Tree studies in the autumn

By Julia Ellen Rogers

# The shagbark hickories

The best **hickory** nut tree that grows wild in our American forests is the **shagbark**, or shellbark. Who says that the pecan is better than the nut of the **little shagbark**? Southern people insist upon this, as the pecan is the pride of the Southern states. As a compromise we may place side by side the pecan of the South, and the little shagbark of the North, and challenge the world to produce a nut that is worthy to rank with these two in quality.

The shagbark takes its name from the tree’s habit of shedding the bark in long, narrow strips or flakes, that curl away from the point of attachment, but cling for months, perhaps, giving the trunk a shaggy appearance, and making very easy the discovery of these trees in a stretch of mixed woodland. And how it does cut and slash the stoutest of overalls to scramble up and down one of these trees? Only boys and their despairing mothers can know just how costly a Saturday afternoon nutting expedition can be, and why many a boy finds it expedient to come back with his bag of nuts in the late dusk. Otherwise he might be mistaken for a tramp, so tattered are his clothes.

The smooth little nuts are angled and pointed, and when they are ripe, the thick, corky, green husks part into four equal divisions, and the nuts fall out. So much less trouble than walnuts, in their spongy husks, that never part regularly, but wait until they are torn off by impatient boys or squirrels, or until they dry and gradually crumble away.

The shagbark hickory is a beautiful tree when covered with its shining foliage in summer. Each leaf is made of five leaflets on a wiry leaf stem. The three outer leaflets are larger than the pair set nearest the base of the stem. The whole leaf is often more than a foot long, and sometimes there are seven leaflets on each.

The most wonderful shagbark hickory tree I ever saw was one I met once at sundown, after a long walk across country. It stood in a field, alone, and so near my home that I had noticed it almost every day through a long winter. I had gathered a quantity of nuts as they fell in the frosty autumn days, and it was a race between me and the squirrels, often, to see who should get the bigger share. I think they beat me, which is perfectly right. I remember now how rich the foliage looked as it slowly turned from green to golden brown, and fell in a great windrow all about the shaggy trunk, as the nuts ripened.

All winter I noticed how strong the lithe limbs were, and how flexible, as the wind twisted them about in storms, and how much of promise there was in the great, scaly buds that tipped the twigs.

It was late April when I came by. As I looked up into that tree top the sunlight was shining through, and at first I thought I must be dreaming. Instead of buds, I saw what seemed like lighted candles, each with a silken frill, like the recurved petals of an iris, below the tip of flame! I had never seen a tree thus illuminated, and the sight was enchanting. The warm spring air had brought out the hickory buds, with those of other trees, and while I was looking for flowers on the ground, the buds above had swollen, cast off the winter covers, revealing the silky inner wrappings of the young shoots. The rich downward-curving “petals” were only the inner scales of the great buds, grown long and wide, their vivid orange setting off the compact yellow buds that still stood erect. These concealed the tender, velvety leaves that were soon to be revealed with the falling of the leaf scales. I had never seen a hickory tree opening its iris-like buds before, but I have never missed it since.

The **big shellbark**, or shagbark, hickory is the sturdy “big brother” of the little shagbark. In every particular it exaggerates the characteristics of the favourite among our nut trees. The bark is more shaggy, the tree grows larger, the nuts are bigger. Are they \_better\_? No. But they are much the same in flavour, and being so good and so big, they have the market name of “king nuts.” The best of them are gathered in the woods of Missouri and Arkansas. The tree is found from Pennsylvania westward to Oklahoma, but the lumber is valuable for the making of vehicles and tool handles, and so the trees are now scarce in the states that are oldest.

In winter the big shagbark trees show their orange-coloured twigs. They are peculiar to this one hickory. The leaf stems stay on the twigs after the leaves fall, and give the tree top in winter a ragged, hairy appearance, that matches its shaggy trunk.

## The disappointing hickories

The **pignut** has been given this ugly name because farmers, in the early days, turned their pigs into woodland pastures to fatten on the thin-shelled nuts that dropped from this kind of hickory tree. They are not bitter, but merely tasteless, and it is only a “greenhorn” from town or city who will spend time to gather these poor hickory nuts, mistaking them for shellbarks. They are not usually angled, but smoothly rounded, often pear-shaped, and the husks are thin. The shagbarks are in husks nearly one-half inch thick, which split in four divisions, and fall apart to release the ripe nuts. The husks of pignuts divide but part way down, and so the nuts are not freed from them promptly. The kernels are yellowish white. A look at the bark of a shagbark hickory, and then at a pignut fixes in mind one of the chief differences between these trees. The pignut has clean, smooth, grey bark, becoming coarser and rougher with increasing age, but never shedding its bark in ragged strips as the shagbark begins to do when the trees are still young. Smoother foliage and twigs, smaller buds in winter, and a more regular round head make the pignut a fine tree to plant on the lawn, where the shagbark would be out of place, on account of its shaggy, untidy trunk. Another handsome hickory tree with nuts that are very disappointing to the members of a nutting party is the **mockernut**, called also the big budhickory, and the white heart hickory. The last name is wrong because the heart wood is brown, and it is the wood near the bark that is white. The tree has the largest buds and the stoutest, clumsiest twigs and branches in the whole hickory family. The leaves are correspondingly large, sometimes nearly two feet long, of seven to nine leaflets, on downy, swollen stalks. The catkins of the staminate flowers are like thick, chenille fringes, six inches long, often longer, hanging in May below the new leaves.

The nuts are large and look most promising at first. The big, four-parted husk is as thick as a shagbark’s, but it does not split all the way down. So the first difficulty is to get the nut out of the husk. The bony shell is the next. It is astonishingly thick and hard to crack. Last disappointment of all, the kernel is at best very small, and not worth the trouble of getting it out, though there is no denying that it is better-tasting than a pignut, and almost as sweet as a little shagbark. Very often the shell contains a spongy substance that is tasteless, instead of the kernel the patient nutter has a right to expect.

Crumple leaflets of this tree in your hand, and they smell fruity, like an apple. They turn to yellow and russet in autumn.

The bitternut is a hickory nut whose kernel no squirrel eats. It is as bitter as gall. Thin-shelled as a pignut, and usually less than an inch in length, the nuts are enclosed in thin husks, that differ from others in having thin ridges that rise along the four lines where they split at the time the nuts are ripe. Two of these clefts run farther down than the other pair. The nut shell is thin, slightly flattened sometimes, and marked with dark lines. The kernel is white, and you will never taste a second one.

The sure sign by which to tell the bitternut hickory is the tapering, flattened, yellow bud. At any time of year a few, at least, of these buds are to be found. They are numerous from midsummer till May; after that, a few dormant winter buds remain to tell the tree’s name until the new buds are showing in the angles between leaf and twig No other hickory has little, yellow buds.

In winter the slimness of the twigs, and in summer the small size of the leaflets make this the most delicately built of the hickories. The buds are the smallest to be found on a hickory tree. Yet it is the quickest to grow, and one of the handsomest trees in the family. Because it loves best to grow with its roots in wet soil, it is called the swamp hickory.

## The Black Walnut

No boy or girl who has ever gone nutting “in brown October’s woods” can forget the fruits of the black walnut trees that hang like green oranges, high up on the ends of the branches, and have to be climbed for and shaken down. And each fellow on the ground looks out for his own head, as the shower of nuts comes down. Oh! the rich, walnut smell of those juicy husks, as we bruised them on the nearest stone, tore them off, wiping our damp fingers on the grass, before cracking the rough-shelled nuts. The brown stains stayed until they wore off, but the memory of the sweet kernels lasts longer, and the pungent odour of those nut husks is in every twig, bud, and leaf of every walnut tree. Bruise any young shoot, and by the odour of its sap the tree’s name may be guessed.

There is another test for a walnut tree, for those who do not know the odour of the sap. Cut a twig, and split it. The pith of walnut trees is not solid, but is in thin plates, separated by air spaces. This is a sure sign.

[*Illustration*: Three pignuts, with husks, three shagbarks, and two pecans; Flowering twig of the little shagbark hickory]

[*Illustration*: Black walnut and butternut. Twig of butternut, in winter and in spring]

Walnut trees grow rapidly, and are a valuable tree crop to plant. Nuts for seed are packed in gravel, and left outdoors over winter. The stubborn shells are cracked by Jack Frost in such a way as not to injure the seed, which is the meat of the nut. The nuts are planted in spring just where the trees are to stand, for it is much better for a walnut tree never to be transplanted.

I have heard my grandfather tell how the early settlers in Ohio cleared the rich bottom land along the rivers. The great trees that had grown, undisturbed, for centuries, were the “weeds” that had to be cut down and removed, before the soil could be ploughed and sowed to oats or wheat. The only way to do this was to burn the trees, by piling them together and firing the pile, as soon as it was dry enough to burn. The “log-rollings” were the neighbourhood gatherings, when men brought their teams and log chains, and worked like Trojans, dragging the logs to the places selected for the giant bonfires, later on. The women and children had a grand time, watching the men at work, and preparing the dinner, which was a feast, and a great social occasion.

