitled "Carnage." The dogwoods

are pale broken wraiths trembling in fear of further attacks; the redbuds blush with shame at their ravishment; the fringe-trees grieve over the rents in their lovely, lacy shawls. The birds have been frightened away. Car after car is returning to city or village laden with flowering branches, especially of the white dogwood. Sometimes the fragile blossoms wilt too soon, and are impatiently tossed away, to be ground in the dust and the grime of the road.

Dogwoods an Asset to the South

The South has never learned to protect the greatest beauty of its springtime, the flowering dogwood. Perhaps it is because in this section it has been so common that most people seem indifferent to the danger of its extinction. In contrast, I know a country schoolteacher of the North who took her children on a five-mile tramp *just to see a flowering dogwood in bloom!*

Near the larger cities and towns of the South these dogwoods have been so ruthlessly stripped that in many sections they are becoming scarce. Though we have many of these trees in our own woodland home, we years ago made a rigid rule never to pick a dogwood blossom, and so when friends come asking for them for parties we simply say we do not pick them. For though dogwood is comparatively free from insect and fungus enemies, its growth is slow and it takes a long time to "come back" after a tree has been stripped of bloom.

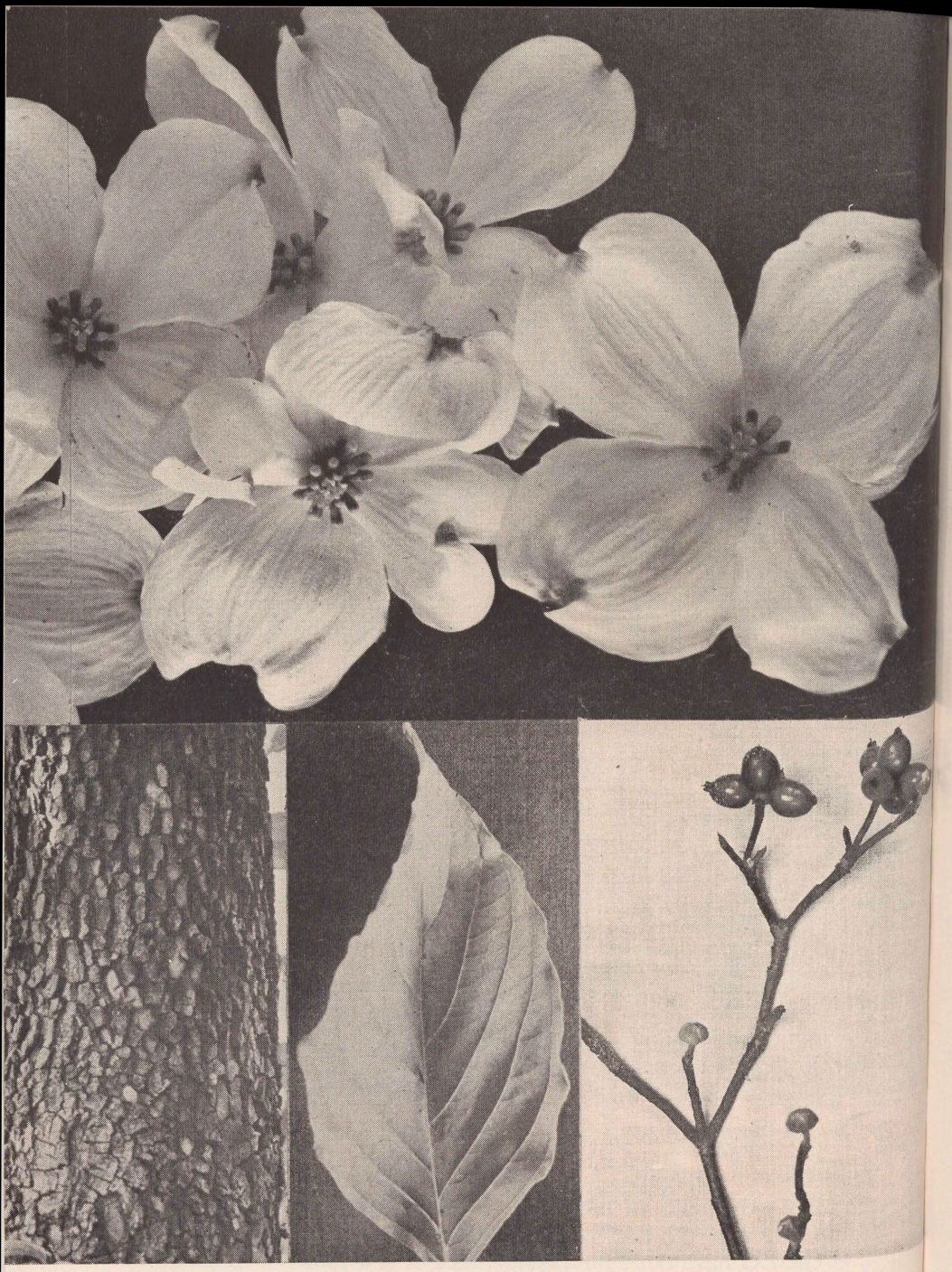
Some tree lovers believe the flowering dogwood should be made the official flowering tree of the South (it has already been adopted as the state flower of Virginia), and that it should be given more protection. (For instance, it is forbidden by law to pick trailing arbutus in certain northern states.) And for the sake of a world that is growing more beauty-conscious, it should be more widely planted along roadsides, in parks, gardens, lawns, and especially on school grounds. There, above all places, beauty should be stressed.

And this dogwood *is* beautiful at all seasons of the year. With

By Bayard Wootten

FLOWERING DOGWOOD (*Cornus florida* L.)

The queen of the South's flowering trees, which might well be nominated the plant personality of the South. If planted in numbers and protected from vandalism, the dogwood could do for the South what the Japanese cherries have done for Japan—make of it a Flowery Kingdom.



True flowers are the inconspicuous greenish-yellow ones clustered in center, surrounded by white or pinkish bracts; lateral veins in leaves run parallel with margin and meet near apex; bark resembles alligator hide; scarlet berries and silvery buds of next spring on same twig. (Dogwood.)

its white bloom of spring, its green foliage of summer, its flaming red leaves and scarlet berries in autumn, and its delicate tracery of bare branches in winter, it is ever a joy to the tree-lover.

Trees of the Northern Hemisphere

Confined almost wholly to the northern hemisphere are some forty to fifty species of dogwoods, widely scattered throughout three continents. Only one species is found south of the equator, in Peru. North America has some sixteen or seventeen species,—more than any of the other continents—but most of these are shrubs rather than trees.

The most common of the dogwoods in the South is the flowering dogwood best known simply as dogwood. Comparatively rare in the North, it becomes common in the middle and southern states, where it ranges from the coast nearly to the summits of the Allegheny Mountains. Naturally a tree of the forest, it is usually found growing in the shade of larger trees, seldom reaching more than fifteen to thirty feet in height, or six to twelve inches in trunk diameter. Occasionally, however, there are larger ones. Chowan County, North Carolina, reports several dogwoods with trunk diameters of about two feet.

This small, low-branching tree is indeed the "loveliest lady of the wood." The flat limbs spread outward and slightly downward, an arrangement that gives the best possible display to the white blooms. Sometimes the tree blossoms before the leaves are out; sometimes the leaves catch up with the blooms, and are like "emeralds buried in the snow."

This dogwood is among the few trees that have opposite twigs and leaves. The pointed, oval-shaped leaves are three to five inches long, two to three inches wide, with unusual veins that run for a distance along the wavy margin. They are bright green above, pale or grayish-green beneath. In autumn they turn a rich scarlet, and with the sweet gums, the sour gums,

the sourwoods and the red maples, light the torches of the autumnal color parade.

Real Flowers Inconspicuous

We speak of the "white blooms of dogwoods" but the real flowers are the tiny inconspicuous yellowish-green ones in the center of the bloom. The seemingly white petals are not petals at all, but bracts, or modified leaves. There may be twenty, more or less, of the perfect flowers in the centers of the "white blooms." The white bracts often remain for some time after these flowers have received the pollen which enables them to mature into the scarlet berries. Not all the real flowers develop into berries, however. Usually there are not more than five or six berries in each cluster.

The mysterious dark notch at the tip of each white bract has been a fascinating puzzle to many. It is the remnant of the silvery-gray flower bud of the winter before. The real time to begin the study of the dogwood bloom is about July of the previous summer. Then little buds, each really the beginning of a flower-cluster with its bracts, begin to form at the ends of healthy strong branches. If the terminal bud is to bear flowers it soon outgrows the others and extends beyond them.

This growth continues through the later summer months and into the earlier days of autumn. Look for these silvery-gray, pearl-like buds in midsummer; open one and you will see there are four parts to it. They are the wrappings, or the "winter blankets" that protect the tiny flowers from injury. They are lapped over each other, one pair inside and one pair outside. And so these "dark notches" are the tips of these "winter blankets" which grow into the beautiful white bracts.

"Alligator Skin" Bark

The bark is reddish-brown to gray-black and is "checkered" or broken up into small, four-sided, scaly blocks, which someone has described as resembling the markings on alligator skin.

The wood is heavy, hard, strong, and very close-grained. It is in great demand for shuttles in mills. In certain sections of the South the forests are being stripped of dogwoods for this purpose.

Dogwoods and Bluebirds

Dogwoods and bluebirds seem to go together. The birds are particularly fond of these berries and help scatter the seeds. Some thirty species of birds feed on them. Sometimes the trees are stripped bare before the berries are even ripe; at other seasons they may remain on the tree until Christmas time. Imagine a tree full of scarlet berries suddenly visited by a large flock of bluebirds! Isn't that a winter picture? And another: bluebirds nesting in a birdhouse (it was really a tin can) in a dogwood in bloom. Almost every year we have *that* woodland scene.

Still another of nature's artistic color schemes is seen in the coastal regions, when yellow jessamine climbs riotously over blossoming dogwoods.

Another of the dogwoods, which is much more common in the North, however, than in the South, is the alternate-leaved, or blue dogwood. In the South it is found mostly in rich woods near streams in the mountains. It is the only dogwood that does *not* have opposite leaves. Although it lacks the beauty of the more common dogwood, in that it has no conspicuous white bracts around the small, loose-clustered flowers, it is a beautiful tree, especially in its fruiting season, when the blue or blue-black berries stand out in marked contrast to the brilliant red stalks on which they are borne.

The Gums (*Nyssa*)

Every tree gives answer to some different mood,
This one helps you climbing; that for rest is good;
Beckoning friends, companions, sentinels they are;
Good to live and die with, good to greet afar.

—LUCY LARCOM.

The Black, or Sour, Gum

One of the first signs of spring is the reddening of the leaf-buds of the black, or sour, gum. So noticeable are these buds that they make a red patch in the landscape wherever there is one of these trees. The time when these appear is a good time to begin the study of the sour gum, which, by the way, is in no manner related to the sweet gum, even though both trees are common in the South and may grow side by side. The sour gum belongs to the dogwood family, and the sweet gum to the witch hazel family.

Winter, then, or early spring is the time to begin knowing this tree intimately. Stark naked, with hardly a leaf or a berry hanging on, it is picturesque. The fine tracery of its twigs etched against gray or blue skies lends the tree an ethereal beauty hardly in keeping with its sturdy trunk and limbs.

Almost always this gum has one main trunk, like a conifer, although our own particular gum, in the field at the edge of the woodland, divides about three-fourths of the way up the trunk. The bark is dark grayish-black, deeply furrowed, with a tendency to break into squarish blocks. The tree may reach a height of sixty to one hundred feet and a trunk diameter of four to five feet, but usually it is much smaller.

A Tree That "Grows Shorter"

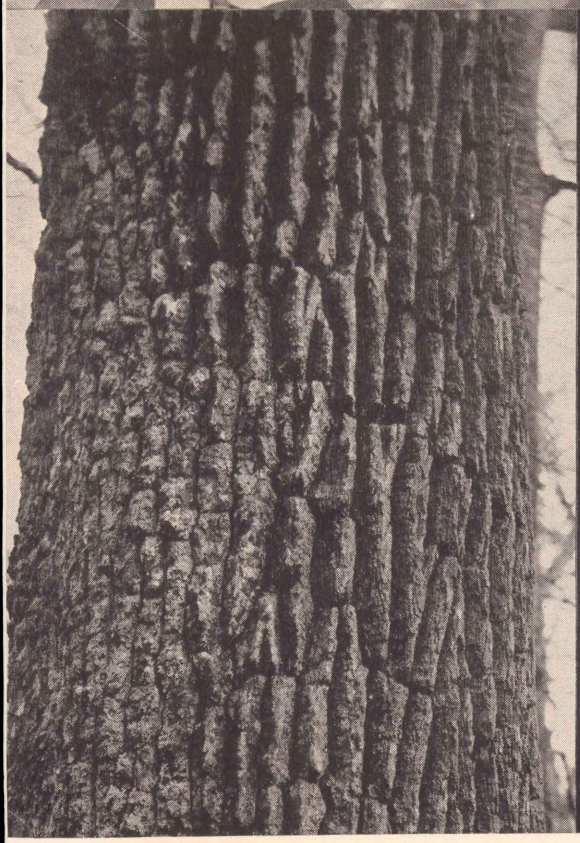
In old age a sour gum loses its symmetry; the branches of its crown begin to break and fall, and decay creeps down from the top. Then it is that the tree "grows shorter." Often this bald crown can be discerned from a distance, and the tree is thus easily identified.

The dark green leaves are rather oval-shaped, and from two to six inches long. They are alternate and simple, often crowded at the end of the twig. The margins are usually entire, or very rarely notched a bit at the base. In summer the foliage presents a deep green shining mass, and as the leaf-

Courtesy U. S. Forest Service

BLACK, OR SOUR, GUM (*Nyssa sylvatica* Marsh.)

Tree in Williamson County, Tennessee. Irregular and picturesque, with short, drooping branches. Freedom from insects and disease, glossy foliage of summer, and scarlet coloring of autumn make this a desirable tree for street, lawn, and roadsides.



Leaves may be entire or sparsely notched with few teeth or lobes; fruits, one to three on stem; sour, blue berries loved by birds who thus help spread the tree; flowers small, greenish, and in clusters, come out with leaves; bark on old trees dark gray, in rectangular blocks. (Black, or Sour Gum.)

stalks are short the leaves do not flutter in the wind, but sway with the whole branch.

It is in early autumn, however, that we see this tree in its chief glory, for then its leaves turn a brilliant scarlet and purple, or scarlet and orange. Together with the other gay cavalcade of trees on color parade, the sour gum does much to brighten our southern landscape.

The greenish, rather inconspicuous, flower clusters appear in April, when the leaves are a third to a half grown. They may be on the same tree or on different trees. The dark blue, fleshy berries, about a third of an inch long, and maturing in the autumn, are borne on long stems, often two or three in a cluster. Though the berries are sour, giving the tree its common name, they are greatly loved by birds, especially robins.

Tree of Many Names

Tupelo is the name given this tree by the Indians, and in New England it is still better known by this name than by sour, or black, gum. In the Middle West it is called pepperidge—why, no one seems to know. Its scientific name is *Nyssa sylvatica, M.,* the Nyssa, because one of the species grows in water, from the water-nymph of that name in classical mythology.

Though most common in the South, it is a tree of rather wide range, occurring from Maine to Ontario, south to northern Florida and west to Texas. It is very accommodating in its habits; in its southern range it prefers swamps in company with cypress, red maple, and black ash. It also grows on hills and on dry mountain slopes, in company with oaks, hickories, and pitch pine.

Though the sour gum is not included among valuable forest trees, but is classed instead as a forest weed, its useful qualities are slowly gaining recognition. The wood is tough, warps easily, and is not durable in contact with the soil. The wood fibers are so twisted and interwoven that their separation is

very difficult, and so the splitting of the wood for rails for the old zigzag fences by the early settlers was almost impossible. However, this very characteristic makes the wood valuable in certain situations where wood which will *not* split easily is in demand. Hence we find it employed for ox-yokes, rollers, flooring for warehouses, and particularly in anthracite coal mines. There it is used for roller bearings for the ropes and cables by which the mine cars are hauled up steep slopes.

Perhaps one of the most familiar uses of the sour gum, in the old days at least, was as "bee gums." According to North Carolina's State Forester, J. S. Holmes, hollow sections of the black gum were formerly commonly used (especially in rural sections of the mountains, where they are still used to some extent) for bee hives. A large hollow trunk would be cut into several sections, the top being covered with a board, and small holes drilled in the sections to allow the bees to pass in and out. Inside, near the top, a small hole was drilled in each side. In these holes a stick was inserted on which the bees hung the comb.

The Tupelo Gum

This gum is a large tree of the deep swamps, inundated a part of the year, near the coast from southeastern Virginia to northern Florida and westward to Texas, also up the Mississippi River to southern Illinois.

A few years ago my husband and I spent several hours in such a swamp at a remote bird rookery of the Audubon Society, at May's Pond, in northern Florida. It was a rainy day in late June and we slithered across red clay roads, then into a miry lane through a watermelon patch where we were to meet the warden's son. The car became mired, and for three miles we tramped in the downpour, through muddy trails, over fallen logs, along the edge of the swamp. At last we came to the spot where the warden's flat-bottomed boat was hidden.

A cypress swamp, with great cypress trees and tupelo gums hung with Spanish moss, is always a beautiful and mysterious place. In a heavy rain it is even more beautiful, more mysterious, and more eerie. Slowly we were poled through the swamp, among great trees draped in moss, over concealed stumps, over fallen logs—some of them half-submerged. Sometimes the boat scraped one of these submerged logs, or knees, or stumps and was held fast. We could not go forward. Slowly, cautiously, the boatman must work the boat back and off. Apologetically he explained that if he tried to hurry we might turn over—and the swamp was full of alligators. Hastily we told him we were in no hurry. Not at all! We were already soaked to the skin. What did more rain matter?

Only once did we see an alligator, a small one that slid off a log as we slipped silently by. If it had been a bright day, said our guide, we would have seen dozens of them sunning on the logs. Knowing they were all about us, yet not seeing them, added to the uncanniness of that eerie, beautiful place. Yet, while we did not see the alligators, we saw their shadow selves. For as they turned, or sank in the water, the guide would point out their outline in slowly rising bubbles. With no sound, and with hardly a ripple, the huge saurian would sink beneath the water of the swamp; and on the quiet black surface, outlined in tiny bubbles, would be the exact shape of this submarine of Nature. Occasionally the boatman would remark briefly, "Must be an old bull down there," as he carefully poled us by.

The entire swamp was clogged with rotting logs, making progress difficult. For in this remote swamp it is too formidable a task to get the logs out, and so when an ancient gum or cypress falls it remains there until slowly rotted and disintegrated by time.

As we floated on, we could see water turkeys, or "snake-birds," queer-looking, long, slender birds, perched on overhanging limbs. Now and then one would silently dive into the water, headfirst. Their appearance, as they swam with body

submerged, and with only serpent-like heads and necks visible, added to the feeling that we were in an unreal world. The silence of the swamp was broken only by the rain, the great drops hitting the black water with a faint, hissing sound, and bouncing back in opalescent bubbles.

A great lurid gash of jagged lightning flashed through the swamp, blinding us momentarily, lighting up the dark, wet boles of the gums and cypress trees. And then a tiny blue and gold parula warbler, which builds its nests in the Spanish moss, flew across our vision. On and on we moved, slowly and silently, slipping by moss-draped trees, to the other end of the swamp.

There were ancient, towering gums in the swamp, but we could only peer upward and estimate their height which, we knew, might be as much as a hundred feet. The bases, we could see, were much enlarged, as were those of the cypresses. Some seemed to be from ten to fifteen feet in diameter through these bases, and from two to four feet higher up.

The roots of this tupelo gum are white, spongy, and light, and in the South are sometimes used as a substitute for cork, and as floats for fishermen's nets. It is also claimed that shoes for plantation Negroes have been made from the wood of these large roots.

When the wood of the tree itself is accessible, and the logs can be got out without too great an expense, the lumber is marketed as tupelo, or bay poplar. It is sometimes used as a substitute for Circassian walnut, or stained in imitation of mahogany.

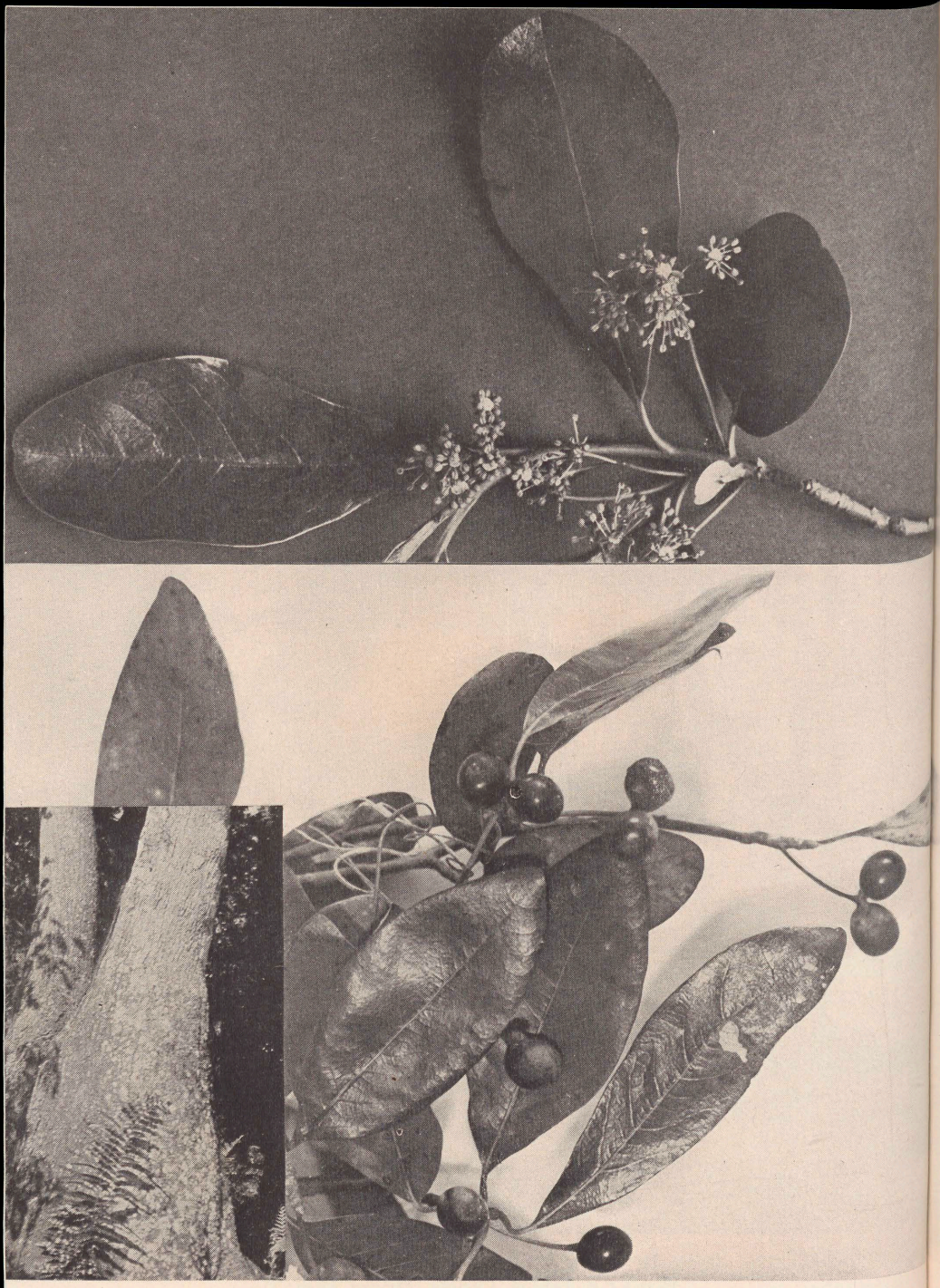
The bark, usually about a fourth of an inch thick, is occasionally much thicker in places on the same tree, as is shown on a specimen in the North Carolina State Museum. On one side of this the bark is the regulation thickness, on the other side it is nearly three inches! Ordinarily, the bark is dark brown, furrowed up and down the trunk, and roughened on the surface by small scales.

The leaves, larger than those of the sour gum, are from

By S. A. Grimes

WATER GUM (*Nyssa biflora* Walt.)

Draped in Spanish moss, this water gum in northern Florida makes a graceful roadside tree. Note swollen base.



At top, mature leaves and flowers; fruits dark blue berries, often in pairs; stones or pits are distinctly ridged, which helps distinguish tree from the black gum, its near relative; often found growing near water; base of trunk often swollen. (Water Gum.)

four to twelve inches long, oval-shaped and long-pointed. They are dark green above, paler and hairy beneath, and the margins may be entire or may have a few large, pointed teeth.

The flowers are rich in nectar and are loved by the bees. Sometimes hives are placed out on boats, or stands, in the swamps, for "tupelo honey" is considered quite a delicacy. The fruits, too, are large, almost an inch long, and are set one to a stem. They are dark purple, hence are sometimes called "plums." Their stone, or pit, has large, prominent ridges.

The Water Gum

Still another gum is the water gum, a small or medium-sized tree found along the coastal plain from southern Maryland to Louisiana. It grows on the edges of ponds and streams, and sometimes in the water. The base of this gum is also swollen, "and when growing in [the] water erect roots rise above the surface."

This gum is sometimes called the two-flowered tupelo because the female flowers usually occur in pairs. The fruit is a blue berry, about a third of an inch long. This tree is very similar to the sour gum, but may be distinguished from it by the prominently ribbed stones of the fruits. The leaves of the two trees are rather similar.

Still another gum of the South is the more rare and local sour tupelo, or ogeechee lime, which, according to Coker and Totten, is found in the river swamps or swamp borders in the southwestern corner of South Carolina and neighboring areas in Georgia and Florida. It is a small tree, often shrubby in habit. Its fruits are oblong, red, sometimes an inch long. It gets its name from the Ogeechee River in Georgia and from the use of its acid juice as a substitute for limes.

THE HEATH FAMILY
(ERICACEAE)

Against rich tapestries of living green
Buds of the holy rhododendron
In innumerable clusters burn,
Sacramental candles,
Too delicate for dazzling.

