Chapter 31

Plants

"The earth's vegetation is part of a web of life in which there are intimate and essential relations between plants and the earth, between plants and other plants, between plants and animals."

—Rachel Carson (Her 1962 book *Silent Spring* questioned the use of pesticides and aroused worldwide concern for protecting the environment.)

Shade. Nourishment. Beauty. Breath. Life. The contributions of plants and plant communities are vital to existence. Vegetation is so universal that it is easy for us to overlook what is all around us. When we take notice, though, we can begin to see the astonishing diversity of the plant kingdom. In size, shape, aroma, texture, and means of adapting to their settings, plants are remarkable members of ecosystems, connected with all other species on the planet.

You can find plant life almost anywhere. Deserts, prairies, shorelines, and urban parks abound with a stunning variety of vegetation. Plant communities thrive in the mountains, too, and bring richness and variety to wetlands, woodlands, tundra, and forests.

Plants pump oxygen into the atmosphere and cleanse it of carbon dioxide. They offer shelter and food for wildlife. Vegetation forming ground cover slows the runoff of rain, allowing it to seep into the earth. Roots prevent soil from washing away. Decaying leaves and other plant matter enrich the soil. In their simplicity and grandeur, members of the plant kingdom are key elements in the cycles of nature, and essential components of all ecosystems. Two plant communities of particular interest to outdoor travelers are forests and prairies.

Forests

From the highest branches to the deepest roots, a forest forms a belt of life up to several hundred feet thick composed of thousands of species of plants and animals. Broad-leaved forests dominate the eastern United States, while conifer forests cover much of the West. These great stands of vegetation shield Earth from the forces of wind, rain, and sunlight. They slow erosion, act as watersheds, and provide havens for animals. Photosynthesis—the process by which most plants manufacture their food—produces oxygen and removes carbon dioxide, which continually freshens the air.

A mature forest consists of levels, or *strata,* all of them essential to the health of a forest ecosystem. Typical forest strata are the canopy, understory, shrub layer, herb layer, and litter layer.

Canopy

The branches and leaves forming the highest reaches of a forest—the canopy—capture maximum sunlight. They also provide shelter and shade for the strata below. Formed by the largest and oldest trees, the canopy is home to birds, climbing mammals, and insects.

Understory

Smaller and younger trees thriving in the broken shade beneath the canopy form the understory of the forest. As canopy trees die, some in the understory will grow to take their places.

Shrub Layer

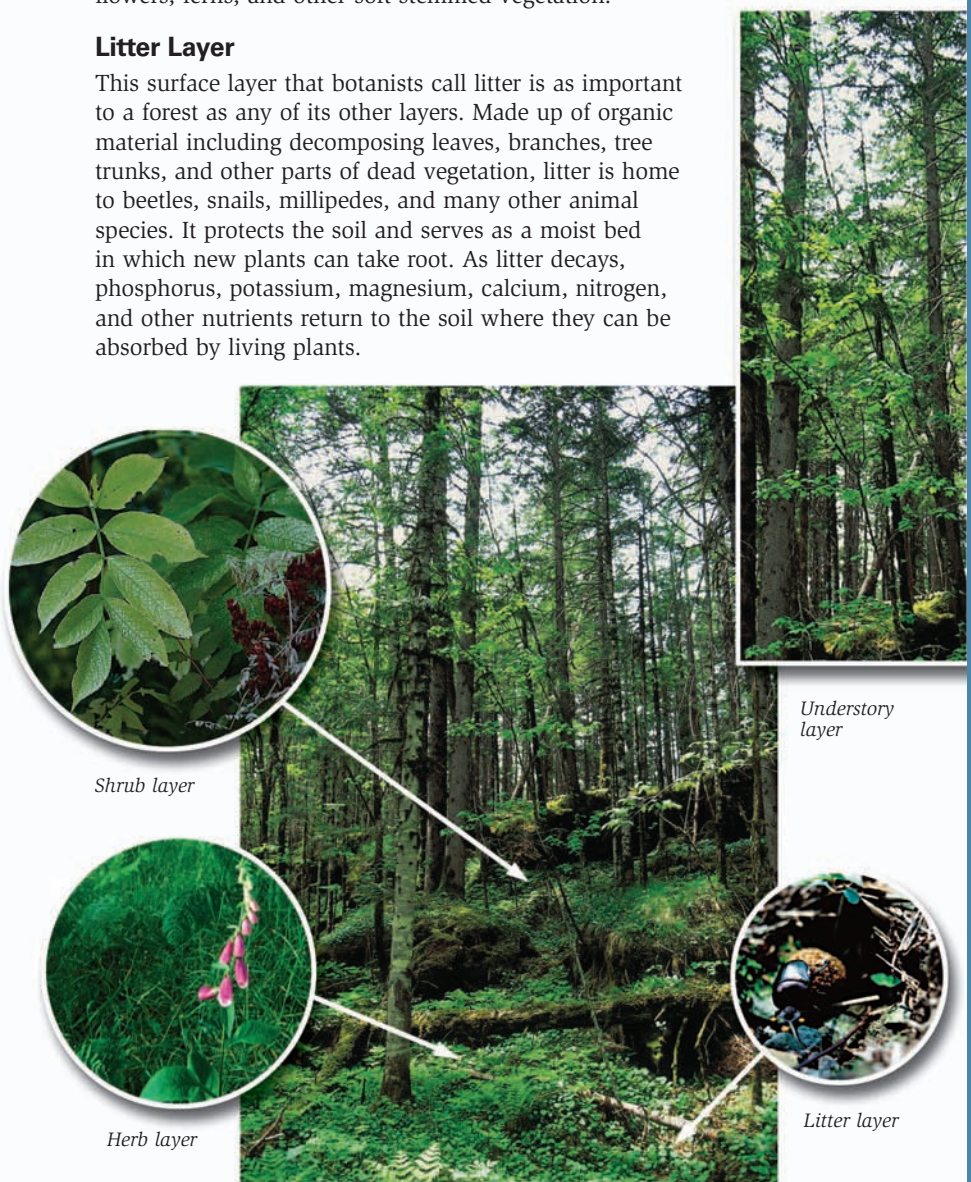
Bushes and thickets of plants with woody stems form the shrub layer, which rises above the ground to about shoulder height. It is this layer that can pose a serious challenge to off-trail travelers when dense vegetation makes hiking difficult.