The stump of many a noble black walnut tree, cut down a century ago, has stood, undecayed, until recent years. So valuable is its wood that these stumps have been pulled up with expensive machinery, for the gnarly-grained roots that are still sound. Cut into thin sheets, the wood is used for veneering furniture. Think how many millions of dollars’ worth of lumber went up in smoke in those bonfires! Black walnut is scarce now, and can hardly be bought at any price.

## The Butternut

The **butternut** trees are stripped of their fruit in October by boys who have visions of long evenings, such as Whittier describes in “Snow Bound,” with nuts and apples and cider, by a roaring fire. Some boys leave the black walnut trees to others, and fill their bags entirely from the low, broad butternut trees, that have more nuts in each cluster, and they are not so hard to reach. Many will say that they are much sweeter and richer than black walnuts. Others do not care for them because they are so oily. Indeed, they are called “oil-nuts,” and woe to the youngster who has eaten “all he wanted”!

The butternuts are oblong and pointed at one end, and sticky to the touch, differing in this particular from the globular fruits of the black walnut. The same clammy feeling makes it unpleasant to touch the leaves of butternut tree. The resinous sap seems to ooze out through pores along the hairy leaf veins.

In summer time, when the fuzzy, green butternuts are scarcely larger than olives, and their shells are so soft that a knitting-needle goes through without any trouble, the time for making pickled nuts has come. The gathering of the clustered green fruit is fun, but as soon as they are scalded, the “fur” has to be rubbed off of each, before the nuts, husks and all, are put down in spiced vinegar, to be used as a relish for serving with meats the following winter. The “furring” usually falls to the children, and they get very tired, for it is a slow and monotonous job, whether one uses a coarse towel or a brush. However, it would be unpleasant to eat a furry nut, no matter how carefully the spicing was done.

## The English Walnut

 The **English walnut** trees are grown in orchards in Southern California. These trees are quick to grow, and come early into bearing. When you buy a pound of these thin-shelled nuts at the corner grocery store, you may well wonder where they grew. Perhaps little children picked them up under trees that grow in Italy or in Greece. Fine, large nuts come from France, but none of them are raised in England. Many of the best nuts are raised in California, where more and more trees of this kind are planted each year. They grow in the Southern states, but have never been planted on a large scale as a commercial nut tree.

The English walnut tree grows in England, but the nuts never have time to get ripe in that climate. They are gathered green, and pickled, husks and all. From English grandmothers we learned to pickle our own butternuts while the shells are still soft.

The earliest shipments of the walnuts of Europe came into this country from England. Probably merchants in London sent them to merchants in New York. The dealers did not ask where these walnuts grew, but told people who asked that they came from England. This explains the name by which everybody now calls them.

Far back in its history, this tree grew wild in Persia, and on the wooded hillsides of Asia Minor. The people gathered the nuts for food. It was the custom of visitors to send presents of these nuts back to their friends in Europe when they were travelling in the Orient, and discovered how very good these unknown nuts tasted. Englishmen were among these who were loud in praise of them. “Walnut,” the name they gave the trees, means “a nut that comes from a foreign country.” The Greeks had called it “Jove’s acorn,” for they could not think of any other name good enough. Kings sent presents of nuts to each other. Then people began to plant nuts, instead of eating them all, and gradually all the warmer countries of Europe found they could grow these walnuts.

The size and quality of the nuts improved under cultivation. Now there are many varieties, all larger, thinner-shelled, and better-flavoured than the original wild nuts that still grow in the forests of Asia Minor.

In the centuries when the countries of Europe were always at war with their neighbours, another reason for planting walnut trees was discovered. No wood was so good for gunstocks. No young man could marry until he had planted a certain number of walnut trees. This was the law in some countries in the seventeenth century. So multitudes of these trees were set out. Besides gunstocks, walnut wood was much in fashion for handsome furniture. A walnut forest was a very profitable crop to raise, for lumber alone. A tree that bore such nuts, while its trunk was growing big enough to go to the saw mill was doubly profitable. The people of the colder countries were ambitious to share in this prosperity. But an occasional winter of extra severity killed the young trees.

## The Chestnut and Chinquapin

Next to the hickory nuts, we must rank the **chestnuts**. Some may give them first place in the list of American nut trees. In England the chestnut trees one hears about are never praised for their nuts. English boys and girls do not eagerly plan for half-holidays spent in the jolly sport of chestnutting. Their chestnut trees turn out to be very familiar to our eyes. They are the horse chestnuts that we see so often at home. Their nuts are handsome enough, and quite worth gathering for use in some games, and just to have and to handle. But chestnutting! That is one of the great joys of October in our country, a thing no boy or girl would miss without bitter disappointment.

While the leaves turn yellow on the big trees, children and squirrels have their eyes on the clustered, spiny balls at the ends of the branches. “Not yet!” is the sign they read as plain as printed words. Warm days come and go, and the tree holds out its sign, even after the leaves begin to fall. Father and mother say: “Be patient!” But they do not remember how hard that is. It is a long time since they were eight and ten and twelve years old.

Then a cold night comes, and in the early morning a hoar frost is disappearing as the sun rises. Four seams can be seen on some chestnut burs, and the impatient boys throw clubs into the tree tops. But their fingers are sore with trying to pry the burs open. The nuts are cheesy and insipid.

“Just you wait a spell.” This is the advice of John, the raggedy man, who does the chores. “You can’t hurry up chestnuts. When they’re ready, I’ll take you where you can get a barrel of ’em, and not kill yourself, nor ruin your hands gettin’ ’em.

” He sees the rising tide of fear before it is expressed in words, and answers mysteriously: “Nobody knows the place but me. Let the little fellers an’ the town folks hunt for nuts under the trees along the road. They’ll get a quart apiece, mebby, if they work half a day. The place I’m goin’ to, you can scoop ’em up in handfuls. ”The trees far back from the high road are certainly more generous to the few who find them than are the more accessible, and therefore more popular trees. Nobody “scoops them up in handfuls,” literally, for there are the burs, quite as prickly as before they split their four segments apart, and let the two or three nuts fall out. Careful and quick motions are needed to pick up the pointed nuts among the larger burs. But the game is most absorbing. If the bags fill slowly, there is the consoling thought that the shells are thin, and the nuts are almost solid meats. The busy picker stops now and then to sample a few. They certainly are riper and finer tasting than they were a short week ago.

Unopened or partly opened husks are often gathered. The nuts will ripen and roll out on the attic floor, or on the roof of the side porch. Few parties who go chestnutting content themselves with the loose nuts they gather. The end of the day is a scramble to fill the bags or baskets with hulls not yet fully open. Mittens faced with leather or made of canvas are a good protection for the hands.

The saddest news from the woods of the Northeast is that a disease that baffles the tree doctors has attacked and killed all the chestnut trees in the neighbourhood of the city of New York, and it is marching steadily westward. It has invaded New Jersey and Pennsylvania. A fungus attacking the living layer under the bark of a tree is working where no remedy can reach it. The tree loses vitality, but only when it is far gone does the disease break through the bark, and show itself as small, yellow pimples on the smooth bark of the branches. Out of these openings the spores escape,—minute germs of the disease. The wind scatters them. So do birds, insects, and squirrels. They lodge in cracks in the bark of other trees. Only chestnut trees catch the disease, though the germs fall everywhere. When it progresses far enough to produce a mat of fungus that encircles the trunk, the tree is girdled, its food supply is cut off, and death results.

The **chinquapin** is a Southern tree, which closely resembles the chestnut. It is usually shrubby and dwarfed in all of its parts. The nuts are about as large as our little hazel nuts, and each is alone in a spiny husk that parts into halves when mature. Five or six of these little burs are often borne on a single stalk.

In Arkansas the tree reaches medium size, but in the East it is familiar as a scrubby tree that sends up suckers from the roots and forms thickets, like hazel brush. Poor folks in the South have time to gather these little nuts, which appear on market day in their season in some cities and towns. They are sweet, and some people think they are better than chestnuts.

# The beech

Least of all the nuts good to eat that grow in our mixed woods is the fruit of the grey-trunked beeches. In nutting time the **beech** tree’s crown of green is almost as clean and bright as in midsummer. The silky leaves are little torn by the wind. They turn to a beautiful pale yellow, and become thin and papery as the green pulp is drawn back into the twigs. Few people see the spiny green burs on the ends of side twigs in summer, even though the crop of nuts be heavy. In the autumn the brown spiny husks open. Their four divisions flare outward, and two triangular brown nuts are released. Almost unnoticed they drop on the ground under the tree. They are so little that the wind helps to scatter them in the woods around. The shifting leaf carpet sifts them through, and we shall have to hunt for them, even under the parent trees.

