Forest Trees of Maine

Twelfth Edition
Maine Forest Service
Department of Conservation
1995

THE MAINE FOREST SERVICE

The Maine Forest Service was established in 1891 to ensure for Maine's citizens the greatest economic and social benefits from trees and forest lands of the State.

Part of the Department of Conservation since 1973, the primary responsibilities of the Maine Forest Service include:

- to protect the forest resource from fire, insects, diseases, and other natural enemies;
- to provide advice and assistance in forest management to woodland owners;
- to maintain and improve the scenic beauty, wildlife habitat, and recreational values of Maine;
- to encourage and promote appropriate forest land management practices; and
- to develop through information, education, and formal publications a greater public awareness and appreciation of forests as Maine's basic economy and renewable resource.

Maine Forest Service:
Protecting and Enhancing Maine's forests.

Forest Trees of Maine
First published in 1908
Revised 1995
(Twelfth Edition)
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INTRODUCTION

First published in 1908, *Forest Trees of Maine* devoted only 16 pages to Maine's native trees. The second edition, 1917, was completely revised and became an integral part of Botany classes in public schools. Not until the 1960's, (the seventh and eighth editions) were additions such as the Glossary, Tree Parts and Functions, Summer Key, "Big Trees," and Selected References included.

Now in its' twelfth edition, *Forest Trees of Maine* is the Maine Forest Service most popular publication. It is available in paper or, for use in the field, waterproof Tyvek.

No attempt was made in the twelfth edition of *Forest Trees of Maine,* to include all the species in difficult groups such as willows and hawthorns. This publication is limited to Maine's significant or most common trees. For information on more complete keys or references see Appendix Four: Selected References.

For the novice, Appendix Five: Summer Key is easy to use, although it is limited to the trees listed in this publication.

Scientific names in this publication follow Kartesz (1994).

Since 1908, all editions of *Forest Trees of Maine* have had the same objective: to relate accurate information and to keep pace with new findings.

For more information about this publication or the Maine Forest Service, call 207-287-2791.

LIST OF TREES AND SHRUBS INCLUDED

14 NATIVE CONIFERS

Cedar:	Atlantic White	**Pine:**	Eastern White
	Eastern Red		Jack (Gray)
	Northern White		Pitch
Fir:	Balsam		Red (Norway)
Hemlock:	Eastern	**Spruce:**	Black
Juniper:	Common		Red
Larch:	(Tamarack)		White (Cat)

52 NATIVE BROADLEAF TREES

Ash:	Black (Brown)	**Hornbeam:**	American
	Green (Red)	**Maple:**	Black
	White		Mountain
Aspen (Poplar):	Balsam		Red (Swamp)
	Bigtooth		Silver (Soft)
	Quaking		Striped (Moosewood)
Basswood:	American		Sugar (Hard or Rock)
Beech:	American	**Mountain-Ash:**	American
Birch:	Blueleaf		Showy
	Gray	**Nannyberry**	
	Mountain Paper	**Oak:**	Black (Yellow)
	Paper (White)		Bur
	Sweet		Chestnut
	Yellow		Northern Red
Butternut			Scarlet
Cherry:	Black		Swamp White
	Pin (Fire)		White
Chestnut:	American	**Plum:**	Canada (Red)
Dogwood:	Alternate-Leaf	**Sassafras**	
	Flowering	**Serviceberry:**	Downy (Shad Bush)
Elm:	American		Allegheny
	Slippery (Red)	**Sumac:**	Staghorn
Hawthorn	(Thorn-Apple)	**Sycamore:**	American (Buttonwood)
Hickory	Shagbark	**Tupelo:**	Black (Blackgum)
	Bitternut	**Willow:**	Black
Hop-Hornbeam:	Eastern (Ironwood)	**Witch-Hazel**	

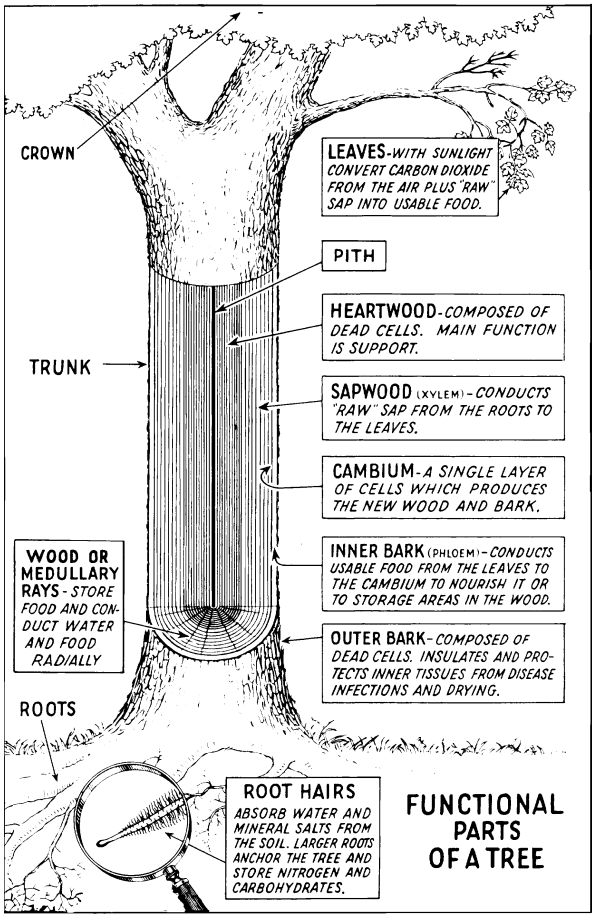
31 EXOTIC SPECIES AND VARIETIES

Beech:	European	**Mountain Ash:**	European
	Purple (Copper)	**Pine:**	Austrian (European
Elm:	Camperdown		Black)
	Chinese		Mugo
	English		Scots (Scotch)
	Scotch	**Poplar (Aspen):**	Balm-of-Gilead
	Siberian		Eastern Cottonwood
Honeylocust			Lombardy
Horsechestnut			White (Silver)
Linden:	European	**Spruce:**	Blue
	Little-leaf		Norway
Locust:	Black	**Tuliptree**	
	Clammy	**Walnut:**	Black
Maple:	Ashleaf (Boxelder)		Heart-nut
	Cutleaf Silver		Japanese
	Norway		

17 NATIVE SHRUBS, HYBRIDS AND VARIETIES

Alder:	Downy Green	**Cherry**:	Common Choke
	Hazel	**Juniper:**	Ground
	Speckled	**Oak:**	Bear (Scrub)
Aspen (Poplar):	White-bark Quaking	**Plum:**	Beach
Birch	Dwarf	**Poison Ivy**	
	Dwarf Paper	**Rhododendron:**	Rosebay
	Low (Swamp)	**Sumac:**	Poison
Laurel:	Mountain		Shining
			Smooth

TREE PARTS AND FUNCTIONS



A tree has three major parts: roots, trunk, and crown.

Large roots anchor the tree and store foods which are manufactured in the leaves. **Small root**s and **root hairs** absorb water and dissolved mineral salts from the soil. These raw materials are conducted upward to the leaves where they are utilized in the synthesis of necessary plant food. Air must be present in the soil for the roots to live.

The **trunk** is the main body of the tree. In the center of the trunk is the **pith**. Next to the pith is the **heartwood** which is composed of dead cells and serves as support. On the outer side of the heartwood is the **sapwood** which contains the sap conducting tubes. Sapwood is usually lighter in color, but it darkens with age and becomes

heartwood. Heartwood and sapwood together comprise the **xylem**. Outside the sapwood is the **cambium**, a thin layer of cells, which annually produces new sapwood inwardly and new **inner bark** outwardly. The cambium produces diameter growth, and callus growth around open wounds. The **inner bark** or **phloem** is outside the cambium and carries food from the leaves downward to nourish the cambium and growing parts. The **outer bark** is the outer-most part of the tree. Essentially, it is composed of dead cork cells and protects the inner bark from mechanical injury, drying, or disease; it also insulates it from extremes of heat and cold. Damage to the inner bark (phloem) causes interference with food movement to growing parts below the injury. Girdling of a tree through its inner bark will kill the tree. **Wood or medullary rays** radiate out from the center, and serve in lateral conduction and as food storage areas. They are most conspicuous in a cross-sectional view.

The **crown** is composed of branches, twigs, buds, leaves, flowers and fruit. The process of **photosynthesis** occurs in the leaves. From energy produced by sunlight, the **leaves** combine carbon dioxide from the air and water from the soil to produce **carbohydrates.** Oxygen is released in the process. Carbohydrates plus fats and proteins are the plant foods necessary for growth and respiration of the tree. **Flowers** and **fruit** are important in reproduction.

ANNUAL RINGS

The **yearly growth** of a tree can be compared to the annual placement of hollow wooden cones one on top of the other. Each cone would represent a single year's growth over the entire stem. At the beginning of each new growth period, new wood cells are at first large and thin-walled and form the **springwood** or **earlywood**. As the growing season progresses, the smaller, thicker-walled cells of the **summerwood** or **latewood** are produced. The darker appearance of the latewood delineates the **annual ring** of growth put on by a tree. The age of a tree, at any desired point along the trunk, can be determined by counting these annual rings.

UTILIZATION OF FOREST PRODUCTS

One of the first industries in Maine, beginning in the early 1600's, was the sawing of white pine lumber. Since that time, nearly every tree species found in the state has been used for a wide variety of wood and paper products, and the forest products industry has been a very important part of Maine's economy. This booklet includes forest product uses for each species listed individually.

For the first 250 years of Maine's forest industry, lumber and poles were the products coming from the woods. In the late 1800's, processes were perfected for making paper out of wood (formerly it was made largely from cloth rags) and by early in the twentieth century pulp and paper were the major products, as they are today. Lumber is still important in forest industry, as are other solid wood products like tool handles, pallets, tongue depressors, shingles, and veneer products.

In recent years, formerly low value species such as aspen have increased in importance and use. Wood is also extensively used for energy, as firewood in many Maine homes or chipped to fuel the numerous wood-powered electricity generation facilities in our state.

In general, the larger and straighter a tree grows, the more valuable it is for forest products, though some species are inherently worth more than others. Small, defective, and/or crooked trees, and the tops of larger trees, are limited to use as pulp, firewood, or biomass fuel. Larger straight and sound trees may be used for lumber and other solid wood products, and large trees which have grown with no lower limbs for many years may be suitable for veneer, the highest valued of all forest products.

AUTUMN COLORATION

Autumn foliage coloration, one of Maine's greatest aesthetic assets, is enjoyed every year with little appreciation for the processes responsible for it. Most hardwoods produce dramatic leaf coloration if climatic conditions are favorable, while conifers usually produce only weak coloration of yellow and brown.

Hardwoods contain green, yellow and orange pigments in their leaves. Chlorophyll allows the green pigment to be the most prominent of the pigments, however the green pigment is also the least stable. It is repeatedly produced and destroyed throughout the summer and masks the carotinoid pigments (xanthophyll and carotene) which give the yellow and orange shades. As autumn approaches, chlorophyll is destroyed faster than it is produced. As the chlorophyll disappears, the carotinoid pigments begin to show. The purple and brilliant red shades become visible from the production of anthocyanin pigments which are also capable of masking the carotinoids. Tannins cause brown shades in some species.

Certain conditions favor maximum autumn coloration. They include adequate summer rainfall, adequate sugar accumulations in the leaves, and prolonged periods of cool, bright, sunny weather without severe frosts. Frost is not an essential element for leaf coloration. In fact, weakened trees occasionally color in mid-summer.

Although variations are numerous, a general guide line to autumn tree coloration is listed below.

Yellows:
green ash, black ash, basswood, beech, birch, butternut, elm, boxelder, mountain maple, silver maple, striped maple, sugar maple, mountain-ash, poplar, serviceberry, willow, witch-hazel.

Red/Scarlet:
hornbeam, red maple, mountain maple, sugar maple, black oak, red oak, scarlet oak, white oak, sumac, tupelo.

Browns:
black oak, white oak.

Purples:
white ash, witch-hazel.

ARBOR WEEK

This is a time to celebrate the importance and benefits that are derived from trees. It should be observed as an ideal time to promote planting, care, and management of both shade and forest trees.

Title 1 M.R.S.A. Section 111-A as revised in 1977 directs the Governor to "annually issue a proclamation setting apart the third full week in May as Arbor Week, recommending its observance by the public in the planting of trees, shrubs and vines, and in the promotion of forest growth and culture, in the adornment of public and private grounds, places and ways, and in such other efforts and undertakings as shall harmonize with the general character of the week. He shall recommend that such week be observed in rural and suburban schools by exercises appropriate to Arbor Week."

Nationally, the last Friday in April is observed as National Arbor Day. Arbor Day is purely American in origin with the first celebration taking place in Nebraska on April 10, 1872, led by J. Sterling Morton. It is estimated that over one million trees were planted on that day. Arbor Day is now observed in every state and in many foreign countries.

In Maine, Arbor Week is the third full week in May. There are numerous activities that take place throughout Maine including celebrations, tree plantings, poster contests, and educational workshops. Youth in our schools are encouraged and given the opportunity to participate through conservation education to learn more about trees and Arbor Week. These are just a few things that occur every year throughout Maine. More information on Arbor Week can be obtained from the Maine Forest Service at (207) 287-2791.

GLOSSARY

Structure in brackets indicates part to which the term applies.

Abortive [fruit] Not developed completely.
Alternate [arrangement of leaves or buds] Not opposite on sides of twig.
Awl-shaped [leaf] Narrow and tapering to a sharp point.
Basal disc [fruit] A plate-like structure on the base of a fruit.
Bloom A whitish covering; usually on new shoot growth or fruit.
Bract A leaf-like structure which is attached to a flower, a fruit, or to its stalk.
Branchlet Shoot growth of the latest growing season.
Bur [fruit] A prickly or spiny husk enclosing the seed.
Capsule [fruit] A dry fruit enclosing more than one seed and splitting freely at maturity.
Catkin A compact, cylindrical cluster of flowers of the same sex.
Chambered [pith] With hollow cavities separated by discs or plates.
Compound [leaf] A leaf composed of smaller leaf units or leaflets.
Conical Wide at the base and gradually tapering to a point; circular in cross section.
Conifer Cone bearing trees; the "evergreens."
Cordate [leaf] Heart-shaped at the petiole end or base.
Cup [fruit] The scaled, concave basal portion of oak fruit.
Cyme A flattened flowering structure, center flowers bloom earliest.
Deciduous [leaves] All leaves drop in the autumn; not evergreen.
Diaphragmed [pith] Solid but divided into sections by firmer discs.
Drupe [fruit] Fleshy outside, hard and stone-like inside.
Ellipsoid Tapers equally at both ends; more than twice as long as broad.
Elliptical Like an ellipse; flat and tapering equally at both ends.
Entire [leaf] Margin of leaf without teeth, lobes, or divisions.
Fascicle [leaf] A cluster of conifer leaves.
Fluted [stem] With alternating, rounded depressions and ridges; sinuate.
Fruit The seed-bearing part of a tree.
Glands Generally raised structures at the tips of hairs, or on a leaf, petiole, or twig.
Globose Spherical or globe-shaped.

Habitat The place where a plant usually grows, e.g. rocky, moist, well-drained, etc.

Hardwood - Term used to describe all broadleaved trees. These tree species are deciduous, retaining their leaves only one growing season. Despite the term, some "hardwoods," such as the aspens, have wood that is relatively soft.

Head A compact aggregate of flowers or fruit on a common stalk.

Husk [fruit] The somewhat leathery, outer covering of a fruit sometimes capable of splitting along well-defined lines.

Lance-shaped Long and tapering; several times longer than broad; broadest at the base.

Leaf Stalk and blade of hardwoods; needles and scales of conifers.

Leaflets Smaller leaf units or leaflets which together form a compound leaf.

Lenticel [bark] Corky, raised pores on woody parts with openings for air-gas exchange.

Linear [leaf] Much longer than broad with parallel margins.

Lobed [leaf] With large, rounded or pointed projections along the leaf-margin. Projection formed by indentations of the leaf margin.

Margin [leaf] The edge, perimeter, or portion forming the outline.

Midrib [leaf] The large central vein.

Oblong Longer than wide with nearly parallel sides.

Obovate Egg-shaped in outline; broadest above the middle.

Opposite [arrangement of leaves or buds] Directly across from one another on a common axis, or twig.

Oval Somewhat elliptical; less than twice as long as broad.

Ovate Egg-shaped in outline- broadest below the middle.

Ovoid An egg-shaped solid.

Palmate [leaf or veins] Compound, with leaflets originating at the same point on a common stalk. Veins originating at a common point at base of leaf blade.

Petiole [leaf] The stalk that supports the leaf blade.

Pinnate [leaf or vein] Compound, with leaflets along a common rachis or stalk. Veins originating along a common mid-vein.

Pistillate Containing female portions of flowers, or the pistils.

Pith The central, soft part of the stem.

Raceme Numerous stalked flowers or fruit along a common axis.

Rachis The common stalk in a compound leaf to which the leaflets are attached.
Ranked [leaves] Arranged in rows or files.
Samara A winged fruit, e.g. ash, maple.
Scales [bud] Small, modified leaves on the outer surface of buds.
Scales [cone] The basic structures that enclose the seeds.
Scale-like [leaf] Small, generally overlapping, triangular-shaped leaves of some conifers.
Seed That part of the fruit capable of germinating and producing a new plant.
Serrate [leaf] Margins with a saw-tooth outline. Doubly serrate, with small teeth on the larger teeth.
Shrub A woody, many-stemmed plant, usually under 15 feet in height at maturity, which branches from its base.
Simple [leaf] A single leaf composed of a single blade. Not compound.
Smooth Without hairs, glands, or any roughness.
Softwood - Term used to describe all needle-leaved trees. These species are typically evergreen, retaining their leaves through two or more growing seasons. Larches, including tamarack, are exceptions, being deciduous "softwoods."
Solid [pith] Without cavities or sections separated by discs.
Spur A short, extremely slow-growing, woody twig projection.
Staminate Containing male portions of flowers, or the stamens.
Stipule A tiny, leafy, sometimes spiny projection arising at the base of a petiole.
Stone The "bony" or stoney pit of drupes.
Toothed [leaf] With moderate projections along the margin.
Tree A woodyplant, generally single-stemmed, that reaches a height of more than 15 feet at maturity.
Umbel A group of flowers or fruit whose stalks have a common point of attachment.
Unequal [leaf base] Base parts of blade on either side of midrib are uneven.
Valve-like [bud scales] Meet at their margins and do not overlap.
Wavy [leaf margin] Undulating but smooth; not toothed nor lobed.
Whorl [leaves or branches] More than two originating at the same level on a common axis.

Pines - The Important Distinctions

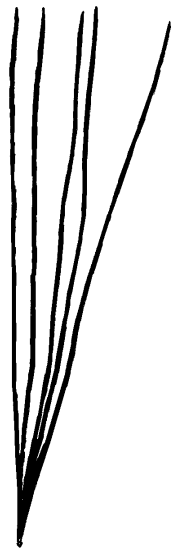
		E. White Pine *Pinus strobus*	**Red Pine** *Pinus resinosa*	**Pitch Pine** *Pinus rigida*	**Jack Pine** *Pinus banksianna*
NEEDLES	Number/Cluster	Five.	Two.	Three.	Two.
	Length	3 - 5 inches.	4 - 6 inches.	3 - 5 inches.	¾ - 1 ½ inches.
	Description	Slender, flexible.	Flexible, straight.	Stout, not flexible, usually twisted, grow at right angles to the branchlets.	Stout, flat, twisted.
	Color	Bluish green.	Dark green.	Dark yellow green.	Light yellow green, later becoming dark green.
	Sheath	Shed in late August.	Persists.	Persists.	Persists.
CONES	Length	4 - 8 inches.	1 ½ - 2 ¼ inches.	1 ½ - 3 ½ inches.	1 ½ - 2 inches.
	Description	Borne on a long stalk; thin smooth scales without prickles.	Borne on short stalks; scales without prickles. Several basal scales remain on branches when cone drops.	Borne on a short stalk, having prickles on the cone scales, flat based when completely open. Often remain on branches for 10 - 12 years.	Much curved inward, without stalk. Prickles minute. Often remain on branches for many years.

EASTERN WHITE PINE

Pinus strobus L.

The abundance and value of eastern white pine in Maine has caused it to be known as the Pine Tree State. The designation has also resulted from Legislative action. Title 1 MRSA Sec. 211 originated with Resolves 1895 Chap. 3, approved Feb. 1, 1895, which stated "Resolved, That the Pine Cone and Tassel is hereby declared to be the floral emblem for Maine, in the National Garland of Flowers." Title 1 MRSA Sec. 208 originated with Resolves 1945 Chap. 8, effective July 21, 1945, which stated "Resolved: That the white pine tree be, and hereby is, designated the official tree of the State of Maine."

The availability and high quality of white pine lumber played an important part in the development and economy of Maine since 1605, when Captain George Weymouth of the British Royal Navy collected samples here and brought them back to England for display. Shortage of ship masts in Europe led to England's Broad Arrow Policy in 1691, whereby pines 24 inches or more in diameter within 3 miles of water were blazed with the **mark of the broad arrow**; such trees to be reserved for use in the Royal Navy. The term **King's Pine** originated from this policy. Most of the accessible virgin pine was cut by 1850. Lumber production reached its peak in 1909 but white pine is still a principal lumber species and continues to contribute greatly to the economy of the state.

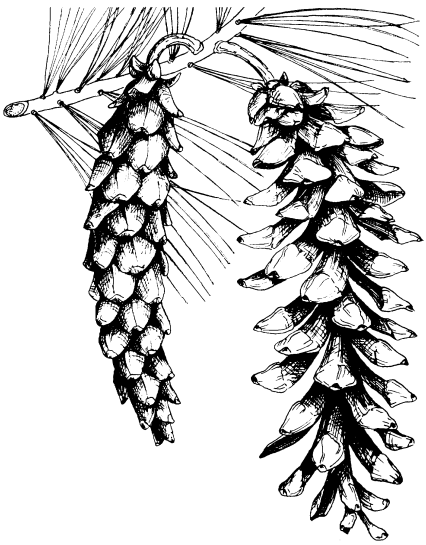


White pine occurs in all localities in the state in moist situations, on uplands, and on sandy soil, but develops best on fertile, well-drained soils. On sandy soil it often becomes established in pure, or nearly pure forests or groves. It is one of the major species planted in the state. The tree grows rapidly both in height and diameter, making an average height growth of one foot or more each year.