—HELEN HARRIET SALLS.

The Rhododendrons (*Rhododendron*)

Strange as it may seem, the rhododendrons, the mountain laurel, and the sourwood all belong to the same family, the heaths.

The members of this family, which is world wide in its distribution and consists of over a thousand species, have a tendency towards profuse and showy bloom. Perhaps the best known, at least in song and story, is the famed Scotch heather. Our own much loved but somewhat rare trailing arbutus also belongs to this family, as does the true wintergreen. The last two are small woody ground plants. Only a few representatives of this family reach tree size.

The Great Rhododendron

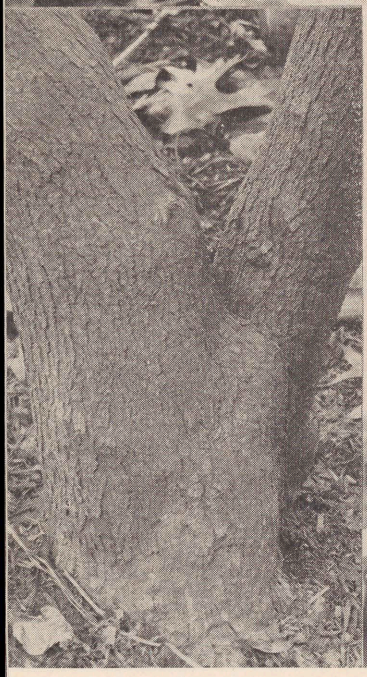
All the woodland artists must have had a share in helping Nature plan the setting of the great rhododendron, for nothing could be more appropriate nor beautiful.

Amid lofty trees, against a background of somber rocks, shine forth the rich glossy leaves and the rose or white flowers

Courtesy U. S. Forest Service

RHODODENDRON (*Rhododendron maximum* L.)

In the Nantahala National Forest, North Carolina. In our southern mountains this rhododendron often becomes a small tree of twenty-five or more feet in height.



Leaves evergreen, thick, leathery, dark shining green above, whitish beneath, with entire margins; fruits woody, many-seeded clusters; flowers varying in color from white to rose, borne in large clusters; bark light red-brown, thin, with small surface scales. (Rhododendron.)

of this shrub, which becomes a tree only in the Appalachian Mountains of the South. It grows from Nova Scotia to the northern shore of Lake Erie and southward to New England and New York and then along the Appalachian Mountains to Georgia. But it is on the mountain slopes of western North Carolina and eastern Tennessee that it attains greatest size, abundance, and glory.

No one who has climbed the peaks of the Great Smokies in June, when the rhododendron and the mountain laurel are in bloom, will refuse to grant all three superlatives. On such a day, with a blue sky and white billowy clouds overhead and with a hermit thrush singing a paean of praise, we climbed Mount LeConte. Sometimes the trail led through great columns of rhododendron and laurel; at intervals it came out into the open, with views of far-away slopes so thick with their blooms that they seemed carved out of rose-hued marble.

In the distance the soft murmur of a brook and the silvery tinkle of a high waterfall added music to the scene, an elfland accompaniment to the name of the plant. For scientists wisely retained the lovely musical sounding Greek name, *rhododendron,* which means "rose tree."

Maturing in early summer, the leaves and flowers of this "rose tree" are both so large and conspicuous, as well as beautiful, that the tree can be seen from a great distance. And so abundant are the plants that whole mountainsides are covered with them, forming impenetrable thickets.

The evergreen leaves, thick and stiff, are borne in a clustered whorl toward the end of the twig. Dark and glossy above, dull whitish beneath, they form a shining rosette background for the clusters of flowers. They are narrow and oblong, from four to ten inches in length, and usually tapering at both ends. Their margins are entire. The midrib is broad and depressed above, very prominent beneath; the side veins are faint and obscure; the petiole is short and stout.

In our mountains it is in June that the flowers bloom. They

are borne in large, somewhat umbrella-shaped clusters, four or five inches across. The individual flower is perfect, five-lobed, about one and one-half inches across, and varies from white to rose, with a spotted throat.

The fruits are long, sticky capsules containing many seeds. Although they open and liberate the seeds in the autumn, the dried capsules remain on the tree until the following summer.

As bush, shrub, or tree, the great rhododendron sometimes reaches twenty-five feet in height. The trunk is crooked and inclined, at times even prostrate, and may be ten or twelve inches thick. The stout, contorted branches form a dense rounded head.

The bark, light red brown in color, is very thin and broken on the surface into small scales. The wood, stronger and harder than that of almost any of our native trees, is light-colored and fine-grained. It is occasionally used for tool-handles and as a substitute for boxwood in engraving.

Many beautiful cultivated varieties of rhododendrons have been developed. These are very popular in parks and gardens both in this country and in Europe.

Catawba Rhododendron

More shrub-like than the great rhododendron is the catawba rhododendron, or rose bay, which does, however, reach small tree size occasionally in our Southern mountains. Its range is far more limited than that of the former. This rhododendron is found native only in the mountains of Virginia and West Virginia to Georgia and Alabama.

In the mountains of North Carolina, say Coker and Totten, it not only ascends the highest peaks, often forming dense stands, especially on the "balds," but it also descends some of the eastern slopes (but *not* the western ones) in scattered areas as low as Asheville. Even more unusual is the fact that it seems to skip great areas, and then is found on bluffs along streams

even in central and eastern North Carolina. Yet in South Carolina it is scarce. The leaves of this species are very like those of the great rhododendron, but its flowers are lilac-purple and come into bloom a full month or more earlier.

Mountain Laurel (*Kalmia*)

A childish gladness stays my feet,
As through the winter woods I go,
Behind some frozen ledge to meet
A kalmia shining through the snow.

. . . . . .

I hear its foliage move, like bells
On rosaries strung, and listening there,
Forget the icy wind that tells
Of turfless fields, and forests bare.

—THERON BROWN.

A small flower-David, hurling its sling-shot of pollen on marauders, is the blossom of the mountain laurel. This is one of the most fascinating puzzle-boxes in all nature. For the perfect, star-like flower has ten stamens, and the anther of each is carefully hidden in one of ten little pocket cavities.

When a bee creeps down into the flower for a sip of nectar its weight releases a tiny spring and up shoots the anther, dusting with golden pollen the body of the hairy visitor. Then away it flies to drink from another laurel nectary, and some of the fine pollen is brushed off on the sticky stigma of the next flower. Cross-fertilization has taken place. The mountain laurel just *won't* have anything to do with self-fertilization. If a flowering branch is covered with a fine net so that the bees cannot get to the flowers, these flowers, though perfect, will *not set seed.* You might like to try that experiment for yourself.

And how cleverly the flower protects its precious hoard of nectar from insects that cannot "pay their way" by scattering its pollen. If an ant, for instance, tries to raid its honey-jar, it finds that the stem of the blossom is both hairy and sticky.

He may be held prisoner in this dainty but effective "flower-glue" until he dies.

The flowers, that bloom in May and June, come from buds which were formed the autumn before in the axils of the upper leaves. At that time they resemble slender cones of downy green scales more than flowers. The lovely pinkish-white cluster, four or five inches across, grows at the tip of the branching twig. Sometimes as many as seventy-five flowers have been counted in a single bunch, the youngest one located near the top. The individual flower is about an inch across. Tiny, pink, and fluted, the flower-bud looks like a rose-colored marble knob with a five-sided, pyramidal top. The unfolding blossom is star-shaped.

Following the blossoms appear the fruits, little flattened green capsules. From the top of each a curved green stigma waves like a fairy's jaunty feather. This capsule opens in much the same manner as that of its cousin, the rhododendron, and liberates the light brown oblong seed. But the pod itself remains on the tree until the following year.

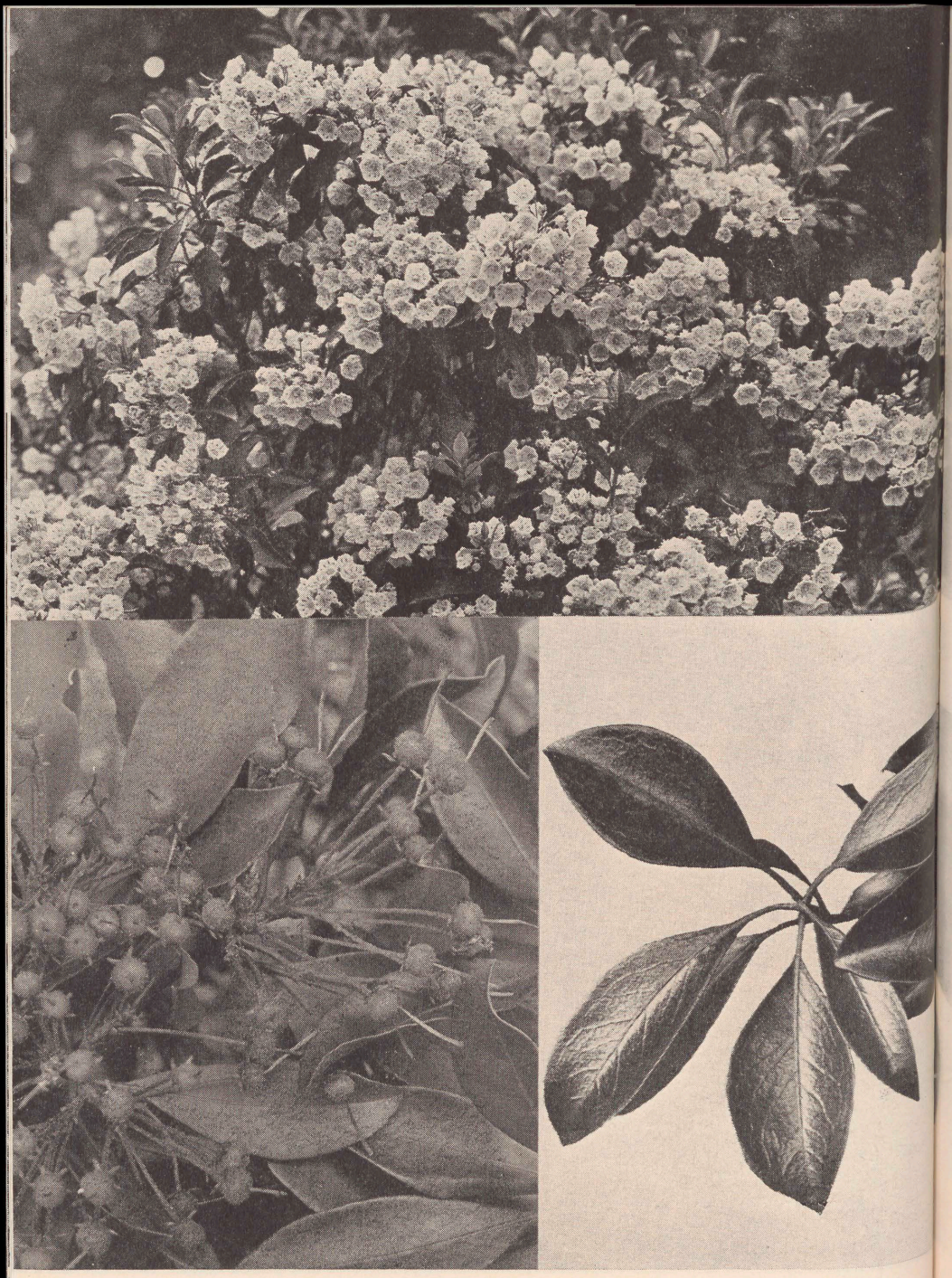
Mountain laurel is found along the highlands and mountains from Canada to the Gulf, and westward through the Gulf States. In the North it is only a lovely broad shrub of five to ten feet, with many crooked branches and slender branchlets, and a dense, round head. Only in the mountains of the Carolinas and Tennessee does it become a small tree. Occasionally it is as high as thirty or forty feet with a short, crooked and twisted trunk sometimes eighteen or twenty inches in diameter.

Though demanding an acid soil, mountain laurel is tolerant of many locations. It often forms dense, impenetrable thickets in the mountains and is even found along some of the bluffs of rivers all the way to the coast. Its dark green, simple, alternate, oblong leaves resemble somewhat those of the rhododendron, and like them are evergreen, but they are smaller and narrower. They are only two to four inches long and one to one and a half wide. They are thick and leathery, and have

Courtesy U. S. Forest Service

MOUNTAIN LAUREL (*Kalmia latifolia* L.)

Nowhere is this small flowering tree or shrub as abundant and luxuriant as in our southern mountains.



In May and June the large flower clusters almost conceal the leaves which are evergreen, thick, and leathery, but smaller than those of the rhododendron; pinkish-white flowers; bark dark brown, tinged with red, thin, and divided into ridges. Note persistent styles in fruits. (Mountain Laurel.)

entire margins. They begin to fall during the second summer.

The dark brown bark of the trunk, tinged with red, is thin and divides into narrow ridges. The wood, also brown tinged with red, is heavy, hard, strong, and close-grained. It is used for tools, turnery, wooden spoons and ladles, and rustic furniture.

Unfortunately, mountain laurel's very beauty is its undoing. Everywhere it is ruthlessly destroyed by thoughtless persons who never think of the future. Some day the South will realize that its flowering trees and shrubs are valuable assets and should be conserved as natural resources. And in that hoped-for Golden Age, we, too, may become a "Flowery Kingdom" with blossom festivals and a deeper appreciation of beauty.

It is particularly fitting that this beautiful plant takes its scientific name, *Kalmia,* from the great Swedish botanist, Peter Kalm, who made plant explorations in this country in 1753. Kalm was a student and friend of Linnaeus, the "father of botany," and sent or brought back to him many of the marvelous and strange plants from the New World across the sea. Among these was the mountain laurel, one of his favorites, which he introduced in Europe. And so it came about that this New World plant was named after the Old World botanist, Peter Kalm.

The Sourwood or Sorrel Tree (*Oxydendrum*)

In warlike pomp, with banners streaming,
The regiments of autumn stood:
I saw their gold and scarlet gleaming
From every hillside, every wood.

—HENRY VAN DYKE.

One of the South's "scarlet trees of autumn" is the sourwood, or sorrel tree. Though it is not as plentiful as the dogwoods, its fall coloring is even more brilliant, and the drooping

clusters of dried fruit pods, which the tree retains until late, add to its interest and artistry.

This small, slender tree is rarely higher thna thirty or forty feet, with a trunk diameter of eight to twelve inches. It is scattered rather plentifully in good, well-drained, gravelly soil through most of our woods from the mountains through the piedmont to the coast and south to Florida and western Louisiana.

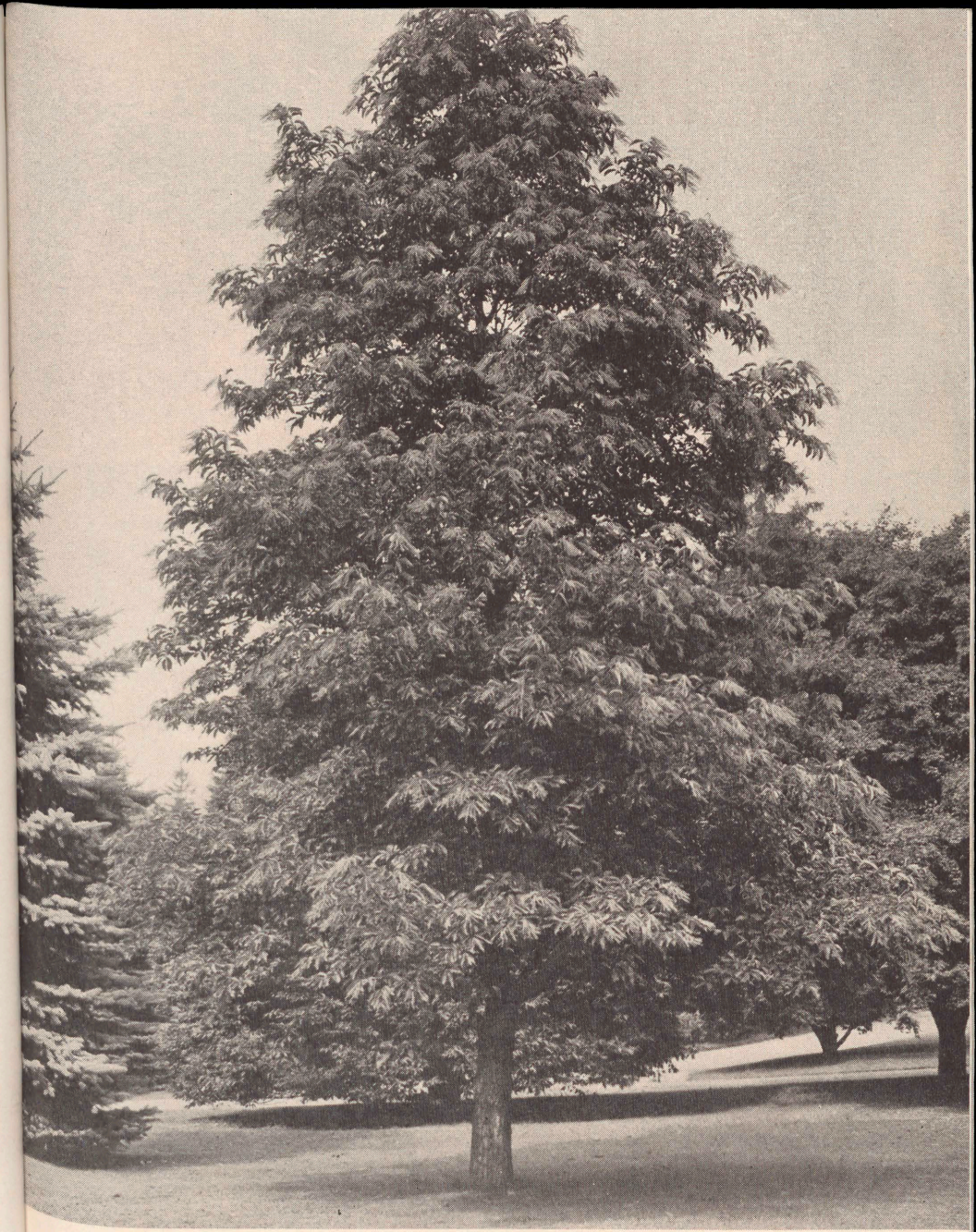
On the western slopes of the Great Smokies in Tennessee it reaches its greatest height and girth. In the coastal regions it is a more slender tree, and along the banks of the Great Dismal Swamp in Virginia it is said to be still smaller and slenderer. There it is a wraith-like tree with a graceful, inclined trunk—as though it were seeking to view its airy reflection in some woodland pool.

On trunks of good size the bark is dark gray and deeply furrowed; on smaller trunks it is thin, lighter gray, and divided into narrow, shallow ridges. When grown in the open the tree develops a rather irregular, narrow, oblong top with spreading, drooping branches.

Sour Leaves Name Tree

The simple, alternate leaves, lustrous green in summer, are from two to five inches long, very finely and sparsely toothed along the margin. They are often so nearly alike at both ends that they can be folded back and both ends made to "fit." Children like to try this, and it helps in the identification of the leaf. Another noticeable factor about the leaf, which also helps in its identification, is that the lateral veins join the midrib at a very wide angle, sometimes almost a right angle.

The leaves and twigs have a decidedly acid taste, which gives the tree its common name. Hunters, berry-pickers, woodsmen, and others on long woodland rambles often chew them to allay thirst. In the past a brew made from the leaves was credited with having tonic value.



By J. Horace McFarland

SOURWOOD OR SORREL TREE (*Oxydendrum arboreum* DC.)
Both under cultivation and in the open, the sourwood is a well developed tree that becomes a mass of bloom in summer and a pillar of flame in autumn.

Clusters of dried fruits remain on the tree through most of the winter; white, bell-shaped flowers, borne in clusters, resemble somewhat those of the lily of the valley; bark dark gray and deeply-furrowed. Note lateral veins of leaves, almost at a right angle with the midrib. (Sourwood.)

Long, drooping clusters of creamy-white flowers are grouped at the ends of the leafy shoots. Sometimes they are seven or eight, even ten or twelve, inches long, and resemble a little the blooms of the lily-of-the-valley. Massed at the ends of the lustrous green leaves, they make an artistic summer "woodland bouquet" at a time when few other flowering trees are in bloom. In the mountains they seem to bloom much more profusely than in the piedmont. The mountains around Roaring Gap, North Carolina, have many exceptionally beautiful specimens. The fruit is a long cluster of conical, dry capsules, each one-third to one-half inch in length and containing numerous small seeds.

The small buds of the sourwood are not easily seen, as they are partially imbedded in the bark. They appear very tiny to be containing next year's leaves and shoots. The U-shaped bundle-scars on the leaf-scars show plainly under a lens, and are very distinctive.

The sourwood has no true terminal bud. Some day in winter, examine the long, slender terminal bud on a beech twig, then for comparison, look for one on a branch of sourwood. Examine this closely, with a lens, if possible, and you will notice that at the very end of the branch is a tiny dark point, close to the upper axillary bud. This is the true end of the twig. Next spring's growth will be continuous from this near-the-end axillary bud.

The sourwood is the only one of its kind in the world, but it is related to the rhododendrons and the mountain laurel, also to the little flowering sparkleberry, and the more common huckleberries. It is one of the most beautiful of our smaller trees, growing wild throughout the South and adding to the beauty of our hills and mountains, river banks and woodlands. Yet it is strangely neglected in border plantings, lawns and parks.

Man has disregarded this tree too long. The very fact that it is of slow growth (a museum specimen of only eleven-inch

diameter shows eighty-six annual ring growths) makes it especially satisfactory for plantings, especially when used with evergreen backgrounds. And always it is interesting and beautiful. The glimmering green of early spring; the long, graceful, drooping clusters of creamy-white flowers of summer—when few other trees are in bloom—and the vivid scarlet of autumn make it ever desirable. There is just one drawback to its use; it needs protection from the ravages of the fall web-worm.

Though not native in the North it is hardy there, where, as in Europe, it has been planted as an ornamental tree. Though considered difficult to transplant successfully, it is easily raised from seeds, which germinate readily, although the seedlings grow slowly. It does very well from suckers, however, and a whole stand or "coppice" of sourwoods may spring up from an old stump. When coppiced the tree grows long, slender shoots which the boys of pioneer days are said to have used for arrows, and so the tree was also once known as "arrow-wood."

The brown-tinged wood is heavy, hard, and very close grained; its satiny surface takes a beautiful, lustrous polish. It is used for turnery, tool handles, and bearings of machinery. The tree's real value to the South, however, is its autumnal beauty. Then it is a gorgeous "scarlet umbrella" under which any woodland chief would be glad to hold court.

THE PERSIMMON, THE SILVERBELL, AND THE SWEET LEAF

Have you ever,
In your travels
Through the queer, uncertain South,
Had a 'simmon—
Green persimmon—
Make a sortie in your mouth?

—FRANK H. SWEET.

THE PERSIMMON (*Diospyros*)

"'POSSUMS an' 'simmons come together, an' bofe is good fruit," is an old-time saying of the southern Negro. They certainly do go together. Even the scientific names of both, it has been pointed out,* are somewhat similar, *Diospyros virginiana* for the persimmon, *Didelphis virginiana* for the opossum—rather big names for such small fruits and animals.

Both are also southern, for the range of the persimmon tree is southward from southern Pennsylvania on down to the Gulf Coast and westward to Texas. That of the opossum is from southern New York southward, and both are far more common in the South than in the more northern parts of their range. In Florida the tree is often called "possumwood," because that animal is so fond of its fruit.

The scientific name *Diospyros* is of Greek derivation and means the "fruit of Jove," one of the gods of ancient mythology. Persimmon, the common name, is of Virginia Indian origin. Interesting in this connection is the fact that "opossum" is

* Weed and Emerson, *Our Trees: How to Know Them.*

also of Virginia Indian origin—from the word *apasum,* meaning "white beast."

Long before the first frost we always find a persimmon tree with a few ripe, luscious fruits, disproving the theory that frost is necessary to ripen them. Usually, however, it is so late in the season before most of them are ripe, that frost has come.

More than any other of our native fruits the persimmon might be known as the "before and after" fruit. Before it is ripe it is astringent, furry, bitter, puckery—then it is that it makes a "sortie in your mouth." When fully ripe it is one of the sweetest, most delectable of our native wild fruits—a "fruit of the gods" indeed.