Herb Layer

A forest's herb layer is composed of the dense ground cover of grasses, flowers, ferns, and other soft-stemmed vegetation.

Litter Layer

This surface layer that botanists call litter is as important to a forest as any of its other layers. Made up of organic material including decomposing leaves, branches, tree trunks, and other parts of dead vegetation, litter is home to beetles, snails, millipedes, and many other animal species. It protects the soil and serves as a moist bed in which new plants can take root. As litter decays, phosphorus, potassium, magnesium, calcium, nitrogen, and other nutrients return to the soil where they can be absorbed by living plants.



Nurse Logs

Long after their deaths, trees falling to the ground play an important role in the life of a forest. Termites, beetles, worms, and other creatures burrow into the wood, allowing moisture to seep in. Fungi and mosses take hold, softening the wood and creating an inviting germination bed for larger plant species. Covered with young vegetation and slowly decomposing into the forest floor, these old trees act as "nurse logs" that help ensure the health of future generations of vegetation. They also provide important cover for small mammals, reptiles, and amphibians.

Prairies

Grasslands cover nearly a fourth of Earth's land surface, creating ecosystems that rival forests in complexity and importance. The steppes of Asia, the savannas and veldts in Africa, and the pampas of South America all are vast grasslands. In North America, the term for extensive grasslands is prairie.

Just as trees are the most noticeable members of a forest community, prairies are dominated by grasses. Storms batter them, animals trample and graze upon them, droughts dry them out, and fires consume them, but grasses endure, recovering quickly from nearly all abuse to thrive again.

Like a mature forest, a fully formed prairie is made up of distinct layers. Big bluestem and similar grasses tower above other species to form a prairie's tallest stratum. Interspersed among the grasses are wildflowers—pasque-flowers, prairie goldenpea, shooting stars, wild roses, and many others. As prairie grasses and flowers die, they mat down to create a dense, tough ground cover. The roots of plants extend deep below the surface, creating stability and guarding the soil from erosion.

Various species of animals thrive upon different levels of the prairie, from antelope, bison, and other mammals grazing on the grasses to earthworms, prairie dogs, and moles finding shelter underground. Many find cover in riparian zones—borders of trees and other woody vegetation growing along the moist banks of prairie streams. By shading the water, the trees of riparian zones can make streams more inviting for fish and other aquatic species. Isolated trees and prairie brush also serve as home for birds and other wildlife.

Old-Growth Forests and Native Prairies

Forests that have never been felled and prairies that have never been plowed are mature ecosystems with finely tuned cycles of growth and decay. Large numbers of plants and animals are interwoven to create a rich diversity that makes these environments very stable. As with wilderness, old-growth forests and native prairies are important for their biological diversity and as reminders of the astonishing ways in which nature functions when left undisturbed by people.

Forest Fires and Prairie Fires

Most fires in forests and prairies are naturally occurring events caused by lightning. Such a fire might burn thousands of acres of timber and sweep across miles of prairie. To those who liked the prairie and the forest as they were, a fire might seem like a great waste. However, the flames that char the trees also consume much of the brush and dead wood choking the understory of the forest, releasing nutrients into the soil and providing a fertile bed for new growth.

Mature trees often can withstand the heat of occasional fires because their bark is dense enough to prevent them from being seriously damaged. The cones of some pines open only after they have felt the heat of a fire, germinating in the ashes and sending up saplings as a new forest begins. Animals can move more freely through land opened by fire, and can browse on the newly sprouted vegetation. Even when large trees are completely burned, the land is left ready for the process of forest succession to begin once more.

Likewise, fire has always been a part of healthy grassland ecosystems. Fire burns away dead prairie vegetation and fire-intolerant invasive plants, releasing nutrients that can be absorbed by the root systems of existing plants and by germinating seeds. The prairie is refreshed and able to thrive again.

Much modern concern about fires results in part from our efforts to manage forests. Forest management practices that seek to eliminate all fires and timbering can allow fuel loads to build up on forest floors, leading to infrequent fires that are hotter and more destructive than might have occurred if the natural cycles of fire and regeneration had been allowed to play themselves out.

For more on ways to help protect the outdoors, see the “Leaving No Trace” section of this book and the chapter titled “Being Good Stewards of Our Resources.”

Plant Divisions

There are hundreds of thousands of known species of plants. Botanists organizing vegetation into understandable groups have classified all complex plants as members of one of five divisions—mosses, club mosses, horsetails, ferns, and seed plants.

Mosses (Bryophytes)

Mosses are small, nonflowering plants generally not more than a few centimeters tall that grow in rock crevices, on forest floors and tree trunks, and along the banks of streams. Many have a small spore capsule at the end of a stalk that rises above a leafy base. Haircap moss, apple moss, and the closely related liverworts and hornworts typify this group. Most of the mosses and their close relatives live in moist areas on land.


Moss

Club Mosses (Lycopsids)

Despite the name, club mosses differ from true mosses because they are vascular—that is, they have veins. Club mosses play a small role among today's plants. Eons ago though, they included vast forests of trees up to a hundred feet tall, forests that scientists believe were to become many of the coal deposits of Europe and North America.