I need not tell any boy or girl how good and sweet these beech nuts are, and how well they repay the trouble of getting the kernels out of the thin, triangular shells. Yet people gather them less frequently than they do chestnuts, because it is slow work, and there is more accomplished under trees whose nuts are larger.

The early settlers fattened their pigs in autumn by turning them into the woods. Beech trees made the best possible pasture for this purpose. The flavour of beech nut bacon is exceptionally delicate, and has an extra high market value. Squirrels and all of the smaller furry-coats take the time and trouble to gather and hoard quantities of beech nuts among their winter stores.

Fortunate for the beech tree, its nuts will grow even in the shade. We shall find a fruiting beech tree surrounded by its children—saplings of all ages, coming up from seeds of various sowings.

By scratching carefully among the dead leaves in spring, we shall find, among the gaping burs, the young trees at the very beginning of their lives. The nuts have slipped down into the damp leaf mould, and the melting of snow, and the warm spring air have started them growing. The triangular shell clings to the top of the stem, while the root is getting a foothold. A pair of broad seed leaves, totally unlike the leaves of the beech tree, unfold. The spreading of these seed leaves soon splits the walls of the nut-shell helmet.

Little beech trees at this age are very weak and helpless, but patient and struggling. Their pale leaves turn green as the root goes deeper down, and draws food from the soil. A shoot bearing true beech leaves rises from the tip, between the seed leaves. The stem straightens, and grows tall, the seed leaves wither, and, unless it has bad luck, or some accident befalls it, the little tree is a long, leafy whip by the end of the season, and under each green leaf is a long bird’s-claw beech bud, just like those on the parent trees. In these buds are leafy shoots which will be side branches during the following summer.

Beech nuts are still one of the main foods of many wild animals. In the earlier days they had much greater importance, for nuts were one of the natural foods upon which the human race subsisted before the days when men became civilised. They depended upon foods which Nature provided, and ate them without cooking. Acorns served the same important purpose.

We cannot go back to the days when men lived in caves, and dressed in the skins of wild animals, and lived upon foods like nuts and berries, and the flesh of wild beasts. But in camping out we return as closely as possible to the simple life of these wild ancestors of ours. It is good to know what foods the forest offers to hungry men and beasts. Some day we may be lost in the woods. We may come to an oak tree, and attempt to eat its acorns, but find them bitter. It is well to know that the oaks with finger-pointed leaves bear acorns that are sweet and good. It is only the oaks with spiny-lobed leaves whose acorns are bitter and unfit for food. Beech trees offer no food to a hungry person, unless he knows how little the nuts are, and how they hide by slipping under the leaves when they fall. To know trees is delightful at any time, and in any place. To know them when one is lost in a forest is often the means of saving one’s life. The forest still feeds the hungry, but only those who know the trees are able to find these stores of food when they need them.

# The witch hazel

The witch hazel is indeed the witch of the woods. It turns the year up-side-down, by blossoming in October, at the same time that it is ripening its seeds. For this reason every child who lives in a region where this little tree grows should know the witch hazel. The better people know it, the more wonderful they find it. It has many odd habits and secrets, which it will reveal only to those who come and ask questions, and keep their ears and eyes wide open to catch the answers.

In spring the witch hazel hides under its green leaves, and attracts no attention from those who have come out to see the great procession of the spring flowers, under foot, and over head. It is simply a part of the undergrowth, a shrubby little tree. But come in October, to the same place. The acorns are dropping from the oak, the foliage ablaze with colour, or faded and falling. There are no flowers overhead, but a few belated asters and goldenrods under foot. Squirrels are busy hiding winter stores, gathered under the nut trees, and on the wild hawthorns.

A thicket of witch hazel is slowly dropping its yellowing leaves. You might not have noticed it at all, had not one of the trees suddenly called attention to itself by tweaking your ear! It is such a surprise to feel in the silent woods the sharp sting of a shot from a silent air gun. You stand still, listening, and feeling of your ear. It is a fine frosty October day, and still. As you listen, another shot strikes the dead leaves at your feet. Where do they come from? This question you will probably not be able to answer at once; but while you are looking in the bushes from which the missile seemed to come, thinking to rout some joker from his ambush, you discover the blossoms of the witch hazel. Each one is waving four little yellow petals, and among these delicate blossoms the bullet pods are bunched. Some of these are yawning wide open, each showing two empty seed pockets, but you do not find any seeds.

Cut a bundle of these things, and carry them home. Put them in a vase of water. The delicate fragrance of the flowers will go through the house, and every one will marvel that any tree or bush can be found in blossom at the very end of the year. Now the strangest thing will happen. Above the quiet talk around the evening lamp sounds the sharp click, as of a bit of metal, or a bead striking the wall with considerable force. Every one sits up to listen. A second click, this time on the glass covering a picture, is located, and a little black object, smaller than an apple seed, pointed and tipped with white, is picked up from the floor. It is this seed which was thrown against the glass; and it does not require a Sherlock Holmes to prove that it came out of one of the witch hazel seed pods. If each person takes a twig, and keeps an eye upon the pods, that show a slight opening, more than one of the pods will be seen when they burst, and throw their seeds. The warmth of the indoor air springs the trigger, and the tiny projectiles fly.

How surprised the squirrels must be when the witch hazel guns are bombarding the dry leaf carpet of the woods! How much pleasure it gives you to take your friends to the thicket, and explain to them the meaning of those scattering shots the pods are firing each crisp autumn day! If it is rainy weather the pods will all be closed. But let the sun come out, and dry them, and the game begins again.

Can any one wonder that witch hazel trees grow in companies? Each little tree flings its seeds in all directions, and for each seed planted a little tree may come. Twenty feet from the parent tree the pods are able to throw their seeds.

Extract of witch hazel is obtained by boiling twigs and leaves of this tree in a still with alcohol. The Indians taught white men that this plant contained a drug which had soothing and curative powers when rubbed upon sprains and bruises. Whether there is any truth in this notion or not, the belief is still strong, and people continue to rub extract of witch hazel on their bruises, even though many doctors say there is nothing medicinal in it but the alcohol.

[*Illustration*: The **beech** tree opens its two kinds of flowers after the long, pointed winter buds have opened, and the lengthening shoot has spread out its leaves.]

[*Illustration*: Catkins, staminate and pistillate, of a hornbeam and a birch; catkins and acorn flowers of an oak]

In England the witch elm corresponds to our own witch hazel. No one in the mining regions would dare to sink a shaft for coal unless he had warrant for doing so from the actions of a divining rod in the hands of a competent person. In other regions the digging of a well depends upon the same thing, and this idea prevails in many parts of this country. An old fellow who can “water witch” may be found in most old-fashioned communities. If you wish to dig a well, you must call on him to locate the site. He cuts a y-shaped twig from the witch hazel, trims it, and is ready for the ceremony. Grasping one of the two tips in each hand, and holding the main stem erect, he paces over the ground you have chosen. In his rigid hands the supple twigs waver, and finally the wand bends downward. This, according to popular belief, is the proper place to find good water, and plenty of it. The water witch moves away, again holding the stem erect. He comes back finally, and as he crosses the spot again, the wand goes down. Now every one is sure that this is the spot, and the well is dug. If the seer’s prediction comes true, his reputation improves, and scoffers concede that “there may be something in it, after all.” In regions where the witch hazel does not grow, a twig of wild plum tree will do.

# The oak family

The fifty kinds of oak trees that are native to America are about evenly divided on the two sides of the Rocky Mountains. No Western oaks are found in the Eastern states, and none of our Eastern kinds grows wild on the other side of the mountains. The backbone of the continent is a bar that neither group has been able to pass.

To know fifty different kinds of oaks by sight, so as to call each one by its right name, is not an easy task; and yet it is not so difficult as it at first might seem. To begin with, any tree we meet, which bears acorns, we at once recognise as an oak. By this one sign, we are able to set this great family apart from every other tree. As soon as they are old enough, all oaks bear acorns. If a tree which we suspect to be an oak has no acorn to show us, on or under the tree, a little close looking will usually find some acorn cups still hanging on, or lying where they fell upon the ground.

The leaves of oaks are distinctive. In general, they are all simple, and their outline is oval. The borders are variously cut by deep or shallow bays, between sharp points or rounding finger-like lobes. They are leathery in texture, compared with leaves of most trees. After a little practice, we learn to recognise oak leaves, no matter how variously cut their borders may be.