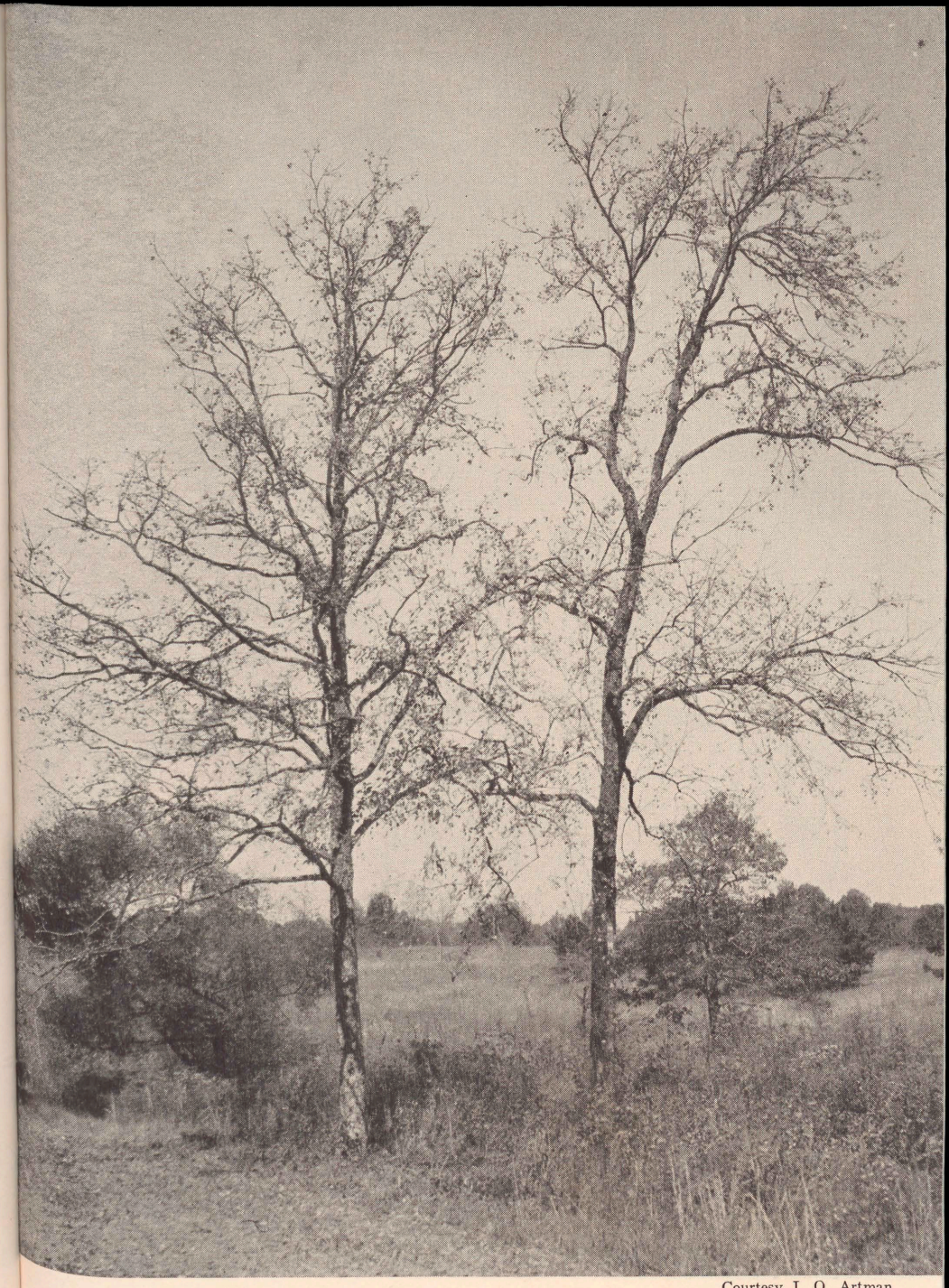
The fruit is botanically known as a "berry" having from one to eight seeds imbedded in pulp, though occasional trees bear fruits without seeds. The orange-red fruit wears a perky little dark cap, which is the enlarged calyx, and is very persistent.

Not all persimmon trees bear fruit, though all the mature trees bear flowers. This, of course, is because the flowers are of two sexes, on separate trees, and only the female ones produce fruits. These flowers open when the leaves are more than half grown. Though not very conspicuous, the creamy-white, bell-shaped blossoms are queer and interesting.

The leaves resemble somewhat in shape, but not in texture, those of the magnolia; they are four to six inches long, thick, simple, alternate, oval with entire margins. In summer they are dark green and shining above, paler and often downy beneath. In autumn they may fall before turning color, or they may become a brilliant orange or scarlet spotted with black. The petioles are always thick and usually downy and help to identify the tree.

On old trees the bark is almost black and is separated into thick, nearly square blocks resembling somewhat those of the black gum. The branches are slender and zigzag, giving a sort of ladder effect when the tree is bare.

In the upper South rarely does this slender tree, with its



Courtesy J. O. Artman

PERSIMMON (*Diospyros virginiana* L.)

Two wayside persimmons of Tennessee. With its orange fruits this tree is a familiar part of the countryside in the South.

Leaves thick, shiny, oblong, with entire margins and thick petioles; two kinds of flowers on separate trees; fruits are true berries, the largest borne by any of our native forest trees; dark gray bark is strongly checkered. Female flowers at right above; male at left. (Persimmon.)

handsome round head, reach over fifty feet in height, with a trunk diameter of eighteen inches. In some of the rich bottomlands and in the fertile valleys of southern Indiana and Illinois it is larger, sometimes attaining a hundred feet height and a diameter of two to three feet. In the upper part of the South it extends from the lower mountains to the sea, but is most plentiful in the lower piedmont and upper coastal plain.

Though it occurs in rich bottomlands, the persimmon seems to prefer dry, open situations and is most abundant in old fields. Because of its manner of spreading from roots it often covers abandoned fields, sides of roads, and fence corners with a scrubby growth. The tree also grows well from seeds, and wherever man, animals, or birds gather the fruits and then scatter the seeds, this "fruit of the gods" is likely to spring up. At one time there was a wild persimmon growing in an old pasture in Massachusetts, many, many miles from any other persimmon. This is north of its natural range, and it is believed the seed was dropped there by a migrating bird, which had probably eaten the fruit far, far to the southward.

A Hundred Years to Grow Heartwood

The wood of this tree is heavy, hard, dense, and strong. A peculiarity of it is that the tree must live nearly a hundred years, occasionally even more, before it begins to form heartwood. When finally formed, however, this heartwood is extremely close-grained and almost ebony black. In fact, it is ebony, for the persimmon belongs to the ebony family, the *Ebenaceae,* although the real ebony of commerce comes from tropical species.

In the few trees producing it, this heartwood is in great demand for golf clubs, and from the rest of the wood turnery, shoe-lasts, and shuttles are also made. Some wood experts claim that it is the best type of wood for shuttles. If that is so, and since the tree spreads rapidly, one wonders if it could not in time be substituted for dogwood for this purpose. That would

save the dogwood for something far better—to remain an asset of beauty for the South.

At the same time, if this plan should be practical and could be carried out, the greater number of persimmons throughout the South would also be an aesthetic asset, as the tree is beautiful and interesting at all times of the year. In summer its canopy of green is graceful and cool-looking; in autumn its colorful fruits and leaves—when they do turn—are part of the fall pageantry; and in winter the few remaining fruits dangle tantalizingly from the upper branches.

Great Variety in Fruits

Personally, we are like the 'possum in having certain persimmon trees spotted weeks in advance. We have known many of these trees intimately for years. One has fruit which ripens unusually early; another has particularly fine-flavored fruit; still another, a bountiful crop. And one—we don't think even the 'possum knows of this one—seems to hold its fruit until late in the year. And then we know of one whose fruit never becomes edible. But that particular tree furnishes a feast for the eye—for since neither the 'possum nor apparently anyone else likes the fruit, it hangs on until late in the winter, adding interest and color to the landscape through long months.

The size of the fruit also varies anywhere from that of a cherry on some trees to that of a small apple on others. In Japan and China where persimmons are also native, and where they have been in cultivation since ancient times, there have been almost as many varieties developed as we have of apples. Our own persimmons might well be developed, although some claim the fruit shows no improvement under cultivation.

Delicacies for De Soto

Always this queer native fruit of our southern autumns has been popular. Long before the coming of the white man the Indians of the region used it in various ways, especially in

making a bread of it dried. In 1539 De Soto and his companions learned from the Indians the value of these fruits, and used them to eke out their own scanty fare. Mention is made of them in the narrative of his expedition at Evora in 1557.

The Silverbell (*Halesia*)

The tree held up her branches to the sky
And danced and flirted in the glowing sun.
She reveled in the summer just begun
And kissed each little breeze that drifted by.
She was a thing of beauty and of grace.
It was a joy to see her standing there
When passing blossoms brushed her lovely face,
Or summer rains dropped softly on her hair.
—MARGARET HALL SMITH. In *Good Housekeeping.*

Long ago a French poet asked, "Where are the snows of yesteryear?" If he could have wandered afoot in spring in our southern mountains, he might almost believe he had found those lost snowflakes, strung along the branches of certain exquisite trees. So completely do the graceful, white, hanging bells of the silverbell cover the ruddy twigs that often the young green leaves can scarcely be seen.

Like tiny flower-Cinderellas, when they first come out the blossoms are so plainly dressed they scarcely show. They hang down, small, flesh-colored and inconspicuous, for some time. The opening leaf-buds are then touched with rose, and the twigs themselves take on a more roseate glow.

The warm sun and the soft gentle rains of April—those good fairies of Mother Nature—play fitfully about these flowering branches. And then some day, as though the Queen of the Woodland Fairies had waved her wand, the bell-like flowers have grown to full size, and, like the dogwood blooms, come out a lovely, fragile white. Perfect flowers, they hang in clusters of twos or threes along the twigs. And then the tree is lit-

erally clothed in white—a bride of the mountain woodlands. Though you may like the surprise of seeing this tree apparently burst into white bloom almost overnight, it is really more fascinating to watch it closely from the first unfolding of its creamy flower-buds.

Curious Winged Fruit Sacs

In time the white bells fade and fall. But something very interesting takes place. Queer little green, sac-like cases with four thin, lengthwise wings develop into seed-containers. These odd little cool, green fruits—something like tiny winged lanterns that might be used by the elves to lighten their midnight revels—form in the summer, and hang on the branches until midwinter. From one and one-half to two inches long, they are attractive throughout the season. Enclosed in each sac is a conspicuously eight-ribbed stone.

The leaves, sharp-pointed at the apex, rounded or wedge-shaped at the base, are somewhat oblong, and either smooth or finely notched along the margin. They are simple, alternate, from four to six inches long and two to three inches broad, with a slender midrib and conspicuous primary veins. In summer they are dark green above, paler and covered with fine hairs below. In autumn they turn a pale yellow, and are late in falling.

A native of the upper piedmont and the mountainous region of the South, the silverbell is found along streams from West Virginia to Georgia. It also extends from northern Florida westward to Texas and Arkansas. In the piedmont it is a small tree, but like many of our trees it reaches its greatest size on the western slopes of the mountains in North Carolina and Tennessee, especially in the Great Smokies. There it may be one hundred feet high, with a trunk diameter of three feet or over. On a recent trip into these mountains, Dr. B. W. Wells, author of *The Natural Gardens of North Carolina,*

By J. Horace McFarland

SILVERBELL (*Halesia carolina* L.)

Found along streams in the mountains and upper piedmont of the South, this is another of our handsome flowering trees.

The white blossoms strung thickly along the green leaves explain the tree's other name of snow-drop tree; leaves oval-shaped, finely-toothed along margins; fruits queer looking sacs with four lengthwise wings; bark reddish-brown, slightly ridged. (Silverbell.)

found a splendid specimen that measured over two and one-half feet in diameter.

Although native only to the South, this beautiful tree is hardy as far north as New England; but there it is usually a small tree or even a shrub. It is easily transplanted, and responds well to pruning. These characteristics make it an excellent tree for parks and private grounds. The beauty of its long flowering period, its grace the year round, and its hardiness should place it among the elect of flowering trees of the South, along with the dogwood, the redbud, the fringe-tree, and the service berry.

The Snow-drop Tree a Close Relative

Another flowering tree of the South, one closely related to the silverbell, is the snow-drop tree, or two-wing silverbell. This tree is found in the lowlands along our southern coast, from Georgia to northern Florida. Indeed, the range of these two trees is somewhat similar, but the silverbell prefers the upper piedmont and the mountains, while the snow-drop likes best the swamps. It does not, however, extend as far north as the silverbell.

Too, the snow-drop never becomes as large a tree as its cousin, seldom reaching more than thirty feet. It is easily distinguished from the other by its larger leaves and more showy flowers. In these flowers the bells are divided nearly to the base, while those of the silverbell are but slightly notched along the rim. Another difference is in the seed-cases, those of the snow-drop having but two wings instead of four. It is this characteristic which gives the tree its common name of two-wing silverbell.

Gleaming white above the dark waters of some remote southern swamp, or in the midst of a dark forest of pines, these graceful flowering trees add a note of light and cheerfulness to the eerie setting.

Sweet Leaf, or Horse Sugar (*Symplocos*)

Still another southern relative of the silverbells is the sweet leaf, or horse sugar, a small shrub or tree that is common in moist rich soil of the coastal plain from Delaware to the Gulf. Found also inland to some extent in the piedmont, it is less rare, but not common, in the lower mountains.

The dark green and thick leaves, lustrous above, paler and somewhat hairy beneath, are five to six inches long and one to two wide. They taper at both ends, and the margins may be entire or slightly toothed or notched. The petioles and midribs are often yellowish in color. Because they have a sweetish flavor, these leaves are greedily devoured by horses and cattle. It is this fact which gives the tree one of its common names—horse sugar.

The small, creamy-white or light yellow fragrant flowers are borne in close axillary clusters along the twigs. In the upper South they bloom in April. The fruit is a small, dry drupe containing one seed. Because a yellowish dye is extracted from the bark of the stems and roots, the tree is also sometimes known as yellow-wood (no relation, of course, to the virgilia, or yellow-wood, described as one of the pulse family).

Decorative Value

Sweet leaf is an attractive and ornamental small tree or shrub especially when its dainty bloom is throwing an elusive fragrance upon the air; and one wonders why it is not more generally used in ornamental plantings and borders. Some forty years ago Mr. James Tufts, in laying out the new Sandhills winter resort, Pinehurst, in North Carolina, used fifty thousand native shrubs, trees, and vines, including, besides the sweet leaf, flowering dogwood, redbud, fringe-tree, shadbush, sweet bay, red bay, bayberry, holly, yellow jessamine, coral honeysuckle, trumpet-vine and others. His country neighbors

shrugged their shoulders and wondered, "Why is he planting such stuff?"

When to the native plantings he added some sixty thousand more trees, shrubs, and plants from northern, European, and Oriental nurseries they said, "That's more like it, now." But those who know the beauty of Pinehurst in the spring today realize how much the native shrubs and trees add to its charm and how wisely the founder, advised by the great landscape architect, Mr. Frederick Law Olmstead, planned and planted.

THE OLIVE FAMILY

(OLEACEAE)

A laggard still, though other trees
Have donned their vernal liveries,
The dainty ash at length receives
Her graceful garniture of leaves.

—THEODORE H. HILL.

The Ashes (*Fraxinus*)

For hundreds, even thousands of years, traditions have clustered about the ashes, especially those of Europe. One of the oldest is that serpents always avoid these trees. And, according to Norse mythology, the ash was "Igdrasil," the tree of the universe, and was the origin of all things.

Another tradition embodied in rhymes of ancient folklore was in the form of a prophecy:

If the Oak is out before the Ash,
'Twill be a summer of wet and splash;
But if the Ash is before the Oak
'Twill be a summer of fire and smoke.

Since they belong to the olive family, these trees are related to the olives that grow in Palestine—and to the lilacs, forsythias, and privets of our gardens. The ashes are probably the most important trees of the family. There are from thirty to forty kinds of ash trees in different parts of the world, eighteen of them native to North America, and some seven or eight to the South.

Because of their opposite, pinnately compound leaves, on

Courtesy U. S. Forest Service

WHITE ASH (*Fraxinus americana* L.)

One of the finest and most important trees of the American forests—and related strangely enough to the olives, the lilacs, and the privets. A fine specimen tree in Natural Bridge National Forest, Virginia.

The clustered dry fruits hang thick on the trees; male flowers and compound leaves are opposite; leaves whitish beneath, but dark green and smooth above; bark is marked with diamond-shaped furrows. Note that the "wing" does not extend along the side of the seed. (White Ash.)

rather coarse twigs, the ashes are easy to recognize. For only a few trees, we remember, have opposite leaves; and only three large trees—the ashes, the Box Elder, and the buckeyes—have *opposite, compound leaves.*

The White Ash

The most common and also the most beautiful of the ashes, the white, or American, ash, grows from Nova Scotia and Minnesota south to northern Florida and Texas. It reaches its greatest size in the lower Ohio Valley. In the South it is the largest, most stately, and most widely distributed of the ashes. It occurs abundantly in rich, moist soil in the mountains and the piedmont, and also extends down the valleys in the coastal plain.

Ordinarily this ash reaches an average height of fifty to eighty feet and a trunk diameter of two or three feet, though much larger trees are occasionally found. A few giants of one hundred and twenty feet in height and six feet in diameter were largely confined to the rich, moist bottomlands of the lower Ohio Valley.

The pinnately compound leaves are eight to twelve inches long, with five to nine sharp-pointed leaflets, each three to five inches long and one to two inches wide. They are dark green and smooth above and pale green or silvery-white beneath, giving the tree its common name. The margins are entire or very finely toothed.

The flowers are of two kinds, and on different trees. The pollen-bearing ones are dark reddish to purple and resemble small, dense, knob-like clusters. The seed-producing ones are in long clusters that increase in size as the fruit matures. Occasional trees produce perfect flowers.

The one-seeded fruits, or samaras, maturing by mid-summer, hang in large, dense clusters. Each fruit is small, and attached to it is a narrow wing, one to one and one-half inches long. In

outline it resembles the blade of a canoe paddle—a tiny one that an elf might use. By means of these wings the seeds are scattered about by the winds, and also float on the surface of the water. Therefore streams play an important part in the distribution of these seeds, which ride along on the current. Often they take root in moist lands that are inundated part of the time.

The ashy-gray bark is cut into diamond-shaped fissures, suggesting the appearance of shaded lines. The sparse, coarse twigs are pale gray or orange and are covered with small whitish dots, or lenticels. These and the dark rounded, opposite buds help identify the tree in winter.

The light, strong, and elastic wood of the white ash is valuable and has a wide range of uses. It is said that our primitive ancestors, seeking a light but sturdy club with which to clout a wild animal or an enemy, preferred one of ash. Mythology credits Achilles with having used an ashen spear in battle. Because of its light weight, its straight fiber, and its strength, the American Indian is said to have preferred the wood of the white ash for his canoe paddles, and for the rims of snow-shoes. In the present day it is used for furniture and interior finish, for such athletic implements as bats, oars, and tennis rackets, and even in musical instruments.

Because of its rapid growth and valuable timber the white ash should be an important tree in reforestation. Seeds often sprout the following spring and by the end of summer have developed into baby trees of sturdy growth. The tree is fairly free from insect and fungus attack, but the thin-barked young trees are easily injured by fire, that dread enemy of southern forests in particular.

Always the tree is worthy of its share of the good earth. In summer the foliage is a graceful mass; in winter the bare tree is stately and dignified. In autumn, perhaps, it is most beautiful. For then it is that the leaves are two-toned, a dull purple above and a pale golden yellow beneath. A delicate, artistic

By L. W. Brownell

RED ASH (*Fraxinus pennsylvanica* Marsh.)

Common along rivers and low grounds in the piedmont and lower mountains of the South.

Note that wings of these fruits extend to middle of seed. This is the longest and most slender of the ash "keys." Compound opposite leaves are green and downy beneath; twigs and petioles also downy; bark less deeply furrowed than that of the white ash. (Red Ash.)

combination which, seen for the first time, quickens the heart with its sheer beauty.

The Red Ash

The next most common ash of the South is the red ash. It lives in low grounds and along watercourses in the piedmont and lower mountains south to northern Florida, northern Alabama, and eastern Kansas. This tree is ordinarily medium-sized, although it sometimes reaches a height of seventy feet and a trunk diameter of three feet.

The red ash is easily distinguished from other ashes at any season of the year by the dense, velvety down on young twigs. The leaves are much like those of the white ash, but their leaf-stalks and under surfaces are covered with fine down. The flowers are also similar, as are the fruits, except that the wing extends along the side of the seed part way, which it does *not* do in that of the white ash.

As a rule the red ash prefers more moisture than does the white, and the bark is generally less deeply fissured. The buds are dark brown and rather small, and the scales are distinctly downy. The wood is similar to that of the white ash, but is less valuable.

Other ashes of the South are the Biltmore ash, known at present only along some of the larger streams of the lower mountains; the pumpkin ash, a medium-sized, slender tree found in the swamps in the coastal plain from eastern Maryland to western Florida; and the water ash, a rather small tree inhabiting as a rule only the deeper swamps of the lower half of the coastal plain from the Potomac River south to Florida.

The Fringe-tree or Flowering Ash (*Chionanthus*)

God must have dreamed a long time
Of the ocean;
But the Fringe Tree
Was just a pretty notion,
A cherished fancy, maybe,
Up His sleeve—
It is so gay and white,
So hard to believe.
To make a thing as lissom and as slim
As this—must have enchanted Him.

—ANNE BLACKWELL PAYNE in
The Progressive Farmer.

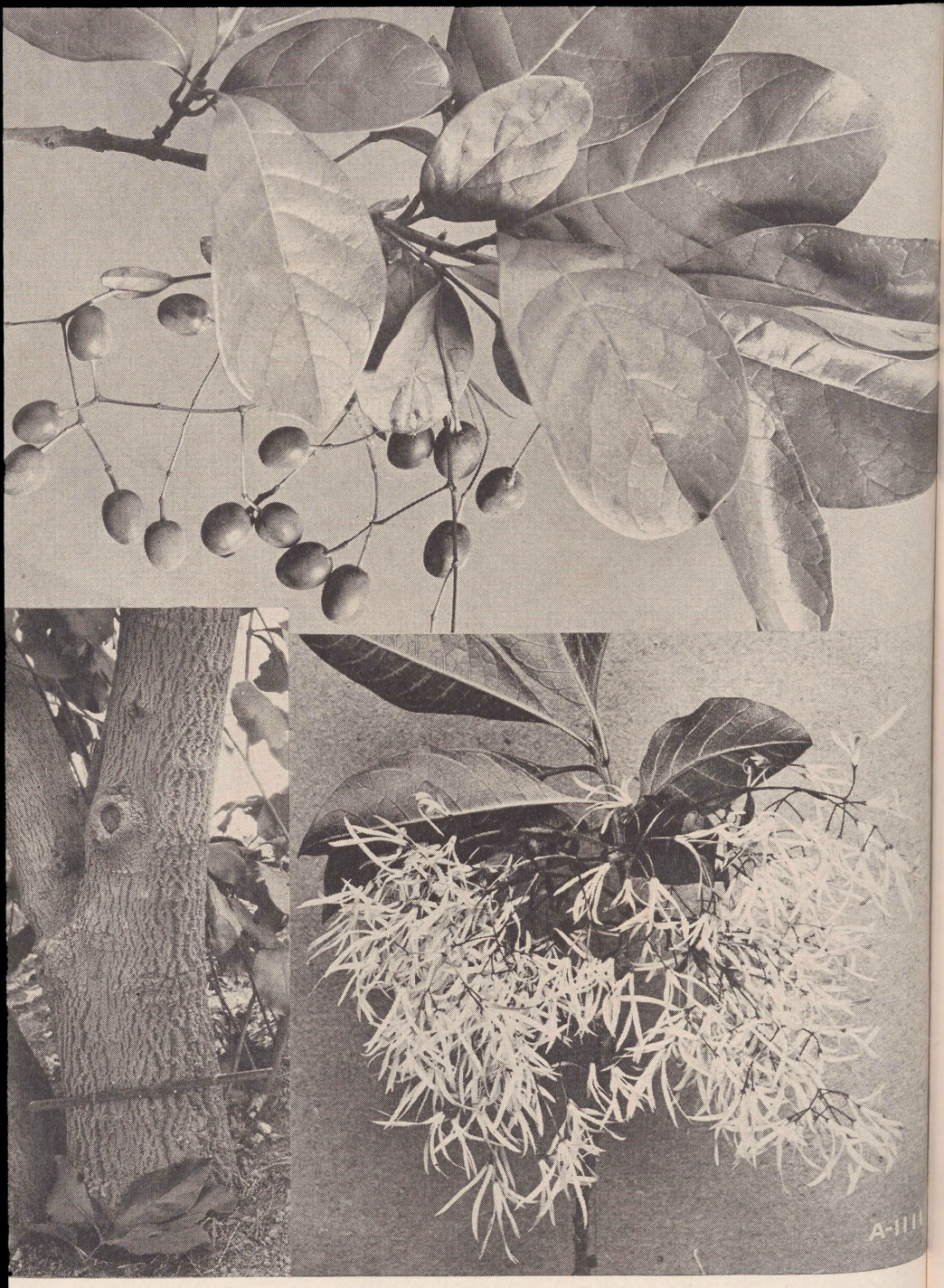
Half-hidden among the lacy white flowers—like emeralds buried in a drift of snow—are the opening leaves of the fringe-tree. Others see in the tree in bloom a resemblance to an old-fashioned fringed bridal veil, which accounts for the tree's more common name.

This flowering tree has many other names significant of its grace and beauty: flowering ash, old man's beard, grancey graybeard, and snowflower tree. Even the scientific name *Chionanthus* is musical sounding and beautiful. It is from the Greek, *chion,* meaning snow, and *anthos,* flower. In full bloom the tree looks as though a delicate, lacy green and white shawl had been tossed carelessly about it.

The flowers are in drooping clusters from four to six inches long, each individual flower having from four to six (but usually four) slender, inch-long curved petals with tiny purple spots at the base. If you are sensitive to woodland odors and scents, the delicate fragrance of the flowers will direct you to the tree blind-folded. "Shut your eyes and follow your nose," a Scout leader I know tells his boys when they are working with this tree in their woodland tests.

By J. Horace McFarland

FRINGE-TREE OR FLOWERING ASH (*Chionanthus virginica* L.)
Another of the exquisite flowering trees of the South.



Flowers fragrant, white, in drooping clusters with long, strap-like petals; leaves simple, opposite, oval-shaped, with entire margins; dark blue fruits have large stones and resemble olives, showing membership in that family; bark divided into small, thin, brown scales. (Fringe-tree.)

Simple Opposite Leaves

This tree is a bit unusual because it is one of the few native trees having simple, opposite leaves. The leaves of the fringe-tree are somewhat oval-shaped and may be either pointed or rounded at the tip, and they have entire margins. They are from three to eight inches long and from one to four inches broad. Downy at first, they later become thicker and dark green above, paler and nearly smooth beneath. In the autumn they turn clear yellow and fall early.

It is in its fruits that the tree gives proof of belonging to the olive family. These grow on slender stems, are about an inch long, are dark blue, thick-skinned, and resemble olives. The flesh is thin and there is one seed, a hard, thin stone. Ripening in late summer or in September, the fruits are quite ornamental.

The bark is irregularly divided into small, thin, brown scales that are tinged with red. The light brown wood is heavy, hard, and close-grained.

Distinctly southern, the fringe-tree is found native from southern New Jersey to the Everglades in Florida and westward to Texas and Arkansas, but it is hardy as far north as New England. Though fairly well distributed it is nowhere very common. In the South it is found scattered through rich woods, especially in moist soil along streams. Although it is most abundant in the piedmont, it extends sparingly into part of the coastal plain and into the mountains to nearly 5000 feet elevation.