When growing in the open, the young tree is symmetrical and conical in outline except when deformed by white pine weevil. White pine weevil is an insect that kills the topmost shoot and often causes the tree to have multiple stems and a round profile. In the forest, a white pine tree has a narrow head, and the trunk is commonly free of branches for a considerable portion of its length.

Old forest trees have a broad and somewhat irregular head. The branches are horizontal, and in regular whorls, usually of 5 each. Very old trees often become very irregular and picturesque. The trunk tapers gradually, and the tree often attains a height of 100 feet. Commonly it is from 70-80 feet tall, and has a diameter of 1-3 feet.

The **bark** of young trees is smooth and thin, green with a reddish brown tinge over-all, or brown in spots. On old trees, it is from 1-2 inches thick, very dark, and divided into broad, flat ridges by shallow fissures.



Leaves are in clusters of 5, flexible, from 3-5 inches long, bluish green but whitish on one side. The papery sheath at the base of the new needle clusters falls in late August. The **cones** are 4-8 inches long, cylindrical and borne on a long stalk. They take 2 years to mature and open to discharge the seed shortly after ripening in late August through September of the second season.

The **wood** is light in color, and durable except when in contact with the soil. It is soft, not heavy, and is easily worked. The wood is used extensively for interior trim, doors, windows, cabinet making, sash and door manufacture, pattern making, furniture, small building construction, interior and exterior finish, and boat planking.

The sale of pine furniture is always active somewhere in North America. Lumber is sold from Newfoundland to Washington state and south into Mexico. Lower grade boards have clear sections cut to size for sale. These clear short pieces may also be finger-jointed to create longer lengths of clear wood. Pine shingles are also sawed. Any part of a pine not making log grade is used for pulp. Ceiling Tiles as well as paper are made from this pulp.

RED PINE

Pinus resinosa Ait.

Red or Norway pine, though common, is found only locally throughout the state, growing on dry, rocky ridges, or light, sandy soil. Groves are usually scattered through forests of other species. The beautiful "Cathedral Pines" occur near Eustis.

The young trees have the branches extending to the ground and form a conical outline. Later, the head is rounded and picturesque. Branches are generally horizontal. It attains a height of 60-80 feet, and a diameter of 2-3 feet. The trunk is straight and tapers slowly. Red pine is intolerant to shade.

The **bark** is divided into broad, flat ridges by shallow fissures.

The **leaves** are arranged in clusters of 2, and are 4-6 inches long, dark green, soft and flexible. They break cleanly, at a sharp angle, when doubled between the fingers.

The **cones** are much like an egg in shape, about 2 inches long, and borne on short stalks. The base of fallen cones is hollow. They mature in the fall of the second season and usually remain on the branches until the following summer. Cones may be collected for seeds from September throughout the fall and winter, due to their gradual release of seed.

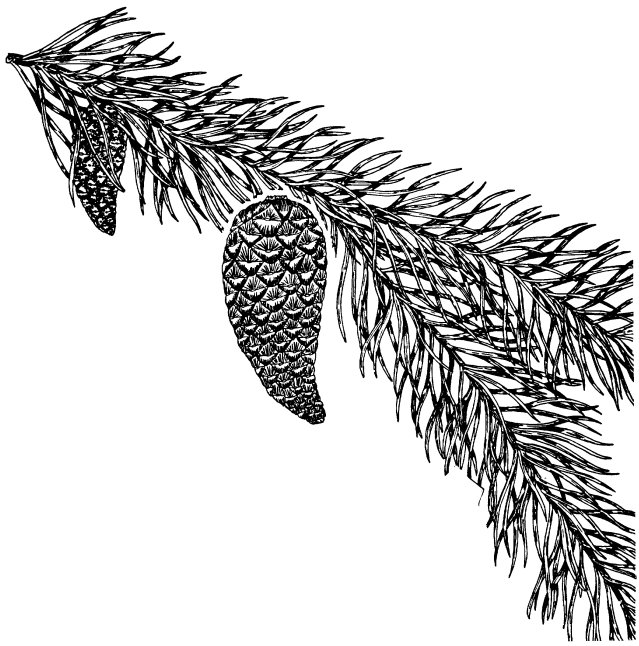
The **wood** is a little heavier and harder than white pine, close grained, hard and fairly strong. It is used for lumber, poles, piles, building construction, and pulp. It treats readily with wood preservatives and therefore is a locally produced alternative to southern yellow pine. An expanding pole market allows for use of shorter stems removed in thinning. Older stands produce large, high-value poles.

Owing to the reddish bark, and the pale red heart wood, the name "red pine" is appropriate. The name "Norway pine" refers to its original finding near Norway, Maine. Since it infers that the tree is foreign in origin, use of this name is not encouraged.

JACK PINE

Pinus banksiana Lamb.

Jack or gray pine grows on sandy, rocky, shallow acid soils. It is known to occur naturally at Alamoosook Lake in Orland, Schoodic Point in Winter Harbor, Great Wass Island in Beals, Matagamon Lake, Cliff Lake, Lobster Lake, and in the areas south and west of Jackman.



The spreading branches are long and flexible and form an open head of symmetrical outline. At maturity the tree is about 50-60 feet tall, and 8-10 inches in diameter. Cones are often produced when the trees are only a few years old.

The **bark** is thin with irregular rounded ridges. It is dark brown in color, with a slight tinge of red. The **leaves** are in clusters of 2, and are ¾ to 1½ inches long. They are stout, yellow-green at first, dark green later, rather flat, and twisted at the base. The **cones** require 2 years to mature, are rather slender, 1½ - 2 inches long, and without a stalk. They are very much curved. The scales have minute prickles which are often deciduous. The cones usually remain closed for several years (unless exposed to extreme heat), and often do not fall for 12-15 years.

The **wood** is moderately hard, heavy, and close grained. It is used mostly for pulp.

PITCH PINE

Pinus rigida Mill.

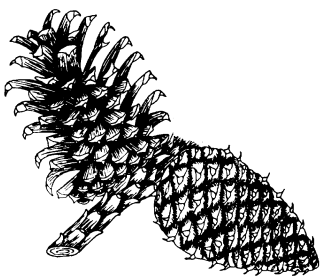
Pitch pine grows on sandy barrens or plains, and on gravely soil of the uplands. It is quite common in the southern part of the state, on the sand plains near Brunswick and Oxford, and on Mt. Desert Island. It is not found in Piscataquis, Aroostook, Somerset and Washington Counties.

Branches are horizontal, rigid, contorted, and form an open crown. Pitch pine attains a diameter of 1-2 feet, and a height of only 30-40 feet. The trunk tapers rapidly and generally is straight. Often the tree produces cones when small. It is the only native pine that will produce "sprout" growth when apparently killed by such factors as fire.

The **bark** is rough, even on young stems and branches. On old trees, it is irregularly divided into continuous broad flat ridges, and is deep gray or reddish brown in color.

The **leaves** are in clusters of 3, and are from 3-5 inches long. They are dark yellow-green, stiff, standing at right angles to the branch.

The **cones** require 2 years to mature, are 1½ - 3½ inches long, borne on short stalks, hardly noticeable, and are often produced in clusters. A sharp, rigid curved prickle is produced on the tip of each scale. The cones open gradually during mid-winter. Seeds are released over a period of several years. Cones often remain on the trees 10-12 years. Fresh cones are used in wreath decorations.



The **wood** is moderately heavy, strong, hard and stiff. It is used for construction lumber and pulp. At one time considerable quantities of tar and turpentine were obtained from this tree.

Introduced Pines

SCOTS (SCOTCH) PINE

Pinus sylvestris L.

Scots pine is a native of northern Europe, and there grows to a tall timber tree in dense stands. It will grow on very poor soils. There are many strains of this species, some producing poor growth habits. This plus its susceptibility to snow, porcupine, and bird injury makes it undesirable to plant for timber production. Some strains are planted for Christmas trees.

The foliage is usually a dull blue - green. Needles are short, stiff, twisted, 1½ - 3 inches long and borne in fascicles of 2. Cones are 1½ - 2 inches long and numerous, even on comparatively young trees. The bark in the crown region of medium to large trees is of a conspicuous orange - brown coloration.

AUSTRIAN PINE

Pinus nigra Arnold

Austrian or European black pine is a native of Europe, has been planted as a decorative tree. It makes rapid growth even on very poor soils, and will flourish on limestone soils, or in the smoke of cities and factories. It also grows well near the sea because of its tolerance to salt spray.

The foliage is very dense and dark green, almost black in color. The long, sharp - pointed leaves are borne in fascicles of 2 and do not break cleanly when doubled between the fingers.

It closely resembles our native red pine, but the bark is darker brown to black and buds are pitch covered. Cones are 2 - 3½ inches long, armed with sharp prickles.

MUGO PINE

Pinus mugo Turra

Mugo pine is a native of the mountainous regions of Europe. It has a dwarf, spreading form. Leaves are dark yellow - green, usually not twisted, 1 - 3 inches long and in clusters of 2. Cones are 1 - 2 inches long. It is planted for ornament and on dry, gravely slopes, for roadside beautification.

TAMARACK

Larix laricina (Du Roi) K. Koch

Tamarack, eastern larch, or hackmatack is most commonly found in cool, swampy places although it also grows on well drained soil. It is found in scattered stands throughout the state.

In the forest, the tree grows to a height of 50 - 60 feet and a diameter of 20 inches. It has a regular, narrow, pyramidal head with small, stiff and horizontal branches.

In northern Maine, the name "juniper" is quite commonly applied to this tree, but since juniper is the true name of another tree, its use for tamarack is discouraged.

The **bark** separates on the surface into small, thin, irregular scales of a reddish brown color.

The **leaves** are linear, about one inch long, triangular in cross section, and borne in clusters of 8 or more on spurs, but leaves on elongating new shoots occur singly. They are bright green and turn yellow in September just before they fall. It is our only conifer that sheds all its leaves every fall.

The **cones** are small, nearly spherical, about ¾ inch long, light brown, and borne erect on stout stems. They open in the fall to liberate the small winged seeds and usually remain on the tree until the following year.

The **wood** is rather coarse-grained, hard, heavy, strong, and with a durable heartwood. It is used for planking, timbers, ties, poles, pilings, sign posts and pulp.

Spruces - The Important Distinctions

		Black Spruce *Picea mariana*	Red Spruce *Picea rubens*	White Spruce *Picea glauca*
NEEDLES	Color	Blue - green.	Dark yellow-green.	Blue-green to dark green.
	Length	¼ - ½ inches.	½ - 5/8 inches.	1/3 - ¾ inches.
	Descrip-tion	Dull with bloom.	Very shiny.	Dull, strong odor when crushed.
CONES	Length	½ - 1 ½ inches.	1 ¼ - 2 inches.	2 inches.
	Reten-tion	Remain on tree many years.	Fall first year.	Fall first year.
	Shape	Spherical.	Wide in middle.	Cylindrical.
	Scales	Stiff and rigid when ripe; margin irregularly notched.	Stiff, with margin entire or slightly notched.	Flexible at marturity, margin entire.
TWIGS	Color	Yellow - brown to brown.	Reddish to orange-brown.	Light gray to yellow- brown.
	Hairs	Short rusty to black harirs; some hairs tipped with globose glands.	Short rusty to black hairs; tips lack glands.	Without hairs.

Seed of all spruce is winged; cones are pendent; bare twigs are roughened by persistent leaf bases.

Norway Spruce

Picea abies (L.) Karst.

Norway spruce is a native of Europe and is of great economic importance in its natural range. Here it is commonly planted both in forest plantations and as an ornamental tree. It rarely reproduces in the wild. It is very symmetrical and graceful in its growth habit, open grown trees often carrying branches clear to the ground. The tips of branches on larger trees have an upward sweep and lateral branchlets are long and pendent. Twigs are without hairs. Norway Spruce is a more rapid grower than any of our native species of spruce, and is a species frequently planted for pulpwood. It is occasionally used for lumber and as an ornamental. The leaves are about one inch long, sharp-pointed, glossy and dark green in color. The needles lack the tendency to bend upward on the twigs as in white spruce. Cones are cylindrical, 4-7 inches long with stiff, notched scales. They ripen from September to November but may be collected from September to April.

BLACK SPRUCE

Picea mariana (Mill.) B. S. P.

Black spruce occurs in every county except Sagadahoc. It grows on cool upland soils, but is more commonly found along streams, on the borders of swamps and in sphagnum bogs. It grows to a height of 70-90 feet and a diameter of 6 - 18 inches. On a good site, it will grow rapidly. It is the most commonly planted spruce. In sphagnum bogs, trees 50 - 80 years old may be only 6 - 8 feet tall and about one inch in diameter. The branches are short, pendulous and have a tendency to curve up at the ends. It forms an open, irregular crown. The lower branches often touch the ground and form new trees by the natural layering method. The **bark** on the trunk is grayish brown and the surface is broken into thin scales. The **leaves** are ¼ - 1½ inches long, dull blue-green in color,

blunt-pointed, flexible, and soft to the touch.

The **cones** are ½ - 1 ½ inches long, ovoid, and become nearly spherical when open. The cone scales are stiff, and have toothed margins. The cones usually stay on the trees for many years. The **twigs** have many hairs, some of which are tipped with glands. The inner bark is olive-green.

The **wood** is soft and light, but strong. It is used for the manufacture of pulp, framing and construction lumber, planking and Christmas trees. Spruce beer is made by boiling the branches.

BLUE SPRUCE

Picea pungens Engelm.

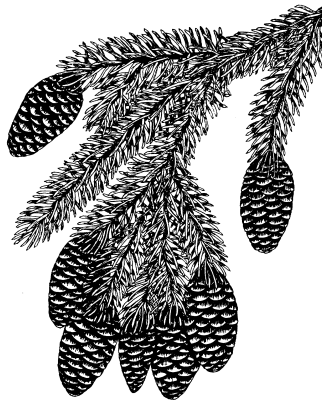
Blue spruce is a native of the Rocky Mountain region, and is frequently planted in the East as a decorative tree. Foliage coloration varies from silvery-blue to blue-green; the intensity of blue varying between individual specimens. The leaves are about one inch long, stiff, very sharp-pointed, and strongly incurved. Cones are oblong, 2 ½-¼ inches long, with thin, flexible, notched scales. Selected specimens are usually planted singly, on lawns or in landscape effects, where the color of the foliage and the shape of the tree are of primary importance. Blue spruce will grow on a variety of sites and tolerates a wide range of growing conditions. These factors contribute to its popularity as a favored ornamental species.

RED SPRUCE

Picea rubens Sarg.

Red spruce is commonly found throughout the state. It grows on well-drained, rocky upland soils, and particularly on the north side of mountain slopes where it may be the major species present. The spreading branches form a somewhat conical, narrow head in young trees. The trunk is long, with a slight taper. It grows to considerable size, and is capable of attaining a height of 60 - 80 feet and a diameter of 1 - 2 feet, but occasionally exceeds these measurements. Red spruce is shade tolerant and will become established in the understory of mixed stands.

The **bark** on mature trees is thick and is broken into thin, reddish brown scales of irregular shape. The **leaves** are dark green often with a yellow tinge and are very shiny. They are about ½ inch long, sharp-pointed, stiff, and prickly to the touch. The **cones** are oblong in shape and usually from 1 ½ - 2 inches long. When ripe, they have a reddish brown color and are quite shiny. The cone scales are stiff like the black spruce, but the margins are generally without conspicuous notches. The cones begin to drop in the autumn or early winter and are all gone from the branches by the next summer.



The **twigs** have hairs none of which have a gland at the tip as in black spruce. The inner bark is reddish brown. The **wood** is fairly soft, light, close-grained, and strong, but is not as durable as pine when exposed to the weather.

Red spruce is one of our most valuable trees for the production of building lumber. It is used for joists, sills, rafters and heavy construction timbers, and is a principal wood used in the manufacture of paper pulp. It is also used for weir poles, piling, and Christmas trees, and is valuable for the sounding boards of musical instruments. Spruce gum is obtained largely from this tree.

WHITE SPRUCE

Picea glauca (Moench) Voss

White or cat spruce occurs statewide except in Sagadahoc and York counties. It is widely distributed, but not as abundant as the red spruce. It grows on shallow, rocky sites from the coast to the tree line in the mountains and is also commonly found in old pastures or cleared land. It does not tolerate shade and does not grow as an understory tree. The long and rather thick branches, densely clothed with stout, rigid lateral branches, are curved upward and form a somewhat open, irregular head having a broad base. It commonly grows to a height of 60-90 feet and to a diameter of two feet.

The **bark** on old trees has light gray, plate-like scales which are thin, irregular, and with a somewhat brownish surface, light gray and smooth on younger trees. The **leaves** on the lower side of the branches are often bent upward in such a manner as to bring them all on the upper side. They are pale blue-green at first, later becoming a dark blue-green. The foliage emits a peculiar and characteristic odor which offers a ready means of distinguishing it from the other species and is the reason for the alternate name. The **cones** are slender, cylindrical in shape, pale brown and shiny when ripe, and usually about two inches long. They ripen in August and September, and may be collected for seed until October. Cones usually fall off the first year. The cone scales are thin and flexible so that they give easily when the cone is clasped in the hand. The **twigs** are without hairs. The inner bark is silvery and glistens.

The **wood** is fairly light, soft, finishes well, and is moderately strong. It is used for pulp, paddles, oars, piano sounding boards, dimension lumber, and in limited amounts for Christmas trees. White and black spruce produce long, tough, pliable roots which were used by the Indians for tying together pieces of birch bark for canoes, and for various other purposes.

EASTERN HEMLOCK

Tsuga canadensis (L.) Carr.

Eastern hemlock is found in scattered stands in nearly every part of the state. Best growth is attained on moist, cool sites. It generally attains a height of 60 - 70 feet, and a diameter of 2 - 3 feet. The terminal shoot is pendulous and bends away from the prevailing winds, quite often toward the east. The trunk usually tapers rapidly from the base. This species can withstand considerable shading.

The **bark** is divided into narrow, rounded ridges covered with thick scales, and varies in color from cinnamon-red to gray. Bark exposed by cuts or bruises shows a purplish tinge

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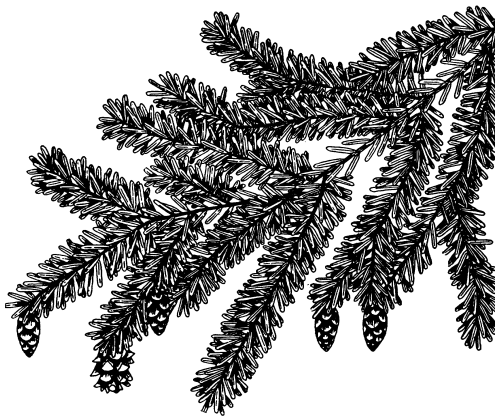


The **leaves** are flat, tapering, generally rounded at the apex, from 1/3 - 2/3 inch long, with a distinct short petiole and so arranged that the twig appears flat. Leaves become progressively shorter towards the tip of the twig. They are dark yellow - green in color with a lustrous upper surface, and a whitish under surface.

The **cones** are about ¾ inch in length, oblong in shape, light brown, pendant, and suspended on short, slender stalks. Cones mature during the first autumn and generally remain on the branches until the next spring. Seeds are winged and fall during the winter. The **twigs** are very fine, limber, and are not pitchy.

The **wood** is coarse, brittle when very dry, light, strong, difficult to work (as it is likely to separate at one or more of the annual growth rings). It is used for framing, sheathing, roof boards, timbers, and pulp. The bark once was valuable for tanning but has been replaced by chemicals.

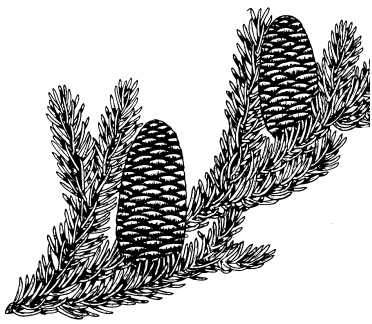
BALSAM FIR

Abies balsamea (L.) Mill.

Balsam fir occurs statewide and is the most abundant conifer in the state. It is frequent in damp woods, and on well drained hillsides, often occurring in thickets. The tree normally forms a sharp spire to a height of 60 - 70 feet and grows to 12 - 20 inches in diameter. On young trees the branches are horizontal, slender, and produced in regular whorls to form a strikingly symmetrical crown. In old age, the top is often slim, regular and spire-like.

The **bark** on young trees is pale gray, smooth, thin, and has prominent blisters which are filled with a resinous liquid known as "Canada balsam". On old trees the bark gets slightly rougher.

The aromatic **leaves** are about one inch long, prone to pitch, dark green and shiny above, silvery white below, and with the tips occasionally notched. On top branches leaves turn up, but on lower branches they spread out at right angles to the branch, giving it a flattened appearance. The **cones** are 2 - 4 inches long, erect and dark purple in color before maturity. Cones ripen in August and September of the first year, disintegrate shortly thereafter, leaving only the central spike-like stalks.The **twigs** are smooth after the leaves have shed. Winter buds are covered with clear resin.



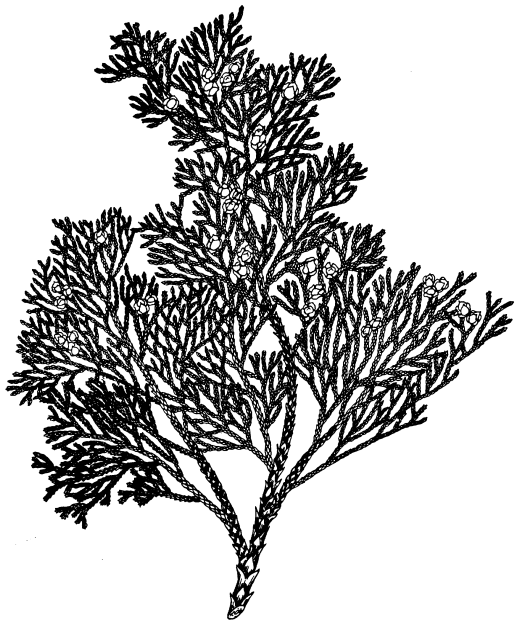
The **wood** is soft, light, and moderately limber. It is sawed into dimension lumber chiefly for light and medium building construction and is used in a large degree for pulp. Balsam fir is favored for Christmas trees and greens. Small trees are cut in great numbers primarily for the northeastern Christmas tree market. The branches can be steamed in a retort to produce oil of balsam. In the past, the clear pitch formed in the blisters of relatively young bark was used to mount microscope slides and to attach theatrical costumes to bare skin.