In spring the flowers of oaks come out with the leaves. A fringe of catkins at the base of the new shoot is composed of pollen-bearing flowers. In the angles of the new leaves farther up the stem, we shall find the little acorn flowers, usually in twos. This is the flower arrangement of all the oaks; staminate and pistillate flowers on the new shoots, separate and very different from each other, but always close together, and always both kinds on each tree. The fringe of catkins falls as soon as the pollen is shed. Little, red, forked tongues are thrust out by the pistillate flowers to catch the golden dust when it is flying through the air, and thus to set seed. All through the summer, the little acorns are growing. We can find them in their tiny cups in the angles of the leaves.

In the autumn the acorns are ripe, and falling. Some trees will show acorns of two sizes, half-grown ones on the new shoots, and full-sized ones on the bare twigs, just back of the new shoots.

This peculiarity divides the oak family into two great groups. One group is composed of trees which have light-coloured bark, bear a crop every year, and in winter are bare of fruit. This is known as the White Oak Group. Its leaves have rounded margin lobes which do not end in sharp points, as many of the lobes of oak leaves do.

All of the oaks whose leaves have pointed, spiny lobes on their margin belong to the Black Oak Group. The bark of these trees is usually dark-coloured. The acorns require two years of growth. For this reason, there are half-grown acorns on the tree all winter, waiting for the second summer to bring them to maturity. Every autumn the acorns which are ripe are found on the twigs just back of the leafy shoots, which grew during the past summer. These acorns have completed their second year of growth.

When we hear any one speak of annual-fruited and biennial-fruited oaks, we know that the White Oak and Black Oak Groups are meant. If you see an oak tree whose leaves are cut into sharp pointed lobes, you will find acorns of two sizes on its twigs. If you look across the fence and see a pale-barked oak with finger-lobed leaves, and not a spiny point on their margins, you will know that acorns of but one size will be found. Fix these three points in mind. Then study all the oak trees you can find.

Trees of the White Oak Group have:

* Rounded lobes on their leaf margins.
* Acorns ripe in a single season.
* Pale-coloured bark.

Trees of the Black Oak Group have:

* Spiny-pointed lobes on their leaves.
* Acorns requiring two seasons to ripen.
* Dark-coloured bark

## The white oak

Those who know trees best agree that there is no nobler broad-leaved tree in the American forests than the White Oak. Tree lovers in England have but one native oak upon which to spend their loyal devotion, the tree worship inherited from Druid ancestors, whose temples were their sacred groves of oaks. The same feeling is in our blood, and roused at sight of an aged white oak, with stout, buttressed trunk, and great horizontal limbs supporting a rounded dome, much broader than high.

The tree is grey in winter. It stands bare of leaves, clothed in its pale, scaly bark. This is the time to study the framework of the dome. The limbs are twisted and gnarled, and their branches end in dense thickets of twigs. Each twig bears the winter buds, and five buds are clustered at the tip of each.

In spring these buds open, and a leafy shoot comes out of each. At the base are the yellow, fringed catkins of the sterile flowers, and above them, in the angles between leaves and twig, the fertile flowers thrust out forked tongues for pollen. These will be acorns next autumn, if the pollen falls upon them, and thus sets seed.

All summer the leaves are green, with pale linings, and when summer ends, they turn to rich shades of purplish red. The sweet acorns are ripe, and as they fall, thrifty squirrels are all about, gathering them into their hidden store-houses for winter use. Plenty of the thin, shallow cups we shall find, but the kernels are scarce, unless we come when they are falling in October.

The Indians taught the early colonists in America to use acorns of this species for food. They boiled them, like hominy, and found them not only nourishing, but good to eat.

If you find solitary white oaks growing here and there in a mixed woods, you may wonder how they were planted thus. The tree cannot scatter its own seeds. It depends upon the work of scampering nut-gatherers, in fur coats, that put away more acorns than they can eat during the long winter. An acorn that is left over in one of the dark pockets along a squirrel’s run-way sprouts in the spring, and in a few years it is a sturdy oak sapling. All oaks are dependent on outside help in planting.

White oak lumber is very high-priced. The wood of this tree we rarely see nowadays except in the most expensive oak furniture. The beautiful satiny streaks that are the chief ornament of the grain in polished table tops, are bands of fibres that radiate from the central pith to the bark. When oak is “quarter-sawed,” these \_pith rays\_, called “mirrors,” show to best advantage. They are most numerous in the wood of the white oak.

## The Bur or Mossy-Cup Oak

The largest acorn I know is the fruit of the bur oak, and it is borne in a mossy cup, indeed. The cup’s scales are drawn out into long, hairy points, and those near the rim form a loose fringe. Once in a while you may find an acorn almost covered up in its husk. But as a rule, the nut is a little more than half-covered. Sometimes these nuts are two inches long, but this is not usual. They are over an inch long, and almost as broad, and the meat is white and sweet. No wonder squirrels harvest the crop, and young trees spring up wherever an acorn is missed by the hungry creatures.

The bur oak is a shaggy tree, for it sheds its bark in big flakes, like the sycamore. The small branches are stout, and their bark is developed into corky wings, like the sweet gum. The tree is irregular in shape, too, its gnarled limbs are thrown out in any direction, and so the top is often unsymmetrical. But it is a rugged and picturesque tree, in spite of all its faults, and it adds beauty of an unusual kind to parks and woodlands.

In Sioux City, Iowa, an aged bur oak stands in Riverside Park. It is called “**The Council Oak**,” for it was a venerable tree in the days when the Indians lived on the banks of the Missouri River. Under this tree their chieftains used to meet the white men, and talk over the questions that interested both. Here treaties were drawn up and signed that kept peace between the red and white men.

I promise a great deal of pleasure to anyone who plants a mossy-cup acorn. The seedling tree is wonderfully vigorous in growth. The leaves are often a foot long in the first years of the tree’s life. The blades are thick, lustrous above, and woolly lined, the finger lobes irregular, and two opposite, deep sinuses near the middle of the leaf cut it almost in two!

Before the tree is more than a sapling it blossoms and bears big acorns in their handsome mossy cups. There is no stage in the life of one of these oaks that is not beautiful and interesting.

This tree is found from Nova Scotia to Western Texas. It forms forests in Winnipeg, and “oak openings” in Minnesota and Dakota. It is as much at home in the hot, arid stretches of the plains of the West and Southwest as in the raw, damp air of the New England coasts. In the rich valley of the Ohio River it reached nearly two hundred feet in height in the virgin forests.

Unlike many oaks, it may be safely transplanted while young.

## The live Oak

The citizen of New Orleans takes his Northern visitors to Audubon Park, and points with pride to the giant live oak trees. He does not hesitate, for he knows that the noble pair called “George Washington,” and “Martha Washington,” though crippled now by tornadoes, are more noted the country over than any monument or building in this famous old city. In Charleston and other Southern cities it is the same. Famous old live oaks adorn the parks and avenues, and the same trees are planted year by year to take the places of the veterans when age and storms shall make an end of their long lives.

These trees wear a crown of green throughout the year. The leaves last but one year, but they cling to the twigs and remain green until they are gradually pushed off by the opening of new leafy shoots. In spring the new leaves are much brighter than the darker old ones. Everywhere the trees are draped with the sage-green ropes of “Spanish moss,” which is not a moss at all, but a flowering plant that steals its living by lodging its roots in crevices in the bark of trees.

The live oak acorns are dainty, dark-brown nuts, set in hoary, long-stemmed cups. Each year there is a good crop of acorns, and they are sweet, and pleasant to the taste. The Indians depended upon them for food, roasting or boiling them. They also skimmed the boiling pot to collect the oil, which the early colonists said was much like oil of almonds.

The “knees of oak” that early ship-builders used to brace the sides of vessels, were taken from live oak trees, where the great boughs spring out from the short, stout trunks. This natural joint is better than any bolted union of two pieces of timber. The scarcity of these trees makes it impossible now to supply these knees, but no steel frame serves the purpose quite so well. The wood is as beautiful as white oak for the making of handsome furniture, though it splits more easily, and is harder for the cabinet-maker to use.

The tree grows throughout the South to Texas; also in Mexico, and Lower California. Its Northern limit is Virginia.

A friend who has for a near neighbour the majestic McDonough Oak, patriarch among the noble live oaks of the Audubon Park, New Orleans, writes interestingly of the habits of this species.

“The live oak sheds its leaves \_in the spring\_, just before the new leaves open. So, for a brief time the tree stands leafless. In this period, however, the tree puts out catkins in great abundance, so that the tree does not appear bare. These catkins are light brown, and have a soft, velvety appearance, and a tree has an absolute change of colour. During this blossom time the splendid form of the trunk and the great limbs is revealed. When the new leaves appear, the framework of branch and bough is concealed by leafage so dense as to be impenetrable to sun or eye. The tree is a symmetrical, shining green dome. The crown of the McDonough oak is over two hundred feet in diameter.”