In the North it is never more than a shrub, but in the South it may reach small tree size, sometimes up to twenty or thirty feet. Nowhere is it large enough for the wood to be of any commercial use. The tree's value is in adding grace and charm to the countryside. As such it is more widely appreciated both in the North and in Europe, where it is more often planted as a beautiful flowering-tree from America, than it is in the South.

There is only one species of fringe-tree in America, but in China, which has so many trees that are similar to our own, there is a sister tree that is very much like it. It is, however, said to be less graceful and beautiful than our own.

The devil-wood, or wild olive, is a small evergreen shrub or tree found behind some of the sand dunes and on the hammocks near the coast. It also belongs to the olive family, though in appearance it is more like a holly. However, the leaves are opposite and the bluish-purple fruits resemble somewhat those of the fringe-tree. The flowers, though small, are abundant and fragrant. The wood is "devilishly hard to split" and this characteristic has given the common name to the tree. The tree is attractive when used in landscape planting.

THE CATALPA AND THE ROYAL PAULOWNIA

THE CATALPA (*Catalpa*)

I care not how men trace their ancestry,
To ape or Adam: let them please their whim;
But I in June am midway to believe
A tree among my fair progenitors.
Such sympathy is mine with all the race,
Such mutual recognition vaguely sweet
There is between us,—surely there are times
When they consent to own me of their kin,
And condescend to me, and call me cousin.

—JAMES RUSSELL LOWELL.

ALL OF US who have dreamed beneath a flowering catalpa on a day in June would agree with the poet that we, too, would like to believe "a tree among our fair progenitors."

Because Europeans are said to have first seen a catalpa tree growing in the fields of the Cherokee Indians, they called it by the Cherokee name of *Catalpa*. The original habitat of this southern tree is not definitely known. It is generally believed to have been along the banks of rivers of western Florida, southwestern Georgia, central Alabama, and Mississippi. For a long, long time, however, the catalpa has been widely naturalized through the South Atlantic States, and has been planted as an ornamental tree for gardens and parks all over the eastern part of the country. Even in parts of New England it is hardy, and much of Europe knows and loves—and plants—this tree of the South.

It is because the catalpa bears some of the most showy flow-

ers of all our ornamental trees that it is so widely planted. It blooms late, after the leaves are fully out. But so profuse are these flowers, so gorgeous and showy the sprays or clusters, that they almost conceal the large leaves. Indeed, during the flowering season the tree as a whole looks almost like a great tropical nosegay that some giant in seven-league boots, stopping for a moment to rest, might pluck for his button-hole.

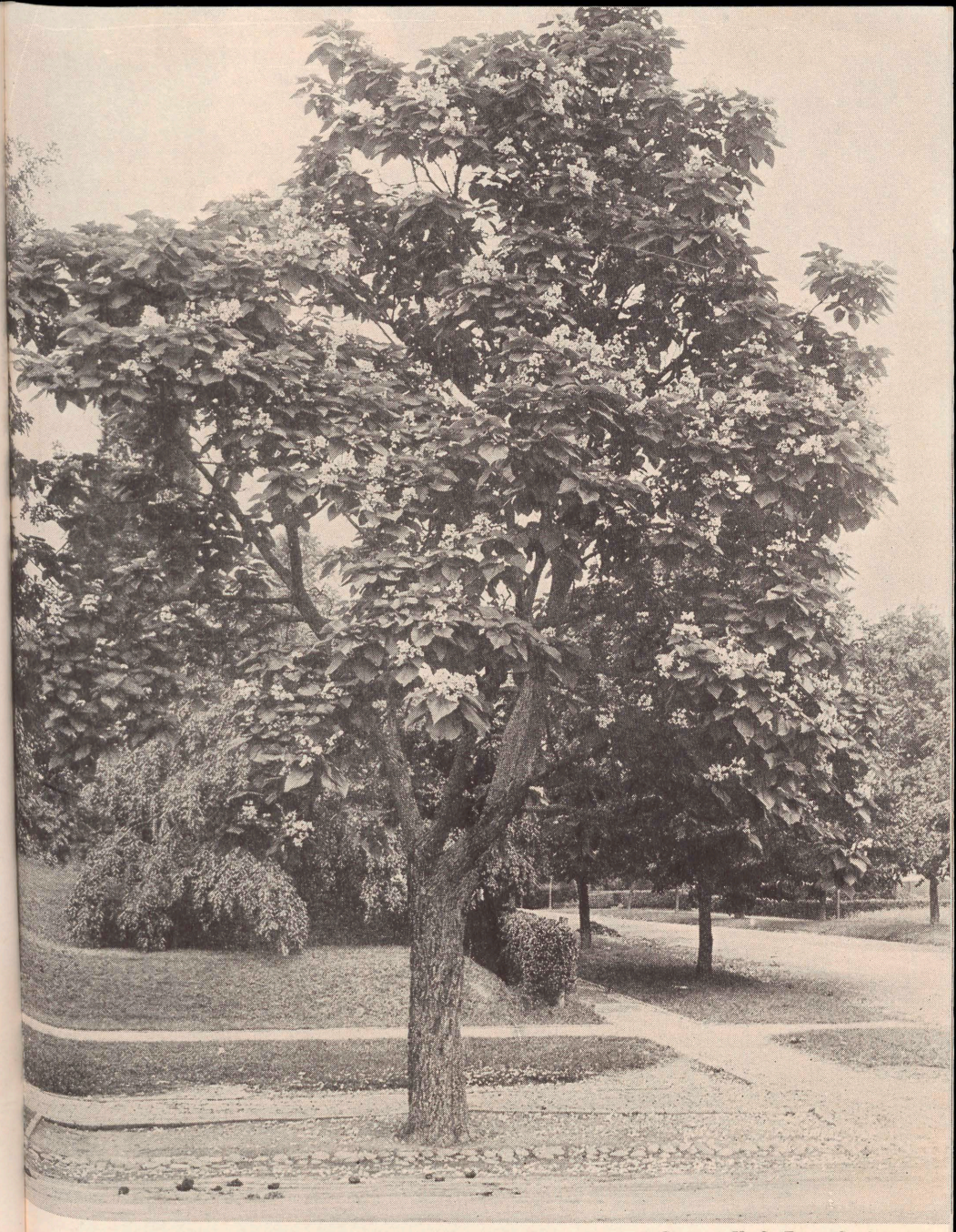
At first glance, the general effect of the flower cluster seems to be white; one must examine an individual flower to realize its full beauty and many colors. Exquisite in shape, it seems a fairy chalice, spotted with lavender-purple and flecked with gold. These flecks make a golden path, pointing the way and enticing winged visitors to the stores of nectar within. The flowers are two-lipped and the lips are lobed, two above and three below.

Nature's Wiles

Catalpa flowers are perfect, possessing both stamens and pistils. And so we might naturally suppose that the pollen of the stamens would drop on the stigma of the same flower, thus self-fertilizing it. But Mother Nature seldom approves of self-fertilization, and so she very cleverly thwarts it. She sees that the stamens and the pistils do not ripen at the same time. And so the bee that is well-brushed with golden pollen from one flower loses it on the sticky stigma of some other flower. Thus, all unconsciously, he helps cross-fertilization and evidently all nature is the happier for it.

During the flowering season, which, in the Upper South, is from the middle of May up through the first week or two in June, the ground beneath a catalpa tree is truly a "field-of-the-cloth-of-gold"—and royal purple. It is "good earth" indeed, when strewn with such a floral covering.

The heart-shaped leaves, six to eight inches long, are arranged oppositely or in whorls of three. The margins are either entire or somewhat wavy. Some botanists claim these



Courtesy U. S. Forest Service

CATALPA (*Catalpa bignonioides* Walt.)

Tree in bloom in Chevy Chase, Maryland. Originally native only in southwestern Georgia and western Florida in the South, the catalpa has become naturalized throughout much of our section.

Flowers in large erect clusters make of the tree a giant nosegay; leaves large and heart-shaped; fruits long, slender, and pod-like, but are capsules not true pods, and contain tiny winged seeds; bark red-brown and smooth. (Catalpa.)

leaves secrete a nectar—an unusual way for leaves to behave, surely. Sargent states that tiny glands in the axils of the primary veins of the under surface of the leaf are supposed to contain this nectar. You might turn the leaf over and examine these "leaf nectar pockets."

"Indian Bean"

Although the fruit of the catalpa is usually called a pod—which gives the tree a common name of "Indian Bean"—it does not belong to the "legume-bearing" trees, as do the locust, the redbud and the mimosa. The fruit is actually a long cylindrical capsule. These capsules are from ten to twelve, sometimes even twenty inches long. During the late summer they resemble long green pencils.

In winter these long slender capsules split in two parts, and out tumble a number of light, flaky, silvery seeds. Papery thin are they, with fine fringed hairs at each end, making them about an inch in length. Far and near the winds scatter these airy seeds, and even the streams float them on their bosoms, on and on to new adventures in far places.

As the seeds are numerous and germinate easily, there are many young catalpa seedlings. Moreover, the trees sprout from the old stumps, and a lower branch, lying on the ground, may take root. The tree also grows rapidly from cuttings. Thus it is no wonder that the catalpa has so easily become naturalized all over the South far beyond its original native home. Though the tree ordinarily prefers river banks and moist, shady places, it is so adaptable that it also does well in dry locations.

Though it is not an important timber tree, its wood, because of durability in contact with the soil, is in great demand for such articles as fence-posts, poles, and cross-ties. In some sections of the country catalpa trees are raised in large plantations for commercial purposes. Nursery stock is cheap and in only a dozen or so years the young trees can be used for posts.

Even though this tree is planted widely for ornamental purposes, its annual period of beauty is rather short. Yet that period of flowering and summer foliage makes up fully for the long period in which the tree is bare and less attractive.

Low and spreading, twenty-five to fifty feet in height, the tree has a short, thick trunk and long, straggling branches. Sometimes the trunk attains a diameter of three to four feet. The bark is red brown and smooth.

Catalpas belong to the family *Bignoniaceae*. Thus it is more closely related to the trumpet vine than to the true pod-bearing trees, such as the locusts. This is a large family, containing more than fifteen hundred trees, shrubs, climbers, and herbs. Most of them, however, grow in the tropics. There are seven known species of catalpa trees, two of them belonging to our own country. One, our native catalpa, is often called the Eastern catalpa, and a very close relative, the Western catalpa, grows in the West. In some of the more western of our southern states, as Kentucky, both species are found.

The Royal Paulownia or Princess Tree (*Paulownia*)

This is an oriental tree;
A Princess from Japan,
With pale blue flowers in her hair,
And strange fruit in her hand.

—TRAVIS TUCK JORDAN.

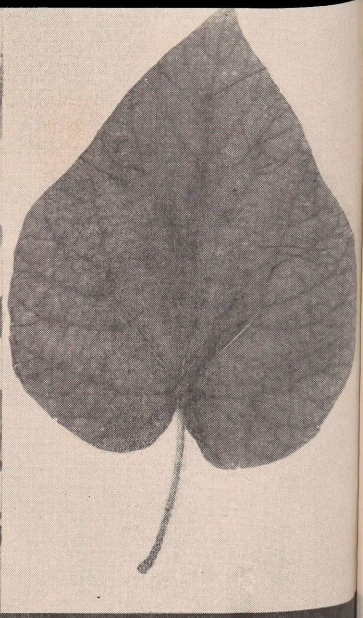
Native to Japan and China, named for a Russian princess—Anna Paulownia—by a Dutch botanist, and naturalized in the South, is the royal Paulownia, or princess tree, which might fittingly be called an "international tree."

Many years ago this tree was introduced to eastern America and rather extensively planted. Since then it has escaped from cultivation and may be found sparingly in waste places from southern New York and New Jersey southward to Florida and in the Gulf States to Texas. It is a tree of many names, includ-

Courtesy U. S. Forest Service

ROYAL PAULOWNIA OR PRINCESS TREE
(*Paulownia tomentosa* Steud.)

Another stranger from far lands. In winter these trees still hold the clusters of dried seed-pods. Widely planted, it has escaped and become naturalized in places.



Relationship to the catalpa is shown by the similar leaves, but this tree flowers before its leaves come out; flowers are an unusual blue-lavender; upright clusters of flower buds identify the tree in winter; woody pods contain many tiny seeds; trunk branches low. (Royal Paulownia.)

ing empress tree, princess tree, cotton tree, and blue catalpa.

A hurried glance will show that this tree, though a foreigner, must be at least distantly related to our own native catalpa. The large, simple, heart-shaped leaves are usually opposite but sometimes in threes. In shape, color, texture, size, and long petioles they are very similar. The leaf of the Paulownia may be slightly larger, its base even more heart-shaped, and its tip, or apex, not quite so tapering. Both trees have leaves measuring from four or six to twelve inches, sometimes even larger, especially on young shoots, where they may be a foot broad. Both are dark green above and hairy beneath, and the margins of both may be entire, or coarsely toothed, or occasionally even slightly lobed.

Blue Flowers on Trees Rare

There is also some similarity in the flowers. They are in large clusters, but those of the Paulownia are less graceful and are blue or violet in color—a rare color for tree flowers. These are also very fragrant, so much so they make redolent the air around the tree. In dense clusters sometimes a foot long, they rise from the ends of the branches. The individual flower is about two inches long and also has a center flecked with gold, but it is less exquisite than that of the catalpa. It resembles somewhat the flower of the foxglove. In the Upper South this tree usually blooms around the middle of April, before the leaves are out, while the catalpa blooms after the leaves are full grown.

In general habit of growth the two trees are somewhat similar. Each is a lusty grower; each has coarse twigs. It is in the fruits that the two trees differ widely. Seeing the trees in summer, in their luxuriant, similar foliage, one must admit the relationship. But in winter, when the fruits are hanging on the bare trees, the great difference is apparent. Nothing could be more dissimilar from the long capsule, or "bean," of the catalpa, than the clustered seedballs of the Paulownia. Each

dark, almost black, ball is the size of a small walnut, and somewhat the shape of a bishop's mitred cap. They remain long on the tree, very conspicuous and, some think, very unattractive. All winter, and sometimes into the following spring, they rattle on the leafless branches. They open early in the fall, valve-like, just enough to liberate the many tiny, filmy-winged seeds. So prolific is the tree that nearly two thousand of these have been counted in one ball. And so light are the seeds themselves that they are carried great distances by even the lightest breeze.

Aside from the interesting, even though unattractive, seed-pod clusters, the tree may be recognized in winter by its conspicuous clusters of brown flower-buds, and by the stout twigs with the big, usually opposite, leaf-scars in the bark.

The Paulownia is a medium-sized tree with a wide-spreading habit of growth. Its trunk is thick and short, sometimes two or three feet in diameter, and usually divides within a few feet of the ground into a few large branches.

Sometimes these trees are planted as a screen, which can be renewed each year by cutting all growth back to the ground, except for one or two low shoots left at intervals. In a single season these may grow branches ten or twelve feet high, with leaves nearly a foot across, giving very effective concealment.

Light, soft, easily worked, and taking a satiny finish, the wood of the Paulownia is highly valued in Oriental countries. In Japan it is used to make wooden shoes.

THE CABBAGE PALMETTO * (*Sabal*)

I never hear the wind blow through the trees
But what I think of palms beside the sea,
And how they rustle in each gusty breeze
On trunks that bend and sway eternally.

The slender boles lean far across the sand
And try to touch the sparkling water near
While drops of spray upon each outstretched hand
Intone a song that we can almost hear.†

—MARGARET HALL SMITH.

Chaw-fo-ka-naw is what the Seminole Indians call the cabbage palmetto. And how important is this tree to these Indians of the Florida Everglades! They use it almost exclusively in the structure of their queer, open-sided homes. The trunks are used for the piles, or corner posts which are driven deep into the soil. The fibers are used for tying, and the adult leaves for thatching the roofs. Coarse hats, mats, and baskets are also made from the leaves.

Even the young buds are eaten as food by both whites and Indians. These, when cooked, have a flavor very similar to that of cabbage, and so it is this tree comes by its common name of cabbage palmetto. As Easter approaches, the unfolded leaf-blades are gathered and distributed as sacred emblems for use by religious organizations on Palm Sunday.

In some forgotten ages long ago, the palmetto trees migrated

* If a scientific sequence were followed, this would come after the conifers and before the broad-leaf trees.

† This poem is more descriptive of some of the introduced palms in Florida —the date and the cocoanut—than it is of the native Cabbage Palmetto of the upper South.

up the coast from Florida as far north as Smith's Island at the mouth of the Cape Fear River in North Carolina. And there, amid the crooked live oaks, these tropical looking trees with their feather-duster tops of fan-like leaves are found among the surrounding yaupon, bays, cedars, wild olives, and dogwoods.

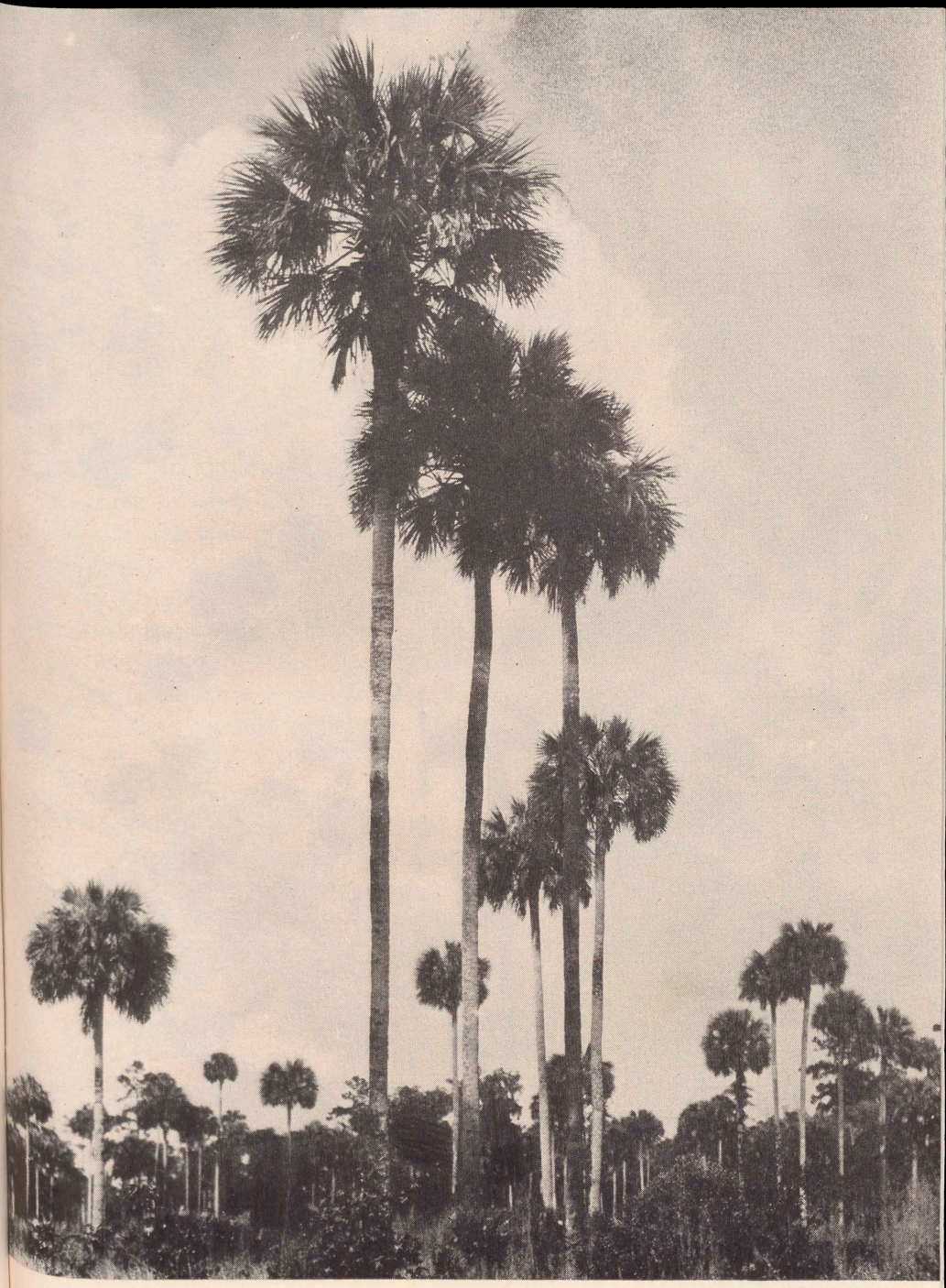
If we could understand the language of trees we would probably see that these trees, by their very presence, are telling us that the warm Gulf Stream is not many miles offshore. In this, its northernmost limit, the cabbage palmetto reaches a height of thirty feet. Along the western coast of the Florida peninsula, where it is most abundant and reaches its greatest height, it is sometimes forty feet.

From this northernmost stand it grows on down the coast, in South Carolina and Georgia on the sea islands, or in the immediate vicinity of salt water. In Florida it is more widely distributed, vastly abundant on the peninsula area, and seems to do well not only in both wet and dry places, but in all kinds of soil, and in fresh, sulphur, and salt water. It is also especially abundant on some of the lower keys, growing either in groups of a few specimens or of several hundreds or thousands. The tree is even more beautiful if given a chance to develop in the open. Wherever it is, it is always a dominant feature of the landscape.

Unusual Trunks

Showing great variation, the trunks of these palmettos may be very smooth, resembling those of the royal palms, or they may have a basket-work, or criss-cross, effect. This is due to the natural arrangement of the coarse leaf-stalks which hang on after the blade of the leaf, which resembles a fan, has fallen away. Usually it is the younger parts of the trunks which show this basket-work effect, while the older parts are smooth.

The large, spreading, fan-like leaves of the palmetto are very distinctive and tropical looking. They are dark green and lus-



Courtesy U. S. Forest Service

CABBAGE PALMETTO (*Sabal palmetto* R. & S.)
Among the palms in a Florida national forest.

Fan-like leaves, criss-cross, or basket-work, of trunk (stalks of leaves left when "fan" part falls), star-like flowers, and black shining fruits tell the story of these palms. The young buds when cooked taste somewhat like cabbage and give tree its common name. (Cabbage Palmetto.)

trous, from five to six feet long, and from seven to eight feet broad. They are partially divided into long, narrow, parted segments. The parting of these segments is often increased by the shredding effects of tropical storms.

In bloom, the tree presents a graceful, starry effect. Hanging among the leaves are numerous open clusters of small yellowish flowers, each flower nearly a fourth of an inch across. They appear in June. The fruits, about a third of an inch thick, are black and shiny. Ripening early in August, they hang among the leaves, persisting into the following summer, when not eaten by birds during the winter.

In the southeastern states this palmetto is often used as a street and ornamental tree. It survives and grows even in poor soil, and in shade, although it does better under more favorable conditions. It can be transplanted when of fair size; however, all the leaves must be cut off, and care must be taken to dig out the whole stem without injuring it.

Like all palms, the cabbage palmetto grows from the central terminal bud. Unfortunately for the tree, the edible part, the "cabbage," is this crown bud, which is often chopped out of the end of the stem and cooked and eaten. Losing this "growing point" naturally means death to the tree.

In moist, warm regions, and especially in southern Florida, there grow upon some of these trees, just under the crown of leaves, dense clusters of ferns which add greatly to their general charm. In other places, notably along the St. Johns River, their trunks are often covered with the flaming flowers of the trumpet vine; or they may be hidden from sight by the dense but attractive foliage of the cross-vine. When in flower, such vines add to the beauty of the palmettos, and occasionally, in parks and gardens, man takes these colorful hints from Mother Nature, the great artist, and plants for a like effect in his own landscaping.

Old histories of the South used to have pictures of ancient forts built of palmetto logs. It was behind such a rude fort, on

June 28, 1776, on Sullivan's Island in Charleston harbor, that a hundred Carolinians under command of Moultrie repulsed an attack of the British fleet. The South Carolina State Seal, first used in May, 1777, was made to commemorate this victory.

PART III

THE CONIFERS—THE OLDEST OF THE TREES

THE PINE FAMILY
(PINACEAE)

Many voices there are in Nature's choir, and none but were good to hear
Had we mastered the laws of their music well, and could read their meaning clear;
But we who can feel at Nature's touch, cannot think as yet with her thought;
And I only know that the sough of the pines with a spell of its own is fraught.

—FRASER'S MAGAZINE.

AND now we come to another great group of trees, the conifers, or cone-bearers. If these tree stories had been written in systematic sequence, they would have started with the conifers. For the trees of this group are much, much older than the hardwoods, or broad-leaf trees. To distinguish them from the hardwoods, these trees are often called the evergreens, because they do not shed their leaves all at one time, as do the broad-leaf, or deciduous trees. There are just two native exceptions to this characteristic: the larch, which does not grow wild in the South, and our own bald cypress.

Many people are interested in "family trees" and are proud to trace their ancestry back through several centuries. But if the conifers—the pines, cedars, firs, spruces, hemlocks, and cypresses—could think and speak, what marvelous stories they could tell us of the relative youthfulness of mankind!

In recent times, though, man has played a large part in the passing of the pines. The wood of these trees which have been among the most important timber trees of the whole world

has been used in such vast quantities that without reforestation the pines seem doomed. In our great-grandfather's time the vast pineries of the North, of the then Northwest—the Great Lakes region—and of the South seemed inexhaustible. Today there are left no great virgin stands of the white pine of the North, nor of the long-leaf pine of the South.

The Pines (*Pinus*)

For many reasons the pines are the most important of all the trees of the great coniferous family. Not only are they more abundant, but there are more species of them than of any of the other conifers. They occupy a greater range and are more useful to man. Indeed, it would be a very different world without the pines.

Today the pines are northern trees. By that is meant that they are trees of the northern hemisphere the world around. They are distributed from the Arctic Circle to Central America and the West Indies, and from the Atlantic to the Pacific Coast. There are pines in Europe, in the mountains of Central Asia, in northern Africa, even in the Philippines. But there are no native pines south of the equator.

There are about eighty known species of pines, thirty-nine of them in this country, eleven of which are found in the South. In most parts of this section, from the mountains to the sea, we have some species of pines.

Like the flowers of all the conifers, those of the pines are wind-pollinated. The flowers of all pine trees are of two kinds, both borne on the same tree. We commonly speak of them as flowers, but botanically they are very different from the flowers of the broad-leaf trees.