Ground pine

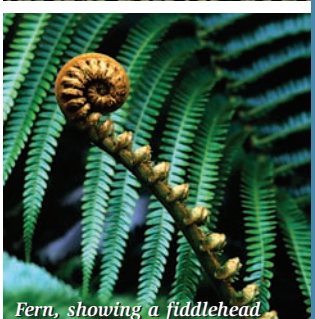
Horsetails (Equisetophytes)

Horsetails are an ancient group of plants, relatively unchanged for eons. These plants with hollow, jointed, and usually grooved stems reproduce with spores rather than seeds, and thus have no flowers. Strobili, cone-shaped structures atop the horsetail stems, produce the spores. Horsetails have been used for medicinal purposes and as scouring brushes for cleaning pots.


Horsetail

Ferns (Pteridophytes) and Their Allies

Although they share with seed plants the presence of chlorophyll and vascular tissues, ferns reproduce without seeds. Ferns often have lacy leaves called fronds. Uncurling in the spring, the fronds of some ferns resemble the decorative ends of violins, and thus are called fiddleheads. Ferns are most abundant in the shade of moist forests. Fern allies include closely related whisk ferns, horsetails, quillworts, club mosses, and spike mosses.


Fern, showing a fiddlehead

Giant sequoia

Seed Plants (Spermatophytes)

The great majority of Earth's plants are those that produce seeds. Among them are the most ancient living beings on the planet, including 4,000-year-old intermountain bristlecone pines, and the largest, including giant sequoias that can achieve a mass of more than 2,500 metric tons.

Seed plants are divided into two groups: nonflowering plants (gymnosperms), such as conifers, ginkgos, and ephedras; and flowering plants (angiosperms), such as wildflowers, grasses, and flowering trees and shrubs.

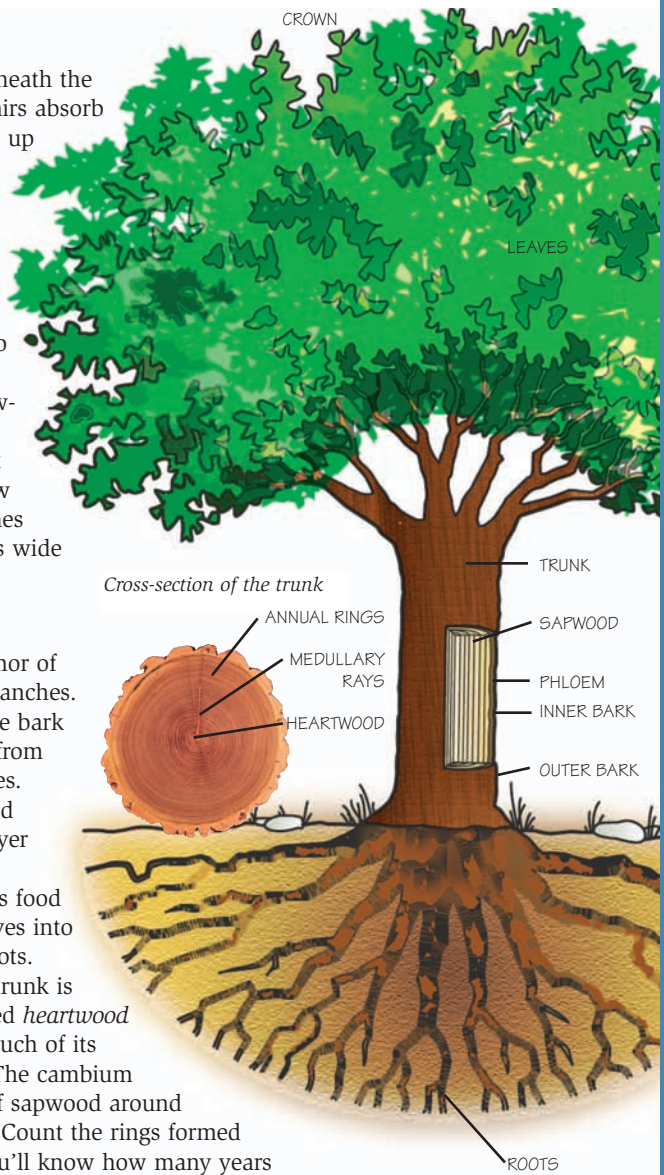
Trees

Many thousands of species of trees grow in North America, and thousands more flourish in other parts of the world. Trees are characterized by their size (usually taller than the height of a person) and by the fact that each usually has a single woody stem, or trunk. (Shrubs, on the other hand, have multiple woody stems, and seldom grow much beyond 8 to 10 feet in height.)

Anatomy of a Tree

Roots

Much of a tree is beneath the ground. Tiny root hairs absorb moisture and send it up into the tree. A root system also is the anchor that holds a tree upright, even in high winds. Some trees have taproots that extend deep into the earth. Others, especially those growing in thin or rocky soils, have roots that spread out just below the surface, sometimes achieving a radius as wide as the tree is tall.



Trunk and Bark

Bark is the outer armor of a tree's trunk and branches. Sapwood beneath the bark transports moisture from the roots to the leaves. Between the sapwood and bark is a thin layer of tissue called the *phloem* that channels food produced by the leaves into the trunk and the roots. In the center of the trunk is hardened wood called *heartwood* that gives the tree much of its structural strength. The cambium grows a new layer of sapwood around the trunk each year. Count the rings formed by the layers and you'll know how many years a tree was alive.

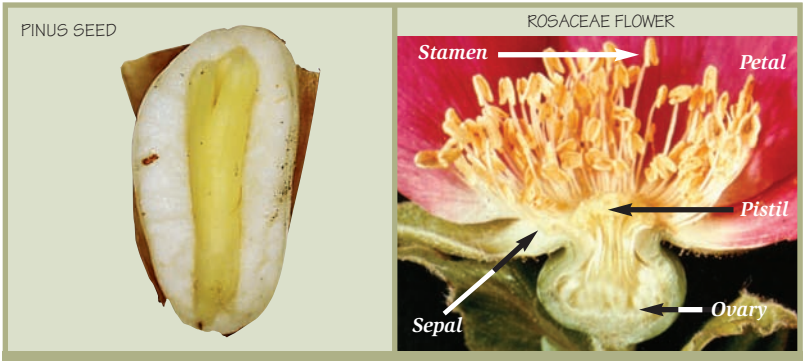
Leaves

Chlorophyll, a chemical compound in leaves, draws power from sunlight to convert carbon dioxide and water into plant food. This process, called *photosynthesis,* also returns oxygen to the atmosphere. Green plants produce the oxygen that supports all of Earth's animal life, humans included.