## The Post Oak

The post oak, a small, rugged tree, is noticeable in winter, because its leaves usually hang on until the open buds in spring push them off. The colour of this winter foliage is yellowish brown, and not at all striking nor beautiful. The bark is brown and deeply furrowed. The twigs wear a yellow fuzz. The leaves are coarse, stiff and rough, four to five inches long, tapering from three broad, squarish lobes to a narrow base, and a short leaf stalk. They are lined with brownish wool, and are dark green and shining above in summer.

The acorns of the post oak are borne in a plentiful annual crop. Each is dainty and trim, in a shallow cup of loose, blunt-pointed scales. The kernel is sweet. In the days when wild game roamed the woods, wild turkeys fattened on these acorns, and some people call the tree the “turkey oak.”

Another name for this tree is “iron oak,” for its wood is hard, and heavy, and close-grained. It makes admirable posts and railroad ties, because it does not rot in contact with water. It is used in boat-building, and for barrel staves. “Knees” of post oak (the angles between trunk and branch) form most admirable timbers to be used in the framework of boats.

## The Swamp White Oak

The swamp white oak is a rugged and ragged tree, with drooping branches and crooked twigs, covered with greyish brown bark which peels in thin flakes from branches and trunk. This habit of shedding its bark in irregular plates reminds us strongly of the sycamore, which carries this habit to excess. The leaves of this oak are large, wedge-shaped at the base, wavy-toothed or lobed, and broadening towards the tips. They are dark green above, and lined with white down. The acorns are borne in pairs on long stems. The oval nut is hairy at its tip, and sits in a rough cup made of scales, sometimes fringed at the border. The kernel is sweet and eatable, not only for beasts, but for man. If one were lost in the woods, he need not starve nor die of thirst, if he is near a stream, and can get the fruit of a swamp white oak, which stands by the water side. He will do well to make a fire, and roast the acorns, which will improve their nutty flavour, and make them more digestible.

This white oak is more beautiful in May than at any other season of the year. The young leaves are pale green, and the tree top is illuminated by the silky hairs that line them. The whiteness of the down is dimmed as summer advances. In the autumn the leaves turn yellow, but never red.

The wood of this oak is not distinguished in the lumber trade from any other white oak. The demand for it for the building of houses and boats, and for agricultural implements and vehicles, is greater than the supply. It is too expensive now to be used as it was a few years ago, for fuel, railroad ties, and fence posts.

## The Chestnut Oak

The chestnut oak has leaves which are much like those of the chestnut tree. They are larger, and wider, however, and have rounded lobes at the ends of the side veins, making a very regular wavy margin, compared with that of most oak leaves. The lining is often silky, and always much paler than the upper surface. This tree is an exception to the rule that the annual-fruited oaks have pale bark. This one has bark so dark in colour that it is often mistaken for one of the Black Oak Group, although its wavy leaf margins, and its annual crop of acorns, prove it to belong to the White Oak Group.

The acorns are very long, and smooth, and they sit in thin cups lined with down, and covered with small swollen scales. They are usually borne alone on short stems. This is one of the largest and sweetest acorns. The squirrels pack them among their winter’s stores.

The wood of chestnut oak is hard, and strong, and durable in contact with the soil. The bark is especially rich in tannic acid. For this reason many of the finest trees yield only tan bark, because the peelers take the bark, and leave the log to fall a prey to forest fires.

## The Black Oak

The black oak, which gives its name to the large group of biennial-fruited oaks, is one of our handsome, sturdy forest trees. It grows from Maine to Florida, and west to Minnesota, Kansas, and Eastern Texas. Its bark is very dark grey or brown, and thick, with rough, broken ridges and deep furrows. Under this outer layer is a yellow belt, rich in tannin. This gives the tree the name “yellow oak,” and since its bark is valuable in tanning leather, it is some times called the “tan bark oak.

”The tree is not graceful nor symmetrical, but there is a picturesqueness and strength about it that redeems its coarseness and irregularity. This species would be planted oftener for shade, were there not so many beautiful oaks to choose from. In the wild, however, a giant black oak is a noble feature of the landscape.

In early spring the large downy winter buds begin to swell, and soon the leaves push rapidly out. The whole tree top flushes crimson in the sunshine. The red glow is from the crinkly, half-awake baby leaves, whose brilliance is softened by a silky covering of white hairs. In a day the leaves turn green, and most of their silky covering is shed.

The bloom of the black oak consists of a fringe of yellow catkins at the base of each shoot, and pairs of red-tongued acorn flowers in the angles of some of the leaves. Back of the new shoot the half-grown acorns of the previous season are seen. In autumn the new crop is well along and the full-grown acorns, which have taken two seasons to ripen, are ready to be shed. Each kernel sits in a straight-sided cup of loosely shingled scales, which form a fringe at the margin. The kernel is bitter, and yellow, as it is in most of the species of the Black Oak Group.

[*Illustration*: Leaves, mossy-cup acorns and warty twigs of the bur oak]

[*Illustration*: The horizontal limbs of the pin oak form a regular pyramidal head]

The large, downy, pointed buds of this oak will often determine its name for us when we are confused by the shapes of the leaves. Often the red oak and the black oak “run together” in their leaf forms. To determine the tree’s name we must call in the buds, the acorns, and their cups, and the general shape of the trees, and consider all these points together.

Black oak leaves are thick, coarse, and leathery. Crumple one in your hand, and you cringe at the harsh scratching noise it makes. They vary from four to ten inches in length, and from two to six inches in breadth. The margins are deeply cut into seven or nine broad, bristly-toothed lobes, with rounded bays between. The upper surface is dark green in summer, shining and smooth, or sometimes hairy. The lining is brownish and a remnant of the scurfy down is found in the neighbourhood of the veins. In autumn these leaves turn brownish-yellow, but rarely show a tinge of red.

The bark of black oak is stripped and carried to the tan-yards. Or it furnishes a yellow dye, used in the printing of calicoes. The wood is used in house-building, and in the manufacture of furniture.

## The Red Oak

The red oak is the tree most likely to be mistaken for the black oak. The bark is brown, with a decided red tinge. The twigs are also reddish, and the wood is red-brown. The inner bark has the same tinge instead of the orange-coloured lining the black oak bark has.

The red oak is a large, stately tree, sometimes 150 feet in height, and far more symmetrical than the black oak. Its leaves vary greatly in the depth of their marginal clefts, but in general they are oval in outline, and their lobes and sinuses are triangular. These lobes always point forward, rather than outward, along the sides of the leaf, and they always end in the sharp, spiny points that belong to the leaves of all the trees that fall into the Black Oak Group. Red oak leaves are thinner than those of black oak, and not so harsh when crumpled in the hand. Their linings are pale green and smooth in summer. Their autumn colour is deep red.

The buds of the red oak are pointed, smooth, reddish, and about one-fourth of an inch long. They are much smaller, and lack the down of the buds of the black oak.

Red oak acorns are the most distinct feature of this species. They are large, often over an inch in length, and broad, and they sit in saucers, instead of cups. These saucers are made of close scales, and they curl in closely at the top as if to tighten their hold on the nut, which extends two-thirds its height above this rim. The kernel is white, and extremely bitter.

## THE SCARLET OAK

The scarlet oak need not be confused with either the red or black oaks, for it is a far more dainty tree than either in its trim trunk, graceful curving branches, very slim twigs, and deeply cut leaves. In form, these leaves are oval, but so much of the “cloth” is cut away by the four or six deep bays along the sides that a small amount of green is left to do leaf duty. The slender lobes are strengthened by the branching veins, each of which ends in a spiny point. These almost skeleton leaves are beautifully lustrous and thin, a trifle paler beneath and sometimes hairy tufted at the veins. They are rarely six inches long, and the side lobes sometimes measure five inches from tip to tip. The leaf stems are long and flexible, and the whole tree top is as light and feathery and tremulous in a breeze as that of a honey locust or a willow. In autumn the scarlet oak blazes like a torch above the duller reds and browns of the woods, and keeps its brilliancy later than any other oak.

The acorn differs from the black oak in being smaller and daintier, and in having its cup drawn in tightly at the rim. The scales are smooth and close-pressed; the kernel white and bitter.

## The Pin Oak

 The pin oak has foliage much like the scarlet oak, but coarser and not so lustrous. Often a pin oak tree has leaves that approach the red oak in form, and these lead to confusion, if leaves alone are consulted in determining the name of the tree. There are better signs in any pin oak that set it apart from its larger-leaved relative. Consult the acorns. They are plump little nuts, as broad as long, rarely measuring one-half inch either way, pale brown, streaked with black in straight lines, down from the pointed tips, and they sit in shallow, saucer-like cups made of close reddish scales. As they fall, the nuts roll out of the cups, which are lined with hair. The kernel is white and bitter and yet, late in winter, it is very common to find them gnawed open by some hungry little four-foot, whose winter store threatens to run short.