The seeds of the pines, borne naked on the face of the scales in the cones, are winged, and like the pollen, are wind-scattered. No wonder the pines, so dependent on the winds for their very existence, seem to offer their needles to serve as

strings for the winds to play upon. Perhaps it is the pine's way of saying grace.

The Pines of the South

Although eleven pines are known to occur in the South, some of these are very rare and also very local in their distribution. Two of the most common are the loblolly pine and the short-leaf pine. The long-leaf pine plays so important a part in the landscape throughout certain sections of the South that it deserves a story and a poem by itself. And the white pine, abundant in the South only in the mountains, though occurring scatteringly in parts of the piedmont, is *the* pine of the North. So commandingly noticeable is it there, and at the same time so different from our other pines, that it, too, merits special description.

The White Pine

If Mother Nature patches
The leaves of trees and vines,
I'm sure she does her darning
With the needles of the pines.

They are so long and slender;
And sometimes, in full view,
They have their threads of cobwebs,
And thimbles made of dew.

—WILLIAM H. HAYNE.

If the long-leaf is King of the Pines, the white pine is Queen, for surely both are royal pines. Tall, stately, with massed, lacy-looking foliage of slender, blue-green needles in graceful, airy tassels, the white pine is a very regal Queen of the Forest.

Essentially a northern pine, as the long-leaf is a southern one, in our section the white pine is found chiefly at the higher altitudes. Although it extends as far south as northeastern Georgia, in that state and in South Carolina it is both scarce

and of little importance. In the mountains of North Carolina and Tennessee, and of Virginia and West Virginia, however, it becomes a common and valuable timber tree. In the states of the upper South it also extends eastward for some distance into the piedmont. Farther north the tree extends from Newfoundland to Ontario and westward to Manitoba, then southward into Minnesota, Wisconsin, Michigan, Iowa and Ohio.

Because of its fine, blue-green foliage and slender three to five inch needles in clusters of fives, the white pine is always easily recognized. *It is the only native pine in the East with five needles.* Close observation shows these needles to have two or three distinct whitish lines on the lower surface, which gives them a faint silvery appearance, especially when the tassels are tossed by the wind.

At one time in certain sections of the country white pines formed vast primeval forests. On and on they stretched, for hundreds and hundreds of miles. So endless did these great forests seem that the first settlers thought their supply of timber would be inexhaustible. But they were mistaken—as well as very, very wasteful. In those early days of lush plenty no one thought in terms of conservation.

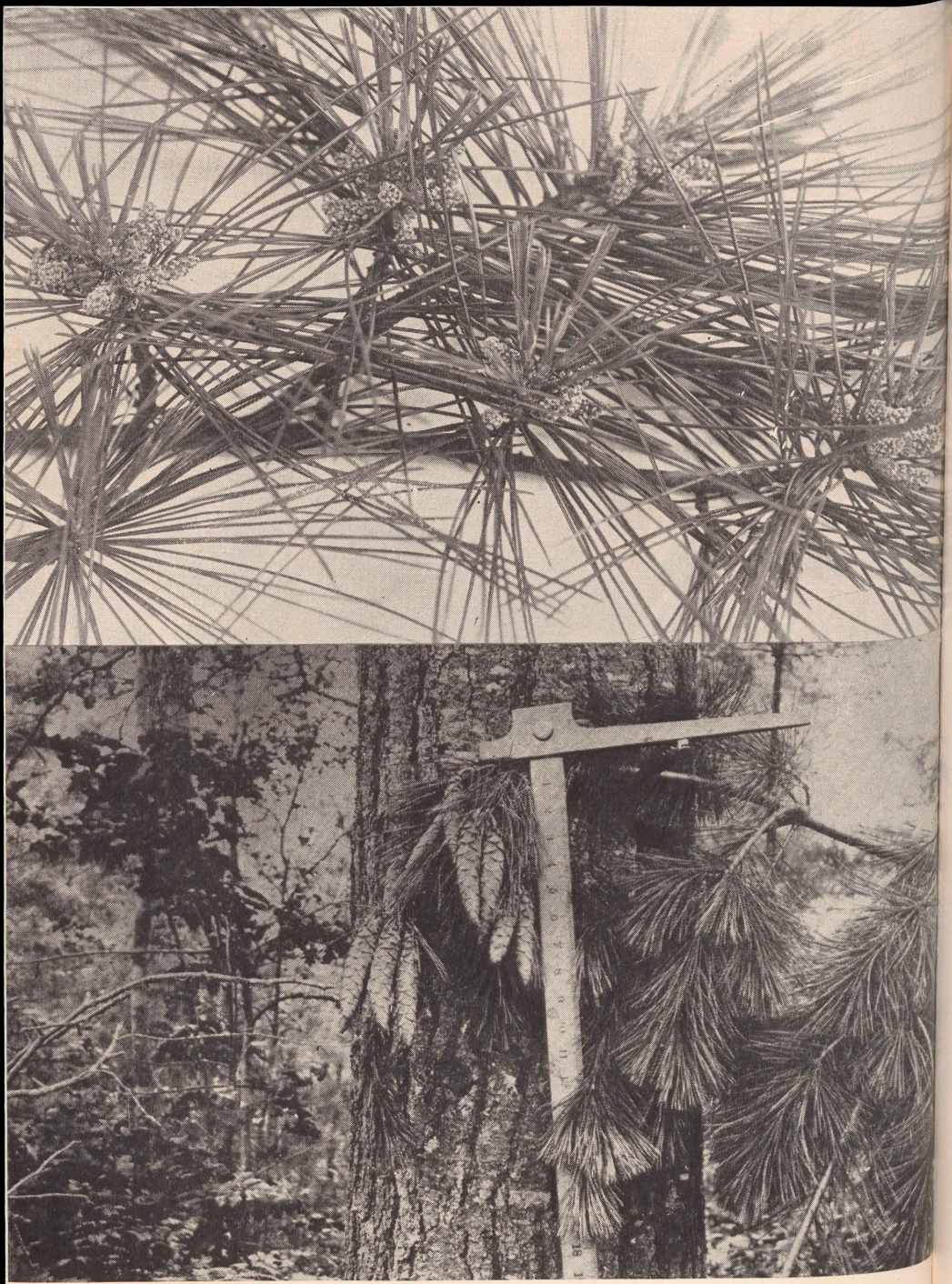
It was the white pine of the Lake States of the North that built the homes of the settlers of the treeless Great Plains, but about the end of the last century the supply began to fail. Today there are no large virgin forests of these pines. Only as individual trees and isolated stands, or as new plantings in reforestation, is the tree found.

In the area where it grows well this pine is one of the most satisfactory of trees for reforestation. If protected from fire, in many sections it spreads naturally from "seed trees"—good, healthy trees which are left standing here and there to scatter their seeds. Until they are established, these precious seedlings are generally protected from wind and sun by the shade of gray birches, aspens, wild cherries or other trees. Of little importance by themselves, such trees have their place in nature's

Courtesy U. S. Forest Service

WHITE PINE (*Pinus strobus* L.)

Grown in the open and branching low, such a tree is beautiful and stately, and also makes a good "seed tree," but it is of little value for lumber.



This is the only eastern pine with needles in bunches of fives. Note their fineness. Male flowers are shown among them in the photograph. Note the slender cones, long curved, and thin-scaled, shown against the trunk. All pine cones take two years to mature. (White Pine.)

plan by taking over abandoned, burnt, or cut-over lands, where they serve as "nurse trees" for seedlings of more valuable trees. Eventually the more valuable trees outgrow and outshade the short-lived nurse trees, which die out after they have served their purpose.

As on all pines, the flowers of the white pine are of two kinds, both on the same tree. The pollen-bearing ones are yellowish and catkin-like, from half an inch to an inch long, and are clustered at the base of the new shoots. The cone-producing ones are single or in twos, small, erect, pink or purplish, and scaly, adding a rich note of color to the tree. These develop into the cones which, to many pine lovers, are the most graceful and attractive of all the cones. Long (four to six inches), slender, slightly curved, with thin, pale brown scales without spines or prickles, they add to the gracefulness of the tree. The small seeds are red-brown, their wing nearly an inch long.

Branches Arranged in Whorls

Like all conifers, the white pine has a main central stem, or trunk, around which the branches are arranged in whorls. Sometimes one of them may seem to have two or even three main stems near the top, but that is because the "leader" has been injured. This "leader" is the very tip of the central stem which leads the growth of the tree upward. Up from the center of the whorl of last year's young branches it stretches, and at its tip are the buds which will produce next year's branches. (Look for them yourself on the next evergreen you see, although they show more distinctly on the white pine.) By counting these whorls—one for each year—you can estimate the age of the tree. In the forest, however, the lower whorls of branches have died and fallen off, and sometimes do not even leave a trace to show where they have been.

On young trees and on the branches the bark of this pine is greenish-red; on old trees it becomes gray, thick, and fur-

rowed with broad, scaly ridges. The wood is light, close-grained, resinous, and easily worked. It is in great demand for construction work, for box boards, matches, and many other products.

"Pine Root" Fences

The roots of this pine are large and strong, but shallow. A hundred or two hundred years ago, in sections of the country where these trees were plentiful, the roots were sometimes used for fences. Many of them are still left in central New York. When the trees were cut or burned, the stumps were uprooted and dragged to some nearby field or pasture line and placed on their sides, one after another. Cattle could not get over or through them; and many a bird and small beastie made its home in their protective shelter. And how picturesque these old root fences were—and are! For apparently they last forever. I have seen many that are a hundred, even two hundred years old, and they are serving their purpose today as well as on the long ago day they were placed there.

Bearded with Moss

We who live in the South are familiar with the so-called Spanish moss, which isn't a moss at all but a flowering plant, related to the pineapple! A different kind of "moss" (which again isn't a moss but a lichen called "usnea") grows on these pines in the cold, damp, dense northern woods as well as on these and other trees in certain sections of our own high mountains.

To the Indians of the North this moss was very important. The mother used it to pack around her little brown papoose when it was fastened to the cradle-board—to be carried on the back of the mother or big sister or, perhaps, hung from the branch of a tree. Soft, clean, fragrant, aseptic, in early days it apparently served the purpose as well as sterilized gauze and cottons and fine soft linens do today.

The Long-leaf Pine

An old darky singin' in de woods of pine,
A-workin' de trees for turpentine,
My luck hit grow wid de Piney Wood,
And while pines grow my luck stays good.
Food in de kitchen and de times ain't hard
When a man works out in God's front yard.

Listen, honey, if you want to farm
Don't let de Piney Wood come to harm.
Dey's always workin' for de farmer hard
Like great big soldier men a-standin' guard.
Keepin' 'way drought, de frost, de bugs,
Oh, happy am de farm de Piney wod hugs.

—WARREN NICKE—Pine Institute of America.

With its tall, tapering trunk branching near the top, and its long needles—the longest of those of any of our pines—the long-leaf is indeed the King of the Southern Pines.

It provides the distinctive feature of certain sections of the southern forests. Generally speaking, it is confined within a belt, rarely more than one hundred and twenty-five miles wide, of gravelly soils and sandhills, which extends irregularly from southeastern Virginia to Florida and westward along the Gulf coast to parts of Louisiana and eastern Texas.

The long-leaf pine is one of the four most important pines of the South. The other three are the loblolly, the short-leaf, and the slash pines. These four have made the South one of the greatest timber-producing regions of the world. About the end of the last century, when the supply of the white pine of the northern and Lake States began to fail, the southern pineries took up the burden of supplying lumber to our rapidly expanding country. And important among these southern pines was the long-leaf.

For some time the South maintained this leadership, and in 1909 it reached its peak year. At that time it was supplying

almost one-half of the lumber cut of the entire country. Since then it has been surpassed by the western regions, but only by a very slight margin.

Masts for Ships

Of course, the long-leaf pine had been of service to the country long before this, but it had not borne as heavy a burden. Early in colonial history this pine, along with the loblolly of the South, and the white of the North, had been supplying masts for ships that sailed the seven seas. The town of Kingstree, South Carolina, is said to have been named for the tall trees taken from that vicinity for masts for the king's navy. A king of the trees for a mast for a king's navy! Surely, this were a better end for a monarch than slow death through turpentining.

Some of our ancestors, looking hopefully to a new land, probably came over on ships equipped with these masts. Pilgrims, with hopes of religious freedom surging in their hearts! Pirates, with skull and cross-bones insignia fluttering from the masts! Slave-ships, their cargoes of manacled humanity weeping for the homes and kin they would see no more!

Besides being used for masts, the wood of this pine, which is hard, tough, and durable, has long been in use for heavy buildings and all kinds of construction purposes. In 1812, after the burning of the White House by the British, some long-leaf pine beams were used in the rebuilding. In 1926—more than a hundred years later, when the roof was being modernized, these beams were removed, and were found to be perfectly preserved.

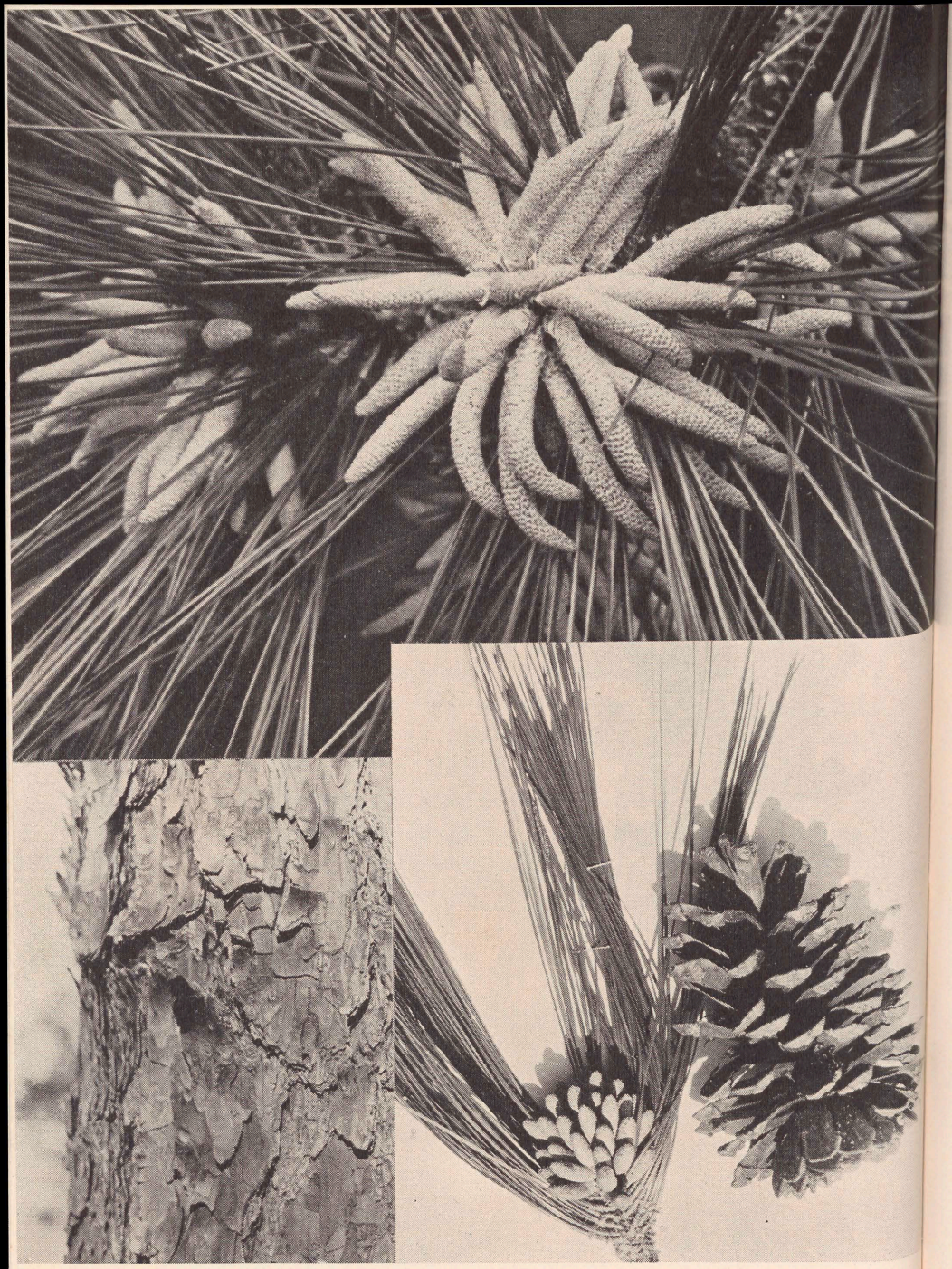
"Naval Stores"

Since the early days of our colonies the long-leaf pine has been the chief source of our naval stores. By this term is meant all the products of the resin of coniferous trees—turpentine, tar, pitch, rosin. For a long time this pine furnished a large part

Courtesy John G. Hemmer

LONG-LEAF PINE (*Pinus palustris* Mill.)

On the Pinehurst, North Carolina, golf links. In the background are turkey oaks and black jack oaks. This pine is king of the southern pines.



Loveliest and most colorful of all pine flowers are the lavender ones of this pine. Leaves are three in a bundle and from ten to fifteen inches long. They give a feather-duster appearance to the branches. Cones six to eight inches long are largest of any of our pines. (Long-leaf Pine.)

of these supplies not only for our own navy, but for the navies of the world. The earliest mention is in an old manuscript of colonial records, dated 1610, giving instructions about the products that were to be sent to England from Virginia.

"Pyne trees, or ffirre trees, are to be wounded within a yard of the grounds, or boare a hoal with an ager the third pte into the tree, and lett yt runne into annye thinge that may receyve the same.... When the tree beginnith to runne softelye yt is to be stopped agayne for preservinge the tree."

Unfortunately, later generations thought less and less of "preservinge the tree." In this new land, where resources have seemed limitless, conservation has remained undreamed of until far too late. As a whole, the South has made little attempt to turpentine its pineries as economically as is possible, although in certain sections some improved methods have been adopted.

On a recent trip into the Deep South in Alabama, northern Florida, and Georgia we traveled through many, many miles of long-leaf pine forests that were being turpentined. Everywhere, at least in the region we visited, the old, destructive methods seemed to be in use, and all about were dead and dying trees. And dead trees and underbrush not only mean loss in themselves, but also add greatly to the fire hazard. By contrast, France turpentines her pines using the best conservation methods, and her trees live on and on.

Fire—"The Red Terror of the Forests"

Besides excessive lumbering and wasteful methods of turpentining, there are other causes for the decline of the long-leaf pine. Yet the tree is so prolific and hardy that "It would provide its own second growth if given a chance." So claims Dr. J. V. Hofmann, Head of the Department of Forestry, of North Carolina State College, at Raleigh.

Much of the long-leaf pine territory is burned over almost

every year by forest fires that kill many of the small trees and their seed, and stunt the growth of others. There is little excuse for these fires, as most of them are man-started. Fortunately the long-leaf pine is exceedingly fire-resistant and can take a lot of punishment. If the bud at the top of the leader of each young tree, which extends the growth, is not injured, the tree has a chance to live. The crown of long green needles is quite a protection to the bud.

Hogs, especially the razorback of yesteryear, have also played their part in retarding the growth of these trees. Indeed, the hog is the vandal of the pine forest. The long, fleshy root of this pine is a juicy, succulent morsel which apparently any hog would "root, hog, or die" for. So greedy is the razorback for this dainty tidbit that to get it he will uproot most of the seedlings within his range. It is this same long taproot which makes the tree very difficult to transplant.

Several of the earlier years of the long-leaf pine are spent in establishing the long, strong taproot. In the seedling the root grows even more rapidly than the stem; long before it begins to show above, it has been growing underground.

"Green Fountains of the Forest"

To the stranger traveling southern highways, one of the first unfamiliar, but interesting sights is the graceful plume of these young long-leaf pinelings. Like "green fountains of the forest" they bubble up out of the ground until the stranger must think he is in a fairyland of green geysers, or in some garden of woodland gods. The single upright stem with its long, dark shining leaves forms a handsome plume of sparkling green.

Unfortunately, this is another case where beauty is its own undoing. These graceful, fountain-like tips are in great demand for decorations, especially during the holidays. Ruthlessly are they cut and either sold locally or shipped north or west for Christmas greens or other decorations. The little green foun-

tain of the forest, taken away from its cool woodland retreat and placed in some hot, dry house, may last perhaps a week or two. And out in the forest from which it came it had already spent some five or more years a-growing.

It is the leaves of this pine which are its most distinctive feature, and which give the tree its common name. They are in clusters of three and are from ten to fifteen inches long. (There is a weeping variety with leaves much longer.) Gathered at the ends of the twigs, they have a sort of feather-duster appearance. Another distinctive feature, especially in winter, is the winter buds, covered as it were by a network of silvery scales.

The deep lavender-rose flowers, the most beautiful of all the conifer flowers, appear in early spring before the new leaves. The pollen-bearing flowers are in prominent, dense short clusters, or rosettes; the cone-producing ones in small, conspicuous groups. The slightly curved cones are from six to ten inches long, with thick scales armed with small curved prickles. Soon after the seeds ripen they fall, leaving their bases attached to the twigs. Only at intervals of several years, however, are long-leaf pine cones abundant.

"Candles of the Pines"

In the spring the "candles" of all pines, especially of the long-leaf, are particularly beautiful and interesting. These new shoots, at first slender and upright like tiny tapers, gradually bristle forth with small green points that grow and lengthen until they become full grown clusters of needles. These "candles of the pines," the new growth, give a soft, greener, velvety look to the tips of the branches and add to the ethereal beauty of the tree.

The Loblolly, Short-leaf, Slash, and Other Pines of the South

Softer than silence, softer than still air,
Float down from high pine boughs the slender leaves.
That comes like snowfall, tireless, tranquil, fair.
Gently they glide, gently they clothe the bare old rocks with grace.

—COL. T. W. HIGGINSON.

Though they may fall silently, the needles of the pines are far from silent when they are on the trees. The poet spoke truly when he said "the sough of the pines with a spell of its own is fraught."

Few of us there are who do not love the music of the pines. Everyone is familiar with the phrase "the murmuring pines and the hemlocks"; and those of us who are fortunate enough to be country or small town dwellers know this music at first hand.

Close by our sleeping porch are three large pines, with several more but a few yards away. Often we are lulled to sleep by the wind blowing through these great "Aeolian harps of Nature" as Mrs. Comstock calls them. For the needles of the pines do act like the strings of an Aeolian harp. The wind, passing through the trees, sets them into vibration, making a sighing sound which nature lovers like to think of as the muted voice of the tree. Nor are the songs of the pines all alike. To the tree lover with a keen ear for music each pine has its own tones, and each whispers softly a different song.

Outside of the long-leaf pine areas, the most familiar pines of the South are generally the loblolly and the short-leaf. A southern pine, the loblolly ranges as far north as Cape May, New Jersey. It is the common pine of the coastal plain from there to eastern Texas.

This is the "old field pine" of these regions, as the short-leaf is of the regions just beyond, in the eastern piedmont, and

Courtesy U. S. Forest Service

LOBLOLLY PINE (*Pinus taeda* L.)

A loblolly in North Carolina. This is one of the South's most important pine trees and is abundant in the coastal plain and eastern piedmont.

Young loblolly, showing staminate or pollen-bearing flowers. Note new growth at the top. This is the new "leader." Leaves are in bundles of threes; cones rather large; bark dark reddish-brown and deeply furrowed; needles are from six to nine inches long, shorter only than long-leaf's. (Loblolly Pine.)

the Virginia, or scrub, pine is of the regions still farther westward. Its abundant seeds clothe abandoned fields rapidly, particularly in light sandy soils where the water table is close to the surface. The tree is also frequently found in clumps along the borders of swamps, and scattered through the swamp hardwood forests.

The loblolly is a fine tree of eighty to one hundred feet in height with a tall, straight trunk, usually two feet in diameter, but occasionally more. It has short, many-branched, horizontal limbs. The largest pine measured in the South belongs to this species.

Dark reddish-brown in color and deeply furrowed, the bark often attains a thickness of nearly two inches on large-sized trees. The resinous wood is coarse-grained, with a marked contrast between the bands of spring and summer wood. It is rather variable, but averages about the same in weight and hardness as the short-leaf lumber. Both are frequently sold under the name "North Carolina pine."

The needles, six to nine inches long (next to those of the long-leaf in length), are borne in clusters of threes, and in the spring the bright green clumps of them at the ends of the branches give a luxuriant appearance to the tree that aids in its identification.

The pollen-bearing flowers are crowded on short spikes; the cone-producing ones, either solitary or in twos or threes, are just below the tips of the new shoots. The cones, from three to five inches long, are borne often three in a cluster. The tree bears abundantly, and in the spring the bright green cones of the previous year add greatly to the attractiveness of the loblolly.

In fact, this loblolly pine has many admirable qualities. It grows rapidly, reforests abandoned lands, is rich in resin, and bears abundantly every year—which some pines fail to do. Its seeds and seedlings are also strong and sturdy.

The Short-leaf Pine

A valuable timber pine that fruits when very young is the short-leaf, also known as the rosemary, or the yellow, pine. It is the characteristic pine of the middle district, and is widely distributed throughout the South.

Next to the long-leaf pine of the South, and the white pine of the North, it is, perhaps, the most important lumber pine of the East. Though its wood is slightly inferior to that of the two former pines, because of the tree's vigor and wider range—southeastern New York to northern Florida and west to Texas—it may in time surpass the others in importance. In its area, this tree is also known as the "old field pine," and often forms pure forests.

At maturity the short-leaf pine has a tall, straight trunk and an oval crown. It reaches a height of one hundred feet, sometimes more, and has a trunk diameter of from two to four feet. The bark is brownish-red, broken into small rectangular scales. It is thinner and lighter colored than that of the loblolly.