ATLANTIC WHITE-CEDAR

Chamaecyparis thyoides (L.) B. S. P.

Atlantic or coast white-cedar is found in bogs or low areas along ponds or streams at Newbert Pond in Appleton, Knight Pond in Northport, and from Cape Elizabeth south through York County. In Maine it rarely reaches a height of over 40 feet. The short branches come out from a gradually tapering trunk, giving the tree a conical appearance. The twigs are only slightly flattened.

The **bark** is fibrous, grayish to reddish brown, often with twisted spirals, and on young trees is easily pulled off in strips.



The **leaves** are bluish-green, scale-like, and arranged in somewhat fan-shaped clusters. When crushed, they give off an aromatic odor.

The **cones** are small, round, smooth and purplish in color before maturity, about ¼ inch in diameter with tack-like scales. They persist through the winter, but are very inconspicuous.

The **wood** is light, close-grained, strongly fragrant, and light brown in color tinged with red. It is brittle and therefore of limited use. The shavings are used for dog-bedding.

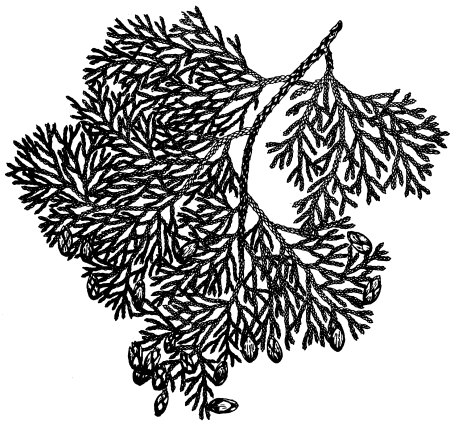
NORTHERN WHITE-CEDAR

Thuja occidentalis L.

Northern white-cedar or eastern arborvitae is generally found in swamps, along streams, mountain slopes and old pastures where the soil is moist. Dense stands are widely distributed statewide. It is most abundant in the northern and eastern sections, and grows best on alkaline soils. It is widely used as an ornamental.

The head is compact, narrow and pyramidal in shape. The branches are horizontal, short and turned upward. Trees grow to 60 feet in height and to 3 feet in diameter. The trunk is often very strongly buttressed.

The **bark** has shallow fissures, which divide it into flat narrow ridges. It is reddish brown in color, tinged very often with orange.
The **leaves** are opposite or two-ranked, usually only about



1/8 inch long, scale-like, blunt, and so arranged as to make the small branches flat in shape. They have a pleasant, aromatic odor, and a rather pleasing taste.

The **cones** are erect, small, about ½ inch long, with only a few pairs of scales. They mature in one season. The seed is small and winged.

The **wood** is soft and light, coarse-grained, brittle, has very durable heartwood and a fragrant odor. It is used primarily for shingles, slack cooperage, poles, posts, rustic fencing, and is sawed into lumber for boxes, crates, siding, and boats. More recently, cedar has emerged as a viable alternative to pressure-treated wood. Cedar, naturally weather-resistant, is used for decks and outdoor furniture.

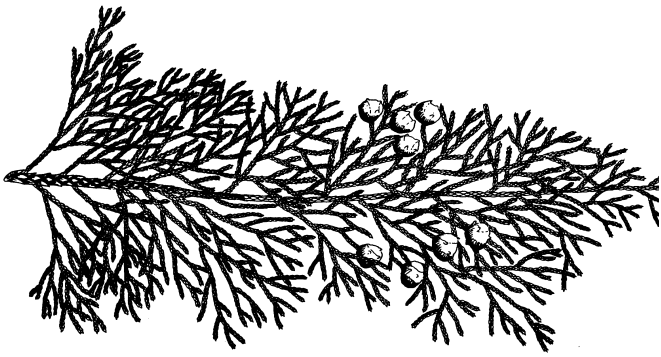
EASTERN REDCEDAR

Juniperus virginiana L.

Eastern redcedar is not a common species in this state. It grows on poor soils, gravely slopes, rocky ridges, and on moist, sandy ground. It is found intermittently in southern Maine and locally in Bridgton, Porter, Denmark, and West Gardiner. It gets the name "redcedar" from the red color of the heartwood.

It is very variable in its habit. Young trees have slender horizontal branches, and a narrow, compact, conical head. The crown of old trees becomes broad and much rounded. In this state, trees attain a diameter of 8 - 12 inches, and a height of 30 feet.

The **bark** on the trunk is light brown, tinged with red, and separating into long, narrow shreds on old trees.



The **leaves** are scale-like, overlapping, about 1/16 inch long, dark green, and remain on the tree 5 - 6 years, growing hard and woody the third season. Branchlets appear square in cross section. Current growth and vigorous shoots contain sharp-pointed, awl-shaped leaves; the so-called "juvenile" growth.

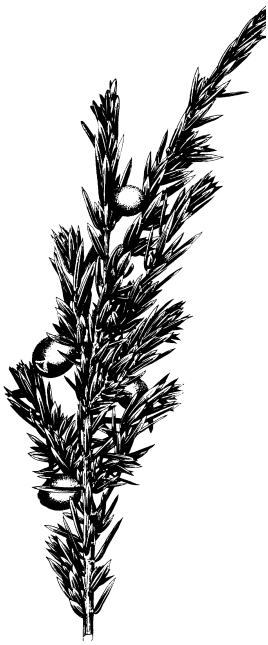
The **fruit** is berry-like, globose, 1 - 2 seeded, pale green at first, dark blue when ripe, and is about the size of a pea.

The **wood** is brittle, fine-grained, light, easily worked, durable, and very aromatic. The heartwood has a dull red color. It is valuable for fence posts and cabinet making, but in Maine it is not sufficiently plentiful to be of commercial importance. The shavings of this species are used as bedding for pets.

COMMON JUNIPER

Juniperus communis L.

Common juniper is found primarily as a shrub in pastures and open spaces on shallow, rocky soil. It occurs infrequently and locally in Penobscot, Somerset, Franklin, Oxford, Cumberland and York counties. It is occasionally found as a tree. Specimens up to 25 feet in height have been recorded, but are extremely rare.



The **bark** is grayish brown in color and occurs in thin, longitudinal, shredded layers. The inner portion has a reddish tinge. The **leaves** occur in whorls of three. They are sharp, stiff, dagger-like, and persist for several seasons. They are from ¼ - ¾ inch in length. The upper surface is concave and marked with a broad, white line. The underside, which due to the bending of the twigs usually appears uppermost, is dark green. The leaves persist for several seasons. The **fruit** is dark blue, covered with a thin bloom, slightly smaller than a pea, remains on the trees during the winter, and has a strong resinous taste. The fruit is usually found only on select trees since male and female flowers are generally produced on separate trees. This trait is common to most junipers.

The **wood** is hard, close-grained, and very durable. The heartwood is light brown. Large stems make long-lasting fence posts if the bark is removed.

GROUND JUNIPER

Juniperus communis var. depressa Pursh

Ground, common or Otisfield juniper is the flat-lying form common in pastures and poor sandy, gravely, rocky soils throughout Maine.

Poplars - Aspens
The Important Distinctions

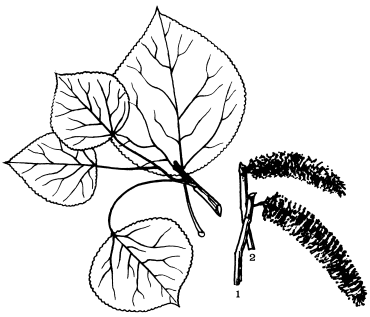
		Quaking Aspen *Populus tremuloides*	Bigtooth Aspen *Populus grandidentata*	Balsam Poplar *Populus balsamifera*
BARK	Texture	Smooth in young trees. Often with horizontal bands of circular wart-like outgrowths.	Smooth in young trees. Furrowed in older trees.	Smooth or roughened by dark outgrowths.
	Color	Light or grayish green.	Dark or olive green.	Reddish brown on younger trees.
	Taste	Very bitter.	Not bitter.	Not bitter.
LEAVES	Length	1 ½" - 3"	3" - 4"	3" - 5"
	Shape	Circular.	Broad egg-shaped.	Egg - shaped.
	Margin	Finely toothed.	Coarsely toothed.	Finely toothed.
	Surface	Shiny upper, not rusty beneath.	Not shiny upper, not rusty beneath.	Shiny upper, rusty beneath.
	Petiole	Flattened.	Flattened.	Rounded.
BUDS	Texture	Not sticky, shiny.	Not sticky.	Very sticky; shiny.
	Shape	Conical.	Broad egg-shaped.	Egg - shaped.
	Scales	No hairs.	Covered with white hairs.	No hairs.
	Odor	Not fragrant.	Not fragrant.	Sweet.

Poplar twigs have a pith that is star-shaped in cross section. The poplars belong to the willow family and resemble willows in flower and fruit characters. The nodding, "woolly bear" caterpiller-like staminate and pistillate catkins are borne upon different trees. They open before the leaves are out and are conspicuous in the early spring. Poplars, like willows, have a transcontinental range, and can be propagated very easily from cuttings.

QUAKING ASPEN

Populus tremuloides Michx.

Quaking aspen, popple or trembling aspen is found statewide and is an abundant, rapid growing tree occurring in either pure stands or in mixture with other species. It is found on many different kinds of soil, but makes the best growth on sandy, moist soils. Frequently it is the first species, with paper birch, to become established following heavy cuttings or burns. It does not persist in dense woods because it is intolerant of shade. It is a graceful tree with slender branches far apart and often contorted. Head round and narrow. It grows to a height of 60 - 75 feet and a diameter of 10 - 16 inches.



The **bark** is smooth, often roughened by horizontal lines of wart-like outgrowths. It is a pale green with dark brown patches. Bark on old trees is ash gray, dark at the base where it is divided into broad, flat ridges. It has a very bitter taste similar to quinine.

The **leaves** are alternate, rounded, short-pointed, with finely rounded teeth; dark green and shiny above, 1½ - 3 inches long. The flattened petiole causes the leaves to tremble in a breeze.

The **flowers** are in catkins which appear before the leaves. The **fruit** is a capsule which ripens about June. The seeds are very small, light and cottony, and are carried long distances by the wind. The **buds** are dark brown, have a varnished appearance, and may be slightly sticky. Flower buds are usually larger than the leaf buds.

The **wood** is close-grained, soft, and rots very easily. It is used increasingly for trim, lumber, pallets, and for the manufacture of wafer board, landscape ties, plywood, core stock, and expendable turnery items. It is used extensively for pulp.

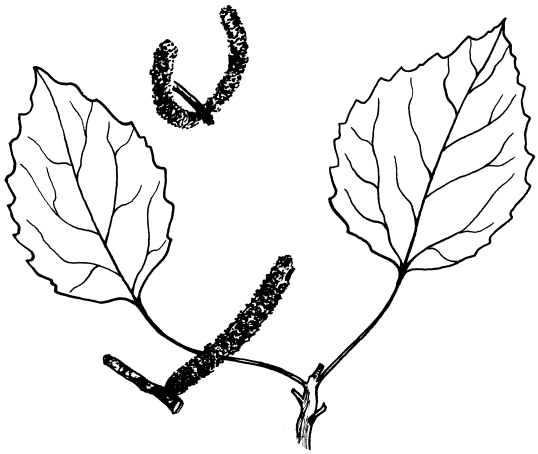
BIGTOOTH ASPEN

Populus grandidentata Michx.

Bigtooth aspen, poplar, or popple occurs statewide and commonly grows with quaking aspen. It is a rapid grower in various soils and in different situations. It grows best in a rich, sandy and fairly moist soil. It is more shade tolerant and therefore more competitive than quaking aspen and grows with other species in either scattered or in small groves. It attains a height of 60 - 80 feet and a diameter of 10 - 20 inches.

The **bark** is smooth, olive to gray-green in color. At the base of old trees, it is dark and divided into broad, irregular, flat ridges.

The **leaves** are alternate, 3 - 4 inches long, broadly egg-shaped in outline, and have a dark green upper surface. When first emeging in spring, they are a distinctive silvery green. The edges are coarsely and irregularly toothed. The petiole, or leaf stalk, is flat.



The **flowers** are in catkins, and appear before the leaves.

The **fruit** ripens in May about the time the leaves begin to come out. The seeds are small and light and are carried long distances by the wind. The **buds** are dull gray, slightly hairy, and not sticky.

The **wood** is like that of the quaking aspen and is used for the same purposes.

BALSAM POPLAR

Populus balsamifera L.

Balsam poplar inhabits the borders of swamps and the low bottom lands along rivers throughout the state except in York County. It gets its name from the fragrance of the resinous, sticky buds.

In habit, the tree is somewhat different from the two preceding poplars. The branches are stout, erect, more or less contorted at the ends, and form an open, rather narrow head. It reaches a height of 30 - 70 feet, and a diameter of 15 - 30 inches.

The **bark** on young trees is smooth, or sometimes roughened by dark outgrowths and is greenish to reddish-brown. On the trunk of old trees it is gray and separated into broad, rough ridges.

The **leaves** are alternate, ovate, 3 - 5 inches long, and 2 - 3 inches wide. They are deep dark green and shiny on the upper surface, light green and usually with rusty blotches on the under side. The edges are lined closely with small, rounded teeth. The petioles are round in cross section.

The **flowers** are in catkins which appear early in the spring just before the leaves.

The **fruit** ripens the last of May or early in June. Each seed is attached to a cottony mass so that it is often carried long distances by the wind.

The **wood** is somewhat like quaking and bigtooth, but it is not as strong. The wood is prone to decay while growing. The larger logs are sawed into landscaping ties.

White-Barked Quaking Aspen (*Populus tremuloides var. magnifica* Vict.). Primarily found in Northern Maine and much like quaking aspen, but with white (ash-gray) bark. Bark may look like white birch from a distance, but does not peel off.

White (Silver) Poplar (*Populus alba* L.) is an introduced species planted to some extent. It is easily recognized by its rhomboid leaves which are green above and white, felt-like beneath.

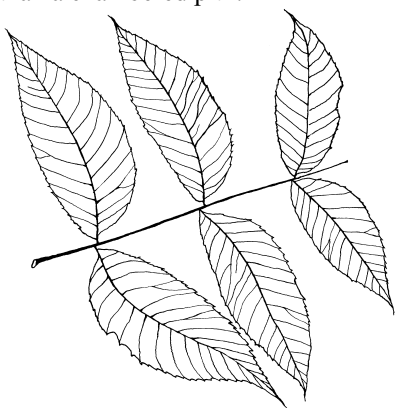
Eastern Cottonwood (*Populus deltoides* Bartr.) has been commonly planted as a street and yard tree but is native further west and south. Leaves are somewhat similar to bigtooth aspen but are much more triangular in outline and are shiny.

Lombardy Poplar (*Populus nigra var. italica* Muenchh.) is a native of Europe and is easily recognized by its narrow, spire-like form. It has been planted commonly but often after a varying number of years dies back due to disease.

Balm-of-Gilead Poplar (*Populus balsamifera var. subcordata* Hylander). Probably not native. Somewhat more spreading than the balsam poplar, but with leaves ovate and with base of leaf margin heartshaped. It produces only pistillate flowers, so propagation is only by cuttings or root sprouts. Also has fragrant buds like the balsam poplar.

BLACK WALNUT
Juglans nigra L.

Black walnut is planted occasionally throughout the state. It differs from butternut in that it has a diaphragmed pith, rather than a chambered pith.



Both **Japanese Walnut** (*Juglans sieboldiana* Maxim.) and **Japanese Heart-nut** (*Juglans sieboldiana var. cordiformis* Maxim) are hardy and have spread readily around Brunswick.

BUTTERNUT

Juglans cinerea L.

Butternut occurs naturally or in cultivation to some extent statewide. It grows on rich, moist soil and on rocky hills, especially along fence rows. It frequently has stout, spreading limbs, extending horizontally from the trunk to form a low, broad, rounded head. It is a tree 30 - 40 feet high and has a diameter of 1 - 2 feet.

The **bark** of young trees and of the branches is gray. On old trees, it is broadly ridged on the trunk and of a light brown color.

The **leaves** are compound, alternate, 15 - 30 inches long, and consist of 11 to 17 leaflets. Leaflet margins are serrate.

The **fruit** is composed of a nut enclosed by a fleshy husk covered with sticky hairs. It is about 2½ inches long and ellipsoid in shape. Fruit is produced in drooping clusters of 3 - 5. The nut is thick-shelled with sharp ridges on the surface. Indians used the oil from the nuts for making butter.

The **twigs** are stout, greenish and hairy, with chocolate-brown, chambered pith. The large leaf scars have a conspicuous, buff-colored, hairy pad at the top. Buds are also hairy.

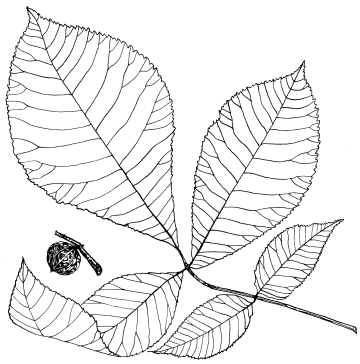
The **wood** is coarse-grained, light, soft, and weak. It is sometimes used for furniture and cabinet work, and takes a high polish.

SHAGBARK HICKORY

Carya ovata (Mill.) K. Koch

Shagbark hickory occurs naturally or in cultivation statewide except in the north and downeast. It is most commonly found in southern Maine on moist, but well-drained soil. It has a cylindrical head and a straight, gradually tapering trunk. It reaches a height of 70 feet and a diameter of two feet.

The **bark** is light gray on the trunk and separates into long, loose plates, giving it a shaggy appearance.



The **leaves** are compound, alternate, 8 - 14 inches long; leaflets most often 5 in number, rarely 7, with the 3 terminal leaflets being the largest. Leaflet margins are serrate.

The **fruit** has the thick outer husk deeply grooved at the seams. The husk separates along these grooves when ripe. The fruit is globose and is borne singly or in pairs. The kernel is sweet. The **twigs** are hairy or smooth and olive gray to dark red-brown in color. Pith is star-shaped in cross section. Bud scales are hairy.

The **wood** is very strong, close-grained, heavy, hard, tough and flexible. It was formerly used in the manufacture of agricultural implements, for making carriages and wagons, especially the spokes and rims of the wheels, and for axe and tool handles. Its principal use now is for pallets.

BITTERNUT HICKORY

Carya cordiformis (Wangenh.) K. Koch

Bitternut hickory is found in the extreme southwestern corner of the state.

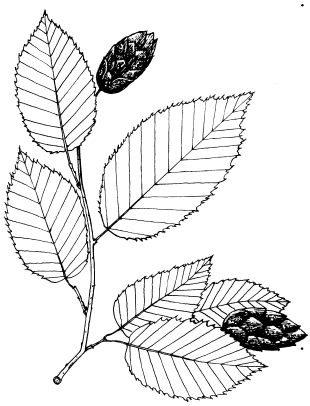
EASTERN HOP-HORNBEAM

Ostrya virginiana (Mill.) K. Koch

Eastern hop-hornbeam or ironwood is a small tree with either an open or rounded crown. It reaches a height of 20 - 30 feet, and a diameter of 6 - 10 inches. The branches are long and slender, and the ends are somewhat drooping.

It is a fairly rapid grower, especially in good soil. It grows on slopes and ridges having a dry, gravelly soil, and is often found in the shade of other species.

The **bark** is gray, separates easily into thin, narrow scales, becoming finer and stringy on older trees.



The **leaves** are either egg-shaped in outline or nearly oblong, widest in the middle, hairy on both surfaces, alternate, sharply toothed, and 2 - 3 inches long. They are somewhat like those of yellow birch.

The **flowers** occur in catkins which open with the leaf buds. The male catkins are pre-formed in the fall and are usually in clusters of 3.

The **fruit** is bladder-like, encloses a ribbed nutlet, and occurs in clusters. It ripens in September. The name "hop-hornbeam" refers to the fruit which closely resembles the true hops.

The **twigs** are light brown, fine, tough and wiry, and have a small green pith.

The **wood** is very close-grained, heavy, very strong, and is exceedingly hard when seasoned. It is used for tool handles and wedges for directional felling of trees.

AMERICAN HORNBEAM

Carpinus caroliniana Walt.

American hornbeam or blue-beech occurs west of the Penobscot River in the southern third of the state. The hornbeam is most commonly found in southern and central Maine, inhabiting wet woods and the borders of swamp and streams. It is a small, slow growing tree 10 - 25 feet tall and 4 - 10 inches in diameter. The branches are crooked. The trunk is characteristically ridged, or fluted longitudinally.

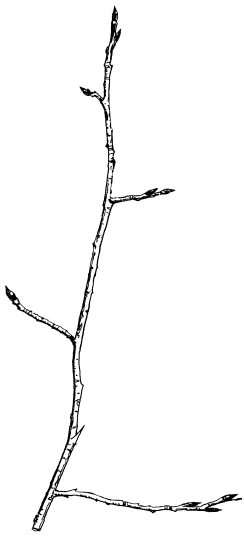
The **bark** is smooth, and grayish-blue. The leaves are alternate, egg-shaped or oval, 2 - 3 inches long, sharply toothed, smooth above and hairy below. They turn a brilliant scarlet in the autumn.

The **flowers** are produced in catkins which open in the spring before the leaves.

The **fruit** is a ribbed nutlet which is attached to the base of a three-lobed bract, and is borne in open clusters.

The **twigs** are reddish brown, slender and tough. Buds are reddish brown, slender, and sharp pointed.

The **wood** is close-grained, compact, strong, tough and durable. It is used for levers, handles, and wedges.



WILLOWS

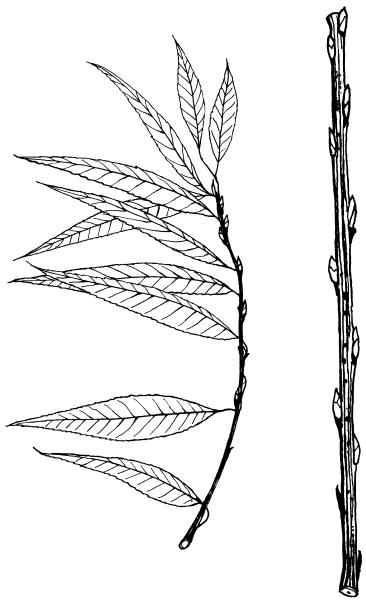
Maine has many willows, but this is a large and difficult group to identify. The *Revised Checklist of the Vascular Plants of Maine*, 1995 (see Appendix Four, p. 105) shows 58 native and exotic species, varieties, and hybrids to be present in the State.