The pin oak takes its name from the fact that its branches are thickly set with short, pin-like twigs, many of which die but do not fall. These stubs stay on for several years. This fact alone will soon enable us to recognise the tree from a distance. No other species is so close-twigged, and the symmetrical form of this tree is very striking in the winter. It is a pyramid with many small branches thrust out horizontally from the main shaft. Below the middle of the tree, the long branches have a downward thrust, and the lowest ones often sweep the ground. Above the middle of the tree the branches are horizontal, and they gradually become shorter, and the tree ends in a pointed tip. There is no oak that I know which has so much the pyramidal form of evergreens like the firs, hemlocks, and spruces.

On the avenues of the city of Washington, we shall find superb double rows of American trees. On one which leads to the Navy Yard, I remember the beautiful pin oaks, uniform in size, perfect in symmetry, that stood in a double row along the sides of the avenue. To the crowds of tourists who visit the capital city every year, I hope that this will be an object lesson. In most towns and cities every owner plants the trees he likes in front of his house, so our streets and avenues present a mixture of trees of all ages, sizes, kinds, and conditions. The better way is for the city to plant the same tree in double lines, the whole length of a street, as has of late years been done in Washington. One needs only to see these trees coming on, each year adding beauty and dignity to the city, to realise that such planting may be done easily anywhere in the country, where trees as beautiful as the pin oaks grow wild.

## The Willow Oak

A Southern tree with slender twigs and narrow leaves like those of a willow, surprises us by bearing acorns! It is the willow oak, a beautiful, graceful tree for shade and for avenue planting. The tree naturally chooses wet ground, but it thrives where the soil is deep and well drained. I remember a fine large willow oak in John Bartram’s garden in Philadelphia, and a young tree in the Arnold Arboretum in Boston. This little one grows rapidly, but the frost nips its twigs in the winter. The species grows wild from New York southward, just back from the sea coast, to Texas. In swampy land, it is found from Missouri southward.

Willow oak acorns are downy, yellow-brown, and set in shallow saucer-shaped cups. The kernel is orange-yellow, and bitter. Half-grown acorns are found with the ripe ones on these trees, and the dark, rough bark agrees with others of the Black Oak Group. Though the leaves have rarely a side lobe, but are mostly narrow and plain-margined, the tip ends in a spine, as all black oak leaves should.

# Trees with winged seeds

Why do the trees grow in such mixed groves, when Nature does the planting? Here and there we find solid groves of beech or oak, but the forest is, for the most part, a gathering together of all kinds of trees. A part of the beauty of any woodland is this variety in the planting. Under a tall oak we find a hornbeam, and under this the witch hazel, and under the witch hazel, a carpet of low woodland plants. We may walk in a straight line, or follow a woodland path a mile, and find every tree we meet is different from all the rest.

Many reasons explain the order in which Nature plants forests. One of the best of these is found in the kind of seeds trees bear. We shall find that trees most widely scattered are those whose seeds are winged. It is not hard to find, from May until far past midwinter, trees bearing light, winged seeds. All through the summer, the wind is busy sowing the seeds of the early-fruiting trees. In autumn, and all through the winter, the sowing of the larger crop goes on.

Let us begin our study with the maples, whose winged seeds every child knows. From the silver maple, whose seeds are dry before the first of June, there is a procession of ripening maple seeds that lasts throughout the year. A high wind shakes off the silver maple’s keys in showers in late May. Watch those in the tree-tops. The wind has a better chance up there. Each key, loosening from its twig, turns round and round in a dizzy whirl, and sails away still whirling as it falls, the heavy seed end always pointed downward. A tree is soon stripped, and the ground littered under it. But a great deal larger area than the tree’s shadow has the seeds scattered over it: the stronger the wind, the further these seeds go. Before the summer is over, a crop of little maple trees springs up from this sowing.

The red maple’s scarlet seed clusters turn brown, and the little winged seeds take flight in June. Lighter and smaller, they are carried longer distances than the seeds of the silver maple, and a crop of little red maples follows this June sowing of the trees.

I remember walking in a corn field in late June; the corn had been last ploughed a month before. Among the weeds that had grown up in this short time was a crop of young red maples, now six inches high. It was amazing to see these little trees grow so plentifully in a cultivated field. I looked for the seed tree, and there it stood on the edge of the field, the only maple tree in sight. A few young trees were growing in the matted grass of the roadside under the tree, but the great crop was from the seeds that flew out to the mellow ground between the corn rows. The disappointed seeds, those which fell and did not grow, were under the tree and in the dusty road.

In the autumn the hard maple, which we call the sugar maple, ripens its winged seeds. So does the three-leaved box elder (which is a maple) and the Norway maple, now a very familiar street tree. The wind takes its time, and the trees stubbornly hang on to their seeds, so that these maples are busy all winter with the sowing. Every day they give up a few, and many seeds that fall on the snow are picked up, again and again, by the wind and thus carried further and further away.

The maple seed, with its curiously one-sided wing, is the sign by which the maple family is easily recognised. Other trees have winged seeds, but none have the peculiar form of this one.

All summer long we may know the trees that belong to the ash family by the clusters of pale green darts that hang among their leaves. These are the ash seeds. Each one is a pointed seed case, containing the embryo plant, and out behind it extends the thin, light, two-edged wing. There is no one-sidedness to this blade. The seed is winged, but balanced like a dart. When the wind loosens one from the wiry stem, it goes like an arrow, seed downward. If there is a gale blowing, the seed may be caught up and borne far away in the upper air, before a lull lets it take a downward course, and drive its point into a snowbank, or into the ground. This little feathered arrow may be long or short, depending upon whether it belongs to the red ash, the white ash, or the black; but there is no mistaking an ash tree for any other, once the form of an ash seed is fixed in the mind.

I have said that a maple seed is shaped like that of no other tree. I must describe here the seeds of the needle-leaved evergreens, which, though very much smaller, are somewhat like maple seeds in form. Go to a pine tree or a spruce, and get one of the cones that has begun to spread its scales apart. Shake the cone over a piece of paper. If nothing comes out from between the scales, cut or break the cone open with knife or hatchet. Under each scale will be found two seeds, each with a thin, one-sided wing. Spruces, hemlocks, firs, and arbor vitæs, all have this same type of seed, hid away in the same fashion, under the protecting scales of their cones. Do you understand how the wind, blowing through the tops of evergreens, shakes the winged seeds from their places, and carries them far away? Do you understand why the ripe cones of these trees hang on so stubbornly, and spread their scales to allow the seeds to escape?

It is a peculiarity of the firs that they hold their cones erect. It would seem hard for the wind to get at the seeds, but the fir cones let their scales fall, and when they loosen, the seeds are freed.

Out of the balls of the sweet gum tree, which dangle on the twigs all winter, the wind shakes little winged seeds, not unlike those of the pines.

Do you know the catalpa’s long, green pods that hang all summer on the top of trees? They are longer than the newest lead pencil, and show no signs of splitting, until the autumn. Now, the two halves of the pod spread apart, and gradually the thin seeds shake out. Each one is in the centre of a thin, fringed wing, that looks as if made of tissue paper. The wind can carry these ghostly seeds for miles. Indeed, it is strange that they ever come to the ground, for they seem to have no thickness nor weight at all.

The birches all bear their seeds in cones, some long and pencil-like, others quite the shape of a pine cone. Under each quaintly notched scale of the cone, a seed is borne; and each heart-shaped seed has a thin rim, which acts like a wing, catching the wind as the seed falls. We shall look far in the woods before we find seeds daintier in form, or better sailors through the air, than those of all the birch family.

The hop hornbeam has a hop-like cluster of seeds, each in an inflated papery bag. When the leaves drop in the fall, the wind has a chance to pick off these little paper seed balloons, one at a time, from the clusters. Take off one of these little bags, open it, and you will find, set in the bottom, the shiny, pointed seed. It is likely to have a long journey, if there be a good breeze, before its bag is punctured.

Back to early May again, when the elm trees are green with their fruit clusters, before the leaves are fully out. Elm trees grow scattered through the woods, and no wonder: the seeds have papery rims, and the wind catches these little falling discs, and scatters them far from the tree where they were born.

The ailanthus tree, whose long, fern-like leaves make it look like a tree from the Tropics, is sowing its seeds all winter, with the help of the wind. Examine one. In the middle of a slim blade is the little seed. The blade is twisted as it ripens, and it sails through the air with a tilting, uncertain flight. After a look at a bunch of these seeds, and after throwing a handful of them out of an upper window, and watching them as they sail away, we shall understand how it is that ailanthus trees spring up in most unexpected places, year after year. And we shall bless the breeze that plants such trees along the hot pavements, and in the ugly back alleys of towns and cities, where few trees are able to grow at all.