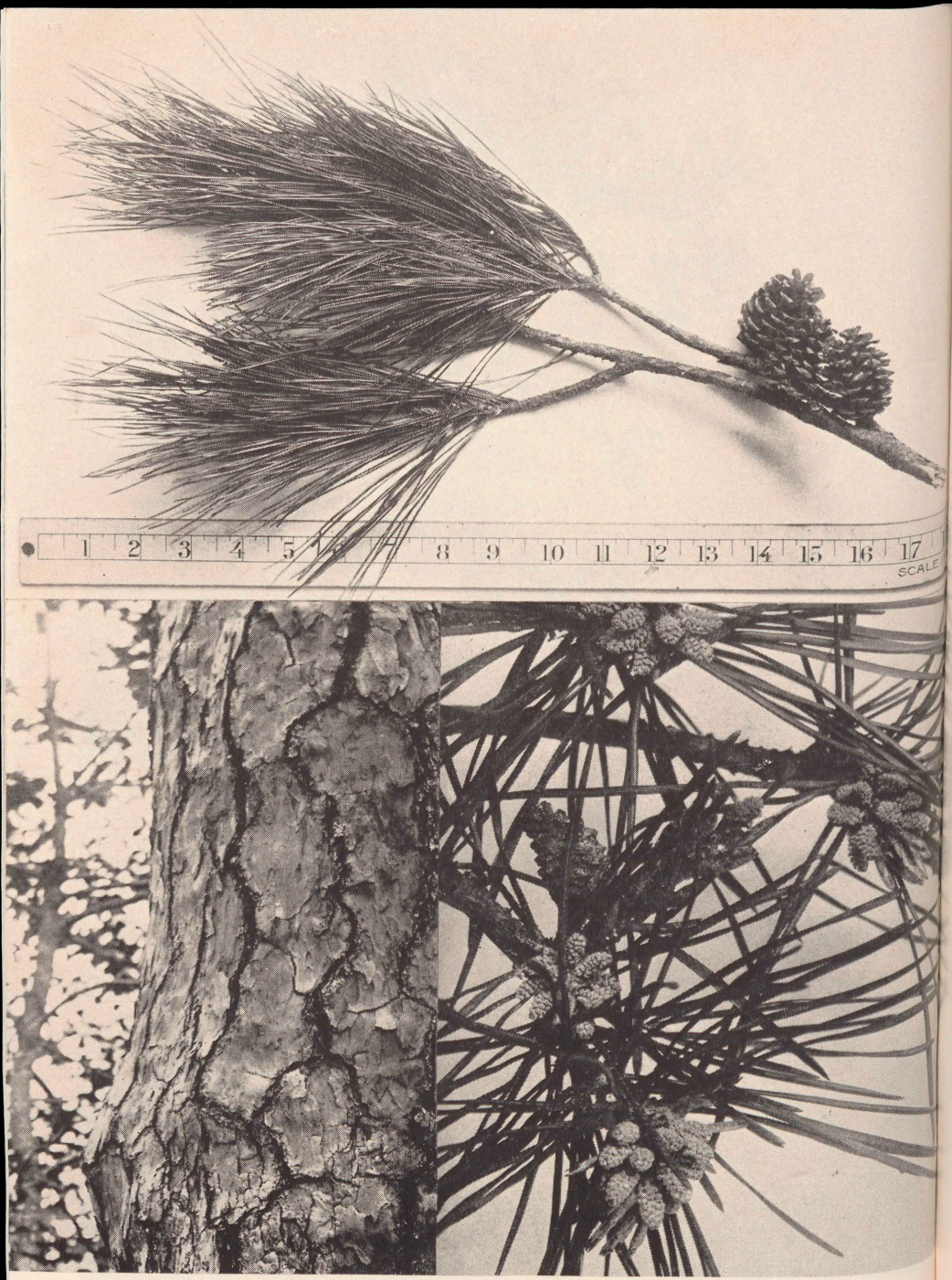
In old trees the wood is rather heavy and hard, fine-grained, and is less resinous than that of the other important southern pines. Its color is yellow-brown or orange. It is used for general construction, interior and exterior finishing, veneers, cooperage, and other purposes.

The leaves of this pine are in clusters of twos, rarely threes or fours, and are from three to five inches long. They are slender, flexible, and dark blue-green. The cones, which are very abundant, are among the smallest of those of our southern pines. They are but one and one-half to two and one-half inches long, oblong, with small prickles, and generally clustered. They often remain on the twigs for three or four years. The small, mottled seeds have a wing which is broadest near the center.

Courtesy U. S. Forest Service

SHORT-LEAF PINE (*Pinus echinata* Mill.)

A short-leaf growing in Georgia. This is the "old field pine" of the eastern piedmont.



Leaves from three to five inches long, borne in clusters of twos (rarely of threes or fours); cones very small (about two inches long or less); bark reddish-brown, broken into small rectangular scales, thinner and lighter colored than that of the loblolly. (Short-leaf Pine.)

The Slash Pine

A tall tree, almost the size of the long-leaf pine when mature, is the slash pine which grows in certain areas south of Charleston. It is found on the sea islands and inland in some sections, then south into Georgia and on to the Everglades, and also along the Gulf Coast to Louisiana.

This lesser-known pine seems to have the possibilities of an important future. Though it is less fire resistant, it yields a much larger percentage of turpentine than even the long-leaf. Its heavy, exceedingly hard, and very strong wood is used for construction, for cross-ties, and for pulp wood.

The tree's advantages are many. It does well in reforestation; it can be turpentined in fifteen to twenty years, cut for pulp wood in thirty years, and for lumber in fifty years. According to Dr. Charles H. Herty,* it can be used for pulp wood much sooner than that. He has experimented with cutting young trees under twenty-five years, *before* the heartwood begins to form. The ground wood is then lighter in color than ground wood from spruce. Also, there is, he claims, no more resin in it than in the Canadian spruce from which so much of our pulp wood comes.

Though the slash pine's natural range is not north of South Carolina, it is being used in many experimental plantings, especially in a number of localities of North Carolina. This is being done largely by the State Department of Conservation and Development, and by the forestry schools. As far as can be told at present, these experimental plantings have been successful.

Slash pine has purple-brown bark which peels off in thin, almost papery layers which are very characteristic of the tree. Its needles are shorter and glossier than those of the Long-leaf, and are usually in clusters of twos, though sometimes of threes.

* Late founder and Director of the Pulp and Paper Laboratory, Savannah, Georgia.

They are variable in length, from four to ten inches. The cones are on stalks three-quarters of an inch to an inch long, and are themselves from two and a half to five inches in length. At maturity they are a handsome reddish-brown with a glossy lustre as though they had been varnished.

The Jersey, or Scrub, Pine

A small, low, twisted tree with dark "discouraged looking branches" is the scrub pine, also known as Jersey pine, spruce pine, and possum pine. This is the "old field pine" of the dry hills, bluffs, and old fields of the western piedmont and lower mountains. Although its range is from southeastern New York to northern Alabama and west to Indiana, it is rare in the coastal plain from Virginia to Georgia.

Perhaps the chief merit of this tree is that it propagates quickly, and is persistent in covering eroded, gullied, or abandoned fields with new forest growth. Somehow or other it manages to wrest a half-starved living from the most meager soil.

A scrub pine is usually not more than thirty or forty feet high, with a short trunk and a wide-spreading crown. Even after dying, the side branches persist for many years, giving a scrubby, ragged appearance to the tree which is responsible for its common name.

This pine is readily distinguished by its short, twisted, grayish-green leaves, and by its numerous cones. The leaves are two in a bundle and from one and one-half to three inches long. The small, oval cones are reddish and about one and one-half to two inches long. They are covered with small, spiny-tipped scales and contain small winged seeds.

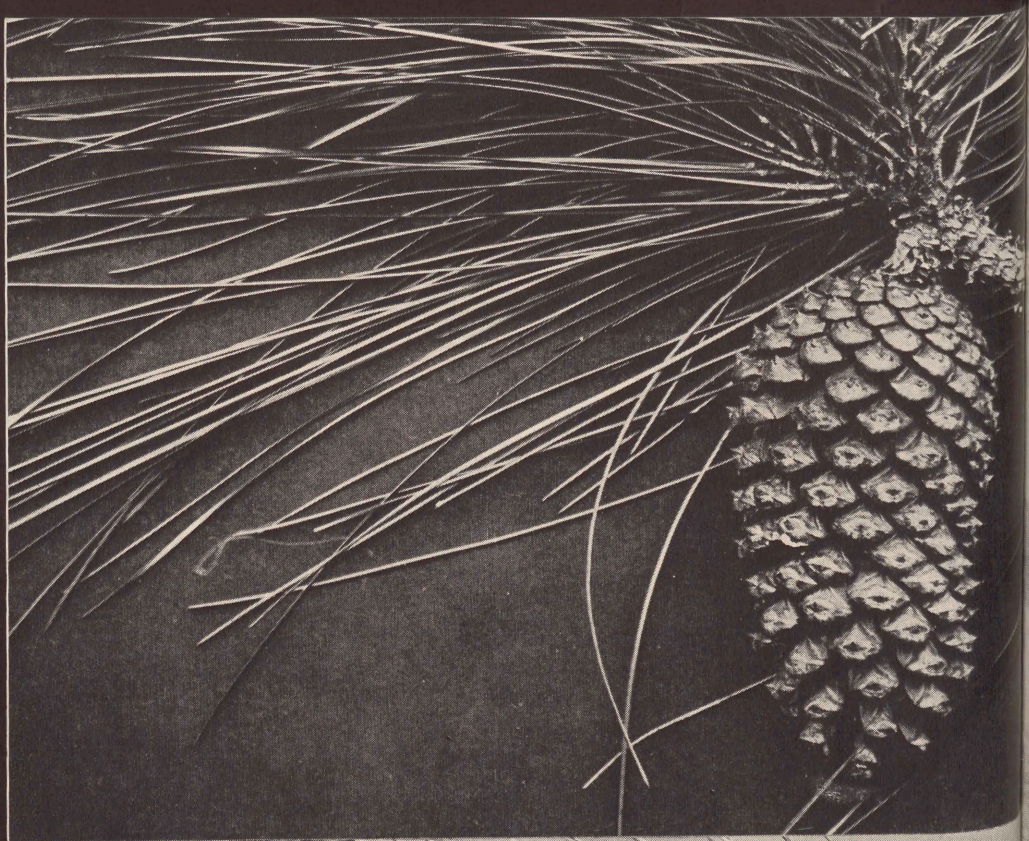
As with all pines, these cones take two years to mature. A crop is produced each year, and as the old, open cones remain on the branches for several years, the tree appears full of them.

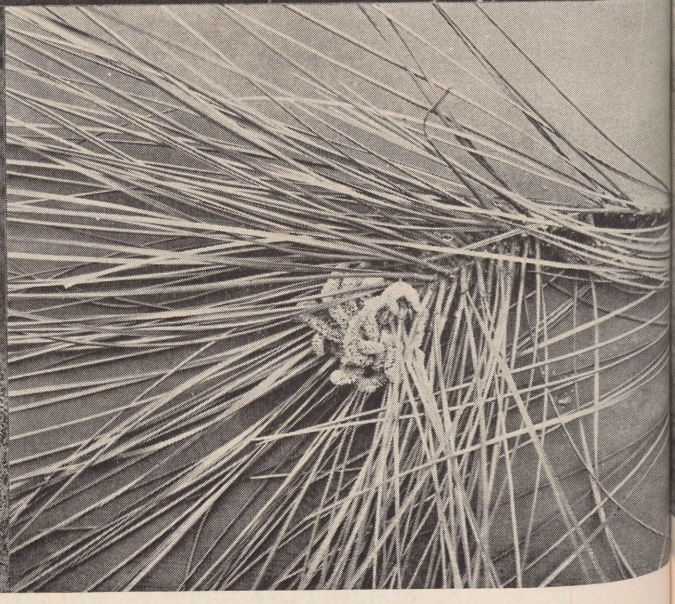
Thin and reddish-brown, the bark of the trunk breaks into

By S. A. Grimes

SLASH PINE (*Pinus Elliottii* Engelm.)

The slash pine is becoming important to the South as a reforestation tree and as a new source of pulp wood. It also yields a higher percentage of turpentine than the long-leaf pine.



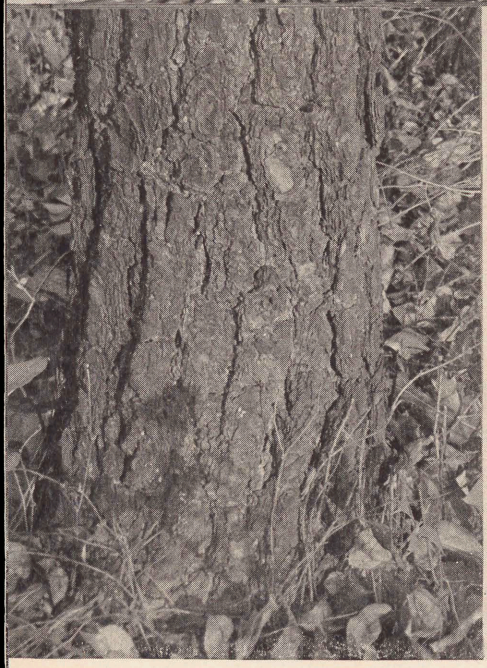


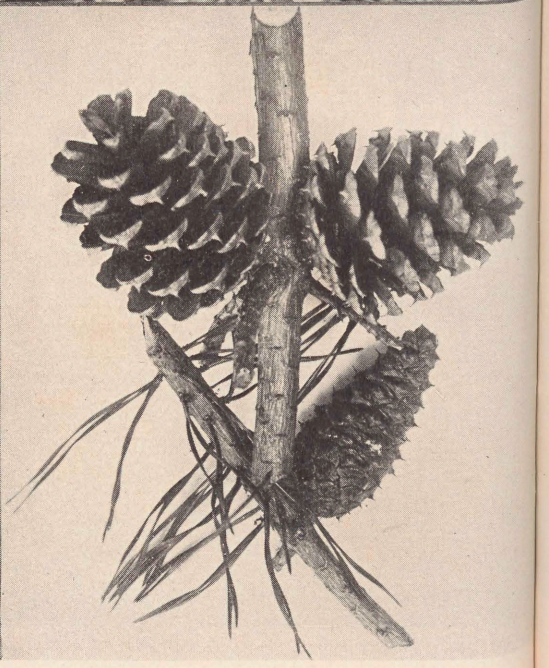
Leaves mostly in bundles of twos, sometimes threes, and are from four to ten inches long; cones reddish-brown with a varnished appearance; scales of cones have small sharp prickles; bark purple-brown, peeling off in thin, almost papery layers. (Slash Pine.)

By L. W. Brownell

JERSEY, OR SCRUB, PINE (*Pinus virginiana* Mill.)

Also familiarly known as Virginia, or New Jersey, pine. Though called a scrub, and "discouraged" looking, it often serves by clothing worthless lands.





Short, gray-green leaves are in bundles of twos; cones small, dark, slightly curved, and armored with sharp prickles; bark thin, reddish-brown, and broken into very shallow plates; new growth or "candles of the pines" show above the pollen-bearing flowers. (Jersey, or Scrub, Pine.)

shallow plates, so shallow as to give a somewhat smooth appearance to the bark. Because of the persistence of the side branches (except in a few large trees) the wood is very knotty.

The Jersey pine's chief value is in clothing abandoned fields, saving the soil and preventing erosion; and in furnishing paper pulp and fuel.

The Pond, or Pocosin, Pine

Common in the coastal plain throughout most of the South is the pond pine, also known as pocosin pine, marsh pine, pitch pine, and bay pine. It is found in small swamps, on low wet flats, and on undrained, peaty soils from southeastern Virginia to the St. Johns River, Florida.

In North Carolina it sometimes occurs as far inland as the eastern edge of the piedmont; in pine flats it occasionally appears in company with the long-leaf pine. It resembles somewhat the loblolly, but can be distinguished from them by the broader and shorter cones, and by being generally found on wet or very sour land.

A fairly good-sized tree, it averages from forty to seventy feet in height, and from one to two feet in trunk diameter. Occasionally it reaches eighty feet and a trunk of three feet. The bark is dark red-brown, irregularly divided by shallow fissures. The orange-colored wood is heavy, resinous, often coarse-grained, with pale, yellowish sapwood. The Pond Pine supplies some turpentine and some lumber, but it is not an important timber tree. It is also one of the few pines which sprout from the stumps after being cut or killed back by fire.

The slender, dark yellow-green needles are from six to eight inches long, and in clusters of three, rarely four. They remain on the tree until the third or fourth year. The dark orange pollen-bearing flowers are in crowded spikes; the cone-producing ones are clustered, or in pairs, on the stout stems.

The solid, sturdy, broad top-shaped cones are covered with

small, weak prickles. They are from two to two and one-half inches long, and about the same width when opened. As with all pines, they require two years to mature, but, unlike the others, these usually remain closed for several years. They persist on the branches sometimes for as many as twelve years. Yet all that time the seeds in the closed cones contain their vitality, and if planted will usually grow. This is very rare in pines.

The Pitch, Black, or Torch, Pine

A good pine from which to get "pine knots" for midnight coon hunts is the pitch, or torch, pine. The pitch pines are so named because they are rich in resin, especially around the knots.

This small, picturesque, and often grotesque pine ranges from New Brunswick, Canada, southward to Georgia. In the South it grows on dry ridges and slopes, and in cold swamps and bottoms in the mountains and neighboring hills. Sometimes it is found scattered, again in small groups with hardwoods and other pines. Often it is seen with the short-leaf pine, but can be told from it by its longer, dark yellowish-green leaves and longer, light brown cones.

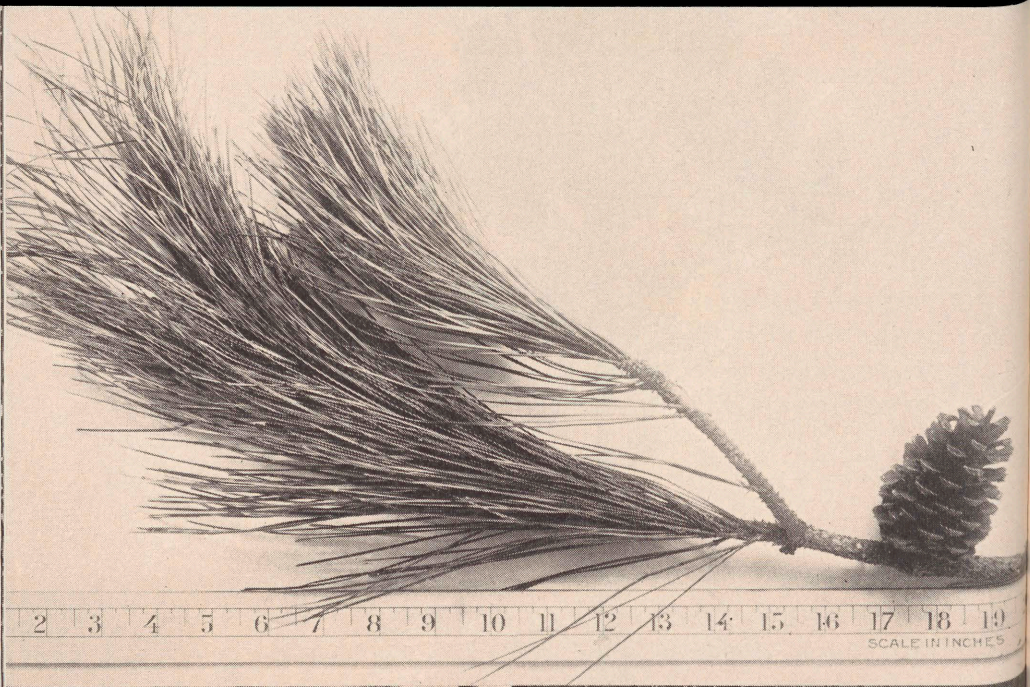
These leaves, or needles, are in clusters of threes, and are from three to five inches long. They stand stiffly at right angles to the twig. The cones are one to three inches long and light brown in color. They often remain on the branches for several years.

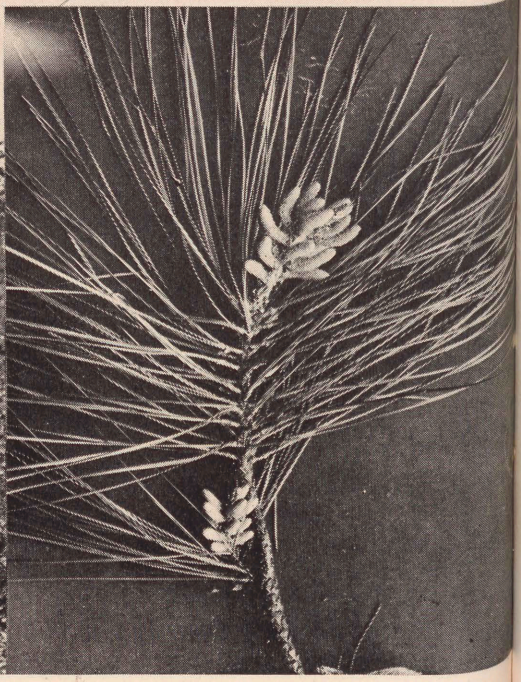
The dark gray or reddish-brown bark of the trunk is rough and scaly, and the trunk itself is often crooked. The wood is light, soft and brittle, and is used mainly for fuel. Like the other pitch pine, this one will sprout from the base of the stump if burned or cut back.

Courtesy U. S. Forest Service

POND, OR POCOSIN, PINE (*Pinus serotina* Michx.)

This tree, also known as marsh pine, is common in swamps and wet lands in the coastal plain of the South.





Leaves dark yellow-green, six to eight inches long, in clusters of threes, rarely fours; broad, short cones persist on the branches, sometimes for as long as twelve years. Note clusters of staminate flowers. At left above, pines in an open stand of bog shrubs in a "pocosin." (Pond, or Pocosin, Pine.)

Table Mountain Pine

The table mountain pine is a small or medium-sized tree of irregular growth. It grows on rather poor soil in the mountains and on gravelly ridges east of them, from Virginia to Georgia.

The leaves are two in a cluster, one and one-half to three and one-half inches long. The heavy cones often hang in clusters of threes, and are characterized by broad, strong spines with bent tips. Some of them may open the first year; others may remain closed for several years.

Because of its toughness this pine is often commonly called hickory pine. The branches can be tied into knots and are practically unbreakable. However, the thin bark, which breaks into loose, scaly plates, may also have something to do with the name of hickory pine.

The Firs (*Abies*)

Fir trees—and spruce—were made for winter time.
When quiet snowflakes start down from the clouds
They do not cling to bare and whimpering branch
Of oak or elm or ash. Instead
They vie among themselves to decorate
In fleecy mats the warm brave evergreens.
Then too you've heard of Christmas trees?
Fir trees, and spruce, were made for winter time.

—JOHN C. FROLICHER, in *American Forests.*

Christmas trees! All over the land, and in many places beyond the seas, they bear colorful blossoms in the dead of winter. Fir, spruce, and hemlock, cedar, and pine—somewhere, every type of evergreen is being used.

When I was a child our Christmas tree was usually a hemlock or a pine, the most common of the evergreens of that particular section. A friend gave us the privilege of going to his woodlot

and choosing and cutting our own tree and greens for decorating. How proudly we bore them home, singing carols and playing we were children of medieval times bringing home the yule-log! No "merry-men" ever went forth to the wood "to gather in the mistletoe" more joyously than we did to gather our "Christmas greens." The child who has never gone to the woods to choose and cut his own tree has missed much.

Most of the Christmas trees that are shipped commercially throughout the country are firs and spruces. When local trees are used they are generally the evergreens that are most common in that particular section.

In 1934 two large fir trees from the high mountains of Avery County, western North Carolina, were sent to Washington, to serve as out-door living Christmas trees for the White House grounds. They were planted one on each side of the walk leading to the mansion. The use of such living Christmas trees is gaining in popularity each year; but few people are willing to admit that these trees can quite take the place of the indoor ones.

The First Christmas Tree

There are several legends about the first Christmas tree. One is that Martin Luther, while passing through the forest on a Christmas Eve, noticed a tall evergreen, over which the stars, shining down brightly on that clear, cold night, seemed to be very close and glowing on the very tips of the tree's branches. It was a beautiful and awe-inspiring sight, and in Luther's heart was born the idea of taking an evergreen into the house and decorating it with lighted candles—a Christmas tree for his children.

In England there is a tradition that the first Christmas tree in that country was brought in and decorated for the Princess Mary, the daughter of King Henry VIII and his first wife, Catherine of Aragon. I'm sure we would all rather think of her as a little princess awed and delighted with the fairy-like

spectacle of a lighted tree than as the Bloody Mary of the troubled reign of her later years.

Every so often there is an agitation to discourage the use of Christmas trees. Foresters, however, do not approve of this movement. The number of trees used for the purpose has no effect on the general forest situation. Often, too, these trees are a source of income to their owners. In some sections of the country Christmas trees are raised as a crop. What should be discouraged, or forbidden, is people going and helping themselves to someone else's property without either obtaining permission or paying for the privilege.

To knows the firs, look for an evergreen with upright cones. Those of the pines, the spruces and the hemlocks hang downwards—sometimes those of the hemlocks extend outwards—but the cones of the firs are held aloft. Perhaps the woodland fairies, knowing that some day the firs, of all the evergreens, would be the chosen ones for Christmas trees, whispered to them to practice holding aloft their cones—as one day they would hold lighted candles.

Fraser's Fir—The Fir of the Southern Mountains

In the South, unless we live in the high mountains, it is at Christmas time that we shall be most likely to see a fir. It may be one of our own southern Fraser's firs shipped down from our own mountains, or it may be a northern balsam fir from far-away Maine.

However, these fir trees probably will not have cones upon them, so we'll just have to get our information from books or climb our high mountains to see them. The cones of the Fraser's fir are one and one-half to two and one-half inches long, and mature the first year. But, here is a queer thing about them—and about those of all the firs. The cones do not fall off the tree; instead, the scales fall off, leaving the bare axis of the cone sticking straight up.

"F for fir and flat; s for spruce and square." That is how the ranger-naturalists in our national parks explain the differences between the leaves of the fir and the spruce. For the leaf, or needle, of the fir is flat; that of the spruce is four-sided, or practically square.