Conifers

Conifers are a type of gymnosperm—plants with naked seeds tucked inside the cones. Exposed to the elements, conifer ovules can be fertilized directly by windblown pollen. Rather than relying on insects to aid in pollenation, conifers release pollen that blows from tree to tree, an ideal transport mechanism in alpine regions and other settings where there are plenty of breezes but perhaps not many bugs. The compact Christmas-tree shape of pines, firs, spruces, and other conifers helps them shed rain, snow, and wind.

Conifers are particularly well-suited to high elevations and northern latitudes where growing seasons are short. The needlelike leaves of most conifers don't fall off, allowing those trees to spur growth as soon as the days begin to warm in the spring. (There are a few deciduous conifers, including cypress, larch, and tamarack, that do lose their leaves.)



Conifers and Broad-Leaved Trees

The two large groups of trees are conifer trees and broad-leaved trees. Broad-leaved trees bear flowers, and most are deciduous—they shed their leaves, typically in autumn, and grow new ones in the spring. Many fruit trees, including the apple, apricot, and plum, are of the rosaceae family. Its flower contains the stamens, pistil, ovary, petals, and sepals, all of which are crucial to reproduction.

Conifers, also known as evergreens, are cone-bearing trees with needlelike or scalelike leaves that stay on many of the trees for several years. The seeds of a pine tree will remain inside the cone for up to two years until the cones open, allowing the seeds to fall out.

Broad-Leaved Trees

Broad-leaved trees are angiosperms—flowering plants with ovules protected inside ovaries. Fertilized ovules develop into seeds. Unlike the cones protecting the seeds of conifers, seeds of broad-leaved trees are enclosed in fruits such as nuts, or some other forms of seed cases.

As their name implies, most of these trees have wide, flat leaves. Many broad-leaved trees have trunks that branch out into round, airy shapes. They do well where conditions during the growing season are not harsh. Everything about them, from leaf shape to the orientation of branches, plays into their survival and their ability to adapt to their environments. Losing their leaves in the autumn, for example, helps protect branches from breaking under the weight of winter snows.

Why Leaves Change Color

Each autumn, the foliage of many broad-leaved trees turns from green to brilliant red, orange, or yellow, and then brown. In fact, those bright hues were in the leaves all summer, hidden beneath the green of the chlorophyll. As the growing season comes to an end, a tree's food production drops and so does the amount of chlorophyll in the leaves. The green fades, allowing the fiery colors to show through.

Another change causes a layer of cells at the base of the leafstalk to cut tissues holding the leaf on the tree. The leaf falls to the ground where it will decompose, returning nutrients to the soil.

Identifying Trees

You don't have to know the names of trees to appreciate them. "The biggest tree in our campsite" might be all the identification you need to share information with friends who have pitched their tents in the same place.

Knowing the name of the tree can open a world of information to you. If you discover that the tree is an ash, you can easily research its geographic range, qualities of the wood, the tree's fruiting bodies, its life span, and ways in which it interacts with other species.

Identifying a tree can be simple. "You can tell a dogwood by its bark," the old-timers say, and they're right. The appearance of the bark is one of several important pieces of evidence that can lead to discovering the name of a tree. Other characteristics to notice are its shape, leaves, and the way it fits into its environment.

Tree Shape

A tree's silhouette can be as distinctive as a fingerprint is for a human. Some trees spread great branches of leaves toward the sky to absorb as much sunlight as possible. Other trees have shorter, tighter shapes that help them endure storms and shed snow. Here are some of the most common tree shapes:

Pyramid

Column

Palm

Weeping

Round

Cone

Irregular

Oval

Vase

Bark

Tree bark is notable for its variations in shape and texture. Some varieties are shown here:

Peeling

Plated

Smooth

Flaked

Furrowed

Leaves

While shape and bark reveal much about a tree, its leaves probably are the most commonly used clues for determining its identity. For starters, leaves of conifer trees are in the shapes of needles or scales. Those of deciduous trees are broad, and might appear singly, in various combinations, or in sets that alternate on a branch or are opposite one another. Basic leaf shapes of broad-leaved trees include the following:

Narrow

Lobed fan

Egg-shaped

Heart-shaped

Veined fan

Long pointed

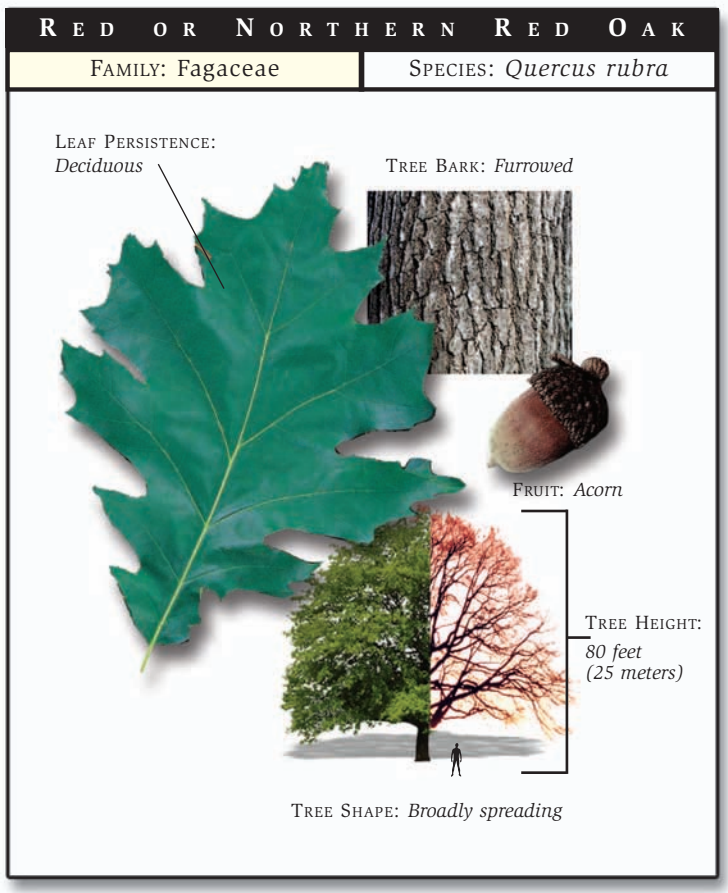
Nomenclature of Trees and Other Plants

Plant naming can be very specific, using Latin terms to describe each species. This system of using standardized names, or *nomenclature,* allows botanists and others who study plants to share accurate information about particular plant species.