# Tree seeds that have parachutes

It is a thrilling moment when the man who goes up with the balloon lets go at last, and drops to the ground. Before he drops, an umbrella-like parachute opens, and by its aid, he comes to the ground gracefully, slowly, and alights unhurt. Should anything go wrong with his parachute he would drop to his death, so every onlooker is anxious as he comes down, and breathes a sigh of relief when the wonderful feat is accomplished.

Seeds with wings sail away on the wind, and seeds with parachutes descend so slowly and gracefully that the winds carry them far out of their courses. The trees most fortunate in scattering their seeds, and thus colonising new territory, have peculiar devices.

The seeds of the basswood hang in clusters attached to a narrow, leaf-like blade. This is a parachute, by which the whole cluster is able to sail away on a good breeze. There is no seed parachute like this among our forest trees. By this sign alone we may know the basswood trees.

The balls of the sycamore bump against the branches, and tiny seeds with hairy parachutes are loosened and scattered. Each is a minute spike, which might drop to the ground, but for the umbrella-like parachute made of a brush of fine hairs. By this, the wind lifts the seed, and carries it away.

Willow seeds, and those of the poplar, are almost too small to be seen. Each seed is hid in a dainty fluff of white cotton, and in this the seed rides. We may miss seeing these trees in fruit, unless we look at the down which accumulates in June on the screens of windows and doors. The air is full of the fluffy stuff when the pods open. In a few days this harvest is over, and we may find the empty pods on the ground under our neighbour poplars, cottonwoods, and willows.

The blue beech, or hornbeam, has a parachute which is leafy, and crinkled so as to look almost like a little boat. The shiny seed sits in one end, and when it gets free, it has a fine long sail through the air before it settles to the earth.

There are wings and parachutes on the seeds of other trees. When you find them you may know that the wind is the partner of the tree, by robbing it of its children. The wind is saving those children from death, which would have been their fate, if they fell on the ground under the shadow of the parent tree. If all the fields that adjoin the woods were left uncultivated for a few years they would grow up to forests. We know the name of the sower, who gathers seeds in the woods, and plants them; who is busy all the year at the endless work of the harvest and the sowing.

# The autumn Berries in the woods

In the roadside thickets, as the summer wanes, the berry clusters of the shrubby viburnums turn red, and soften, and in September change to a vivid, or a dark blue. They are very pretty on their coral red stems, and look like little plums. Indeed, they are not unpleasant to taste, but it is the birds who delight in these sweetish, juicy berries, and we are willing that they should have them all. The names, sheepberry and nannyberry, are given to these little trees, because sheep are said to browse on the foliage and shoots in spring.

The blue berries of the sassafras, also on coral red stems, are not unlike those of the viburnums in appearance, but fewer in a cluster. The birds take them eagerly before they are fully ripe. To leave them until they ripen would be to lose them to other birds.

[*Illustration*: Cone fruits of (1) a birch, (2) a pine, (3) a magnolia, and (4) a fir]

[*Illustration*: Clusters of the winged seeds of hornbeam and white ash]

The dogwood berries are redder than the whorl of leaves that surround the fruit clusters in early October. These waxy berries have taken the place of the central cluster of small flowers, which were surrounded in spring by the four large, white bracts.

It is the birds who first accept the invitation of these little trees. The migrating hosts turn southward in September, and in October the bird procession is in full swing. We hear them overhead, often so high in air that we cannot see them. Tired of the long flight, they descend for food and water, and if the neighbourhood has many fruiting dogwood trees, the joy of the winged voyagers is correspondingly great. In a surprisingly short time the hungry birds have taken the last one.

Far in the winter we shall find red berries glowing in clusters on the mountain ash trees, among the evergreen holly leaves, and in conical spikes on the sumachs. The winter birds ignore these dry, insipid seeds, until everything else is gone. Frequently, when winter snows cover up all other foods, the berries of these two trees stand between the birds and actual starvation. So it happens that many a mountain ash is stripped of its fruit during the early days of March, and the holly berries which have glowed red all winter disappear for the same reason. The sumachs are rarely stripped as closely as the other two.

In September the hackberry hangs full of its sugary fruits. It is surprising to find a tree which looks like an elm, yet bearing soft, purple berries. But this, we shall learn, is the hackberry’s way. Under each leaf a long thread grows, on the end of which is a single, oblong berry, the size of a pea, but not the same shape. The fruit hangs on late into the winter, if the birds will permit such a thing, and it is a grateful supply of food to birds that winter in the North. If there were no other reason for planting hackberry trees, they are worth having as fruit trees for the refreshment of birds.

The autumn colour of hackberry leaves is yellow. The purple fruits make little show, until the leaves fall. The bark of the tree is its chief peculiarity. On the trunk it is deeply checked into small, thick, warty plates. The branches are often ridged and broken into warty excrescences that stand close together.

The leaves are peculiar. There is no other tree that has not a main vein, or a rib, which prolongs the leaf stem straight to the tip. The hackberry leaf stem divides into three equal branches at the base. The two side branches are shorter than the middle one, but their size is unusual.

It is in autumn, of course, that the hackberry earns its name, sugarberry. The bark will guide us to the tree at any season. The leaves fix in mind another important family trait. The berries we may safely taste to find out if they are as sugary as we are led to expect.

Nettle tree is the common name of the European hackberry. You may have read of the lotus-eaters, who, tasting the sweet fruit of this little tree, straightway forgot their native land, and could not be persuaded to return. The wood is tough and peculiarly adapted to make the handles of hayforks, and similar agricultural implements. Young trees are grown for these uses. The roots remain alive and send up suckers, slender but tall. These are cut for walking sticks, whipstocks, and ramrods for guns. Older trees furnish wood, as hard as box or holly, and beautiful as satinwood when polished. This is a material which the wood-carvers delight to use. The tree is widely planted for shade, and its leaves are used as fodder for cattle.

Bad as its reputation is, according to the tradition that its fruit had power to rob men of their patriotism, yet this is one of the most useful little trees. It grows easily, and is contented on land that is worthless for other purposes.

Besides the hackberry, another big tree in our woods bears a crop of purple berries in September. That is the wild black cherry. The bark of this tree is dark brown and shining, and satiny smooth on the branches. It breaks on the trunk into rough, squarish plates, which curl horizontally at the edges. The plates still retain the silky outer bark, whose fibres run crosswise, and whose surface has many slit-like, horizontal breathing holes.

We are strongly reminded of the birches, especially the cherry birch, which has dark-coloured bark, and has its name from its resemblance to this tree. The thin young bark of the black cherry curls in a very birch-like fashion. One difference is very marked. The bark of the cherry is bitter, with the flavour of the pit of a peach or cherry. Birch bark is pleasantly aromatic in flavour.

The fruit of the black cherry is more plentiful than that of the hackberry. The close-set side shoots on the new twigs end in fruit clusters two or three inches long, and often containing a dozen berries each. The sweet pulp is flavoured with the bitter taste of cherry pits, a flavour found in the sap of this tree. Nibble the bark, or a bit of cherry wood, a leaf, or the tip of the root, and you get the same Prussic acid taste. I do not like wild black cherries, but many people do. Children and birds seem not to notice the bitter with the sweet. They eat the berries as soon as they change colour, with evident enjoyment.

Cherry brandies and cordials are made from the fruit by people who rely upon old-fashioned home remedies. These are the people who chew the bitter opening buds of the wild cherry in spring, as they drink sassafras tea, believing that spring is the time to clear the blood, and that Nature offers free remedies far better than they can buy in bottles.

We cannot wonder that wild cherry trees spring up in the woods, in fence corners, and along roadsides. The birds are feasting in the trees each autumn, and until the last berry is taken. They are the sowers of the seed.

Our greatest objection to the wild cherry is the fact that its shining young leaves are regarded by the apple tree tent caterpillars as particularly good. When the white blossom clusters deck this tree in May, we often see a web of white silk wrapping together some of the upper branches. Day by day the web is extended, and the twigs are stripped of their leaves by the host of caterpillars which return at night to the tent, and range more widely in the day time. When the tent is as large as a peach basket, it is found empty, for the caterpillars have descended to the ground, spun their cocoons, and will soon emerge as winged moths, to lay their eggs, from which later broods of caterpillars come. The winged females are very likely to seek the nearest orchard, and lay their eggs in bands around apple twigs. Many an otherwise harmless roadside wild cherry is a deadly menace to an orchard because it breeds the insects, which, in a second generation, become a serious pest among the apple trees.

In the forest the lumberman is glad to find wild black cherry trees of large size. The lumber is very valuable for interior finish of houses, and for furniture. It is hard, and close-grained, and dark reddish-brown in colour, with a lustre, when polished, that puts it in the class with mahogany and rosewood. It is more often used nowadays as a veneer on cheaper woods. Parlour cars and steamships, and fine houses are very often finished in cherry. The small limbs and other bits of the lumber are utilised for tool handles and for inlay work. The wood is too valuable to waste.