The leaves, or needles, of the Fraser's fir are fragrant, narrow, and blunt. They are whitish below, at least when young. They resemble somewhat the needles of the hemlocks, but in falling they leave small circular scars, and so the twig is smooth, instead of rough, as is the hemlock twig. It is because the firs hold their needles much longer than do the hemlocks and the spruces that they make much more desirable Christmas trees.

The needles of the firs, as well as those of the hemlocks and the spruces, are single, not in clusters like those of the pines.* The flowers are of two kinds, the pollen-bearing ones yellowish-red and the seed-producing ones cone-shaped and yellowish-green.

Our Fraser's fir, commonly known as balsam, or she-balsam, is seldom more than thirty to forty feet high, though on rare occasions it reaches seventy feet. Its trunk diameter sometimes reaches two feet. The bark of the trunk is covered with thin, bright cinnamon-red scales which become grayish on old trees. The coarse-grained wood is light and soft, with little strength. It is occasionally used for lumber, and is now being unfortunately butchered for paper. This is the true balsam of the highest mountains of the Appalachians and from southwestern Virginia to western North Carolina and eastern Tennessee.

Fragrance of the Firs

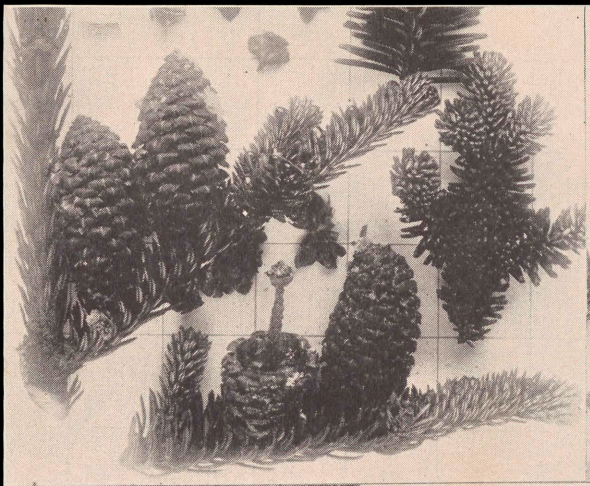
Balsam firs, both our own and the more northern form, get their common name from the fragrant, sticky resin and from the clean, pungent odor of balsam that comes from the bleeding stub. So characteristic of the trees is the resin that appears in

* There is in the western part of the United States a one-leaved pinon pine.

By J. Horace McFarland

FRASER'S FIR (*Abies Fraseri* Poir.)

In the South this fir is limited to the high mountains of Virginia, North Carolina, and Tennessee.



Leaves flat (remember "F" for fir and flat) and after falling leave the surface of twig smooth; bark marked by "blisters" filled with resin. Note cones erect on branch. Shown are leaves and bark of balsam fir, the northern fir which grows in our mountains, but is rare in the South.

blisters on the bark itself that the Indians called the northern balsam *Cho-koh-tung,* or *Blisters.*

It is the boughs of the balsam firs that are used by hunters, trappers, fishermen, and campers for beds. Because of their elasticity they make comfortable beds, and the fragrant odor is very refreshing and soothing. At the camp on the top of Mount Le Conte, in the Great Smoky Mountains National Park, which we climbed a few summers ago, the campers' beds had always been made of balsam boughs. But now that the government has taken over these mountains for a national park, the cutting of balsam boughs for this purpose is forbidden. Of course, believing in conservation, we thoroughly approved, but—oh, we did wish that just once we might have slept on a balsam bough bed!

The Canada balsam, also called balsam fir, and just balsam, is very rare in the South, being found only in the high mountains of Virginia. It is the common balsam of the Far North and Canada and furnishes the Canada balsam of commerce.

The Spruces (*Picea*)

God planted spruce trees on a hill
When evening gathered blue and still.

He placed them dark against the rise
With strong arms lifted to the skies,
And flung a cloak of dusky green
About their shoulders grave, serene—
Then gave them rhythmic voice to sing
Strange songs in muted whispering.

At night when starlight pricks the sky,
The spruce trees sing a lullaby.

—TRAVIS TUCK JORDAN.

The common spruce of the South is the red spruce, which ranges throughout much of Canada and New England and in

the higher mountains of the Alleghenies extends as far south as Georgia. Locally it is sometimes called "he-balsam" to distinguish it from the balsam fir, which is locally called "she-balsam." It is the "blisters" of liquid resin found on the bark of the Fraser's fir which accounts for the name, "she-balsam." In contrast, the spruces do not have this liquid resin, and so our red spruce is known as "he-balsam," even though it is not a true balsam. However, in our high mountains, the two trees are often found growing together.

Like many of the conifers the red spruce has a tall, tapering trunk. The needle-like leaves are much shorter than those of the pines, and are placed singly upon the branches, as are those of the firs and the hemlocks. They are linear, four-sided, about one-half inch long, and are sharp-pointed, dark yellow-green and shining. (Try rolling one of these leaves between your fingers. If it rolls, it's a spruce. Remember, S for square and spruce!) Growing from all sides of the twigs, these needles curve upwards and are borne on stout little stalks or projections that are left on the twig when they fall. The bare twigs covered with these low projections are rough to the touch and sight, and the trees are thus easily recognized.

The flowers are of two kinds on the same tree. The oblong cones, from one to two inches long, mature in one year and fall during the first winter. The red spruce is true to its name throughout the year. The wood is reddish—giving the tree its common name—the slender downy twigs also have a reddish coat during their first winter, and there is a hint of red in the brownish bark. Even the flowers are a rich purplish-red and the cones are a glossy reddish-brown.

A medium-sized to large tree, narrowly conical in outline, the red spruce commonly reaches a height of sixty to eighty feet, occasionally even a hundred, and a trunk diameter of one to two, or even three feet. The branches are drooping and the lower ones are very persistent even when the trees are growing in the dense forest.

Courtesy U. S. Forest Service

RED SPRUCE (*Picea rubens* Sargent)
A bit of "Canada in the South" in Pisgah National Forest, North Carolina.

Leaves short, more or less four-sided (remember "S" for spruce and square), borne on stout little stalks which remain on the twig when the leaf falls, making it rough to the touch; cones somewhat oval. Note the two kinds of flowers in photograph at upper left. (Red Spruce.)

The light, soft wood is close-grained and is largely used for lumber, but some of it is selected for more particular purposes. Perhaps the spirit of the tree—if trees could have spirits—that must hate the woodmen's axe, would be happier if it could know that its wood might be used for sounding boards of musical instruments. For the soft but strong and elastic wood of the red spruce is peculiarly adapted for that purpose.

The black spruce, which is a common tree in Canada, forming great forests in parts of the Far North, is found in a few locations in Virginia and has been reported in North Carolina, but that report has not been fully verified. The cones of this spruce are smaller than those of the red spruce and they hang on much longer.

The Hemlocks (*Tsuga*)

O hemlock tree! O hemlock tree! how faithful are thy branches!
Green not alone in summer time,
But in the winter's frost and rime!
O hemlock tree! O hemlock tree! how faithful are thy branches!
—HENRY WADSWORTH LONGFELLOW, *from the German by* HEINE.

A tree that takes its scientific name from the Japanese is the hemlock. For a hemlock also grows in Japan, where it is known as Tsuga (pronounced Seu-ga). Our own eastern hemlock is known botanically as *Tsuga canadensis.*

Magnificent is this tree, and loved by man, bird, and beast. Because of its dense, evergreen foliage and its slender, drooping branches which often sweep the ground on younger specimens, it offers a safe and snug harbor for many a bird or small beastie. In winter many of the seed-eating birds which remain, and some of those which come down from the Far North, feed on the seeds of the dainty brown cones. Red squirrels find in the trees a haven of refuge and food supply and can almost always be found frisking about, or ferociously scolding at an intruder in their vicinity.

Tall, graceful, pyramidal, this eastern hemlock, often known as Canadian hemlock, ranges from Nova Scotia to Minnesota and south to Delaware and Maryland. And then along the Appalachian Mountains it extends still farther southward, to northern Alabama and Georgia. Its preferred habitat is rocky uplands, near streams.

Like so many of our trees, the hemlocks reach their greatest size on the slopes of the mountains of North Carolina and Tennessee. There they have a height of from sixty to one hundred or more feet and a trunk diameter of two to four feet. Occasionally they are even larger, as were some I saw in Cades Cove, in the Great Smoky Mountains National Park.

Roughened Branchlets

Hemlock leaves are very characteristic and thus aid in the identification of the tree. They are evergreen and remain on the tree until well into the third year. When they do fall, the persistent leaf bases which remain give a roughness to the branchlets. Although the spruces have a somewhat similar roughness, the branchlets of the hemlock are much the finer and more graceful of the two. Firs, which the novice might confuse with the hemlock, have smooth branchlets. Another simple way to distinguish between the two, even at a distance, is that the very top shoot or "leader" of the hemlock always droops, while that of the fir stands up straight and stiff.

The leaves, flat and short, about a half inch in length, have the appearance of being arranged in double rows along each side of the twig. Usually they are blunt at the tip; only rarely are they notched. On the upper surface they are dark glossy green; on the lower, they are distinctly marked by two parallel whitish lines. Seen from above, or from a distance, a grove of hemlocks may appear dark and gloomy, but seen from below, these white markings give the whole foliage mass an effect of lightness and silvery, ethereal beauty.

In spring, from the tip of every twig grow new leaves which

Courtesy U. S. Forest Service

HEMLOCK (*Tsuga canadensis* Carr.)

A hemlock in Maryland. Farther south this species is confined to the mountains, except for a small grove on a bluff in Wake County, North Carolina. There is an element of romance in this isolated stand of trees.

Pistillate and staminate blooms (top) on same tree. Fruiting branch shows small, graceful cones, maturing in one year. Note size of trunk in comparison with man and outstretched arm and axe. Bark is gray to reddish-purple with thick scales. (Hemlock.)

are greenish-yellow in color and impart to the tree a golden appearance in the slanting sunshine. But spring is not the only time of beauty of a hemlock. On a snowy day a walk through a hemlock grove is like being in an enchanted fairyland of the Frost King. The great, feathery branches are gleaming with soft lightly-packed snow. Then suddenly, almost soundlessly, it may slide gently off.

In the mountains of the upper South the hemlocks blossom about April. Both kinds of flowers are found on the same tree. The seed-producing ones, which later develop into the cones, are so tiny and greenish-yellow that they are difficult to see, but if you search carefully you will find them at the very tip end of the twigs. The pollen-bearing flowers are also tiny yellowish balls and are on short, delicate stems borne in the axils of the leaves on the sides of the twigs.

The three-fourths inch cones, small, oblong, at first purplish, then brown, are at the very tip ends of the graceful sprays, and add much to the beauty of the tree. They mature in one year, and usually fall in the following spring. The seeds are attached to the inside of the scales of the cone, and are small and winged. Fully developed by autumn, they drop out during the winter. If you live in the mountains, or in any other hemlock country, or where there is a planted hemlock, you may like to compare some of these tiny winged seeds with those of the cones of the pines. Indeed, a most fascinating tree-puzzle game can be worked out with the seeds of the various cone-bearing trees. How many different shapes and sizes can be found? And how many have wings?

If good fortune is with the small seeds and they are dropped in leaf-mold and overshadowed by larger trees, hemlock seedlings may start in great numbers. But they are slow growers. For the first four or five years they average scarcely more than an inch a year. Like the long-leaf pine of the South, these seedlings are putting their energy into establishing good, strong root systems. After that they grow more rapidly and form an

excellent protective covering for the seedlings of the valuable white pines, for both trees often grow in the same habitat.

Light, soft, brittle, and not strong, the wood of the hemlock has no great value as lumber. It has, however, two things in its favor. It does not split in nailing, nor does it loosen its hold on the nail or spike, and so it is used for rough boarding of buildings, and for railroad cross-ties. It is also used for paper pulp. The great value of this tree has been not in its lumber, but in its bark, which is rich in tannin and so has been in great demand for the tanning of leather. On old trunks the bark is cinnamon-red or dark gray and divided into narrow, rounded ridges.

Only in summer can the logs be cut for tanbark, for it is from May until August that the bark "slips." After that, peeling is difficult. In former years this hemlock was one of the most abundant trees of the northeastern forests, but until recently the bark has been in such demand and the trees have been so ruthlessly cut that there are now no great stands of virgin hemlock left.

Carolina Hemlock

Eastern North America has another hemlock, far more rare and lesser known, the Carolina hemlock. It is a smaller tree, found growing in a much narrower range, on dry slopes and rocky ridges at moderate elevations from Virginia to northern Georgia.

Though this tree is far less abundant and does not attain the great size of its more northern cousin, it is generally conceded to be a handsomer tree. Its flat, usually longer, leaves point in all directions, giving the tree a more airy appearance; and the cones are longer, the individual scales being longer than broad. It is considered hardier and better suited to the trying conditions of city plantings than the Canadian hemlock.

At the small Knox Arboretum in Maine we saw both hem-

locks growing side by side, and the greater beauty and grace of the southern tree was easily apparent. In fact, some tree-lovers consider this Carolina hemlock America's most beautiful conifer.

The Red Cedar (*Juniperus*)

The Cedars lift boldly their rugged arms,
The favors of autumn scorning,
And keep their green bravery, though the alarms
Of surly winter give warning.
So loyal and true, so valiant and strong,
The snows and the tempests daring,
The gallant old cedars, a whole life long,
The same old standards are bearing.

—ZITELLA COCKE.

A queer tree is the red cedar. It has blue berries and "cedar apples"—yet its fruit is a—cone! It really is! A modified cone, to be sure, but a cone for all that. Nor is *that* all of its queerness. It has two kinds of leaves—*and* it isn't a cedar at all, but a juniper!

How would you like to use a juniper pencil, or a juniper trellis for roses, or a juniper chest in which to protect your clothes from moths? It may sound a bit queer, but that is exactly what you and I *are* doing, for our common cedar is a juniper. The true cedars have large cones that stand upright on the branches, and they are not even closely related to our so-called cedars, the junipers. These true cedars are not native trees. They are the cedars of Lebanon, of which Solomon's temple was built, and the Deodar cedar, of Kipling stories' fame, and the Mount Atlas cedar.

It was the lumbermen who gave the common name of red cedar to the wood of this tree. And red cedar it will remain, for habit is a hard thing to break. Whatever its name, it is an interesting and valuable tree, widely distributed through almost all of the eastern United States. It grows from Nova

Scotia south to the coasts of Georgia and northern Florida, to the interior of southern Alabama, and westward almost to the Rocky Mountains.

It is found in all classes and conditions of soils. It grows by swamps and stream-sides, it dots pastures and abandoned fields, it climbs dry, rocky ridges, and thrives in barren soils where few other trees are found. In the South it is common in the piedmont but rare in the coastal plain except near the sea. At other than low elevations it is absent in the mountains.

Seeming to like to battle with the wind, farther north this cedar is often used to form windbreaks in exposed positions either along the coast or inland. It loves alike the sun and the salt spray, and a few are even found combating the wind and the waves along New England's "stern and rockbound coast."

A slim conical tree, attractive and interesting in form, the red cedar is a picturesque feature of many southern landscapes. In Virginia in particular, long lanes of these cedars often line the driveways leading to ancient houses. So distinctive is the shape of the tree that even at a distance one can always recognize it.

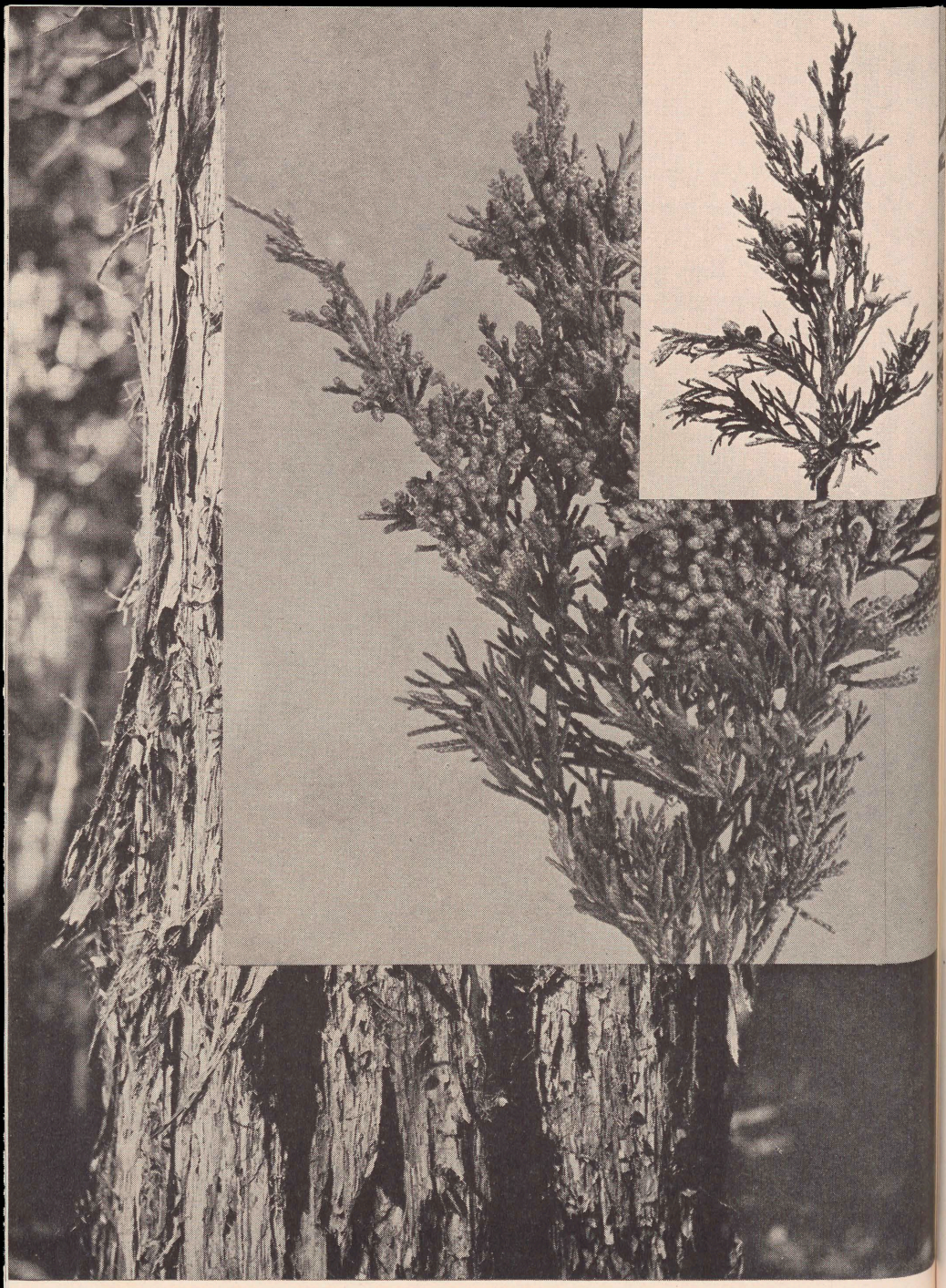
Though usually no more than forty or fifty feet in height, with a trunk diameter of two to three feet, the tree occasionally reaches one hundred feet. In the swamps and rich alluvial bottom lands of the South and the Southwest it attains its largest size.

Berries Modified Cones

The red cedars differ in two respects from other members of the conifer family. One is that as cedars have the two kinds of flowers on separate trees, only the so-called "female" trees have the beautiful blue "berries," which are the size of small peas. The other has already been mentioned—the fruit is a cone that looks like a berry. What happens is that the scales of the minute cones thicken, grow together, and become soft when ripe. Then the fruits really seem more berry-like than

Courtesy F. C. Peterson, State Forester, Virginia

RED CEDAR (*Juniperus virginiana* L.)
A tree easy to recognize even at a distance.



Bark peels off in long, ragged strips; fruit blue and berry-like, but really a modified cone; male cones in the picture are in the pollen-shedding stage, on separate trees from the female flowers; leaves of two kinds, scale-shaped and awl-shaped. (Red Cedar.)

cone-like. In color they are a lovely pale blue-green covered with a silvery-whitish bloom; later they become a darker blue, but still retain the bloom.

Birds find the flesh of these berries particularly delicious, and repay the tree a thousand-fold for its "wayside fruit stands." The birds are the main distributors of these berries (each one contains two or three small seeds), scattering them far and wide. That is why we so often see red cedars along fence rows, roadsides, and under telegraph wires. Wherever birds stop to rest and drop the seeds, there young cedar seedlings may spring up.

Two Kinds of Leaves

Two kinds of leaves, scale-shaped and awl-shaped, are borne on this tree. The awl-shaped leaves appear always upon the young growth or vigorous shoots. The more common of these two leaves is the scale-shaped, which is dark green, minute, and clasps the stem. These leaves grow nearly opposite each other and so close together that they make the leafy twig appear square.

The effect of the whole mass of foliage is a rich bluish-green. In winter it turns slightly rusty or yellowish brown, but less so than in the more northern parts of the tree's range. And in spring, when the flowers appear, it has still a different cast. When shedding their pollen the male tree's tiny golden-green catkins (which open earlier than the flowers of the female tree) often make the whole tree take on a soft hazy golden glint. Shake the tree and a cloud of golden dust descends over everything. On rare occasions the male trees bloom so much earlier than the female trees that practically all the pollen is shed too soon.

Distinctive Bark

Even the bark of the red cedar is different from that of most trees. It is thin and reddish-brown, and it peels off in

long, shred-like strips. And as the tree is very irregular in its growth, the trunk is often more or less grooved.

The wood is particularly valuable, and so is in great demand for pencils, cedar chests, closets, and interior work. Because it is very durable in contact with the soil it is also used extensively for posts, telephone poles, trellises, and other rustic work. The sapwood is white, the heartwood reddish—a color pattern showing plainly and attractively in finished work. The wood also has a delightful fragrance.

So valuable is this wood, and in such demand, that pencil factory owners have not only bought up large tracts of it, but they have made extensive plantings. When these trees can be found large enough and tall enough to use for telephone poles, they bring excellent prices. The highest grade red cedar, a southern variety, grows in the swamps of western Florida.

"Cedar Apples"

If Alice in her trip down the rabbit's hole, or through the looking glass, had happened upon this tree, she ought not to have been much surprised. A tree that has two kinds of leaves, a name that doesn't belong to it, beautiful silvery-blue berries that are not berries but cones—and then also has "cedar apples!" Surely such a tree should belong to Alice's Land of Adventure!

One day Alice might have looked at a cedar tree and noted nothing unusual about it. And then, perhaps the very next morning, if it had been raining, she might rub her eyes and ask, "*Now* where am I?" For the tree is likely to be covered with tufts of bright orange-yellow, jelly-like masses, from which stretch out numerous slender, weird-shaped tongues that wave about almost as though they were something alive—like the arms of tiny sea-urchins. These masses are fungi belonging to the rust family and are popularly known as "cedar apples." When the weather is again dry they contract and become small brownish, irregular lumpy balls.

It is the spores from the jelly-like "tongues" that do the damage. And here is another queer thing. When these spores are germinating, do they seek another part of the tree, or even another red cedar to germinate on? They do not! They go to an apple tree, if one is near enough. Only those which reach an apple tree, or one of its near relatives, live. But, more queerness still! On the apple tree they do not produce the "cedar apples," nor the great masses of orange-yellow, jelly-like spurs. Instead, they develop into yellow blotches, or "apple rust" spots on the leaves or fruit. And this causes one of the most serious diseases of our apples.

And then, in time, borne by the wind, back from the apple tree a slightly different kind of spore goes to the cedar and falls on the twigs. Eventually there are "cedar apples" again, and so the whole story, or cycle, is repeated. Look for these brownish-purple "cedar apples" on the next red cedar you see. At times you are much more likely to find them than the lovely silvery-blue berries.

The American Arborvitae (*Thuja*)

"Trees are our green ambassadors
From earth to heaven. In all lands
The tree God's grace divine implores
With lifted head, uplifted hands.
And he who looks upon a tree
Must upward look beyond, afar—
Shall in the selfsame vision see
Above the tree the sun, the star."

—UNKNOWN.

Oo-soo-ha-tah—"Feather-Leaf," the Indians called this tree, which is also known as northern white cedar, but, like our red cedar, isn't a cedar at all.

With us this is a rare and local tree, growing wild only in the high Alleghenies of Virginia, North Carolina and Ten-

nessee. Some splendid specimens are located in Cedar Creek ravine, at Natural Bridge, Virginia, where the tree is more abundant than elsewhere in the South.

In most of the South its territory is in what we call the "Canadian zone"—those parts of our mountains that are so high and cold that plant and animal life is similar to that found in Canada. Indeed, it might almost be a bit of Canada which creeps down our high mountains. For "whether we go far north, or up a high mountain, it just gets cold in either case," explains Dr. B. W. Wells.*

In most of the South this tree is doubtless much better known as a cultivated tree or shrub, for it is an excellent one for parks and gardens and lawns. For over a hundred years it has been so planted, and nearly fifty varieties have been developed. Because of its tolerance of many conditions of heat and cold, of drought and wetness, of severe pruning and transplanting, it will probably long retain its well-deserved popularity.

Planted close together these trees make an excellent windbreak. Such a row of trees lined the driveway of "the little girl next door" who was my cousin and playmate, when, like *Christopher Robin* "we were six." When we kept store we used the funny little brown cones for money; when we were Indian maids we strung them for beads; and when we played "Convent" with the little Catholic girl across the way, we gravely made them into rosaries.

Though in its native state this tree is very scarce and limited in the South, it has a wide range in the North, growing from Nova Scotia and Quebec west to Manitoba, Minnesota, Michigan, and Illinois, and southward through New England and New York to New Jersey.

In its far northern home the arborvitae often forms exclusive and dense forests in swampy localities and along banks of

* *The Natural Gardens of North Carolina.*

Courtesy Arnold Arboretum

AMERICAN ARBORVITAE (*Thuja occidentalis* L.)

This is the tree that is often clipped in various shapes. It is one of the most popular trees in cultivation.

Two kinds of flowers on same tree, but usually on different branchlets; cones mature first season; on old trunks bark comes off in long ragged strips. Note scale-like leaves in flat spray. The leaves at right and above are more typical than those pinned to trunk photograph. (Arborvitae.)

streams. When massed on these stream borders or grouped on rocky slopes the trees are most attractive.