All willows have the following characteristics in common: Buds are covered with a single, cap-like scale with silky, gray hairs beneath the scale. Leaves are alternate, mostly narrow, and the petioles are short or lacking. Flowers occur in catkins. Fruits consist of small, usually two-valved capsules filled with silky hairs which are attached to the seeds.

BLACK WILLOW

Salix nigra Marsh.

Black willow occurs throughout the State, but may be rare or absent in Aroostook, Piscataquis and Washington Counties. It grows to a height of 45-65 feet, and is found near streams and ponds. The stout, upright, spreading branches give the tree a broad, irregular outline. It is probably our largest native willow. The bark on old trees is shaggy and dark brown. The very narrow, sometimes sickle-shaped, finely-toothed leaves are 3-6 inches long. The wood is soft, light, weak, and is used occasionally for farm lumber.



Birches - The Important Distinctions

		Sweet Birch *Betula lenta*	Yellow Birch *Betula alleghaniensis*	Gray Birch *Betula populifolia*	Paper Birch *Betula papyrifera*
BARK	Texture	Smooth on young trees; broken into irregular plates on older trees.	Separates into thin, ribbon-like strips.	Does not separate into papery layers.	Separates into thin, papery layers.
	Color	Dark to almost black.	Bright silvery gray or light orange.	Outer, chalky or grayish white; inner bark orange.	Outer, cream white and shiny; inner, bright orange.
	Odor	Strongly aromatic on young branches.	Aromatic on young branches.	No odor.	No Odor.
LEAVES	Length	3 - 5 inches.	3 - 4½ inches.	2½ - 3 inches.	2 - 4 inches.
	Outline	Egg-Shaped.	Egg-Shaped.	Triangular.	Egg-Shaped.
	Margin	Singly and sharply toothed.	Coarsely and doubly toothed.	Coarsely and doubly toothed.	Doubly toothed.
	Shape	Base heart-shaped.	Base unevenly rounded.	Tip long pointed.	Tip short pointed.
	Surface	Upper dark green, dull; Lower light yellow-green.	Upper dark green, dull and hairy.	Upper dark green and glossy.	Upper dark green and dull.

Birches - The Important Distinctions (continued)

		Sweet Birch *Betula lenta*	Yellow Birch *Betula alleghaniensis*	Gray Birch *Betula populifolia*	Paper Birch *Betula papyrifera*
	FLOWER	3 - 4 Catkins.	3 - 4 Catkins.	Single or Pair Catkins.	3 Catkins.
	Arrangement	Not clustered.	Not clustered.	Not clustered.	Clustered.
BUDS	Texture	Smooth.	Smooth.	Not sticky.	Sticky when squeezed.
	Shape	Long, sharp pointed.	Long, sharp pointed.	Short, globe-like.	Long, tapered.
	Scales	Without hairs.	Hairy.	Without hairs.	Without hairs.
	Color	Chestnut brown.	Reddish-brown.	Red-brown to greenish brown.	Reddish-brown.
TWIGS	Texture	Smooth, with spur shoots, no hairs.	Somewhat hairy, with spur shoots.	Very fine, warty but not hairy, without spur shoots.	Hairy, with spur shoots.
	Color	Reddish-brown.	Greenish or yellow-brown.	Dull gray or brown.	Depends on age.
	Oder	Strong wintergreen oder.	Slight wintergreen oder.	No wintergreen oder.	No wintergreen oder.

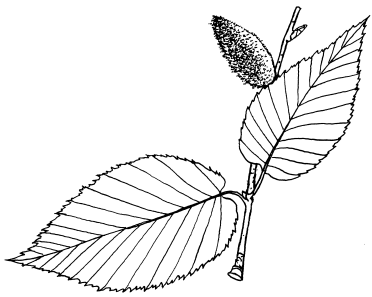
A number of minor species or varities of birch occur in Maine.

SWEET BIRCH

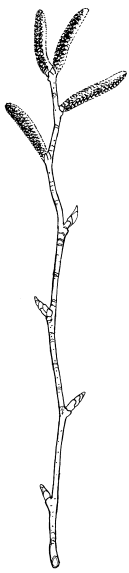
Betula lenta L.

Sweet, black, or cherry birch is found, though uncommonly, in the southern one-third of the state. It inhabits the banks of streams or moist, rich upland soil. It is a handsome tree with a tall dark stem, spreading, slender, horizontal branches, pendulous at the ends. It has a graceful, open, narrow head, which in full sun becomes round and symmetrical. It grows to a height of 60 - 70 feet and a diameter of 1 - 2 feet.

The **bark** on the trunk of old trees is dark to almost black, and separates into large, thick, irregular plates. On young trees and branches it is smooth, shiny, dark brown tinged with red, aromatic, and has a very pronounced wintergreen flavor.



The **leaves** are alternate, 3 - 5 inches long, aromatic, ovate or somewhat oblong, sharply toothed; upper surface dark green, dull; lower surface light yellow-green.



The **flowers** are produced in catkins. The winter shoots support three to four staminate catkins. They open just before the leaves unfold in the spring.

The **wood** is hard, heavy, strong, and can be beautifully polished. It is very much prized for use in the manufacture of furniture. Limited amounts are used as pulpwood. An oil having some medicinal value can be obtained from the branches and bark by distillation, and is generally known as wintergreen oil.

The name "cherry birch" is applied to this tree because of the resemblance of the bark on old trunks to that of the black cherry.

YELLOW BIRCH

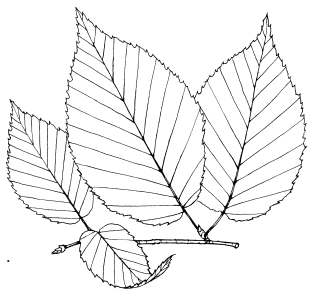
Betula alleghaniensis Britt.

Yellow birch is the largest of the native birches, growing to a diameter of three feet and a height of 70-85 feet. The spreading branches are somewhat pendulous, and form a broad, round-topped head in the open, but irregular in the woods. It grows well statewide on cool, moist sites, and is frequently mixed with beech and sugar maple, or with hemlock.

The **bark** on the branches and on the stems of young trees is very shiny, silvery gray or yellowish brown in color, separating into loose, thin, often ribbon-like layers. On old trees it is divided into large thin plates and is colored a dull gray or black. The young twigs are aromatic like the black birch, although to a lesser degree. Both the buds and twigs have a pronounced wintergreen taste.

The **leaves** are ovate or nearly oblong, alternate, the edges doubly toothed, the upper side dull, dark green, hairy and 3 - 4½ inches long.

The **flowers** are in catkins. In winter there are 3 - 4 pre-formed staminate catkins on the shoots, but not in clusters. They open in the early spring.



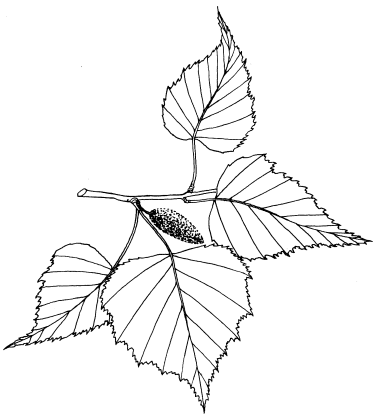
The **twigs** are yellowish to dark brown, with a wintergreen taste and are somewhat hairy.

The **wood** is hard, strong, heavy, and will take a good polish. It is close grained and evenly textured. The heartwood, which makes up the bulk of the wood, has a very pleasing reddish color. It takes stains easily, makes excellent veneer wood, and does not easily warp. It is also used for furniture, flooring, woodenware, lumber for interior finish, plywood, railroad ties, pallets, pulp, gunstocks, and dowels. The yellow birch is one of our most valuable timber trees.

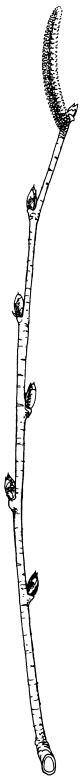
GRAY BIRCH

Betula populifolia Marsh.

Gray birch is a short-lived and not a particularly valuable tree. It occurs to some extent statewide, but is only abundant in the southern and eastern sections of the state.



It is frequently found in old fields, burns, and heavily cut areas. This is a small tree which commonly reaches 20 - 30 feet in height and 4 - 8 inches in diameter. It usually occurs in clumps and often leans. The branches are short, slender, and frequently pendulous and contorted. These bend toward the ground when the tree is not crowded. The head is long, narrow, pointed and open.



The **bark** is close and firm and does not easily separate into thin layers. The outer part is dull grayish white or chalky. The inner portion is orange.

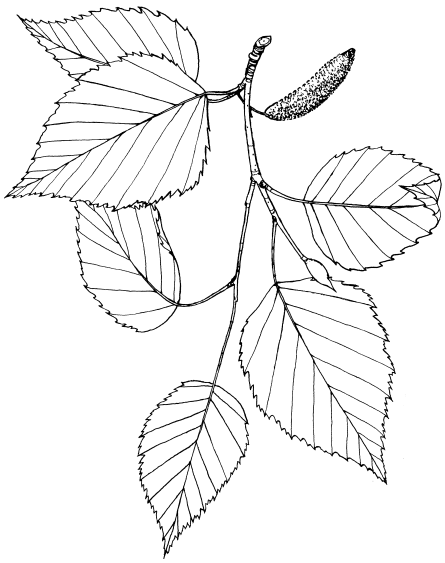
The **leaves** are 2½ - 3 inches in length, thin, long-pointed, triangular, alternate, and doubly toothed. The upper surface is dark green and glossy. The slightest breeze causes them to flutter like those of the poplars, hence the scientific name *Betula populifolia* which means "birch with poplar leaves."

The **flowers** are produced in catkins. Those which appear in the fall are of the male sex and are usually solitary. They open in early spring before the leaves. The **twigs** are the finest of our native hardwoods. They are tough and wiry, dull gray or brown, hairless, and have a rough, warty surface. The **wood** is light, soft, often coarse-grained, and decays rapidly when exposed. It is used primarily for pulpwood.

PAPER BIRCH

Betula papyrifera Marsh.

Paper, white or canoe birch is a common tree in all parts of the state and occurs in pure stands or in mixture with other species. It reaches 60 - 70 feet in height, and 1 - 2 feet in diameter. It grows along streams and on the borders of lakes and ponds, thriving best in a rich, moist soil.



When young, the branches are short, slender, and spreading, somewhat drooping, and forming a narrow, regular head. In the forest the trunk is free from branches well up from the ground, and the tree forms an open, narrow and round-topped head.

The **bark** on the trunk and limbs separates freely and easily into thin, papery sheets. The outer surface is white, the inner part bright orange. Seedlings or very young trees have a darker colored bark, which gradually changes to a creamy-white. The bark is a protective layer and should never be removed from living trees.

The **leaves** are alternate, ovate, short-pointed, 2 - 4 inches long, thicker than those of gray birch, doubly-toothed, with the upper surface dark green and dull.

The **flowers** are in catkins. Those appearing in the fall are dormant, staminate catkins and occur mostly in clusters of 3. They open in early spring before the leaves.

The **twigs** are usually hairy, and unlike yellow birch, without a wintergreen taste. The buds are slightly sticky.

The **wood** is close-grained, moderately hard, and strong. It is used for clothespins, woodenware, flatware, turned products, including spools, toys, toothpicks, dowels, furniture parts, paper-roll plugs; plywood, and for pulp.

This is one of the most valuable tree species in Maine. The tree gets the name of "paper birch" because of the use to which the bark was put by the early settlers, and that of "canoe birch" because the bark was used to make canoes. Paper birch sap in the early spring contains considerable sugar.

HYBRID BIRCHES

It is known that natural hybrids often occur between certain closely related species of birches, especially between gray and mountain paper birch. The offspring are often intermediate between the parents, or in some cases, resemble one parent much more than the other. In such hybrids, it would require the experience of a specialist in order to determine the exact parentage.

Minor Species or Varieties of Birch in Maine:

Mountain Paper Birch *(B. cordifolia* Regal) is known from many points in Maine, particularly on mountain slopes and coastal headlands and islands east of Mount Desert Island. The leaves are heart-shaped, abruptly pointed, coarsely doubly serrate. The bark separates into thin layers and is reddish-brown or white.

Dwarf Paper Birch *(B. minor (*Tuckerm.) Fern.) is found near the summit of Mt. Katahdin.

Blueleaf Birch *(B. x caerulea* Blanchard) is widely distributed on exposed mountain slopes. Leaves are dull bluish-green above doubly serrate, ovate, long-pointed. Trees reach a considerable height.

Dwarf Birch *(B. glandulosa* Michx.) is a dwarf species found on Mt. Katahdin.

Low or Swamp Birch *(B. pumila* L.) is another dwarf species. Found infrequently through the central part of the state in open bogs.

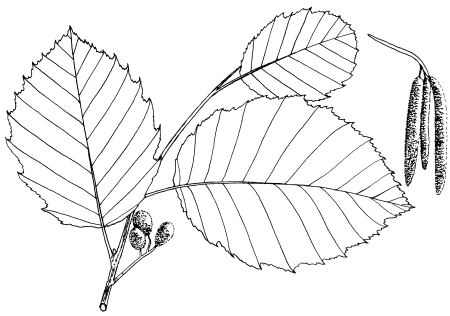
SPECKLED ALDER

Alnus incana ssp. rugosa (Du Roi) Clausen

Speckled alder commonly occurs statewide, usually growing in wet areas along brooks, in swamps, and in pastures. It sprouts very readily and is a nuisance on pasture land. Alder usually occurs as a shrub, rarely as a small tree. It is seldom more than four inches in diameter and 20 feet in height.

The **bark** is smooth, dark chocolate brown, and marked with white elongated spots called lenticels.

The **leaves** are alternate, 2 - 3 inches long, usually broadly ovate, and the texture is rough or rugose as the scientific name implies. The edges are unevenly or doubly toothed.



The **flowers** are in catkins, and open before the leaves in the spring. The purplish, wax-like, male catkins are pre-formed the previous fall. The **fruit** is woody and cone-like, with a very short stalk.

The **winter buds** are short-stalked, maroon in color, with few scales showing. The **twigs** are reddish brown; the pith is triangular in cross section.

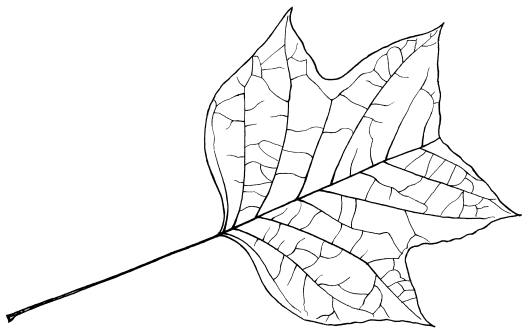
The **wood** is light and soft, and has very little commercial use. The wood discolors very rapidly on exposure to the air. Baskets for the florist industry are made from small diameter stems. In the past the wood was used in hand forges because of the intense heat it produced when burned.

Two other species, **Downy Green Alder** *(Alnus viridis (Vill.) Lam. & DC. spp. crispa* (ait.) Tirrill) and **Hazel Alder** *(Alnus serrulata* (Ait.) Willd.) occur as shrubs.

TULIPTREE

Liriodendron tulipifera L.

Tuliptree or yellow poplar is found from western Massachusetts to southern Michigan and southward but has been introduced as an ornamental statewide except in Washington, Penobscot, Piscataquis, Somerset, and Lincoln Counties. The bark is at first smooth and green with white streaks. Older bark is fissured and ridged.



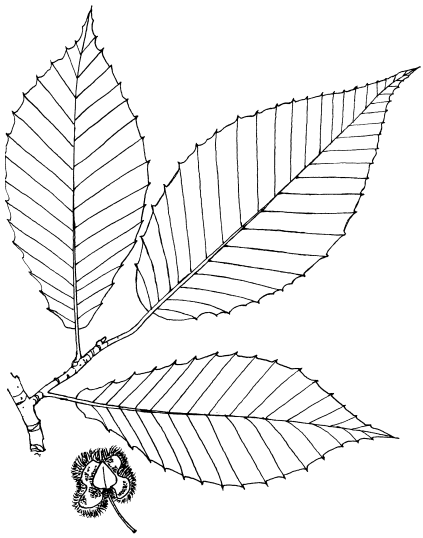
Leaves are alternate, lobed, and squarish at the tip. The flowers are tulip-like and yellow-green in color. The fruit is contained in a conelike structure about 3 inches long. Winter buds are smooth with two duckbill-like scales. The pith is white and diaphragmed. This is reported to be the tallest native American hardwood species. In its native range, it is used extensively for lumber and pulp. It is also used for furniture-making and carving.

AMERICAN BEECH

Fagus grandifolia Ehrh.

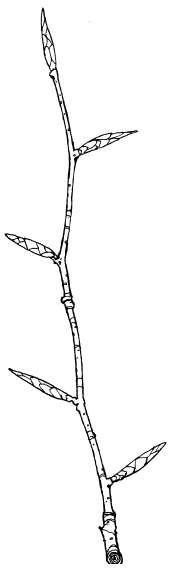
American beech occurs statewide, grows up to 70 feet in height and 13 feet in diameter. Shoots often spring up from the roots. Beech is common and sometimes forms nearly pure stands. It grows best on rich upland soil.

The **bark** is of a light gray color and smooth unless affected by beech bark disease.



The **leaves** are alternate, from 3-5 inches long, elliptic, acutely pointed, with coarse, and hooked teeth. The margin between the teeth is nearly straight. Dead leaves tend to remain on trees into the winter.

The **fruit** consists of a bur, which usually contains 2 triangular edible nuts. These are sweet and are utilized for food by wildlife. The **winter buds** are long, slender, many scaled, and sharp-pointed.



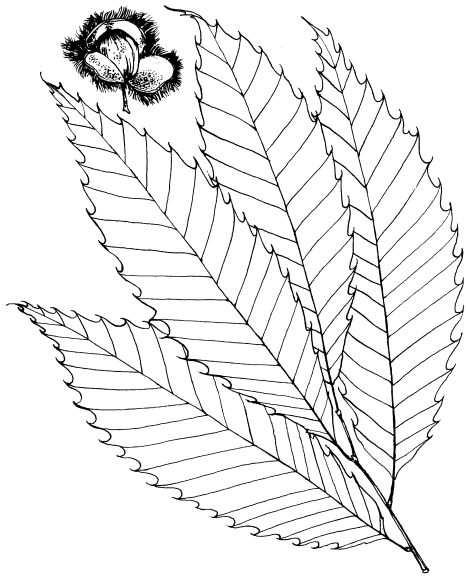
The **wood** is strong, hard and tough but not durable. It is used for clothespins, furniture, handles, woodenware, railroad ties, pulp, dowels, flooring, and pallets.

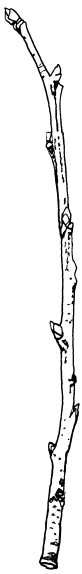
European Beech *(Fagus sylvatica* L.) and **Purple** or **Copper Beech** *(Fagus sylvatica var. atropunicea,*West) are two species of European origin planted in southern and central Maine as ornamentals.

AMERICAN CHESTNUT

Castanea dentata (Marsh.) Borkh.

Most of the chestnut trees in Maine have been destroyed by the chestnut blight fungus, *Endothia parasitica.* There are national efforts underway to develop blight resistant trees of this once very important tree species. The natural range of American chestnut only extended into southern and central portions of the state and now



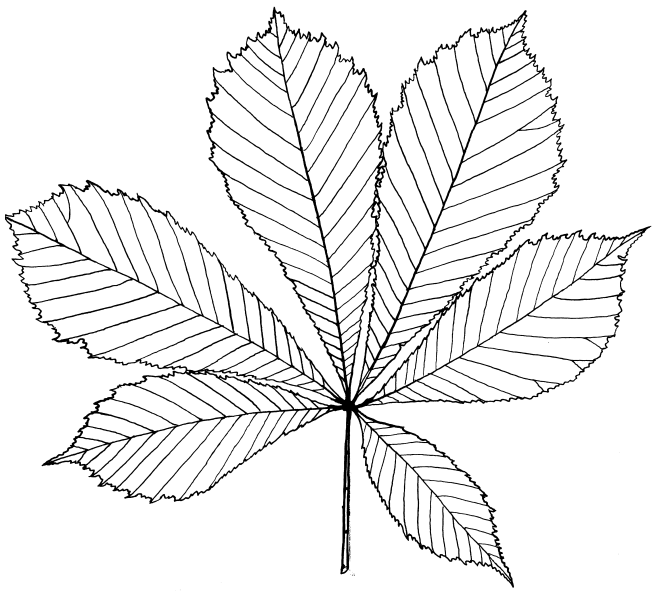


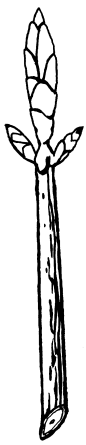
occurs infrequently, usually as sprout growth, in the southern half of the state on rich, well-drained soil. It has been planted occasionally as far north as Bangor. The tree grows rapidly. In the forest, it has a tall, straight trunk free of limbs, and a small head. When not crowded, the trunk divides into three or four limbs and forms a low, broad top. It reachs a height of 60-70 feet and a diameter of 15-30 inches. The **bark** on the trunk of old trees is dark brown and divided into broad, flat ridges by shallow, irregular fissures. On young stems, it is smooth and dark gray with a green tinge. The **leaves** are coarsely toothed and hooked, with the leaf margin between the teeth rounded. Leaves are alternate, 5-8 inches long, yellow-green, and smooth on both surfaces. The **fruit** is a prickly bur, containing 2-3 nuts tipped with hairs. The inner lining of the bur is plush-like. The **nuts** contain a sweet meat and were once gathered in large quantities for the market. The **wood** is soft, very durable, strong and splits easily. It is used for interior finishing and was (prior to the blight) in much demand for telephone poles, railroad ties and fence posts. The durability of the wood is due to the tannic acid which it contains.

HORSECHESTNUT

Aesculus hippocastanum L.

Horsechestnut is not related to the native chestnut. It comes from Asia and the Balkan Peninsula and is generally planted as a shade and ornamental tree.





It is symmetrically round or oval in outline with a stiff branch habit. The tips of the branches curve slightly when mature. It has a heavy, luxuriant foliage of deep green which changes to bronze in early autumn. The large, opposite leaves with 5-7 leaflets, arranged palmately on a single stalk, distinguish it from any of Maine's native trees. Taken together with the pyramids of white flowers blossoming in the early spring and the large bur-like, leathery husk enclosing one or more smooth, mahogany- colored nuts, it is not easily confused with any other species. It makes a good shade tree but requires rich soil for best development. It is prone to a leaf blight. The fruit is poisonous when taken internally.