Plant Keys

The most useful tools for studying plants are plant keys, which group plants based on similarities they share. Plant keys are available both as books and as interactive Web sites.

A powerful aspect of a plant key is its ability to guide you step-by-step to the identity of a plant species. Each plant key addresses particular kinds of vegetation (trees, for example, or mushrooms or wildflowers), and may be further focused on a specific region (the trees of North America, for instance, or the mosses and ferns of the Pacific Northwest).



Using a Plant Key

Plant keys typically are constructed with an either-or format, asking you to answer a series of questions that will steadily narrow your choices until you come upon the specific description of the plant you want to identify. A typical sequence might lead you this way:

1. Needlelike leaves or broad-leaved? If broad-leaved, then . . .
2. Compound leaves or simple leaves? If compound, then . . .
3. Thorns or spines present, or thorns or spines absent? If without thorns or spines, then . . .
4. Are leaves smooth, toothed, or lobed? If lobed, then . . .
5. Are leaves arranged opposite each other on the twigs, or do they alternate? If opposite, then . . .
6. Are leaves heart-shaped or oval? If oval, then . . .

Identification keys are available for trees, shrubs, flowers, and many other plants, as well as for mushrooms and animals.

Once you have identified a plant, the plant key can provide a wealth of information about the species, often including its normal geographic range, its general size and shape, and descriptions of fruiting bodies, leaves, and bark.

Plant identification is most effective when it is done in a plant's natural setting where you have a wide range of clues to help you—appearance, aromas, and evidence of the interaction between a particular plant and other species of plants and animals. You also can observe the full array of leaves and determine whether they are staggered, opposed, or in clusters.

Identifying Dormant Trees

Most conifers look much the same in the winter as they do in the summer; however, dormant broad-leaved trees will have lost their leaves, and also will be missing color, aroma, and other clues useful in determining their identity. You might be able to make an accurate identification using the tree's bark, shape, and orientation of branches and twigs. A leaf picked up from the ground beneath the tree also can be a strong clue, though there's a possibility it is from a different tree, blown there by the wind. Make your best winter guess as to the identity of a tree, then come back in the spring or summer and see if your guess was right.

A Sampling of North American Conifers

Pines

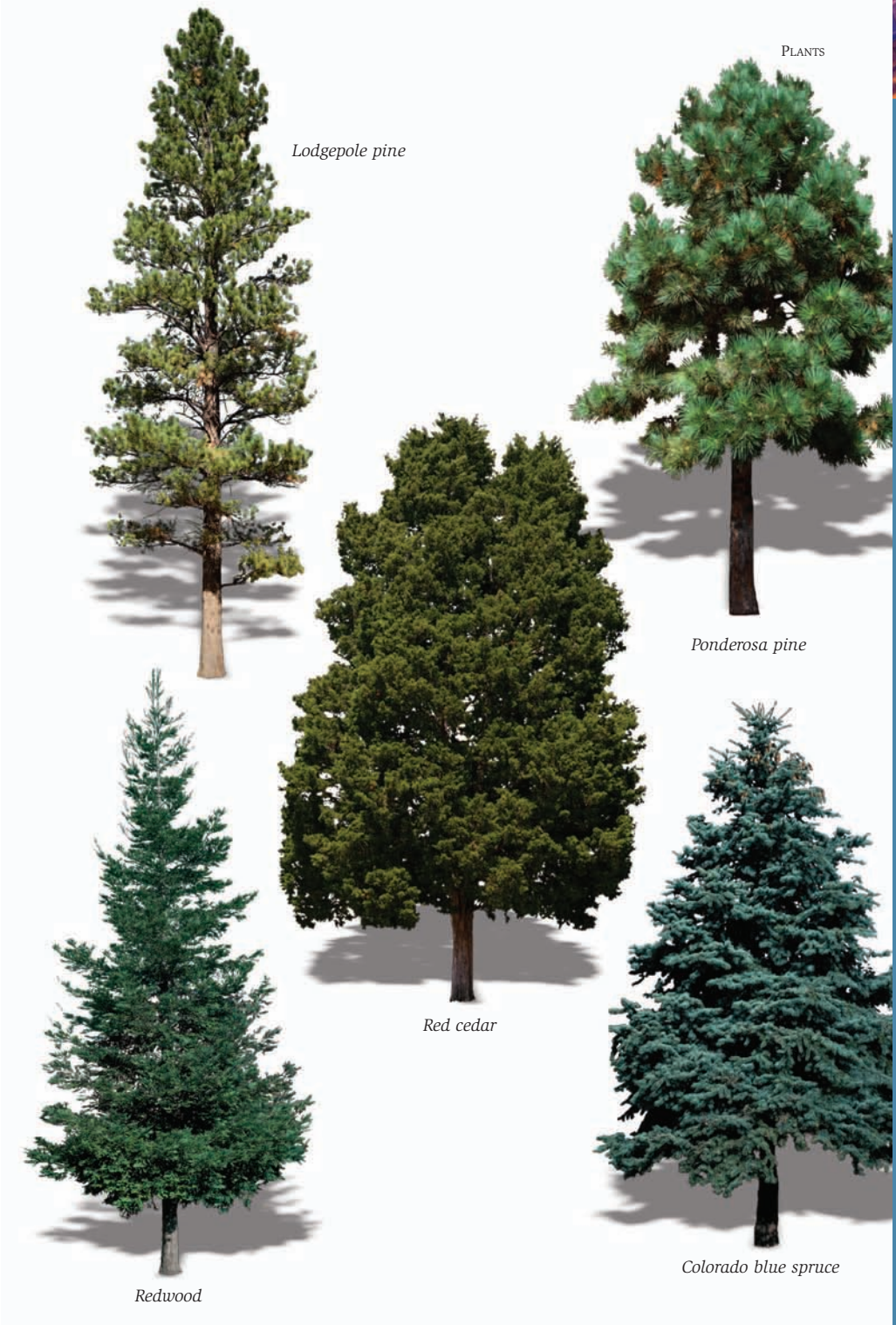
Many species of pine trees thrive in North America, each finding an ecosystem for which it is particularly well-suited.