This evergreen tree, conical and compact in growth, may be from twenty-five to fifty, sometimes even sixty feet, in height, with a usual trunk diameter of two to three feet. Sometimes this trunk is divided into two or three stout, secondary stems. The intricate branches are short and ascending, with a flat, fan-like twig arrangement that looks as though the whole thing has been pressed.

This flat leaf design sets the tree off. The scale-like leaves are somewhat similar to those of our better known red cedar. They are arranged in four rows in alternating pairs, each lower pair of leaves covering the bases of the pair above. So completely do these leaves cover up the twigs that many people take the twig for the leaf. Yellow-green in color and very aromatic, when crushed or bruised they give off a delightful resinous odor.

The flowers, which appear in March or April, are small and inconspicuous. They are of two kinds, on the same tree but on different twigs. The pollen-bearing ones are yellow, the cone-bearing ones are purplish.

The pale cinnamon-brown cones, tiny and oblong, only one-fourth to one-half inch long, mature in one year. They have from six to twelve scales, and tend to stand erect on the twigs. As in most of the evergreens—the pines, hemlocks, spruces, firs—the cones are made up of scales. Under each scale of this cone are two seeds, each with a thin, one-sided wing. When the cone is mature the scales spread wide, and the wind, blowing through the trees, shakes the seeds out and away they go, riding the breezes. Sometimes they go only short distances and may grow up not far from the mother tree; but again they may be borne far, far away to start new stands of trees.

The light brown and thin bark is shreddy, somewhat as that of the red cedar, and can be peeled down the trunk in long, thin, ragged strips. It is rich in tannin. The soft, fragrant,

brittle wood is coarse-grained, but is very durable in contact with the soil. Many of these tall trees of the forest have been used for fence posts and telegraph poles. The wood is also in demand for cross-ties and shingles.

In the far Northwest grows a giant arborvitae out of which the Indians of the region made their totem poles—crudely carving on them their tribal "coats of arms"—and also their great dug-out war canoes. If you should ever visit the American Museum of Natural History in New York City, you can see one of these great war canoes, manned with life-size figures of the Indian warriors.

The Southern White Cedar

And many a little feathered guest
Came through his branches springing;
They hopped and flew from spray to spray,
Their notes of gladness singing.

—FROM THE GERMAN.

A lover of lonely swamps haunted by silence is this southern white cedar, the so-called "juniper" of the coastal plain swamps from Maine to Florida. And, like the other two so-called cedars, this one also is not a true cedar. The spray-like twigs resemble those of the arborvitae, but the two trees are never found together. One is a tree of the low coastal swamps; the other, a common tree of the far North, but very rare in the South, is found only in our high mountains unless it has been planted.

Both trees are alike in having opposite, scale-like leaves firmly pressed to the twigs, which form flat, fan-like sprays. The foliage of the northern cedar is yellow-green, that of our southern one, blue-green. The scale-like leaves of the latter tree almost always have prominent resin dots, but sometimes those of the more northern tree do also.

The chief difference besides their habitat—the fact that one

Courtesy U. S. Forest Service

SOUTHERN WHITE CEDAR (*Chamaecyparis thyoides* L.)
A tree of the coastal plains, found in swamps as far south as Florida.

Leaves scale-like and foliage arranged in flat sprays; flowers of two kinds (lower right) on same tree; fruit small, nearly round cones; bark thin, pale, reddish-brown, separating into plate-like scales that peel off into long thin strips. (Southern White Cedar.)

tree would never be found in the other's home—is in the fruit. That of the arborvitae, or northern white cedar, is oblong; that of the southern white cedar is a tiny round, knobby ball, about a fourth of an inch long. At first these fruits are light green covered with a powdery covering; gradually they become a bluish-purple and finally a dark red-brown. They, too, mature in one year, and they contain from four to eight small, winged seeds.

Seeming to avoid the deeper water, in its southern range this white cedar is sometimes found in association with bald cypress, tupelo gum, sweet gum, holly, pin oak, and laurel oak. More often it is found in pure stands called "glades" where, says Mr. J. S. Holmes, the clean trunks are so densely set as to give the impression of "serried ranks."

There are two kinds of flowers, both on the same tree, and both are small and inconspicuous. The pollen-bearing ones are red and yellow and very abundant; the cone-producing ones are fewer and greenish.

The bark, which also resembles that of our common red cedar, is thin, pale, reddish-brown, readily separating into loose, plate-like scales which easily peel off into long thin strips. The light reddish-brown wood is soft, weak, close-grained and has a delicate fragrance. Easily worked and very durable in the ground, it is in great demand. Indeed, so valuable is it and so much of it has been cut that the tree is no longer common. Great inroads have been made upon it for boat and canoe building, cooperage, shingles, cross-ties, and telephone poles.

In *The Natural Gardens of North Carolina,* Dr. B. W. Wells states that in the bog known as the "Open Grounds" of Carteret County, North Carolina, near the base of the peat are innumerable logs of an ancient white cedar forest.

The Bald Cypress

"For it had bene an ancient tree,
Sacred with many a mysteree."
—SHEPHEARDS CALENDER.

The Story of an Ancient Cypress

In 1066 William of Normandy invaded England and defeated the Saxons under King Harold at the Battle of Hastings. About seven years later a tiny seed dropped from a mother cypress tree in a swamp in what is now eastern North Carolina.

Sometime during the following spring the little seed germinated. It grew slowly, and in the hundreds of years that followed it lived through some of the most important events of the world's history. An ancient tree, like an aged person who has lived long and honorably, has an interesting history.

If only it could have spoken during its last years, what tales the old cypress could have told! If the winds that blow ever whisper of passing events to the trees, how much knowledge of world affairs must be stored away in their sturdy crowns.

Think of actually living through the stirring times in which the great "Domesday Book" was being compiled in England! Through Marco Polo's adventures in Far Cathay—which seem half legendary to us! Yet this cypress of our eastern swamp was a sturdy youngster of two hundred years when Marco was having his fabulous adventures with the great Kubla Khan.

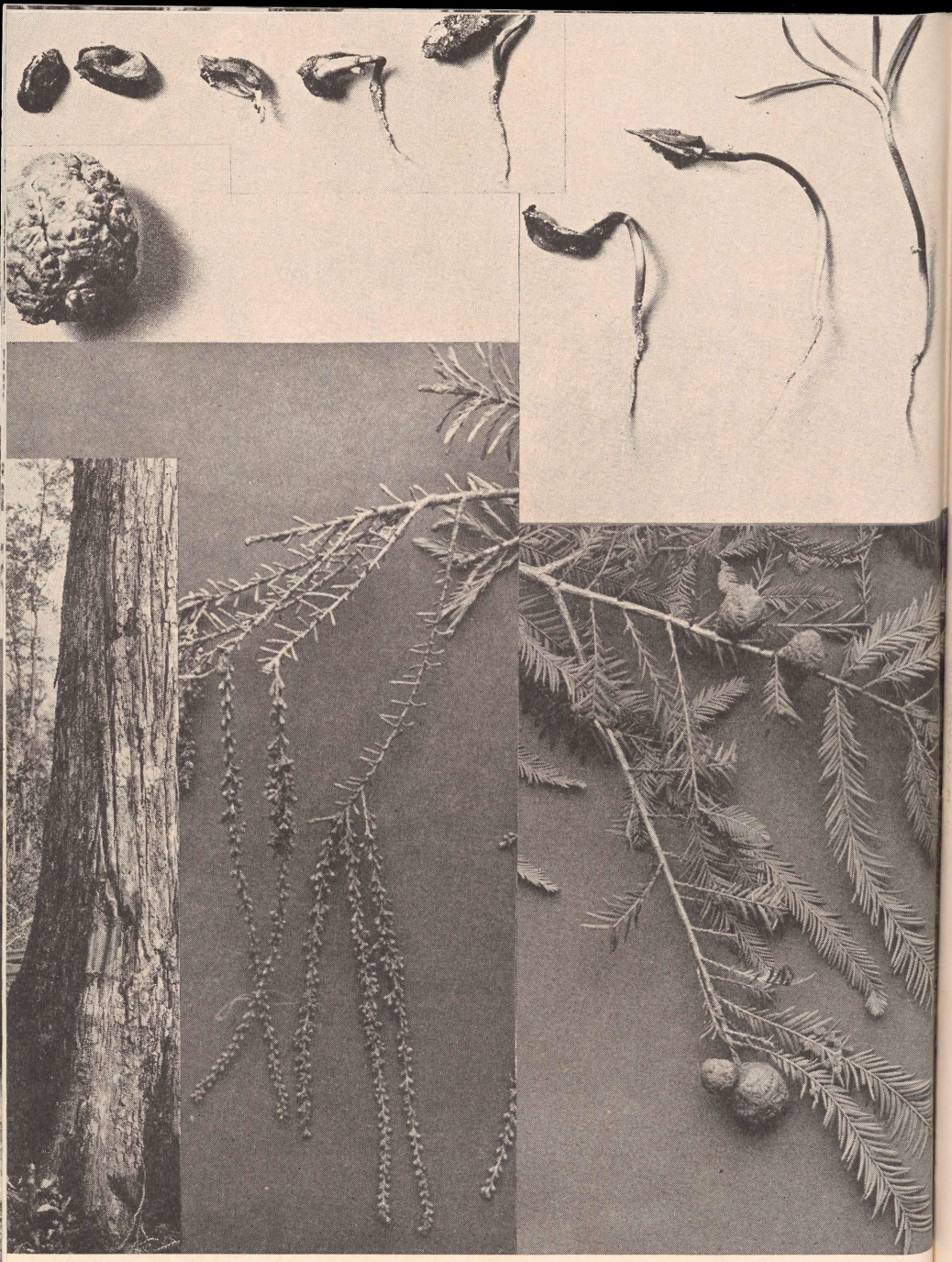
But it was much younger, only twenty-three years old—a mere babe of a tree—when the First Crusade started. And for the next two centuries of its life generation after generation of our ancestors went forth to wrest the Holy Land from the Saracens. It lived through those sad, mad years of the Children's Crusade—the ill-fated march down the Rhine, the dreary, bitter months of crossing the Alps, and the tragic end in slavery and death to the misguided children.

When the cypress was but a youngster of one hundred sixty-

By Bayard Wootten

BALD CYPRESS (*Taxodium distichum* Rich.)

Our only southern conifer that sheds its leaves in autumn. The "knees" might be called the lungs of the tree, for they aerate the roots when they are submerged.



Leaves small, simple, short; small side branches fall with the leaves; cones round, mature in one year; female flowers smaller than male, scattered near ends of twigs; bark very thin, pale silvery to reddish-gray, and scaly. Note flower spray (staminate) in loose drooping clusters. (Bald Cypress.)

two years came an event that was to be important to the race of people who were later to build their homes in the tree's country. At Runnymede, in 1215, the English barons forced King John to grant them a charter—the Magna Charta that meant more liberty for the people.

Before the White Man Came

And so the years passed. Through dim hours of twilight and of dawn the tree grew; through long hot days of summer, through cold, chilly days of winter. As yet no white man had trod the soil of the tree's own land. Only the Red Man paddled his dug-out canoe through the silent shadows of the great cypress swamp. Even he came but seldom, for the swamp was remote and game plentiful in more accessible country.

Now and again the silence was broken by the harsh, discordant cries of the colorful green, yellow, and orange Carolina paroquet, a bird believed to be extinct now, but at one time abundant in this coastal country. Ivory-billed woodpeckers, now almost completely lost to us, probably beat tattoos on its trunk. Instead of wearing a "nest of robins in its hair," more likely the tree wore a nest of blue and gold parula warblers in the gray, swaying moss of its beard.

And so the cypress lived on, increasing in size, especially in girth. For a bald cypress continues to increase in height during its second and third century to a broad, flat-topped crown consisting of a few wide-spreading branches. This form persists during two to four centuries; then decay, accompanied by winds, usually carries away a considerable part of the crown.

And then, when our cypress was in its three hundred nineteenth year, a daring navigator sailed westward, on and on, ever towards the setting sun, until one golden October day he discovered a new world—our western land.

Nearly two centuries more were added to the life of the old cypress before an English colony was attempted in the tree's homeland. Far to the south, however, the Spanish, under Ponce

de Leon, had marched seeking the Fountain of Youth. And far to the north the French, under Cartier, had discovered and explored a great river—the St. Lawrence.

The English Come to the Tree's Own Land

And then, in its five hundred thirty-fourth year, on an island to the northeast, which the Indians called Roanoke, a little English girl was born. If the old tree could later have been given the power of speech, and could have repeated the gossip which the whispering winds carried inland of what was happening among the trees along the great sea, might it, perhaps, have been able to tell what had become of the little Virginia Dare? But the tree, if it knew, kept its secret well.

The years sped on. Silver hours of twilight and of moonlight were followed by golden-streaked dawns. The tree was a veteran now—seven centuries old—and dreadful things were happening along the coast. Pirates were invading Ocracoke Inlet and Pamlico Sound, making a shambles of these waters so long haunted by peace and silence. At last Blackbeard was killed and his crew dispersed or slain. Did the old tree, secluded in its remote swamp, know about it, we wonder?

Stirring events were crowding each other fast. The colonies rebelled against unfair rulings of the mother country and won their independence. The country expanded to the westward. Great canals and railroads were built. Man even learned to travel through the air. Some of these "men with wings" may have flown over the old cypress in its swamp.

How many experiences the old tree must have lived through! How many winds had sung softly through its branches; how many gales lashed furiously at them? How many thousands and thousands of sunsets had it beheld; how many white, mystic nights of cold and lonely moonlight had it known? How many thousands on thousands of times had it "lived intimately with rain"—or worn a "diadem of snow?"

But perhaps, in its old age, for the tree was in its ninth cen-

tury now, it had become a bit weary and dozed away the time, no longer keeping close track of the passing years. And then, while it may have been dreaming of reaching the dignity of a thousand years—the old cypress was startled out of its deep revery by the woodsman's axe striking at its very heart. "Oh, oh," it must have protested. "Are you going to sacrifice me? Me, an ancient veteran who have lived through nearly a thousand years of the history of your race?"

It may be the old tree did not protest loudly enough—or the sawmen were deaf to its pleas. And thus, in the name of progress and civilization it came down, a living sacrifice. But a bit of the old tree's very heart remains—and can be seen in the State Museum at Raleigh, North Carolina. From its home in the Tuckahoe Swamp, Lenoir County, this section was sent to the museum. At the time the old tree was cut it was over a hundred feet in height and the stump, four feet above ground, measured eleven feet and one inch in diameter. The trunk was hollow for the first eighteen feet, and this solid section, sixty-five inches in diameter, was cut twenty feet from the ground.

To unfold and read an accurate biography of the old cypress it would have been necessary to spend days or even weeks going over every particle of the trunk, roots, and limbs with a magnifying glass. This was not possible, but Mr. H. H. Brimley and Mr. Harry Towles Davis, director and curator of the museum, did make an accurate study, using a magnifier, of the section in the museum. They computed the tree to have been a seedling about A.D. 1073. Anyone who is interested in the biography of this old tree can read a part of its history just from this cross-section. It knew drought and flood, fire and tornadoes. Around 1786, when the tree was about seven hundred thirteen years old, there must have been a prolonged drought, perhaps of several years. For the old cypress grew very slowly then, taking twenty-three years to increase one inch in diameter, whereas, in average growth, it only took twelve and one-half years to increase that much.

In places some of these annual rings show healed scars which, to him who can read them, tell tales of fire, of torn bark, of broken arms. More than once the flames must have licked at the old tree. And there are several broken places that tell of "wind-shakes"—perhaps a West Indies tornado may have threatened to uproot it. But its "knees" must have held it securely, for the old tree did not go down.

Functions of Cypress "Knees"

In soft, yielding soils, and in locations subject to periodic high waters, cypress trees develop peculiar root projections called "knees." Their smooth, conical shapes distinguish them from stumps. The function of these "knees" is not exactly known. Most scientists, however, believe that they serve as air systems for the submerged roots. There is another theory—generally discounted—that they also serve to "stiffen and strengthen the roots in order that they may anchor the great tree safely in the soft, yielding soil." When the tree is planted in parks and lawns, it does not develop these "knees."

Bald cypresses are found exclusively in deep swamps which are usually flooded for long periods at a time, and on wet stream banks and bottomlands. Their range is the lower Atlantic coastal plain and the Gulf and the Mississippi Valley region.

According to a government bulletin, the regions of the largest and tallest cypress trees seem to be in South Carolina and Georgia. The largest known living one is in Seminole County, Florida (not far from Robinson Springs), and is known as the "Big Cypress." According to Mr. H. Harold Hume of the Research Department of the University of Florida it has a diameter of seventeen and one-half feet and an estimated age of 3500 years. Others consider this an overestimate, and place its age as being nearer 1500 years. This is the largest known conifer east of the Mississippi.

In the old days, in the rice fields and the great river swamps

of the Low Country of South Carolina, dug-outs made of the large trunks of these trees were in use. Even today some of these old dug-outs are serviceable, and some new ones are still being made, so Mr. Alexander Sprunt, Jr., of Charleston, informs me. There are two magnificent specimens of these dug-outs—old plantation barges—in the Charleston Museum. The smaller size is more in use today. The Negroes refer to these as "trus'-me-gods!"

A Conifer That Sheds Its Leaves

Unlike all our other conifers (the larch is not native in the South) the cypress sheds its leaves in the autumn, just as the deciduous trees do. Indeed, it not only sheds its tiny leaves, but also the small branchlets to which they are attached.

These leaves are narrow, flat, thin, one-half to three-fourths inches long and about one-twelfth inch wide. In summer they are bright yellow-green both above and below; in autumn, before falling, they turn dull orange-brown.

The flowers, too, are unusual. They are of two kinds, both on the same tree. The pollen-bearing ones are in loosely branched, drooping clusters four to six inches long. The seed-producing ones are round and scaly, and scattered near the ends of the twigs.

Surely a queer but interesting tree is this bald cypress! It "grows shorter" in its old age; it has "knees" to help it breathe; it sheds its branchlets with its leaves, which no self-respecting conifer would do. And like the red cedar, it has a different type of cone. But its cone is nothing like the "berries" of the cedar. The cypress cone is more like a round ball about an inch in diameter, and it matures the first year. The small seeds are winged.

The bark is very thin, from one-eighth to three-eighths inch thick. It is a pale silvery to reddish-gray, scaly, and divided by shallow fissures. Cypress wood is in great demand, for though light, soft, and easily worked, it is very durable, espe-

cially in contact with the soil. It is used for exterior trim, greenhouse planking, boat and ship construction, posts, poles, cross-ties, and a variety of other purposes.

It is greatly to be hoped that everywhere many of these trees will be spared in order that future generations may know this ancient holdover from another tree age. So slow growing are bald cypresses that there are few commercial plantings being made anywhere, and so every thoughtful forester or lumberman should save a few of the healthiest trees.

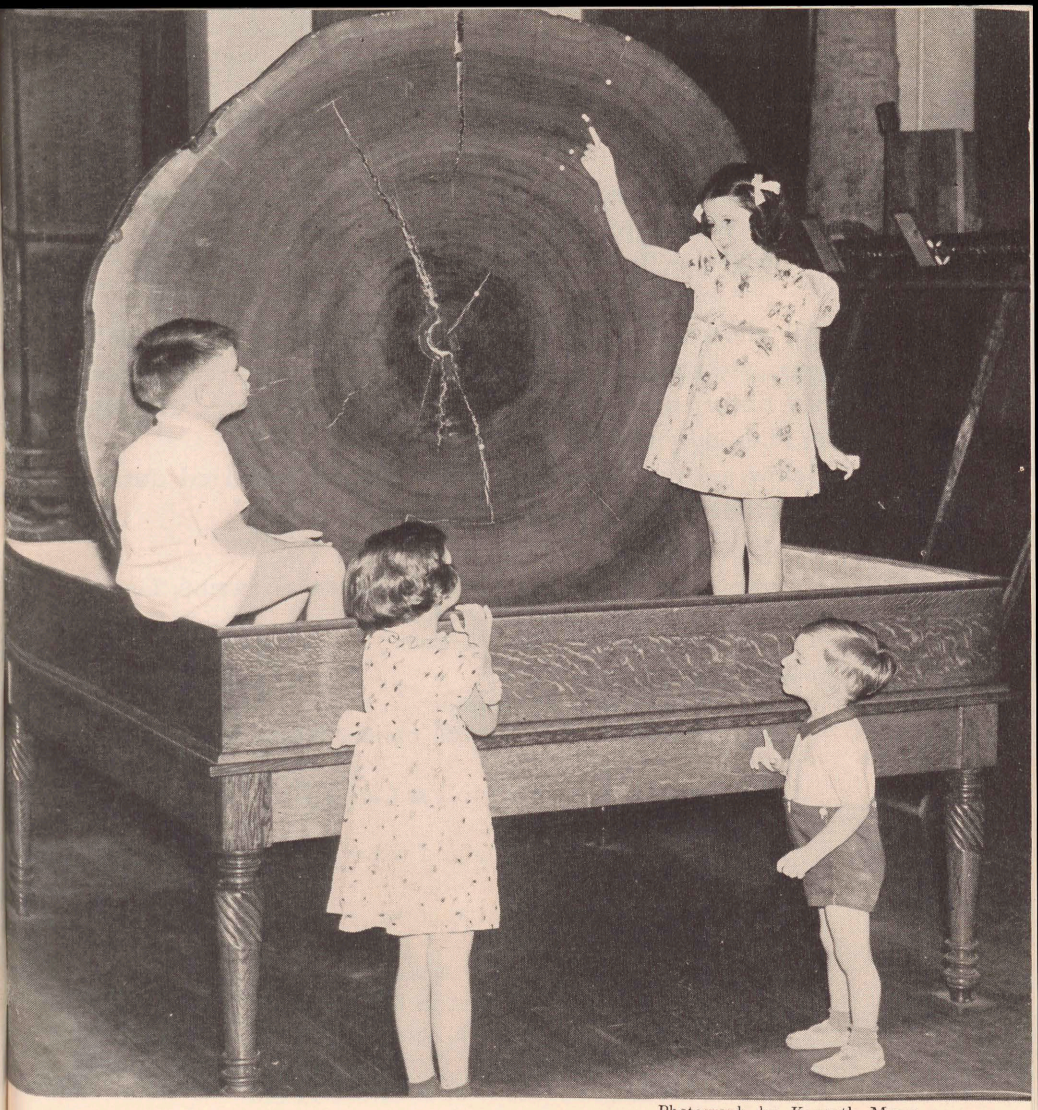
On the State College School Forest in southeastern North Carolina is a remote stand of these trees, some of them over 1100 years old. Dr. J. V. Hofmann, head of the Forestry School, and in charge of the forest, plans to save the better specimens and to cut trails through to them, in order to make them accessible to all tree lovers.

Pond Cypress

A cypress that is usually smaller, far less common, and not so well known as the bald cypress is the pond cypress which inhabits savannahs and poorly drained bogs in a limited range. It is found in certain areas in the coastal region, from the Dismal Swamp to southern Florida, and also in eastern and southern Louisiana.

In appearance the two trees are rather similar, the chief differences being in the bark and the leaves. The soft, reddish-brown bark is more coarsely ridged, and much thicker than is that of the bald cypress. The leaves do not extend out, feather-like, from the short, slender branches that fall with them, as do those of the bald cypress. Instead, the needle-like leaves of the pond cypress are short and slender and are pressed against the twig, somewhat scale-like. However, in seedlings and strong shoots the leaves are sometimes more spreading. The flowers and fruits resemble those of the bald cypress.

This cypress is sometimes cultivated as an ornamental tree



Photograph by Kenneth Mears.
Courtesy Raleigh *News and Observer*

A section of the ancient cypress in the Northern Carolina State Museum. The tree started as a seedling in Tuckahoe Swamp, Lenoir County, North Carolina, in 1073, and was cut down in 1913. Many important events in world history occurred during the tree's life-span. The white dots mark the annual layers, or rings, of some epochal years. The first one, reading from the center outward, is 1212, the year of the Children's Crusade; the second 1462, the year the first Bible was printed; the third, 1492, when Columbus discovered America; the fourth, marked by two dots, 1587, the year Virginia Dare was born on Roanoke Island; the next, 1776, marks the signing of the Declaration of Independence; and the last, 1903, the year of the first successful airplane flight at Kitty Hawk, North Carolina. Virginia Hudson points to the annual layer made the year Virginia Dare was born, as Wood Smethurst, Sarah Bradley Small, and Donald Small look on.

in the northern part of our own country, and in parts of Europe. When grown in upland soils this cypress, like the bald, lacks the "knees" sent up from the roots.

All who know and look at the remains of our ancient bald cypress and read the record of its rings; all who dream dreams of the history of its nearly thousand years, will agree with the poet that "only God can make a tree."

Below are listed some of the events that occurred during the lifetime of our ancient cypress.

1073	Tree started as seedling in Tuckahoe Swamp, Lenoir County, North Carolina
1085	Domesday Book compiled
1096–99	The First Crusade
1212	The Children's Crusade
1215	Barons at Runnymede obtain Magna Charta from King John
1271	Marco Polo travels to Far Cathay
1272	End of the Crusades
1348	Black Death in England wipes out nearly two-thirds of population
1431	Joan of Arc burned at stake
1462	First Bible printed
1492	Columbus discovered America
1513	Ponce de Leon landed in Florida
1584	Amadas and Barlowe, sent out by Raleigh, explore Roanoke Island
1585	First English colony at Roanoke Island
1587	Birth of Virginia Dare
1588	English under Drake defeat great Spanish Armada
1607	Jamestown colony, first permanent English settlement, founded
1636	Opening of Harvard College
1693	Founding of William and Mary College (Virginia)
1733	Georgia founded by Oglethorpe
1769	Daniel Boone enters Kentucky
1776	Declaration of Independence
1793	Eli Whitney invents cotton gin

1795 Opening of University of North Carolina
1803 Louisiana Territory purchased
1836 Battle of the Alamo, Texas
1849 Gold discovered in California
1865 End of the War Between the States
1898 War with Spain
1903 First successful airplane flight made at Kitty Hawk, North Carolina
1913 Old cypress cut down

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