The **buds** are large, sticky, and nearly black. The wood is soft, light, and close grained. In Europe it is used for wood carving and veneer.

Black Oaks - The Important Distinctions

		North. Red Oak *Quercus rubra*	Scarlet Oak *Quercus coccinea*	Black Oak *Quercus velutina*	Bear Oak *Quercus ilicifolia*
BARK	Texture	Slightly ridged.	Ridges small and irregular.	Deeply fissured. Ridges very dark.	
	Color	Dark gray to black; inner-reddish.	Inner - pale red or gray.	Inner - deep orange or bright yellow.	Gray to dark brown.
LEAVES	Length	5 - 8 inches.	3 - 6 inches.	5 - 6 inches.	3 - 5 inches.
	Color	Surface - Dull, dark green; below - yellow-green.	Surface - bright green and shiny; below - paler.	Surface - dark green and shiny.	Surface - dark green; below- white or gray.
	Surface	Smooth beneath.	Smooth beneath.	Hairy beneath.	Hairy beneath.

Black oak group: leaf lobes sharp-tipped, acorns mature in two years and are hairy inside.

Black Oaks - The Important Distinctions (continued)

		North. Red Oak *Quercus rubra*	Scarlet Oak *Quercus coccinea*	Black Oak *Quercus velutina*	Bear Oak *Quercus ilicifolia*
ACORN	Size	2 - 4 times longer than cup.	Twice as long as cup.	Twice as long as cup.	Small nearly hemispherical, striped above middle.
	Cup	Saucer-like, with scales fused.	Bowl-like, with shiny scales.	Bowl-like, with dull scales.	Shallow.
BUDS	Shape	Conical, smooth.	Small, rounded.	Large, decidedly angled.	Small, short, blunt - pointed.
	Color	Chestnut brown.	Light brown.	Yellowish - gray.	
	Scales	Silky at tip.	Hairy at tip only.	Coated with matted wool-like hairs.	Loose scales.

Black oak group: leaf lobes sharp-tipped, acorns mature in two years and are hairy inside.

White Oak - The Important Distinctions

		White Oak *Quercus alba*	Bur Oak *Quercus macrocarpa*	Swamp White Oak *Quercus bicolor*	Chestnut Oak *Quercus prinus*
BARK	Texture	Ridges broad, flat, flaky.	Deeply furrowed, flaky.	Deeply fissured; broad, flat ridges, flaky.	Furrowed.
	Color	Light gray.	Grayish.	Grayish - brown.	Reddish brown to dark brown.
LEAVES	Length	4 - 7 inches.	6 - 12 inches.	4 - 6 inches.	4 - 8 inches.
	Color	Surface - bright green.	Surface - dark green.	Surface - dark green.	Surface - yellow - green.
	Surface	Upper dull.	Upper shiny.	Upper dull.	Upper shiny.
	Shape	Lobes rounded, cleft to midrib.	Violin-shaped; lobes rounded.	Slightly lobed.	Narrowly elliptical; shallow rounded lobes.

White oak group: leaf lobes rounded, acorns mature in one year and lack hairs inside.

White Oak - The Important Distinctions (continued)

		White Oak *Quercus alba*	Bur Oak *Quercus macrocarpa*	Swamp White Oak *Quercus bicolor*	Chestnut Oak *Quercus prinus*
ACORN	Size	2 - 4 times longer than cup.	Twice as long as cup.	3 times as long as cup.	3 times as long as cup. Long and wrinkled.
	Cup	Short stalked.	Margin fringed with long, hair-like scales. Short stalked.	Margins slightly fringed with scales, long stalked.	Hairy, moderately long stalked.
BUDS	Shape	Broadly ovoid, blunt pointed.	Broadly ovoid, sharp or blunt pointed.	Roundish, blunt pointed.	Broadly ovoid, sharp pointed.
	Color	Dark red - brown.	Reddish brown.	Brown.	Yellowish brown.
	Scales	Without scales.	Coated with soft hairs.	Small, without hairs.	Without hairs.

White oak group: leaf lobes rounded, acorns mature in one year and lack hairs inside.

NORTHERN RED OAK

Quercus rubra L.

Northern red oak occurs statewide and is the most common species of oak in Maine. It is found mainly in the southern half of the state. Best growth is attained on rich upland soils.

It grows to a height of 60-80 feet and a diameter of 2-3 feet, forming either a narrow or broad head. The branches are stout, horizontal or upright.

The **bark** on the trunk of old trees is dark gray or nearly black, and is divided into rounded ridges. On younger trees and branches it is smooth and greenish - brown or gray. The inner bark is reddish. The **leaves** vary in shape, are 5-8 inches long, alternate; dull, dark green above, yellow-green below, and have bristle-tipped lobes.

The **flowers** appear in May, while the leaves are only partly grown. The **fruit** ripens the second year. The acorn is broad, large, 1-1 1/4 inches long, and up to 4 times longer than the shallow cup. The inside lining of the acorn is densely hairy. Its tannic acid content makes it bitter. The **twigs** are smooth, greenish- to reddish brown, and have a star-shaped pith.

The **wood** is hard, strong and heavy. It is used for furniture, interior finish, shipbuilding, planks and frames, lobster traps, flooring, implements, piling, cross-ties, timbers, pallets, and dowels.

Q. rubra var. borealis

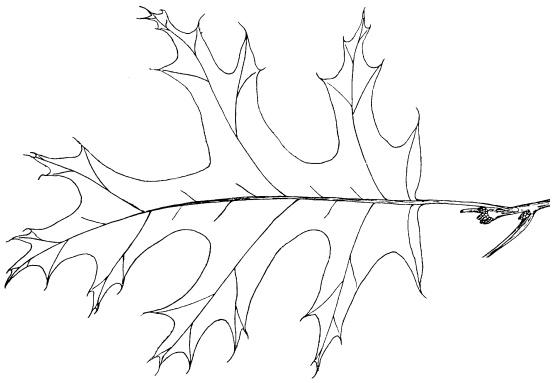
It has a smaller acorn, ¾ - 1 inch long, and only three times longer than the cup.

SCARLET OAK

Quercus coccinea Muenchh.

Scarlet oak occurs locally and rarely in the southern tip of Maine. It grows on the dry soil of ridges and uplands in York, Cumberland and Androscoggin Counties.

Scarlet oak in Maine is a smaller sized tree than red oak, growing to a height of 30-50 feet and 1-2 feet in diameter. The branches are slender and form an open, narrow head.



The **bark** on the trunk of old trees is separated into irregular ridges by shallow fissures and is dark gray with a reddish inner bark.

The **leaves** are alternate, 3-6 inches long with a variable outline. The upper surface is bright green and shiny, the lower is paler and less shiny. Lobes are sharp-tipped. In the fall the leaves turn a deep scarlet, which accounts for the common name of the tree.

The **flowers** appear in May when the leaves are only partly developed.

The **fruit** ripens the second year. The acorn is about ½ inch long, about twice as long as the cup, and is from ⅓ - ½ enclosed by the cup. It is quite bitter.

The **wood** is hard, strong, heavy, but coarse grained. It is used to a limited extent for interior finish, shipbuilding, planks and frames, flooring, piling, cross-ties, timbers, pallets, and dowels.

BLACK OAK

Quercus velutina Lam.

Black or yellow oak is found in southern Maine from Lincoln and southern Oxford Counties southward. It grows on dry ridges and gravel uplands. It is common near Fryeburg. The branches are slender and the head is narrow and open. It grows to a height of 50-60 feet and a diameter of 1-2 feet.

The **bark** is smooth and dark gray or brown on young stems. On old trees it is divided by deep fissures into broad, rounded ridges and is dark, almost black. It is rougher than red oak. The inner bark is characteristically bright orange or bright yellow. It is used for tanning.

The **leaves** are alternate, 5-6 inches long, the upper surface glossy, dark green, varying much in shape and general outline, usually 7 lobed with bristle points. Under surface generally hairy with more obvious, rusty hairs in axils of veins. The **flowers** appear in May when the leaves are only partly grown. The bitter **fruit** matures the second season. The acorn is ½ - ¾ inch long, almost twice as long as the cup and one-half enclosed by it.

The **twigs** are smooth; buds are densely hairy, angled and yellowish-gray. The **wood** is hard, heavy, strong, and coarse grained. It is used for the same purposes as scarlet oak.

BEAR OAK

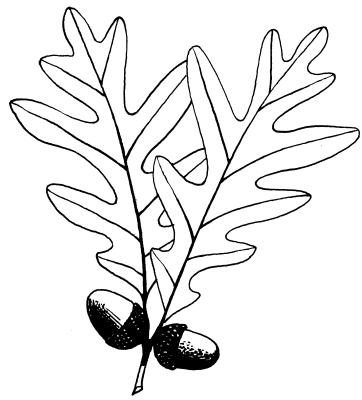
Quercus ilicifolia Wangenh.

Bear or scrub oak is found from Hancock County southward along the coast and in southern Maine. It is a small, shrubby tree, less than 20 feet high. It is common on the sand barrens of southern Maine, eastern Hancock County, and on rocky ridges and barren ledge sites along the coast. Its principal distinguishing feature is leaf shape. The 2nd lobes from the base are much larger than others.

WHITE OAK

Quercus alba L.

White oak, which gets its name from the color of the bark, occurs naturally in southern and central Maine as far north as Oakland in northern Kennebec County. It is specifically found in coastal Knox County and southern Franklin and Oxford Counties. It grows on sandy land, gravely ridges, and moist bottom lands, but makes the best growth on rich, heavy, upland soils.



In good situations, height of 60-70 feet and a diameter of 3-4 feet. When not crowded by other trees the bole is short, the limbs are large and diverging, and the head is broad and rounded. In the forest it has a long bole and a narrow head.

The **bark** on the trunk is separated into thin, irregular flakes and varies from light to ashy-gray.

The **leaves** are usually 9 lobed, round-lobed, slightly cleft, or cleft nearly to the mid-rib, alternate, 4-7 inches long, bright green above, pale green or whitish beneath. They sometimes remain on the tree during the winter.

The **flowers** come out in May when the leaves are half grown.

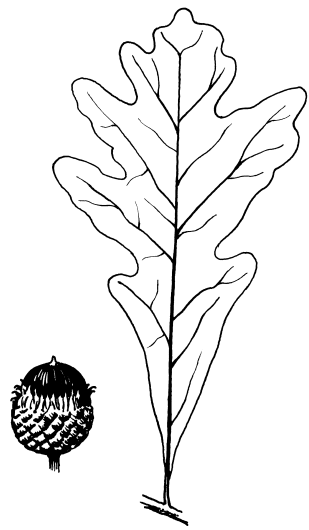
The **fruit** ripens in September of the first year. The acorn is about ¾ inch long, from 2-4 times longer than the cup, and about ¼ enclosed by it. The fruit is edible. Indians pounded it into a flour and bleached out the tannin with hot water. The **twigs** are gray to purple; buds are blunt pointed and scales are without hairs.

The **wood** is strong, heavy, hard, and durable. It is used for ship and boat building, ties, tight cooperage, posts, poles, piling, agricultural implements, interior finish, furniture, flooring, and in limited quantities for pulp.

BUR OAK

Quercus macrocarpa Michx.

Bur oak is found in the southern two-thirds of the state and is locally plentiful in central Maine. It is quite common along the Sebasticook River, the lower Penobscot basin, and east into Hancock county. It grows in low, rich bottom lands, and is rarely found on dry soil. It has a broad top of wide spreading branches. The trunk is often clear of limbs for $^2/_3$ or more of its length. It attains a height of 60-70 feet, and a diameter of 2-3 feet. The **bark** is grayish, deeply furrowed, and broken into plate-like irregular scales. The **leaves** are roughly violin-shaped in outline, have rounded lobes, but mostly not as deeply cut as the white oak. The upper end of the leaf is widest. They are alternate, dark green and shiny on the upper surface; the lower, pale green or silvery white. The **flowers** appear in May when the leaves are partly formed. The **fruit** matures the first year and is usually solitary. It varies much in size and shape. The acorn is about ¾ inch long, and about ½ enclosed by the cup. The margin of the cup is fringed with long, hairlike scales. The fruit is edible. The **twigs** have corky wings or ridges. The **wood** is very durable, hard, heavy, and strong. It is used for the same purpose as white oak, except for plywood, furniture, flooring and implements.



CHESTNUT OAK

Quercus prinus L.

Chestnut oak only occurs in the southern tip of Maine. It is found on Mt. Agamenticus in the town of York and has been reported from Oxford County. Trees grow 12 inches or more in diameter and about 40 feet in height. The leaves are similar to those of chestnut, narrowly elliptical, with shallow rounded lobes, yellow-green above, hairy below. The large fruit is edible, ellipsoid, and the cup encloses ½ the acorn.

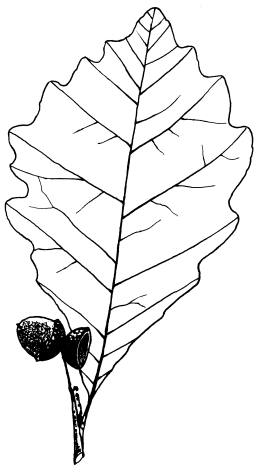
SWAMP WHITE OAK

Quercus bicolor Willd.

Swamp white oak is not abundant, but occurs in small, widely scattered groves in York and Androscoggin Counties. It grows in moist, fertile soil on the borders of swamps and along streams.

Swamp white oak grows to a height of about 50 feet and a diameter of 2-3 feet. The limbs are small, usually pendulous. The head is narrow, open, and round-topped.

The **bark** on old trees is deeply furrowed, divided into broad, flat ridges, flaky, and grayish brown in color. On young trees and branches it is smooth and separates into papery scales which hang loosely.



The **leaves** are alternate, 4-6 inches long, slightly lobed. The upper surface is dark green, shiny. The lower, pale white or tawny.

The **flowers** appear in May when the leaves are not more than half grown.

The **fruit** matures the first season. The acorn has a long stalk, is about one inch long, three times as long as the cup and about $^1/_3$ enclosed by it.

The **twigs** have a yellowish or a light orange to reddish-brown bark.

The **wood** is strong, heavy and hard and is used for the same purposes as the white oak.

Elms - The Important Distinctions

	American Elm *Ulmus americana*	**Slippery Elm** *Ulmus rubra*
Profile	Tall and variable in outline, yet typically vase-shaped.	Medium height. Head broad and almost flat.
Bark	Ashy gray. Inner bark not containing sticky substance.	Dark brown tinged with red. Inner bark contains sticky substance.
Leaves	Somewhat rough on upper surface and smooth on the lower. Short pointed tip.	Very rough on upper surface; hairy and nearly as rough on lower. Long pointed tip.
Buds	Brown and smooth. The terminal bud is cocked at a 45°angle from the tip of the twig.	Dark reddish brown and covered with rusty hairs.

INTRODUCED ELMS

English Elm (*Ulmus procera*) a native of Europe, is more compact, stiffer, and has a less spreading form than our native species. At a distance, it resembles oak rather than elm. It has denser foliage and a longer leafing period than our native elms, and it is less susceptible to insect troubles. Leaves are similar to those of American elm but are smaller and more hairy below. The rough, coarse bark is divided by fissures into rather large plates on old trees. The almost black buds and twigs are densely hairy.

Chinese or lacebark **Elm** (*Ulmus parvifolia*) and the **Siberian Elm** (*Ulmus pumila*) have been occasionally planted along our highways. Siberian elm trees are brittle. Leaves are quite small, generally only singly serrate. Chinese elm fruits in the autumn, unlike most other species of elm.

Scotch Elm (*Ulmus glabra*) is a native of Europe occasionally planted as a street tree in central and southern Maine, often mistaken for Slippery Elm. Leaves are simple to bear-paw shaped, and sandpapery to the touch on the upper surface.

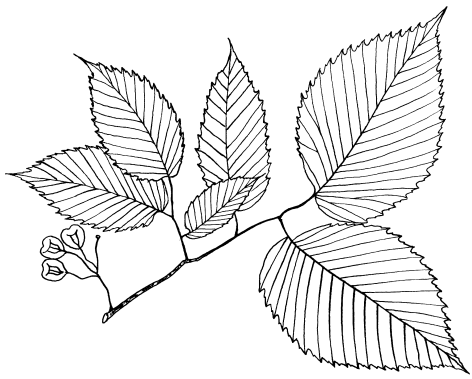
Camperdown Elm (*Ulmus glabra var. camperdowni*) is a short, spreading tree with pendulous branchlets and a round-topped head, thus its name also as the umbrella elm.

AMERICAN ELM

Ulmus americana L.

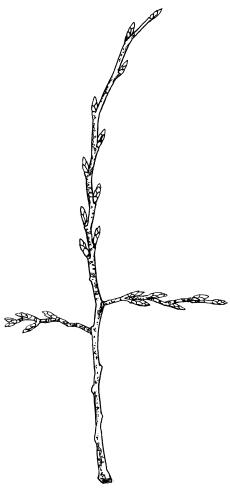
American elm is one of our largest and most graceful trees and often occurrs throughout the state. Its numbers are severely decimated by the Dutch elm disease. It is found more often on rich bottom lands and moist soil along streams, but sometimes grows on higher ground.

The trunk often divides into numerous limbs which form a vase-shaped or spreading round-topped head with graceful, drooping branches. It attains a height of 60-70 feet and a diameter of 2-4 feet.



The **bark** on the trunk is separated into broad ridges by deep fissures and is an ashy-gray color on the surface. It shows alternate layers of chocolate brown and buff coloration beneath.

The **leaves** are alternate, 3-6 inches long, with coarsely doubly-toothed margins and uneven bases. The upper surface is dark green and somewhat rough.



The **flowers** appear in April before the leaves.

The **fruit** consists of a small, winged seed which ripens about the last of May before the leaves have fully developed. It has a wide, open notch at the apex, and a hairy margin.

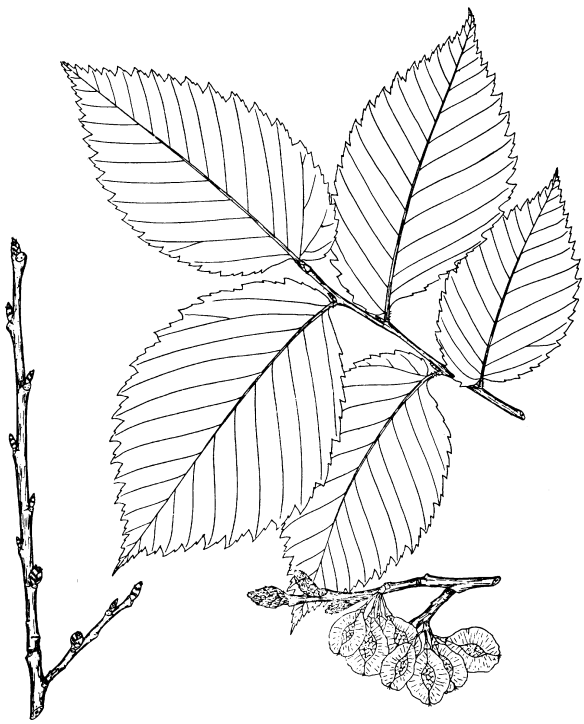
The **wood** is spiral and coarse-grained, hard, heavy, strong, tough and hard to split. It is used for flooring, railroad ties, hoops, farm lumber and pulp.

SLIPPERY ELM

Ulmus rubra Muhl.

Slippery or red elm is extremely rare in the state. The 1995 *Revised Checklist of Vascular Plants of Maine* by Campbell et al. shows this species occurring naturally in scattered locations in York and Franklin Counties. It grows best on low, rich soil though it sometimes occurs on higher ground. It grows up to 50 feet in height and 2 feet in diameter.

The **bark** is thick, dark brown tinged with red, divided by shallow fissures into flat ridges and covered with flat



scales. Inner bark is sticky when chewed.
The **leaves** are simple, alternate, 4-6 inches long, sharply toothed, dark green and very rough on the upper surface and hairy on the under surface. The **flowers** appear before the leaves in the middle of April. The **fruit** is small, flattened and winged without hairs on the margin. It ripens in late spring. The **winter buds** are obtuse, dark brown in color and covered with rusty hairs.

The **wood** is heavy, strong and durable. The inner bark is gathered for medicinal purposes.

SASSAFRAS

Sassafras albidum (Nutt.) Nees

Sassafras occurs in southern Maine in eastern Cumberland, southern Oxford and York Counties, and is sometimes planted for ornament.

The **bark** on young stems is thin and reddish brown. On older stems it becomes thick and scaly. The inner bark is very fragrant and sometimes chewed.

The **leaves** are alternate, very hairy when they first appear, losing the hair at maturity except on the midrib. They are light green and of 3 shapes: entire, mitten-shape, and three-lobed.

The **flowers** open in early spring with the first leaves, in racemes containing about 10-15 flowers.

The **fruit** ripens in September and October and is a blue, lustrous drupe which is supported on a fleshy, red stalk.

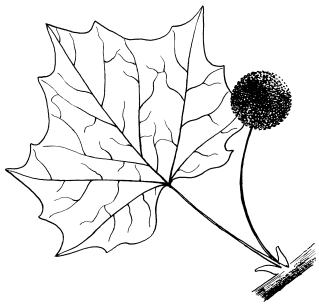
The **wood** is soft, weak, brittle, very aromatic, light brown and very durable in the soil. The roots and bark are distilled for oil of sassafras, used to perfume toilet articles.

AMERICAN SYCAMORE

Platanus occidentalis L.

American sycamore, buttonwood, or planetree occurs rarely on the borders of streams and rich bottom lands in York, Cumberland and southern Franklin Counties. In Maine it does not attain great size. The trunk may spread near the ground into several large, secondary limbs, or it may rise without branching for a considerable distance and then have large, spreading branches.

The **bark** on the trunk and large limbs is greenish-gray in color and flakes off in broad scales exposing white patches beneath.



The **leaves** are simple, alternate, 3 - 5 lobed and light green. The base of the leaf-stalk is hollow and swollen and covers the winter bud.

The **fruit** head generally occurs singly and is in the shape of a ball about an inch in diameter. It contains very many small wedge or shoenail-shaped nutlets, and usually remains on the tree until spring.

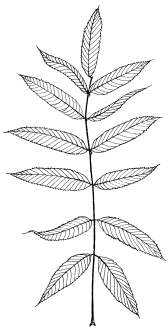
The **twigs** are zigzag in shape and are encircled by conspicuous stipules. The winter buds have a single, wrinkled, cap-like scale.