The white pine, found throughout the Northeast, is recognizable by its smooth, tight bark and leaf clusters of five needles each. It is the tree featured on the state flag of Maine. Other pines common in the Eastern states include the pitch pine with three needles per cluster, and the jack and red pines with two needles. In the Southeast, the longleaf and loblolly pines have three needles to a cluster, while slash and shortleaf pines display two.

The largest pines grow in the mountains of the West. Sugar pines can reach a height of 200 feet. Look for five needles in each of its leaf clusters. The heavy cones of sugar pines can be 18 inches long.

Jeffrey pines have long needles in groups of three. Get close to the bark of a Jeffrey or ponderosa pine and you might smell a pleasant vanillalike aroma. Ponderosa and knobcone are other Western pines with three-needle clusters. Lodgepole pines, named for the straight, clean trunks some American Indian tribes used to set up their tepees and lodges, have clusters of two needles each.

Conifer forests can be found in many parts of the United States.



Many conifers have the Christmas-tree look of an inverted cone.


White spruce


Balsam fir


Larch


Tamarack


Eastern hemlock


Douglas fir

Spruces

The needles of spruce trees are four-sided in shape. The Engelmann spruce, found in Southwestern states and in the forests of the Rocky Mountains and the Pacific Coast, has soft needles with a blue-green hue. The blue spruce, growing primarily in New England, the Rockies, and Southwestern states, has needles that are stiff. The tallest American spruce is the Sitka spruce of rain-drenched Pacific Northwest coastal forests.

Firs

Fir needles are flat and flexible, and appear to be arranged in orderly rows along the sides of branches. The needles are dark green on top, while the undersides show two white lines. Fir cones grow upright on the upper branches of the trees. The balsam fir of the East and the white fir of the West are stately, fragrant representatives of these evergreens.

Larches and Tamaracks

The soft needles of the larch grow in tufts out of old-growth bumps on the branches. Unlike those of most other conifers, larch and tamarack leaves fall off in the winter. Larches are tall, slender trees with small cones.

Hemlocks

Hemlocks are large evergreens identified by short, flat needles with dark green tops and silvery undersides. The small cones hang from branches that can droop in the shape of a graceful pyramid.

Douglas Firs

Douglas firs are found primarily in the western United States. Also known as the Douglas spruce, red fir, and Oregon pine, the tree actually is of the pine family, as are spruces, firs, larches, and tamaracks. Its flat needlelike leaves spiral around the branches, giving them the appearance of bottle brushes or squirrels' tails.

Sequoias and Redwoods

The world's largest trees are the redwoods and giant sequoias of California. Redwoods can grow to over 300 feet in height, and sequoias to a diameter of more than 25 feet. Some of these trees reach several thousand years of age.

Cedars, Junipers, and Cypresses

The leaves of cedars are tiny, bright-green scales arranged like small shingles on flattened twigs.

The western red cedar is, in fact, a juniper. Junipers have two kinds of leaves. Some are scaly and flat like a cedar, while others are prickly. Juniper cones look like moldy blueberries.

The bald cypress of the South drops its needles each winter, and some kinds of cypress grow in swamps; portions of their roots exposed above the water are called *knees.*

Bald cypress

Identifying Firs, Spruces, and Pines

As a quick rule of thumb to determine some of the larger groups of conifers, examine their needles and note their shape, then apply these identifications:

Flat needles = fir

Square needles = spruce

Pairs or clusters of needles = pine

Scaly, shingled needles = cedars

Aspen trees

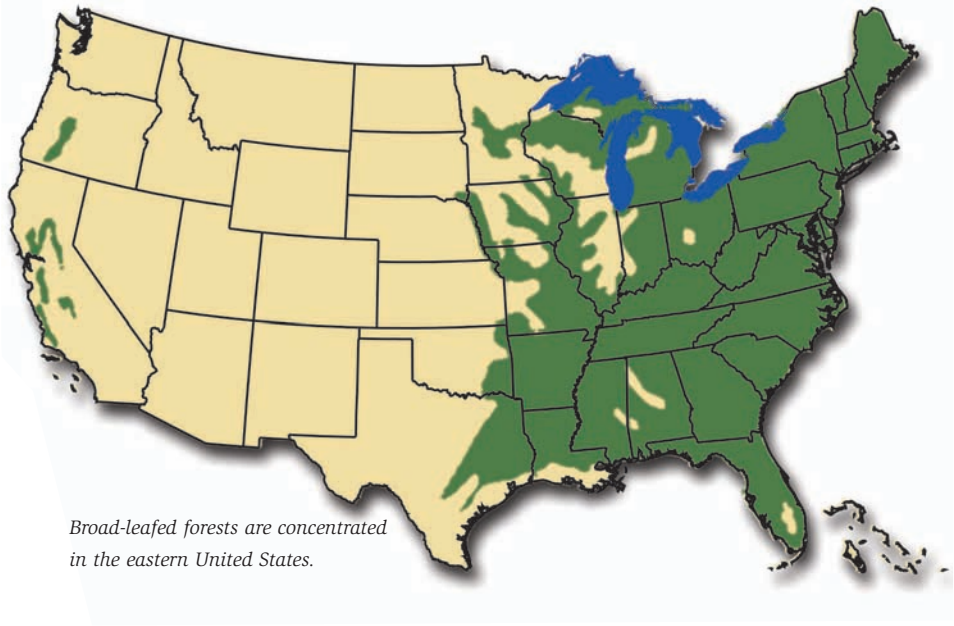
Pussy willows

A Sampling of North American Broad-Leaved Trees

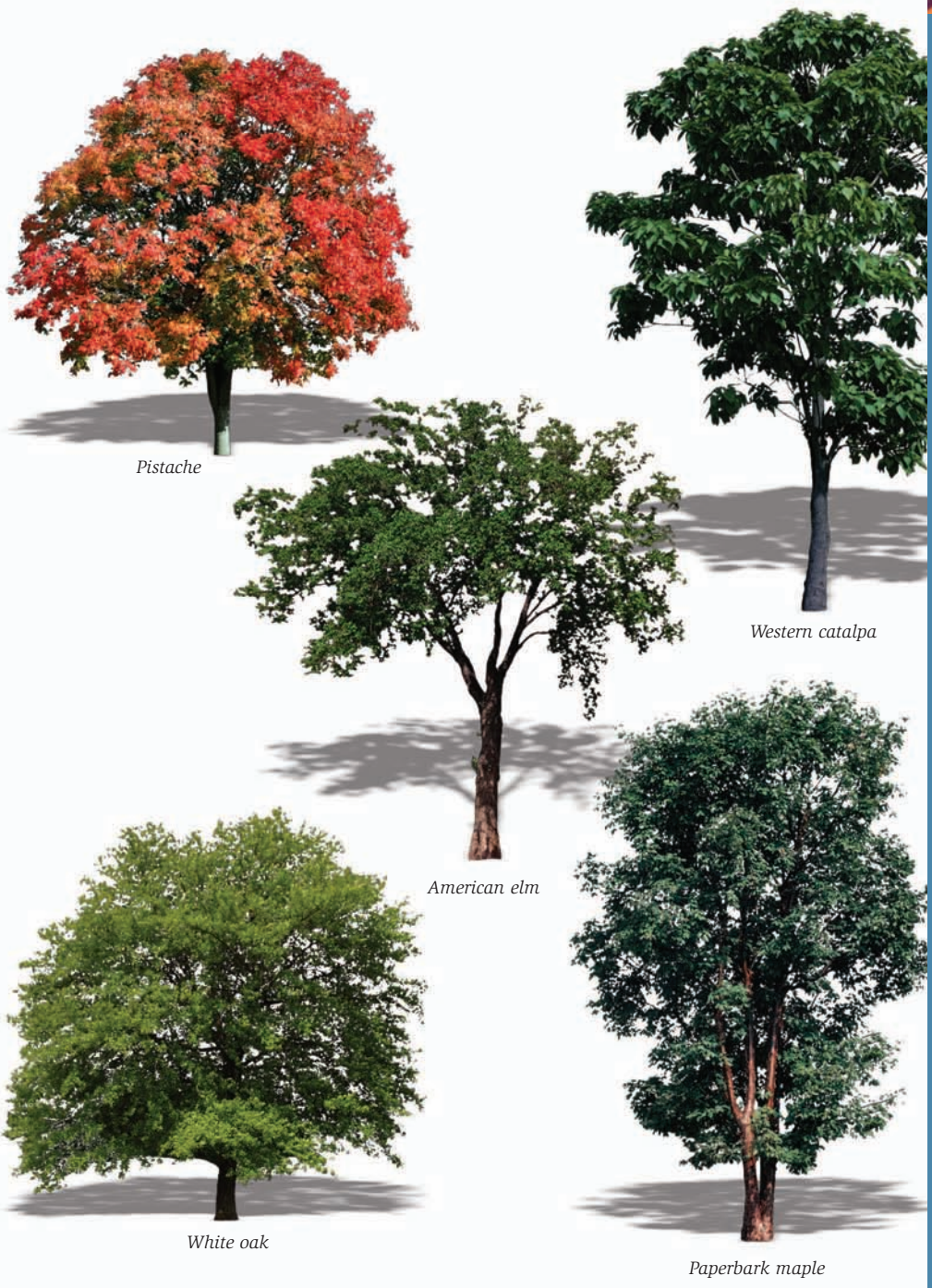
Willows and Aspens

The pussy willow takes its name from its furry flower clusters that resemble tiny kittens clinging to the willow's long, straight branches. The sandbar willow often is one of the first plants to grow on new ground formed by shifting river currents.

Aspens thrive on sunlight. They take root quickly on mountain slopes burned by fire, protecting the soil from erosion and providing browse for deer, elk, moose, and other animals. As slower-growing conifers mature, they tower above the aspens and eventually create so much shade that the aspens must give way.



Broad-leafed forests are concentrated in the eastern United States.



Deciduous trees flourish in the temperate climate of the Northeast.

Nut Trees

Walnuts and hickories have compound leaves, each made up of a number of leaflets. A hickory leaf has three to nine leaflets, while the leaf of a walnut tree might have more than a dozen. Walnuts and hickory nuts are the seeds of their trees. Both are good to eat, as are the nuts of pecan trees. Mockernut, bitternut, and pignut trees have small, bitter kernels.

Bitternut hickory

Walnut

The Birch Family

This family of broad-leaved trees includes birches, hornbeams, and alders. The trees are most commonly found in the East and Northeast. Their oval leaves have jagged edges and shiny surfaces.

Birch

American Indians used sheets of white bark from the paper birch to build their canoes. The bark of yellow birch peels away from the trunk in curls. Gray and black birches have much tighter bark.