The largest berry that grows on a tree in the woods of the United States is the persimmon. We should mistake this berry for an apple, perhaps, when we see it for the first time—a little, orange-brown apple, one to two inches in diameter. But there is no core such as apples have, though there are from one to a dozen seeds in each fruit.

The persimmon tree is tall, with a handsome round head, and zig-zag, twisted branches. It grows from Rhode Island west to Kansas and south to Florida and Texas. It is found scattered in mixed woods, and comes up in fence rows and in abandoned fields wherever the seeds have been dropped. Light, sandy soil is this tree’s preference. Although it is a relative of the ebony of Ceylon, our persimmon is not an important lumber tree. Its wood is hard, dark-brown in colour, and is used for shoe lasts, tool handles, and various other small articles.

In the South the persimmon ranks among the choicest of fruit trees. The negro and the possum await the ripening of the ’simmons with eager eyes, and the Southerner, born and bred, confesses an equal interest in this native fruit. There is a long waiting period between the time when the persimmons change colour from green to reddish-yellow and the time when the frost mellows and sweetens the pulp, and takes away the harsh, puckery taste which draws the lips and chokes the throat as if the fruit were a lump of alum. The Northerner who judges by its appearance only, dares to taste this fruit before it is ripe. He cannot be persuaded to try it again. And he cannot understand the enthusiasm for persimmons that all people in the South feel.

A ’simmon tree, when the fruit is ripe, belongs to the first comer. The negro and the opossum come into direct competition for the fruit of this tree. You might think the negro would kill the opossum, and be rid of his rival. He knows too much for that. “’Possum an’ ’simmons come together, and bofe is good fruit.” Better divide the ’simmons with the ’possum and his family. Then get the fat ’possum for the Christmas dinner. There is no ’possum like the one that is fattened on persimmons, so it pays to be patient and leave the beast his share of the fruit.

In a hollow tree, or a woodpile, the opossums sleep by day, and trail out in companies to climb the persimmon trees at night to feast. They hang by their tails on the branches, or prop themselves in crotches of the limbs within easy reach of the soft, sugary berries. The fatter they get, the lazier they are; and as the season advances, and the fruit falls, the opossums are likely to satisfy their appetites with the persimmons they can pick up under the trees. Along about Thanksgiving day, or Christmas, the day of reckoning arrives, when the negro hunter comes home with the opossums which have stolen his persimmons. The whole score is wiped out by the opossum feast, which suitably closes the season.

Persimmons improve, the longer they hang upon the trees. As late as January or February, little trees scarcely a dozen feet high, which have been overlooked in the ’simmon harvest, are found to be still hung with fruits exceptionally large and fine. To the hungry and thirsty hunter, prowling for quail in the underbrush, these unexpected fruits are a delightful surprise. They are delicious, sugary lumps, rich in flavour, and juicy, taking away both hunger and thirst, and leaving no after-taste that is bitter or puckery, suggesting their unripe stage.

Japanese persimmon trees, whose fruit is larger and better in every respect than our native species, have been successfully introduced into California and the Southern states. These persimmons look like great ripe tomatoes as we see them on the fruit stands, but these, too, must wait until they are thoroughly ripe before they are fit to eat.

# The changing colour of the autumn woods

All through the autumn, when the wonderful colours come in the forest leaves, we shall see the green of these leaves creeping back along the veins. The horse chestnut leaves tell a very interesting story. They turn brown first upon the edges. If we watch a single leaf for a whole week in September, we may see the green gradually draw in towards the central stem, and the brown papery borders widen, just as if something were squeezing and crowding the pulp of the leaf, inch by inch, back through the leaf stem into the twig. The last traces of green linger along the sides of the veins, and before it falls, even these leaf channels will be drained dry.

When the leaves of a sugar maple give up their pulp there are wonderful changes inside each leaf. A yellow liquid fills the cells where the green pulp used to be. Chemical changes in the mineral substances deposited in the leaf cells produce wonderful shades of red and yellow, which glow where once the leaf was solid green. Iron is one of the minerals brought up in the soil water, left in the leaf, and changed to produce the bright red when the leaf mask of green is taken away.

The scarlet maple remembers its name in the autumn days. It puts on a cloak more brilliant perhaps than the sugar maple, which has a good deal of orange as well as red in its autumn foliage. The scarlet oak is amazingly brilliant; so is the sassafras and the sweet gum. The tupelo, or sour gum, also called the pepperidge, has foliage that is splashed and streaked with various shades of red and yellow. Each little leaf is so brilliantly polished that the tree’s beauty and colour seem to be doubled by reflection. The sumachs of the roadside thickets wear foliage of scarlet, each leaf drooping away from the fruit pyramid which rises, a deeper crimson, on the end of each upright shoot. The foliage and the fruit together make a colour harmony that is dazzling, indeed.

In contrast with its umbrellas of red leaves are the scarlet berry clusters of the flowering dogwood. This tree has the habit of snuggling up against the trunk of large forest trees and reaching its white flowery arms out to us in spring. How wonderful they are, on the edge of the woods, with the green leaves of the larger trees making a background for their flowers! In the autumn the same surprise awaits us, when under a towering tree with yellow or russet foliage, the dogwood leaps up like a scarlet flame, against its dark background, holding straight out its platformed branches of red leaves, tipped with berries, like rubies, set on the upturned twigs.

Often the trees are stripped by birds before the berries are ripe. It is in woods where the trees are numerous that we shall find the fruit reaching its perfection of ripeness and colour.

Among the trees that turn to purple in the autumn we may name the white oak and the ashes. Many oaks turn from green to russet, without showing any red or yellow. The lindens and the tulip trees and the beeches turn yellow; so do the poplars and willows, the hickories, and walnuts. Up and down the street you may see the yellow crowns of the silver and the Norway maples, and on the lawns the white birches have also turned to gold. The deepest red is on the black and red oaks. The brightest red is on the scarlet oak.

[*Illustration*: The flowering dogwood covers its bare branches with blossoms in May]

[*Illustration*: Flowering dogwood, in flower and fruit, the winter flower buds and alligator-skin bark]

It is not fair to charge Jack Frost with all the gay colours of the autumn woods. Perhaps I should say, rather, that he does not deserve all the credit people give him for painting the landscape with the sunset glories of the dying leaves. The cause is the ripening of the leaves themselves, as I have already explained. Frost may hasten the process, but if a heavy freeze comes in September, before the leaves have coloured, we lose our chance for autumn colouring that year. The leaves drop as if scalded, and the trees lose their leaf pulp, which they had expected to withdraw and save for future use. A long dry autumn of warm days and mildly frosty nights produces the finest succession of colours.

Countries that have a more moist, warm climate than ours, do not have the vivid autumn colours that we enjoy. England, and the countries of Western Europe, are like our West coast in lacking the colour changes that make October for us the most glorious month of the year. Our New England woodlands and the forests of Canada are matched in brilliancy by the wooded slopes of the Swiss Alps, and the forests along the Rhine and the Danube. In our Southern states there is little or no change that comes to the foliage towards the end of the year. The leaves on the trees of Florida are lazy in falling. They wait until pushed off by the swelling buds in early spring. Many trees that shed their leaves promptly each autumn in the Northern states, gradually become evergreen in the Southern parts of their range. The longer a tree carries its leaves, the more battered and worn they become. A tree with fresh, new leaves mingling with old ones is not a pleasant object, at least to Northern eyes. This is the way most trees in the South look in spring.

If we should travel the world over, and see the trees of many lands, in spring, in summer, in autumn, and in winter, I believe we should all come back to the clean, beautiful mixed woods of our north temperate zone, and declare that these woods are the most beautiful in the world. In the dead of winter, they are budded full of promise. We learn to love them as well in this period of rest as we do in the beauty of their spring flowers, or in the glory of their autumn colouring, or in the steady growth of summer.

Each leaf is nurse to a bud that is growing between its base and the twig. Find these little buds on any tree with broad leaves. A part of all the food that passes that way stops to feed this growing bud; and in the late summer the twig provides for the future welfare of all its buds. The thrifty tree withdraws the green pulp from its leaves, before it lets them fall. A store of starch is put away in the twig, close to each bud. This is the food supply which will be used in the spring to enable the bud to open and spread its young leaves, or its flowers, in a surprisingly short time.

When the worn-out leaf has been drained of all of its pulp, the tree lets it go. It has done its work, and given up its pulp to be stored in the twig for future use. It seems as if the tree knows that, with the coming of cooler weather, growth must stop; that the tender leaves must die when frost overtakes them. So it is a frugal habit to save all of the good green leaf pulp, and to cast off only the dry leaf skin.

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