The **wood** is hard, firm, very perishable when exposed to the weather, and liable to warp. It is used for furniture and interior finish of houses.

AMERICAN MOUNTAIN-ASH

Sorbus americana Marsh.

American mountain-ash or roundwood occurs statewide and is not a true ash, but is closely related to the apple. It rarely reaches over 20 feet in height. It is particularly common in mountainous regions and along the coast. The leaves are alternate, compound 13-17 inches long, tapered, finely toothed leaflets. The leaflets are 2-4 inches long, $^{5}/_{8}$-1 inch wide, and without hairs.



The small creamy-white flowers are borne in cymes. The fruit is bright red, berry-like, about ¼ inch in diameter. These remain on the tree late into the winter and are sometimes used as an astringent in medicine. The bud scales are hairless and sticky. The pale brown wood has little value because it is soft and weak.

SHOWY MOUNTAIN-ASH

Sorbus decora (Sarg.) Schneid.

Showy mountain-ash is most commonly found in northern and western parts of the state. It is not found in Lincoln and Kennebec Counties southward. It is usually better balanced in outline than the American mountain-ash and has a well-rounded crown. The leaves are alternate, compound, and differ from the preceding species in having leaflets which are only 1½ - 3 inches long, and $^{5}/_{8}$ - $1^{1}/_{8}$ inches wide. The fruit is larger, up to ½ inch in diameter, and matures later in the season. The outer bud scales are sticky; the inner scales are hairy.

EUROPEAN MOUNTAIN-ASH

Sorbus aucuparia I.

The European mountain-ash or rowan tree is native to Eurasia and is superior to the native species in the brilliancy of its fruit. The buds are silky and the leaflets somewhat hairy beneath. The fruit is large and abundant. The leaves are similar although more blunt than those of the American mountain-ash.

HAWTHORN

Crataegus spp.

Hawthorn or thorn-apple occurs in Maine as a low spreading tree or shrub, rarely reaching a height of more than 15-18 feet. There are 31 different species found in the state. Hawthorns can usually be recognized by the small apple-like fruits and the thorns on the branches.

The **bark** is dark brown to ashy gray, somewhat scaly.

The **leaves** are alternate, doubly toothed, and usually somewhat lobed, thin and dark green.

The **flowers** appear about the first of June in flat, showy white clusters.

The **fruit** which is ¾ inch in diameter resembles a small apple. The flesh is thin and mealy and encloses from 1-5 rounded nutlets. It is used for jellies.

The **twigs** are slender, rigid, and usually armed with long thorns. They form a compact crown due to their zigzag method of growth.

The **wood** is heavy, hard, and close grained. It is used to some extent for handles and other small articles.

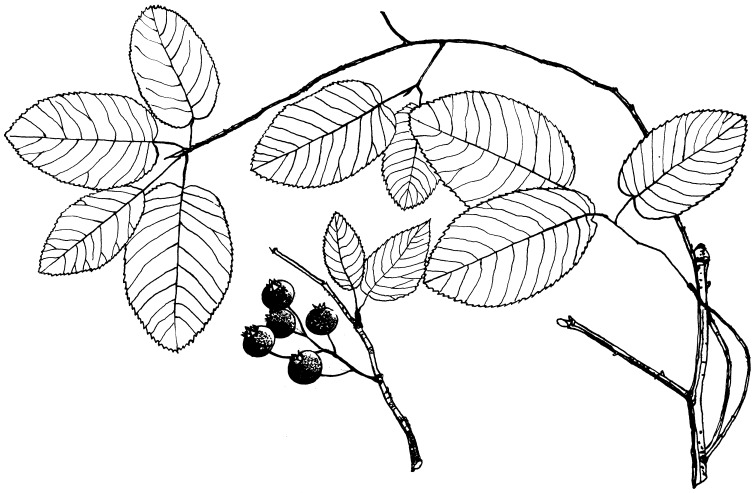
ALLEGHENY SERVICEBERRY

Amelanchier laevis Wieg.

Allegheny serviceberry, the most common species, occurs as a medium-sized tree or shrub on acid soils in open hardwood stands or along margins of open areas throughout Maine.

The **bark** is smooth, light violet-brown with a purplish cast, slightly fissured longitudinally and twisted on older stems.

The **leaves** are half grown at flowering time and have a reddish or purplish tinge. Mature leaves are dark green above and lighter green below, 2-2½ inches long, 1-1½ inches wide, elliptic to ovate in shape with a rounded or heart-shaped base. Leaves are alternate and smooth in all stages.



The **fruit** is berry-like, dark purple or almost black when mature, juicy and sweet to the taste.

Serviceberry **winter buds** are slender and reddish or pinkish, and are filled with silky hairs.

About seven other species and numerous interspecific hybrids occur as small trees or shrubs in Maine.

DOWNY SERVICEBERRY

Amelanchier arborea (Michx. f.) Fern.

Downy serviceberry or shad bush is usually found as a shrub, but sometimes reaches a height of 25-30 feet. Although not common, it occurs throughout the State except in Lincoln, Piscataquis, Somerset, Franklin, Waldo, and Sagadahoc Counties.

The **bark** is pale red-brown, streaked longitudinally with darker lines, and from ¼ - ½ inch in thickness on large trees. It is smooth and glossy.

The **leaves** are alternate, heart-shaped or rounded at the base, finely serrate, and ovate or ovate-oblong in outline. When just unfolding they are green and densely hairy beneath. When mature they are dark green and dull above, pale below, 3-4 inches long, 1-2 inches wide, and downy on the petioles and underside of veins. They turn a bright clear yellow before falling in the autumn.

The **flowers** are characteristically the first tree flowers to appear in the spring, borne on slender stalks ½ - 1 inch long, in graceful, nodding, white, sweet-smelling racemes when the leaves are still folded.

The **fruit** is globose, berry-like, ripening early summer, and $^1/_3$ - $^1/_2$ inch in diameter. It turns from bright red to a dark purple with a white bloom when ripe. It is dry and tasteless, but may be eaten raw or cooked.

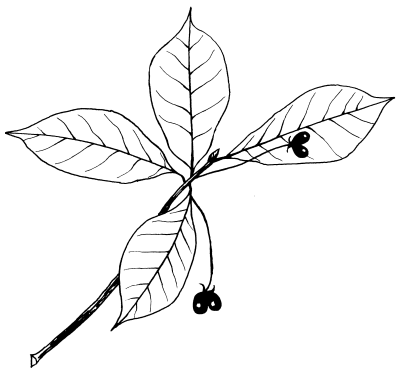
The **wood** is occasionally used for tool handles, small implements, and fish rods. It is heavy, hard, strong, close-grained, and dark brown tinged with red.

BLACK TUPELO

Nyssa sylvatica Marsh.

Black tupelo or blackgum is found in Sagadahoc, Androscoggin, Cumberland and York Counties and as far north as Southern Oxford county and Waterville in Kennebec County. However it is not commonly found except in very wet areas. Trees two feet in diameter are found in the Town of Casco on an island in Sebago Lake. Large specimens have also been reported on the south side of Pleasant Mt. in Denmark on a flat, open, wet area. It is easily distinguished at a distance by its numerous slender horizontal branches. The tree rarely reaches more than 50 feet in height. It occurs in rich moist soils, such as swamps or borders of rivers.

The **bark** on young trees is smooth, grayish and flaky, later becoming reddish to grayish brown. On old trees it forms coarse blocks or ridges.



The **leaves** are alternate, oval to obovate in shape, 2-5 inches long, wedge-shaped at the base and pointed at the tip. The edges are usually entire. The leaves are dark green, shiny above, occasionally hairy below, turning bright crimson in the autumn.

The **fruit** is dark blue, fleshy, approximately ½ inch in length and is borne in clusters of 1-3 on long, slender stems. The fruit has an acid taste, but is edible.

The **twigs** are moderately stout with a diaphragmed pith.

The **wood** is heavy, fine grained, very tough, but not durable. It was formerly used for the hubs of wheels, and for soles of shoes. It is now used principally for pulp.

Cherries and Plum - The Important Distinctions

		Pin Cherry *Prunus pennsylvanica*	Black Cherry *Prunus serotina*	Common Choke Cherry *Prunus virginiana*	Canada Plum *Prunus nigra*
BARK	Texture	Nearly smooth. Large lenticels show orange when rubbed.	Young trunks -prominent white lenticels. Older trunks-fissured and ridged with transverse broad, flat plates, blocked appearance.	Slightly round even on small branches. Smooth with a pungent, disagreeable oder. Lenticels less prominent than on other Prunus species.	Lenticels yellowish.
	Color	Reddish brown.	Young trunks are black .	Grayish brown, with light colored fissures.	Dull reddish brown to black.
LEAVES	General Outline Margin Shape Surface	Long and tapering from base to tip. Widest in the lower 1/3; thin and firm textured with rounded teeth. Glands on stalk, and no hairs on midribs.	Elliptic/oblong, widest in the center, thick leathery and shiny. Underside of midrib near stalk end covered with rusty, brown hairs. Glands on stalk near blade. Margin has rounded teeth.	Obovate, widest in the terminal 1/3, sharply saw-toothed and without hairs, medium leathery in texture, glands on stalk and no brown hairs on midrib.	Ovate or obovate tapering abruptly into a long thin point. Teeth rounded. Glands on stalk.

The twigs and branches of cherry and plum trees may be distorted by the 'black knot' fungus *(Dibotryon morbosum* (Schw.)Th. & Syd.).

Cherries and Plum - The Important Distinctions - (continued)

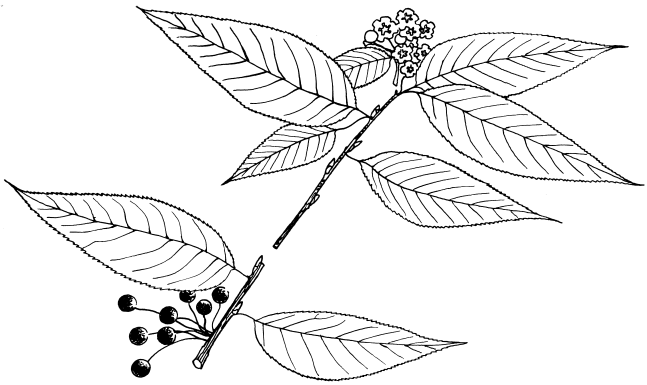
		Pin Cherry *Prunus pennsylvanica*	Black Cherry *Prunus serotina*	Common Choke Cherry *Prunus virginiana*	Canada Plum *Prunus nigra*
FRUIT	Color	Bright red .	Black.	Deep red to purple.	Light red to yellow.
	Size	¼ inch diameter.	½ inch diameter.	¼ - ½ inch diameter.	1 inch diameter.
	Arrangement	Hang in umbelate or corymbose clusters.	Produced in a raceme, the individual fruit have a persistant basal disc.	Produced in racemes, basal disc not persistent.	Football shaped with a longitudinal furrow.
BUDS	Shape	Ovoid.	Ovate, flattened.	Cone shaped, slender - pointed, side buds not flattened.	Cone shaped, pointed.
	Color	Red brown.	Red brown with a lighter or greenish margin.	Purple to tan pattern.	Gray brown.
TWIGS	Shape or Texture	Very fine.	Waxy.	Medium slender.	Thorns common on older twigs.
	Color	Red or reddish brown.	Reddish brown.	Gray or purplish brown.	Current growth gray, older growth darkening to black.
	Odor	Slight cherry odor.	Sharp pungent smell when broken.	Strong pungent bitter-almond odor.	None.

PIN CHERRY

Prunus pensylvanica L. f.

Pin or fire cherry is a small tree, seldom growing taller than 25-30 feet in height and 6-10 inches in diameter. It has slender, horizontal branches and a narrow, somewhat rounded head.

It is common throughout the state, but has little value except as a protection and cover for the soil on recent clearings or burned areas.



The **bark** on the trunk of old trees is dark red-brown and broken into thin plates. Bark on young trees is smooth and reddish brown. The inner bark is slightly aromatic and very bitter. The large lenticels show orange when rubbed.

The **leaves** are alternate, narrow to oblong, widest in the lower third, rather sharp pointed, finely and sharply toothed on the edges, bright green and shiny above, without hairs below, 3-4 inches long, bitter and aromatic, with glands on petiole.

The **flowers** are white, in clusters of 4 or 5, and appear in May when the leaves are only half grown. The **fruit** is bright red, almost translucent, pea-sized, globular in shape, and ripens from the first of July to August. The **twigs** are shiny, reddish-brown and very slender. The buds are small, ovoid, reddish-brown and clustered at the end of twigs. They are commonly distorted by a black, warty, fungus growth called "black knot."

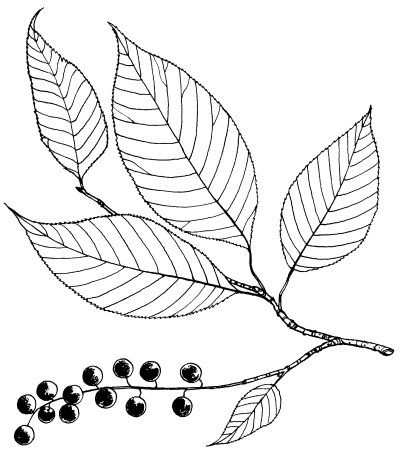
The **wood** is coarse-grained, soft and light. It is not used commercially. The gum is edible.

BLACK CHERRY

Prunus serotina Ehrh.

Black cherry is widely distributed throughout the state and is one of our most valuable timber trees, although not abundant in sufficient size. It grows on a variety of soils, but makes rapid and best growth on rich, moist land. It has a narrow head, small horizontal branches, and attains a height of 40-50 feet and a diameter of 10-20 inches.

The **bark** on the trunk is red-brown to black and rather shiny with prominent white lenticels on young trees. On older trees, the bark is broken into small irregular plates.



The **leaves** are alternate, elliptic, oblong, widest at the center, finely toothed, dark green, shiny, thick, somewhat leathery, and 2-5 inches long. The underside of the mid-rib near the stalk end is covered with rusty brown hairs.

The **flowers** are produced in many flowered racemes 4-5 inches long which appear the last of May or early June when the leaves are half grown.

The **fruit** is in drooping racemes, dark purple or almost black when ripe, pea-sized, and globular in shape. It ripens from June to October.

The **twigs** give off a pungent odor when broken and the bark has a bitter taste. They are commonly distorted by a black, warty, fungus growth called "black knot."

The **wood** is rather hard, close-grained, light, strong, and is easily polished. It is used for furniture and cabinet making, interior finishing, woodenware, veneer, and plywood.

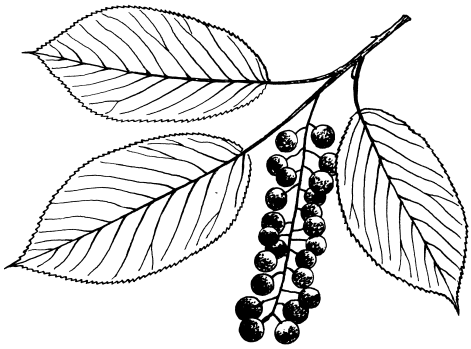
COMMON CHOKECHERRY

Prunus virginiana L.

Common chokecherry, a shrub or small tree, occurs throughout the state especially along fence rows in farming communities. It occasionally is 25 feet high and 6 inches in diameter.

The **bark** is smooth, grayish brown, and disagreeably scented. It is usually marked by long, light colored fissures.

The **leaves** are alternate, dull, widest at the terminal one-third, 2-4 inches long, finely toothed on the edges, and at maturity are without hairs and medium-leathery in texture.



The **flowers** appear from the first of May to June on slender stalks in racemes.

The **fruit** ripens from July to September and is about $^{1}/_{4}$ - $^{1}/_{3}$ inch in diameter, at first bright red, turning at maturity to a dark red or nearly black. Fruit slightly astringent, but edible.

The **winter buds** are strictly cone-shaped, slender and pointed with a definite purple and tan pattern on the scales. Side buds are not flattened as in black cherry.

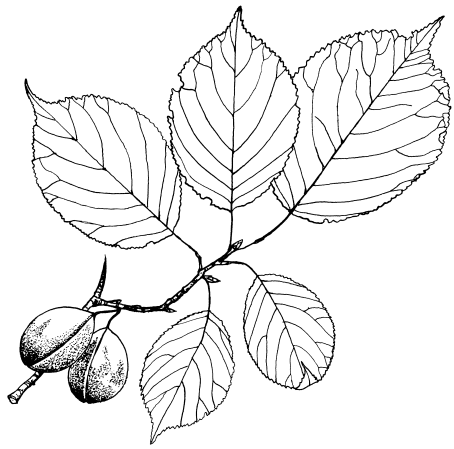
The **twigs** have a strong, pungent, skunk-like odor when broken and are frequently distorted by a black, warty, fungus growth called "black knot."

The **wood** is heavy, hard, but not strong and is not used commercially.

CANADA PLUM

Prunus nigra Ait.

Canada or red plum, although not native, is a common tree throughout the state except in Washington, Lincoln and Sagadahoc Counties or in densely forested areas. It usually occurs in thickets and is seldom found over 8 inches in diameter and 30 feet high. The twigs and branches of cherry and plum trees are distorted by the



black knot fungus, *Apiosporina morbosa*. The **bark** is thin, dull reddish brown to black, peeling in thin papery scales, and exposing the shiny reddish brown, inner bark. The **leaves** are alternate, egg-shaped in outline, and taper at the apex to a long sharp point. Dark green on the upper surface, lighter below; margin with glandular, rounded teeth. The **flowers** are white and appear early in the spring before the leaves in groups of three or four on slender stalks. The **fruit** ripens the latter part of August, is football-shaped and furrowed along one side, has an orange-red skin and yellow flesh. The single stone is flattened and slightly grooved on the edges. Fruit is edible. The **twigs** and **branches** often have thorns. The buds are brown to gray and are without hairs. The **wood** is not used commercially except as an ornamental tree.

BEACH PLUM

Prunus maritima Marsh.

Beach plum is a low shrub commonly found east to Knox County in localized coastal areas on sea beaches and dunes. The leaves are ovate to elliptic, acute or obtuse at the tip, teeth without glands, smooth above and hairy below. The flowers are white. The fruit is globose, ½ to ¾ inch in diameter, purple or red, with a bloom, and makes a delicious jelly. The fruit stone is round. The twigs and buds have velvet-like hairs.

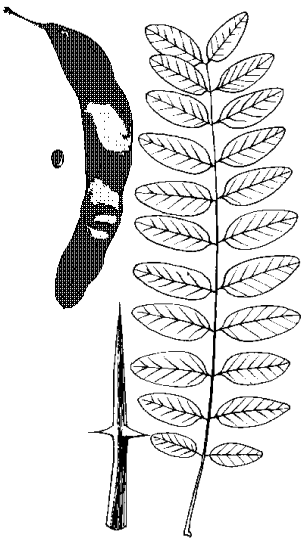
HONEYLOCUST

Gleditsia triacanthos L.

Honeylocust is not native in Maine, but has been frequently planted in urban areas in the southern and central portions of the state. It has spread readily in the town of Paris.

It has somewhat pendulous slender spreading branches that form an open, broad, flat-topped head. Simple or usually 3 forked spines, 1½ -3 inches long or longer occur on the branches and trunk. A thornless form, *G. triacanthos* f. *inermis* (L.) Zabel, is preferred in plantings. It attains a height of 75 feet and a diameter of 20 inches.

The **bark** is divided into long, narrow ridges by deep fissures and the surface is broken into small scales that are persistent.



The **leaves** are alternate, both once and twice compound, 4-8 inches long and have from 18-28 leaflets. The margins of the leaflets are finely blunt-toothed.

The **flowers** are borne in slender clusters from 2-2½ inches long. They appear in June when the leaves are about fully grown. Staminate and pistillate flowers are produced separately on the same tree.

The **fruit** is a shiny, reddish brown, flattened pod 8" or more in length. The pod is curved, with irregular wavy edges, often twisted. The walls are thin and tough.

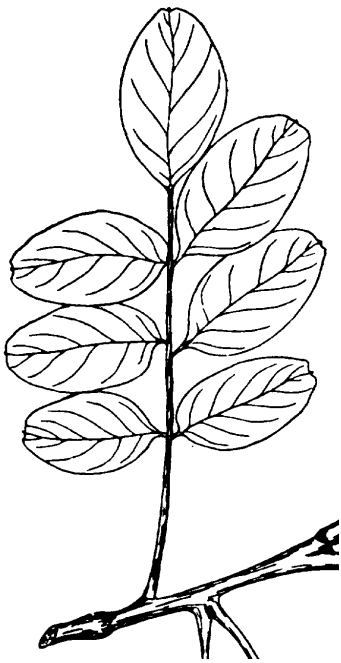
The **twigs** are smooth and distinctly zigzag in shape. Winter buds barely protrude from the leaf scar.

The **wood** is coarse grained, hard, strong, and very durable in contact with the soil. It is used for fence posts and boat decking in Maine.

BLACK LOCUST

Robinia pseudoacacia L.

Black locust is not a native of this state, but is extensively planted. It is abundant in some localities and is found mostly near dwellings or on abandoned farmlands, where it often becomes naturalized. The locust is a rapid grower, frequently attaining a height of 20 feet in 10 years, but increasing much more slowly thereafter. It reaches a height of about 50 feet and a diameter of 8-20 inches. The branches are small, brittle, occasionally multi-angled, and at first are armed with stipular spines. The top is narrow and oblong. It is one of the last trees to send out foliage in the spring. The **bark** on old trees is dark brown, deeply furrowed and broken into small scales. The **leaves** are alternate, once compound, 8-14 inches long; have 7-19 leaflets which are about two inches long with an entire margin and a slightly notched tip. The **flowers** are borne in loose racemes 4-5 inches long and appear in June. They are showy and very fragrant. The **fruit** is a smooth, flat, dark purplish brown pod about 3 inches long, containing from 1-8 beanlike seeds. The **wood** is heavy close-grained, strong, and very durable in contact with the soil. It is used for fence posts, small building construction, and planking for boats.



CLAMMY LOCUST

Robinia viscosa Vent.

Clammy locust is another species not native to Maine. It is found near dwellings and is distinguished from other locusts by the sticky material covering the twigs. It has been planted extensively for erosion control.