The wood of the smooth-barked American hornbeam is so tough that the tree is sometimes called ironwood. The trunk resembles a person's muscular arm.

Alders grow in moist ground throughout the country. They have broad leaves, stalked buds, and small, conelike fruits.

American beech

Beeches and Chestnuts

You can identify an American beech tree by its smooth, pale gray bark. Like those of the birches, each beech leaf has a strong midrib and parallel side veins. Its burrlike fruit contains two triangular nuts.

The chestnut was once common in forests of the eastern United States until the appearance of the chestnut blight, a fungal disease that killed so many of the trees you would probably have a hard time locating an American chestnut today.

Acorns

Oaks

Wood from America's oak trees has long been prized by carpenters and cabinetmakers. Oak timbers are slow to rot, even if they are wet. The Revolutionary War ship USS *Constitution* ("Old Ironsides") was made of oak, and hand-hewn oak beams were used in many Colonial homes.

The acorn is the fruit of an oak. Most oaks have notched leaves. The lobes on the leaves of some oaks are rounded, while those of others come to sharp points. One exception is the live oak; its leaves have smooth edges and no lobes at all, but its acorns help you identify it as an oak.

Elms

Elms are large, graceful shade trees found at one time in towns and cities throughout the nation. The leaves of American elms and slippery elms are egg-shaped and lopsided with saw-toothed edges. Leaves of American elms are shiny and smooth. Despite the name, the leaves of the slippery elm have dull, rough surfaces. Dutch elm disease, caused by a fungus, has wiped out the elm populations in many parts of the United States.


American elm

Magnolias

Magnolia trees are found in the southeastern United States. Their large, distinctive leaves are shiny dark green on top and pale underneath. One magnolia, the cucumber tree, bears a mass of many small, elongated pods.

Another member of the magnolia family is the tulip tree, a very tall tree named for the tuliplike appearance of its flowers. The tulip tree is one of the few members of the magnolia family that is native to North America. It once flourished throughout the continent, but now grows only in the eastern United States.


Magnolia

Papaws and Sassafras Trees

The common papaw belongs to the custard-apple family. It is found in forests of the East and Midwest. The fruit of the papaw looks and tastes like a chubby, overripe banana.

Tea made from the dried root bark of the sassafras tree is an old household remedy for colds. On the same tree you can find leaves of many shapes—some oval, some like three-fingered mittens.


Papaw

Gums and Sycamores

The sweet gum tree has star-shaped leaves that turn a brilliant red in autumn. Its fruits look like spiny balls.

The fruit of the sycamore has a similar shape, but doesn't have the spines. The bark of a sycamore gives the trunk a distinctive patchwork of large blotches of white, green, and yellow.


American sycamore


Sweet gum

Plums and Cherries

A dozen varieties of wild plum trees grow in the eastern United States. Look in the woods for small trees with shiny oval leaves and purple or reddish fruits. The hard pit inside each fruit contains the seed of a new tree.

Wild bird cherry or pin cherry are small trees with tiny red fruits in clusters of two or three. Other wild cherries have fruits arranged in bunches.


Plum

Wild cherry


Maple

Maples

The leaves of maples are arranged in pairs opposite each other on the branch. Their main veins come out like fingers from the base of the leaf. Fruits of maple trees, called *samaras,* each have a "wing" attached that causes them to twirl through the air.


Buckeye

Buckeyes

Inside a tough, spiny burr is the fruit of the buckeye. Its size and shiny brown surface make it look something like the eye of a deer, and thus its name. Leaves of buckeyes have five long leaflets. Ohio, the Buckeye State, takes its nickname from this tree.

Ashes

Many ax handles and baseball bats are made from the hard, smooth wood of the ash tree. Each ash leaf is made up of many leaflets that grow in pairs on either side of the stalk. The leaves are in pairs, too, and so are the branches of the tree.

Flowers

Flowers are the reproductive parts of many plants. The shapes and bright colors of flower petals attract insects and other animals that spread pollen among the plants. The male part of the flower, the *stamen,* produces pollen. The female part of the plant, the *pistil,* receives the pollen. The pistil often is shaped like a stalk with a knob on top. Insects, bats, and birds pollinate many flower species as they move from plant to plant.

"Plants are much more than familiar, pleasant, useful objects about us. They are indispensable. They are more than a part of our environment, such as it is. They have helped create that environment."

—Paul B. Sears, *This Is Our World,* 1971
(His research, teaching, and writing place him among America's most influential botanists and ecologists.)

Native Plants, Exotics, and Weeds

The role of vegetation in ensuring the diversity of an ecosystem is starkly evident when desirable native plants are pushed out by weeds. The cause of these disruptions often is human activities. Solutions also can rest with our actions.

Native plants are those that are the natural inhabitants of an area. A nonnative plant is one that has been introduced to an area. Whether native or nonnative, plants that spread aggressively and push out species important for a healthy ecosystem often earn the designation of weeds.

A noxious or invasive plant is a weed designated by law as undesirable and requiring control. These plants usually are nonnative and highly invasive; some examples are passion flower, Scotch broom, purple fringe, and spotted knapweed. Weeds crowding out native vegetation can create a monoculture, an area dominated by a single species. When that happens, plant diversity is lost.

Yellow star thistle

Many native plants have fibrous root systems that provide soil cover, stability, and water infiltration while many weeds have narrow taproots that leave bare soil exposed to erosion. Other weeds have roots that penetrate deeper than those of native plants, allowing them to tap more water and thus crowd out native vegetation.

Weed seeds can be spread by wind, water, livestock, wildlife, vehicles, and people. Outdoor users traveling with horses, mules, or other livestock often carry hay that is specially treated to prevent the seeds of weeds it might contain from taking root and competing with native vegetation.

For more on using livestock without leaving a trace, see the chapter titled "Riding and Packing." For more on ways to improve the environment by controlling weeds, see the chapter titled "Being Good Stewards of Our Resources."