Maples - The Important Distinctions

		Sugar Maple *Acer saccharum*	**Silver Maple** *Acer saccharinum*	**Red Maple** *Acer rubrum*	**Striped Maple** *Acer pensylvanicum*
BARK	Texture	Older trees: rough and deeply furrowed. Young trees: smooth and slightly fissured.	Older trees: somewhat furrowed, separates into thin plates. Young trees: smooth.	Older trees: ridged and broken into plate like scales. Young trees: smooth.	Marked with whitish stripes running lengthwise on trunk.
	Color	Gray on older trunks.	Dark gray with reddish tinge on older trunks. Gray on young trees.	Dark gray on older trunks. Light gray on young trees.	Reddish brown or dark green.
LEAVES	Lobes	3-5 lobes, sinuous, sides of terminal lobes flare outward, notches between lobes rounded.	5 lobes, rarely 3. Lobes long and narrow.	3-5 lobes. Sides of terminal lobe converge, notches between lobes V-shaped.	3 lobes, shaped like a duck's foot, thin.
	Margin	Sparingly toothed.	Irregularly and sharply toothed.	Irregularly doubly toothed.	Edges finely and sharply toothed.
	Surface	Under surface pale green.	Under surface silvery white.	Under surface slightly white.	Under surface pale green, pubescent.

Maples - The Important Distinctions (continued)

		Sugar Maple *Acer saccharum*	Silver Maple *Acer saccharinum*	Red Maple *Acer rubrum*	Striped Maple *Acer pensylvanicum*
FLOWER		Greenish yellow, appears with the leaves.	Greenish yellow or pinkish, appears long before the leaves.	Scarlet or yellow-red, appears before the leaves.	Bright yellow, appears after leaves are full grown.
BUDS	Length	Terminal bud - $^1/_4$ inch.	Terminal bud - $^1/_8$ inch.	Terminal bud - $^1/_8$ inch.	Terminal bud - $^1/_2$ inch.
	Shape	Sharp pointed many scales showing.	Blunt pointed, slightly ridged.	Blunt pointed, about as long as broad.	Distinctly stalked with 2 scales showing.
	Color	Purplish brown to gray.	Bright red above, green below.	Dark red.	Bright red.
FRUIT	Shape	Paired and slightly divergent.	Paired, but with one usually abortive.	Paired, slightly divergent.	Paired and moderately divergent.
	Seed body	Baseball shaped.	Football shaped.	Oval in outline.	Large smooth depression in seed body.
	Wings	One inch long.	Strongly divergent, two inches long and hooked.	Reddish; ¾ inch long.	Reddish-brown; ¾ inch long.

Insufficient space in the key to include the native Mountain Maple (*Acer spicatum* Lam.) and the apparently exotic Boxelder (*Acer negundo* L.). See pages 86 and 87.

SUGAR MAPLE

Acer saccharum Marsh.

Sugar, rock, or hard maple is found abundantly throughout the state on moist, rocky slopes, but grows best on moist, upland soils. In the forest it grows to 60-70 feet and to a diameter of 20-30 inches. The top is short and spreading. In the open, the branches begin 8-10 feet up, forming an egg-shaped head when the tree is young and a broad rounded top when older. It makes an attractive street or ornamental tree, but it is sensitive to road salt. Globe and columnar shapes are available at nurseries. Maple sugar and syrup are made largely from the sap of this tree, although sugar is present in the sap of all maples. **Bark** on young trees and large branches is smooth or slightly fissured and pale. Older trees are deeply furrowed and light to darker gray. **Leaves** are opposite, 3-5 lobed, sparingly toothed, 3-5 inches long, dark green above, pale green below. Sides of the terminal lobe are parallel or divergent and notches between lobes are rounded. In autumn, leaves turn various shades of red, scarlet, orange or yellow. **Flowers** are pendulous, on long, slender, hairy stalks, in clusters, greenish yellow, and appear with the leaves. **Fruit** is paired, baseball-shaped with wings about one inch long, slightly divergent. It ripens in the fall. **Wood** is heavy, close-grained, strong, and hard. It is used for furniture, flooring, tool handles, veneer, railroad ties, novelties, dowels, woodenware, canoe paddles and pulp. "Birds-eye" and curly patterned wood is in high demand in the furniture industry.

BLACK MAPLE

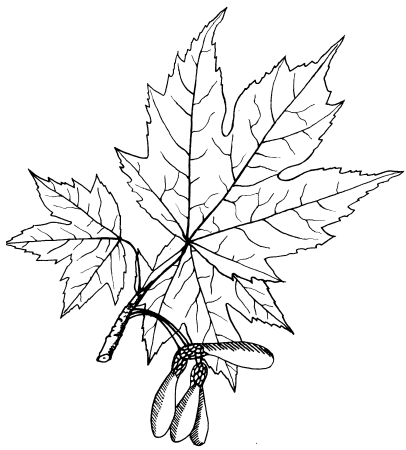
Acer nigrum Michx. f.

Black Maple is found in southern Maine, leaves are similar to sugar maple, but three-lobed and pubescent.

SILVER MAPLE

Acer saccharinum L.

Silver maple is a common tree found throughout the state except along the coast and is abundant in some localities. It grows largely on sandy banks along streams. It usually grows to a height of 60-80 feet and a diameter of 2-3 feet. The trunk normally separates into 3 or 4 upright, secondary stems, destitute of branches for some distance. The branches are long and slender, often pendulous. The **bark** on young trees is smooth, gray, slightly tinged with red. On old trees it is furrowed, separated into large thin scales, and is reddish brown in color. Twigs are chestnut brown and shiny. The **leaves** are opposite, deeply 5 lobed and the edges are irregular and sharply toothed. The upper surface is pale green, the lower, silvery white. They turn a pale yellow in the fall. The **flowers** are on very short stalks and in clusters. They are greenish yellow or sometimes pinkish, opening early, long before the leaves appear. The **fruit** is paired, winged and ripens in the spring. Frequently, one of the pair does not fully develop. The **twigs** are curved upward at the tip, orange or red-brown above and green below, slender, with a bitter taste and a rank odor when broken. The **wood** is softer than that of the hard maple, close-grained, not durable, and easily worked. It is used to a limited extent for pulp.



CUTLEAF SILVER MAPLE

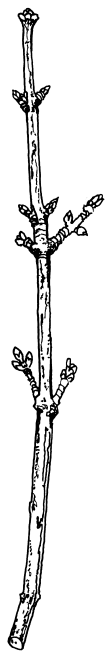
Acer saccharinum var. laciniatum (Carr.) Pax

Cutleaf silver maple varieties are very similiar to the silver maple, but have a more deeply-lobed leaf and the branches and twigs are more droopy. These varieties are utilized mainly for ornamental and shade tree planting.

RED MAPLE

Acer rubrum L.

Red, soft, or swamp maple occurs throughout the state. It is a rapid grower and the most abundant of the maples. It is typically found in swamps, and poorly drained sites, but also occurs elsewhere. The red maple is a medium sized, slender tree that becomes 50-60 feet high, and 1-2 feet in diameter. The branches are upright, forming a somewhat narrow head. Usually the trunk is not divided. The **bark** on young trees is smooth and light gray. On old trunks, it is dark-gray, ridged and broken into plate-like scales. The **leaves** are opposite, 3-5 lobed, margins irregularly double-toothed, 3-5 inches long, upper surface light green; lower surface is white. The sides of the terminal lobe converge toward the tip, and the notches between lobes are V-shaped. In the fall, they turn scarlet and orange. The **flowers** are produced in clusters on stalks before leaf buds open. Males are yellowish-red while females are bright scarlet. The **fruit** is winged, ripens in the spring or early summer, and germinates as soon as it falls. Wings are only slightly divergent, about ¾ inch long. The seed body lacks a depression. The **twigs** are straight, stiff, do not have a rank odor when broken, and are red in color on both surfaces. Buds are red and often clustered.



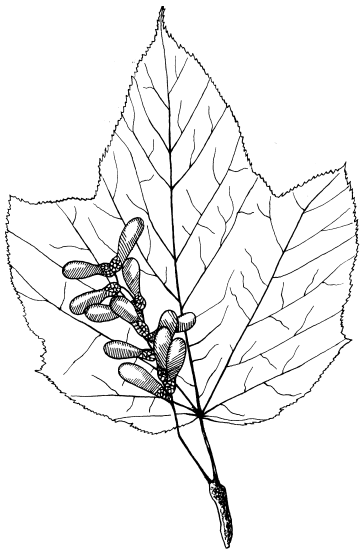
The **wood** is close-grained, heavy, moderately strong, and easily worked, not durable although it will take a good polish. It is used mainly for pulp, but also for pallets, furniture stock, canoe paddles, and turnery products. As sugar maple becomes more expensive, more mills are using red maple.

STRIPED MAPLE

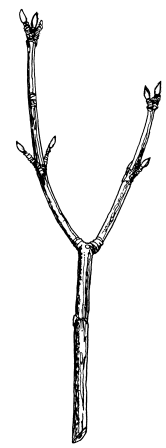
Acer pensylvanicum L.

Striped maple or moosewood is common throughout the state. It is a shade-loving tree that is found growing with other hardwoods or occasioinally with conifers on rich, moist soils or rocky slopes. It is of little value except for its beauty. It rarely exceeds a height of 25 feet and a diameter of 8 inches. The branches are slender and upright and the top narrow and often short.

The **bark** on the trunk is reddish brown or dark green and marked by whitish lines running lengthwise which turn brown after a time. The leaves are three-lobed toward the apex, resembling a goose foot, opposite, finely toothed, pale green, 5-6 inches long and about as broad. In the fall they become light yellow in color.



The **flowers** are bright yellow in slender drooping racemes opening the end of May or early June when the leaves are fully grown. The **fruit** is paired, with wings moderately divergent, fully grown in late summer. It has a smooth, oval depression in the seed body. The **twigs** are smooth, reddish or greenish; the buds are valve-like, stout, stalked, and without hairs.

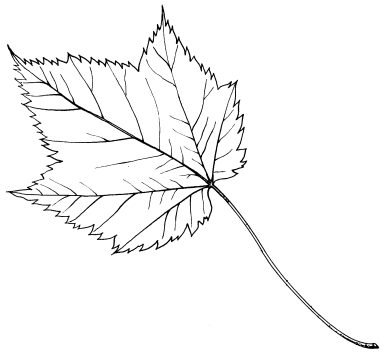


The **wood** is close-grained, light and soft. During the spring when the cambium layer is active, it is easy to make a whistle from the smaller branch sections.

MOUNTAIN MAPLE

Acer spicatum Lam.

Mountain maple occurs throughout Maine and is especially common in the northern part of the state. It grows as a small bushy tree seldom over 30 feet in height. The tree at times forms fairly dense thickets due to its habit of growing in clumps. It grows best in a wet habitat or on damp, northern slopes. The slender twigs grow in a



somewhat upright position.
The **bark** is reddish brown to gray in color. It is thin and somewhat furrowed. The **leaves** are opposite, 3 lobed, shiny above, somewhat hairy below. They have rather coarse teeth and prominently sunken veins on the upper surface. The **flowers** appear in June in long, hairy, yellow- green clusters after the leaves are full grown. The **fruit** is paired, with wings slightly divergent, and occurs in ascending clusters. It has a wrinkled depression on the seed body and ripens in early fall. The **twigs** are hairy, green, red, or reddish brown, not striped, and the pith is brown. The buds are hairy, valve-like, green, and only slightly stalked, slender and pointed. The **wood** is close-grained, soft, and light.

NORWAY MAPLE

Acer platanoides L.

Norway Maple is an exotic from Europe and Asia and is becoming a favorite for shade tree plantings. It resembles somewhat the sugar maple, but the leaves are larger, darker green, and the petiole gives off a milky juice when broken, which is not common to any of our native maples. The terminal buds are usually of a larger diameter than the end of the twigs. There are many varieties of Norway maple.

SCHWEDLER MAPLE

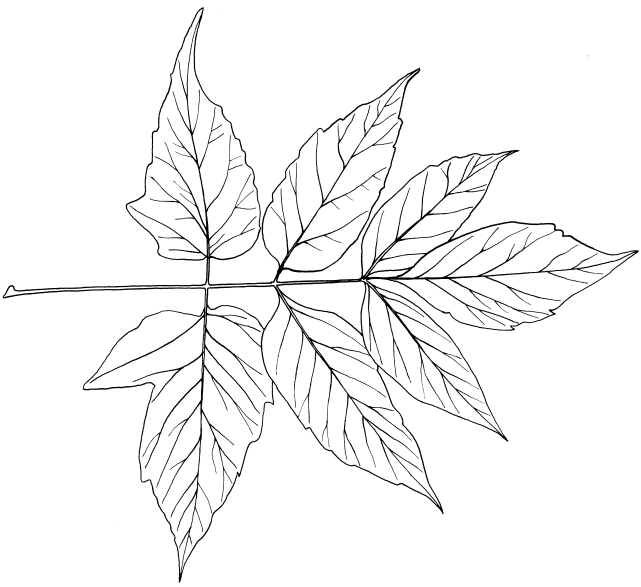
Acer platanoides

Schwedler or red-leaved maple is a cultivar also common as a shade tree in Maine. The leaves are dark reddish-green turning to green later in the season.

BOXELDER

Acer negundo L.

Boxelder or ashleaf maple is apparently not native to Maine, but is largely planted as an ornamental tree throughout the state and has escaped in localized areas near habitation. It was introduced along the St. John River in Aroostook County. It reaches a maximum height of 50 feet and diameter of about two feet in Maine. It is a short-lived, fast growing, brittle tree, very prone to wind

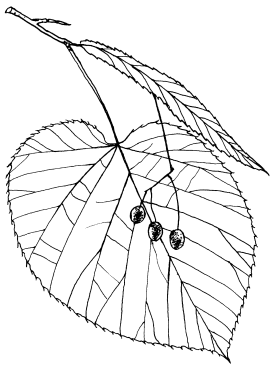


and ice damage. The **bark** is light gray and smooth on young stems, becoming roughened and shallow-fissured on older trees. The **leaves** are opposite, compound, usually 3-7 leaflets per leaf, rarely 9. The leaflets vary greatly in shape, often lobed and unlobed leaflets are found on the same leaf. Leaflets are occasionally divided into individual blades. The **flowers** open just before the leaves in the spring and are yellow-green. They have no petals. The **fruit** attains mature size in summer, ripening in autumn, consisting of a double winged pair of seeds. Wings are only slightly divergent and the seed body is wrinkled, three times longer than broad. The **twigs** are smooth, rather stout, green or maroon in color, and covered with a white, chalky bloom. The bark yields a pungent odor when bruised. The **wood** is light, soft, creamy white, often tinged with green, weak and close-grained. Occasionally it is used for pulp.

AMERICAN BASSWOOD

Tilia americana L.

American basswood or linden occurs as scattered specimens throughout the state. It grows to a height of 50-70 feet and a diameter of 2-3 feet. The branches are slender, somewhat pendulous, comparatively small and numerous, forming a broad and rounded head. The **bark** on the trunk of old trees is deeply and irregularly furrowed. On young trees, it is smooth or slightly fissured and has a grayish appearance. The **leaves** are alternate, broadly egg-shaped to heart-shaped in outline, toothed,



upper surface dark green; lower, yellow-green and shiny, 5-6 inches long. The leaf base is uneven. The **flowers** are greenish yellow, borne on a slender stalk which is attached to a rather long, yellowish, leaf-like bract. They are fragrant, contain an abundance of nectar and open in July.

The **fruit** is clustered, spherical, covered with short buff-colored hairs, woody, and is about as large as a pea. It remains attached to the leaf-like bract when it falls.

The **wood** is light, soft, and easily worked. It is used for moldings, yardsticks, veneer, dowels, oars, furniture, pattern stock, carvings, and pulp.

Bees make an excellent grade of honey from the flowers. The young fruit and flowers ground into a paste make an excellent substitute for chocolate.

The **European Linden** *(Tilia europaea* L.) and **Little-leaf Linden** *(Tilia cordata* Mill.) are commonly planted as shade trees. They are smaller in height than our native species and with smaller leaves. Baxter Boulevard in Portland is lined with both of these species.

Ashes - The Important Distinctions

		Black Ash *Fraxinus nigra*	White Ash *Fraxinus americana*	Green Ash* *Fraxinus pennsylvanica*
LEAVES	Leaflets	7 to 11 in number.	5 to 9, usually 7 in number.	7 to 9 in number.
	Description	Toothed leaflets which are without stalks except the one at the end. Hairs lacking below except for buff colored hairs at the junction of the leaflets and the rachis. Turn yellow in autumn.	Leaflets are mostly entire, borne on stalks, without hairs below. Turn purple in autumn.	Leaflets borne on stalks. Hairy below and on rachis. Turn yellow or bronze in autumn.
BUDS	Size	Less than $^1/_4$ inch.	$^1/_8$ inch.	$^1/_8$ inch.
	Shape	Sharply pointed.	Blunt pointed.	Cone shaped.
	Color	Black or very dark.	Brown.	Brown with rusty or dull red hairs.

*Specimens of green ash which lack hairs on the twigs or leaflets, but otherwise fit the above description, were formally designated as var. *lanceolata.* They are now designated under the species due to the many gradations of the hairiness character.

Ashes - The Important Distinctions (continued)

		Black Ash *Fraxinus nigra*	White Ash *Fraxinus americana*	Green Ash* *Fraxinus pennsylvanica*
FRUIT	Wings	Flat, completely surrounds seed body.	Wing terminal.	Seed body grading gradually into wing.
	Seed body	Slightly twisted. Is less than half the length of the fruit.	Cigar shaped.	Funnel shaped.
TWIGS	Texture	Smooth, not shiny.	Smooth and shiny, often with slight bloom, very brittle.	Somewhat covered with downy hairs.
	Color	Pale gray, inner bark is dirty white.	Gray or greenish brown, inner bark bright brick red.	Greenish gray, inner bark cinnamon colored.

* Specimens of green ash which lack hairs on the twigs or leaflets, but otherwise fit the above description, were formally designated as var. *lanceolata*. They are now designated under the species due to the many gradations of the hairness character.

BLACK ASH

Fraxinus nigra Marsh.

Black or brown ash occurs is common statewide except in Sagadahoc County. It grows almost entirely on rich, moist ground or in cold, wet swamps and along the banks of streams.

It is a tall, slender tree, with slender branches and a short, narrow head. It grows to a height of 50-60 feet and a diameter of 10-20 inches. The trunk is often without branches for a considerable distance from the ground.

The **bark** is gray to dark gray, corky and spongy, with more or less parallel ridges. It rubs off freely with the hand.

The **leaves** are 12-15 inches long, opposite, and have 7-11 leaflets which are 4-5 inches long, and without stalks except the one at the tip. Leaflets are lance-shape and have remotely-toothed margins. The upper surface is dark green. There are buff-colored hairs at the junction of the leaflets and rachis.

The **fruit** is a single samara occurring in clusters. The seed is flattened and completely surrounded by the wing.

The **twigs** are smooth, gray to olive-green. The **buds** are black or brown and pointed at the tip. The inner layer of the bark is dirty white.

The **wood** is coarse-grained, heavy, tough, durable, and pliable. It is used for interior finishing, cabinet work, barrel hoops, baskets, and, to a limited extent, pulp.

WHITE ASH

Fraxinus americana L.

White ash is one of Maine's valuable timber trees and is found commonly throughout the state. Best growth occurs on rich, rather moist soil of low hills. It grows to a height of 60-70 feet and a diameter of 15-30 inches. The branches are upright or spreading, forming a narrow top in the forest.

The **bark** is broken into broad, parallel ridges by deep furrows and is a dark brown or deep gray in color.

The **leaves** are opposite, and consist of 5-9 leaflets, and are 8-12 inches long. The leaflets are 3-5 inches long, oval to lance-shape, borne on short stalks, edges remotely toothed towards the tip, dark green and often shiny on the upper surface. In the fall they turn to a soft velvety purple color.

The **fruit** is a single samara occurring in clusters. The seed body is cigar-shaped and has a terminal wing.

The **twigs** have a smooth, shiny bark which is grayish, greenish or maroon on the surface. The inner layer of the bark is brick red. The terminal buds are rounded or dome-shaped.

The **wood** is hard, strong, and tough. It is used for agricultural implements, tool handles, oars, furniture, interior finish, dowels, sporting goods and pulp.

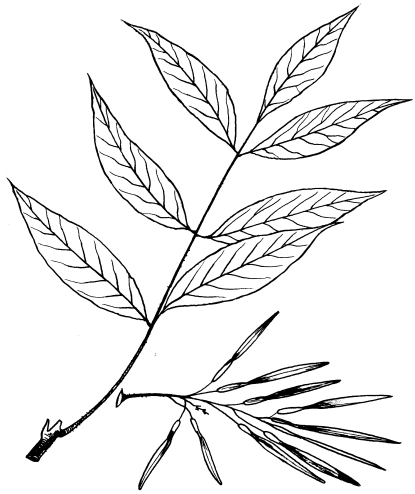
GREEN ASH

Fraxinus pennsylvanica Marsh.

Green or red ash occurs statewide except in Piscataquis, Franklin and Hancock Counties. It is not as abundant as the white and black ash, but is fairly common in central Maine. It is sometimes mistaken for black ash. It grows near the banks of streams and lakes on rich, moist soil.

It has stout branches which bend downward on older trees. These form an irregular, compact head in the forest. It seldom exceeds height of 50-60 feet and a diameter of 16-20 inches.

The **bark** on the trunk of old trees is firm and furrowed like that of the white ash. In color, it is dark gray, or brown.



The **twigs** of the season are greenish gray and covered with numerous hairs; sometimes with no hairs. Inner bark is cinnamon red in color.

The **leaves** are 10-12 inches long, opposite, 7-9 leaflets borne per stalk. Leaflets are 4 - 6 inches long, entire or wavy, or sometimes toothed, particularly on the upper-half of the leaflets, yellow-green on the upper surface, hairy below and on the rachis, and oval to elliptical in shape.

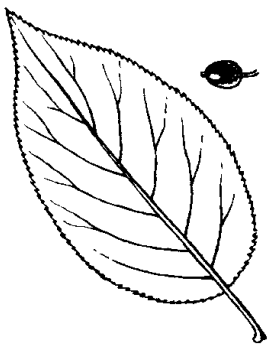
The **fruit** has a funnel-shaped seed body gradually blending into the terminal wing.

The **wood** is hard, heavy, fairly strong, coarse grained, and brittle. It is used in the same way as white ash, but the quality is not as good.

NANNYBERRY

Viburnum lentago L.

Nannyberry occurs statewide as a shrub or small tree reaching a height of 10-30 feet. It occurs frequently in the state growing in moist soils often along the borders of swamps or streams.



The **leaves** are opposite, ovate, abruptly pointed, with fine sharp teeth. The upper surface is a lustrous deep green. The under surface is lighter. The petiole is conspicuously flanged with a warty, wavy margin.

The dark blue **fruit** ripens in the fall. It is about one-half inch long, ellipsoid, edible, sweet, tough-skinned, with a nipple-like tip. The fruit occurs in small drooping clusters on red stemmed stalks and does not shrivel or shrink when ripe.

The terminal **buds** are shaped like a pair of rabbit ears and bulge at the base. The two large bud scales extend beyond the end of the bud. They are nearly smooth and are purplish brown to lead-colored. The smooth **twigs** of the season are gray to gray-brown in color. The **wood** is orange-brown and emits an unpleasant odor.

WITCH-HAZEL

Hamamelis virginiana L.

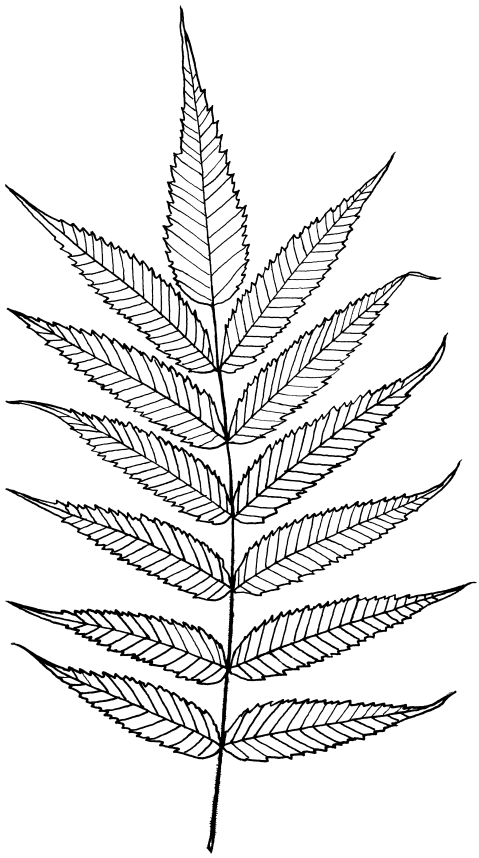
Witch-hazel occurs as a small tree or shrub in most parts of Maine except in the far north. It has scaly bark, zigzag branchlets, and exposed, hairy, scalpel-shaped buds. The leaves are alternate, broadly egg-shaped in outline, non-symmetrical at the base, and have a wavy margin.

It is found on borders of the forest in low rich soil, or on rocky banks of streams. It has bright yellow flowers in the autumn. The fruit is a woody capsule, usually two in a cluster. The seeds are discharged fiercely when ripe. An extract from the bark is mixed with alcohol and used as an astringent.

STAGHORN SUMAC

Rhus hirta (L.) Sudworth

Staghorn sumac occurs mainly as a shrub throughout the state. It has alternate, compound leaves with 11-31 opposite, serrated leaflets. The twigs are very hairy. The flowers form in early summer in large, compact, yellow panicles 2-8 inches long. The fruit ripens in August as a spire of showy, red, velvety berries. The plant is not poisonous.



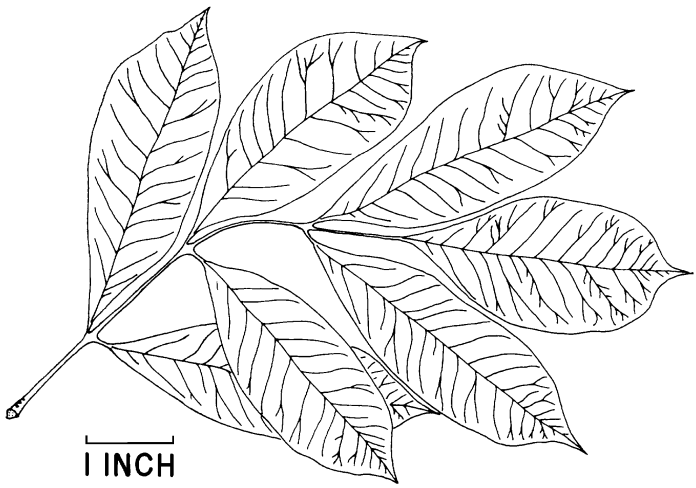
Smooth Sumac (*Rhus glabra* L.) and **Shining Sumac** *(Rhus copallina* L.) are not poisonous and are found as shrubs in Maine.

POISON-SUMAC

Toxicodendron vernix (L.) Ktze.

Poison-sumac is found throughout the southern part of the state and as far north as Penobscot County. It occurs as a tree in low, wet swamps. It is particularly common around Mt. Agamenticus in southern Maine.

The **leaves** are alternate, 7-14 inches long, consisting of 7-13 leaflets along a smooth greenish red rachis. Leaflets have entire margins, short stalks, are dark green and lustrous above, with scarlet midribs; paler and glabrous below. **Twigs** are without hairs.



The **fruit** is a globose, slightly compressed, thin-fleshed, ivory white or tawny white berry, about $^{1}/_{5}$ inch in diameter, borne in loose, pendent, axillary clusters, ripening in September, but persisting on the tree far into the winter.

CAUTION: Severe dermatitis results when skin comes in contact with roots stems, leaves, flowers, fruit, or with implements or clothing that have come in contact with plant parts of either posion-ivy or poison-sumac. Smoke resulting from the burning of plant parts of either species is also poisonous.

POISON-IVY

Toxicodendron radicans(L.) Ktze.

Poison-ivy or mercury is widely distributed throughout the state and grows as an aerially-rooted climbing vine on trees or as a smooth, trailing vine or erect shrub along stonewalls, fencerows and roadsides.

The **leaves** are alternate, compound, with three very shiny, dark green leaflets. Leaflet margins are lobed, wavy, toothed or entire. The stalk of the terminal leaflet is much longer than those of the two lateral leaflets. Fall color is a fiery red.

The **fruit** is creamy-white, ribbed, globular, B.B.- sized drupes, occurring in axillary clusters.

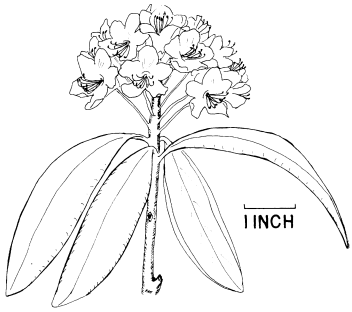
CAUTION: Severe dermatitis results when skin comes in contact with roots stems, leaves, flowers, fruit, or with implements or clothing that have come in contact with plant parts of either posion-ivy or poison-sumac. Smoke resulting from the burning of plant parts of either species is also poisonous.

ROSEBAY RHODODENDRON

Rhododendron maximum L.

Rosebay rhododendron or great-laurel is a shrub or straggling tree up to 30 feet high. It is a very rare species found locally in parts of Somerset, Franklin, Cumberland and York Counties in damp woods or near pond margins. It is listed as an endangered species in Maine as there are less than five known occurences.

The **leaves** are evergreen, ovate to oblong, alternate, entire, 4-8 inches long, thick and leathery, with the margin frequently rolled under. They are smooth and dark green above, pale below. The **flowers** are bell-shaped and occur in dense clusters. They are generally white with a pinkish tinge with other variations possible. The **fruit** is an oblong, woody capsule covered with sticky hairs. It is borne terminally in erect clusters on stalks several times longer than the capsule. The **twigs** are hairy.



FLOWERING DOGWOOD

Cornus florida L.

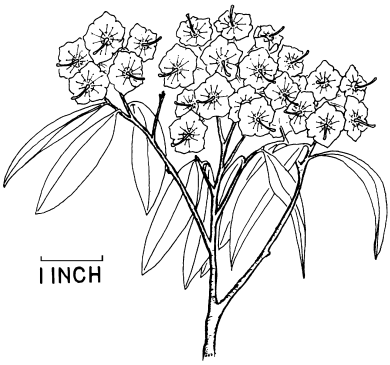
Flowering dogwood is an unusually beautiful shrub or small tree and occurs naturally only in York County. Planted specimens generally are only hardy in the southern and coastal areas of the state. It reaches a height of 12-20 feet. The **leaves** are opposite, entire, ovate to elliptic, bright green and smooth above, pale green and with hairs on the veins beneath. They are 3-6 inches long. The **flowers** are conspicuous and appear early in the spring. They are greenish white or yellowish and are arranged in dense umbels surrounded by four large, white, petal-like bracts which give the appearance of large spreading flowers. The **fruit** is a bright red, ellipsoid drupe about ½ inch long and occurs in clusters. The **twigs** are smooth, greenish, and angular. The **buds** are covered by two valve-like scales.

MOUNTAIN-LAUREL

Kalmia latifolia L.

Mountain-laurel is an erect-stemmed low shrub or small tree that grows in rocky woods or low ground. It is widely distributed, but local; absent in Somerset, Franklin, Kennebec and Androscoggin Counties. Mountain-laurel occurs rarely and is listed on the State 'watch' list.

The **leaves** are evergreen, green on both sides, elliptical, up to three inches long and one inch wide. They are flat, thick and leathery with an entire margin, and are narrowed at both ends. Arrangement is mostly alternate, sometimes opposite and rarely occurs in threes, grouped at the tip of the twig. The **flowers** are pink in color with variations possible. They are borne in erect, terminal clusters. The **fruit** are globose, woody capsules borne on erect, hairy, sticky stalks that are many times longer than the diameter of the capsules. The capsules have long, persistent styles. The **twigs** are rounded and sticky at first, but later becoming smooth.



ALTERNATE-LEAF DOGWOOD

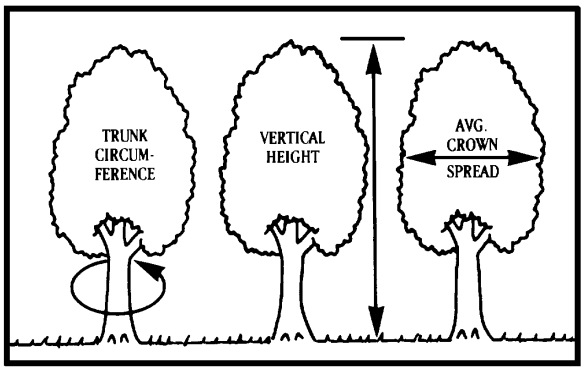
Cornus alternifolia L. f.

Alternate-leaf or blue dogwood occurs throughout the state as a shrub or small tree up to 20 feet tall. The **leaves** are alternate, entire, elliptic-ovate, and tend to be crowded at the ends of the twigs. They are 2½ - 4½ inches long, yellowish green, smooth above, and have appressed hairiness beneath. The creamy white **flower** clusters appear in June after the leaves have developed. The **fruit** is a bluish black drupe, somewhat round, about $^1/_3$ inch in diameter which ripens in September and October. The **twigs** are often lustrous and greenish-brown. Dead twigs become bright yellow-green in color.

HOW TO NOMINATE A POTENTIAL CHAMP

For each nomination, we need the following information:

1. Correct name of the species or variety. If you need help with identification, call your local Forest Service or Extension office.
2. Circumference of the tree in inches at 4 1/2 feet above the ground. If there is a growth or branch at this point, measure the narrowest point below 4 1/2 feet.
3. Vertical height of the tree to the nearest foot. The most reliable tools for this purpose are on Abney hand level, a hypsometer, or a transit. Lacking such a tool, you can use a straight stick. Hold the stick at its base vertically at arm's length, making sure its length above your hand equals the distance from your hand to your eye. Walk



backward away from the tree, staying approximately level with the tree's base. Stop when the stick above your hand appears to be the same length as the tree. You should be sighting over your hand to the base of the tree and, without moving anything but your eye, sighting over the tip of the stick to the top of the tree. Measure how far you have backed away from the tree, and that measurement, in feet, is the tree's height.

4. Average diameter of the crown to the nearest foot. Measure the widest spread of the crown and the narrowest, then add them together and divide by two.
5. Location.
6. Date measured, and by whom.
7. Name and address of owner.
8. Clear photograph with date taken.
9. Description of the tree's physical condition and state of preservation.
10. Name and address of nominator.

Send to: Department of Conservation, Maine Forest Service, Big Tree of Maine Nomination, 22 State House Station, Augusta, Maine 04333-0022.

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SUMMER KEY

Numbers at left are **paired** and give opposing characteristics to look for. **Starting** with numbers 1, select the description that fits your specimen and proceed to the number given on the right until the common group name (e.g. maple) is reached. Turn to the given page number for **species keys.** Use average material for analysis.

See Glossary - page 9.

		Key
1.	Leaves are needle-,awl- or scale-like; conifers	2
1.	Leaves are broad and veined, not as above; hard-woods or broad-leaf trees	9
2.	Leaves needle-like	3
2.	Leaves awl- or scale-like, or both	7
3.	Leaves flat, tips blunt, and occur singly	4
3.	Leaves angular in cross section, tips pointed	5
4.	Leaves taper, twigs limber; cones shorter than 1 inch ... ***Hemlock p. 24***	
4.	Leaves parallel-sided, twigs stiff; cones over 2 inches ... ***Fir p.* 25**	
5.	Leaves occur singly, never clustered ... ***Spruce p.* 20**	
5.	Leaves occur in clusters, also singly in larch	6
6.	Leaves in clusters of 2 to 5 with papery sheath at base[1] ... ***Pine p.* 12**	
6.	Leaves in clusters[2] of 8 or more on spurs; papery sheath lacking ... ***Tamarack p.* 19**	
7.	Branchlets with prickly, awl-shaped leaves; cones are berry-like ... ***Juniper, Redcedar p.* 28**	
7.	Branchlets with scale-like leaves; leaves not prickly; cones un-berry-like	8
8.	Twigs flat; cones oblong, woody, up to ½ inch; wood slightly aromatic ... ***Northern White-Cedar p.* 27**	
8.	Twigs slightly flattened; cones ¼ inch, rounded, leathery; wood strongly aromatic ... ***Atlantic White-Cedar p.* 26**	
9.	Leaves opposite, trees only	10
9.	Leaves alternate	15
10.	Leaves simple	11
10.	Leaves compound	13
11.	Leaf margin serrate ... ***Nannyberry p.* 94**	
11.	Leaf margin lobed or entire	12
12.	Leaf margin lobed ... ***Maple p.* 80**	
12.	Leaf margin entire ... ***Dogwood p.* 98**	
13.	Leaves palmate ... ***Horsechestnut p.* 51**	
13.	Leaves pinnate	14
14.	Leaflets 3-5, lobed, coarse teeth ... ***Boxelder p.* 87**	
14.	Leaflets 5-13 ... ***Ash p.* 89**	
15.	Leaves simple	16
15.	Leaves compound	37
16.	Leaf margin entire, wavy, or lobed	17
16.	Leaf margin toothed or serrate	25
17.	Leaf margin entire	18
17.	Leaf margin wavy or lobed	21
18.	Leaves thin, veins parallel ... ***Dogwood p.* 98**	
18.	Leaves thick and leathery, net-veined	19
19.	Pith diaphragmed; leaves 2-5 inches long ... ***Tupelo p.* 71**	
19.	Pith not diaphragmed	20
20.	Leaves to 3 inches long ... ***Mountain-Laurel p.* 99**	
20.	Leaves 4-8 inches long ... ***Rhododendron p.* 98**	

[1] Papery sheath on white pine drops in late August

[2] Larch leaves are borne singly on elongating shoots.

		Key
21.	Leaf margin wavy toward tip. Base of leaf one-sided . ***Witch-Hazel p.* 94**	
21.	Leaf margin lobed or wavy throughout	22
22	Leaf petiole hollow and covers bud; numerous main leaf veins radiate from base ..... ***Sycamore p.* 66**	
22.	Leaf petiole neither swollen nor hollow; leaves with one main vein	23
23.	Leaf tip flat or notched; pith diaphragmed ..... ***Tuliptree p.* 48**	
23.	Leaf tip not flat; pith solid	24
24.	Twigs angular; pith star-shaped ..... ***Oak p.* 52**	
24.	Twigs round, spicy odor and taste; leaves 0-3 lobed ..... ***Sassafras p.* 65**	
25.	Leaf margin singly toothed or serrate	26
25.	Leaf margin doubly serrate	32
26.	Teeth hooked, prominent; fruit a bur	27
26.	Teeth not hooked, fruit not a bur	28
27.	Pith star-shaped; buds blunt; bark brown ..... ***Chestnut p.* 50**	
27.	Pith round; buds long, pointed; bark gray ..... ***Beech p.* 49**	
28.	Leaf base one-sided, leaf cordate; pith not symmetrical . ***Basswood p.* 88**	
28.	Leaf base even; pith symmetric in cross section	29
29.	Leaves long and narrow; petioles short without glands; buds with a single, cap-like scale ..... ***Willow p.* 39**	
29.	Leaves broad, or if narrow with glands on petiole; buds with several scales	30
30.	Leaf petiole usually long, flat, except rounded in balsam poplar; pith star-shaped ..... ***Poplar p.* 30**	
30.	Leaf petiole short, not flat; pith round	31
31.	Twigs pungent when broken; glands on petiole ..... ***Cherry, Plum p.* 72**	
31.	Twigs odorless; leaf petiole glandless; buds slender, twisted at tip, silky within ..... ***Serviceberry p.* 69**	
32.	Leaf base one-sided, surface sand-papery ..... ***Elm p.* 62**	
32.	Leaf base even, surface smooth	33
33.	Branches with thorns 1 inch or more long ..... ***Hawthorn p.* 68**	
33.	Branches without thorns	34
34.	Pith triangular; buds stalked, smooth ..... ***Alder p.* 47**	
34.	Pith not triangular; bud scales overlapping	35
35.	Leaves hairy on both surfaces; pith green ..... ***Hop-Hornbeam p.* 37**	
35.	Leaves if hairy only so on one surface; bark smooth	36
36.	Stem fluted; bark smooth, gun-metal gray ..... ***Hornbeam p.* 38**	
36.	Stem not fluted; bark white, yellow, or red to dark brown ..... ***Birch p.* 40**	
37.	Leaflets with margin entire	38
37.	Leaflets with serrate margin	39
38.	Twigs with paired spines; leaflets 7-19 ..... ***Locust p.* 79**	
38.	Twigs spineless; leaflets 7-13; poisonous ..... ***Poison-Sumac p.* 96**	**
39.	Leaflets ½ inch long with fine, rounded teeth ..... ***Honeylocust p.* 78**	
39.	Leaflets over 1 inch long	40
40.	Pith chambered or diaphragmed ..... ***Walnut/Butternut p.* 34-35**	
40.	Pith solid	41
41.	Leaflets 5-7; pith star-shaped ..... ***Hickory p.* 36**	
41.	Leaflets 11-31	42
42.	Twigs smooth; leaflets 11-17; buds large ..... ***Mountain-Ash p.* 67**	
42.	Twigs densely hairy; leaflets 11-31; buds small ..... ***Sumac p.* 95**	
** See also poison-ivy, page 97.		

FIREWOOD AND WILDLIFE

The increased demand for firewood threatens the habitat of many wildlife species. Dead or dying trees that commonly are cut for firewood are vital to wildlife species that nest in tree cavities. Likewise, healthy trees of many species preferred for firewood are important components of wildlife habitat. This chart outlines the importance of various tree species for wildlife as well as for firewood. Some species listed only occur as ornamentals in landscape planting; however their value to wildlife is still important.

Tree	All Wildlife	Songbirds	Upland Game Birds	Mammals *	Fire Wood	Remarks
Oaks, *Quercus spp.*	Excellent	Excellent	Excellent	Excellent	Excellent	Retain a variety of species.
Black Cherry, *Prunus serotina*	Excellent	Excellent	Good	Good	Good	May have high timber value when mature.
Apples, *Malus spp.*	Excellent	Good	Good	Good	Excellent	Expecially attractive to grouse.
Pines; *Pinus spp*	Excellent	Excellent	Fair	Good	Fair	Good as kindling.
Maples, *Acer spp.*	Good	Good	Fair	Excellent	Excellent	High aesthetic qualities in the fall.
American beech, *Fagus grandifolia*	Good	Fair	Good	Excellent	Excellent	Aesthetic in the fall; important to squirrels, bear.
Alders, *Alnus spp.*	Good	Good	Good	Fair	Fair	Locally important to songbirds and game birds.
Aspens, *Populus spp.*	Good	Fair	Good	Excellent	Fair	Especially attractive to grouse, beaver.
Birches, *Betula spp.*	Good	Fair	Good	Good	Excellent	Important to northern wildlife.
Spruces, *Picea spp.*	Good	Good	Fair	Good	Fair	Good as kindling; important to northern wildlife.
Hickories, *Carya spp.*	Fair	Fair	Fair	Good	Excellent	Especially attractive to squirrels.
Ashes, *Fraxinus spp.*	Fair	Fair	Fair	Fair	Excellent	Supplies mast in the fall.
American Basswood, *Tilia americana*	Fair	Fair	Fair	Fair	Fair	Good as kindling.

Tree	All Wildlife	Songbirds	Upland Game Birds	Mammals *	Fire Wood	Remarks
Black walnut, *Juglans nigra*	Fair	Fair	Fair	Fair	Excellent	May have high timber value when mature.
Black tupelo, *Nyssa sylvatica*	Fair	Fair	Fair	Fair	Fair	Locally important to songbirds and game birds.
Eastern cottonwood, *Populus deltoides*	Fair	Fair	Fair	Fair	Fair	Good as kindling.
Elms, *Ulmus spp.*	Fair	Fair	Fair	Good	Fair	High water content when green; hard to split; cut if diseased.
Northern White Cedar, *Thuja occidentalis*	Excellent	Excellent	Excellent	Excellent	Good	Low heat value, good kindling. Important winter browse.
Balsam fir, *Abies balsamea*	Fair	Fair	Fair	Fair	Fair	Good as cover for snowshoe hares.
Eastern hemlock, Tsuga canadensis	Fair	Fair	Fair	Fair	Fair	Attractive to northern wildlife.
Black locust, *Robinia pseudoacacia*	Fair	Fair	Fair	Fair	Excellent	Low wildlife; high firewood; nitrogen-fixer.
Magnolias, *Magnolia spp.*	Fair	Fair	Fair	Fair	Good	Low wildlife.
Eastern redcedar, *Juniperus virginiana*	Fair	Good	Fair	Fair	Fair	Attractive to songbirds.
Sassafras, Sassafrass albidum	Fair	Fair	Fair	Fair	Good	Berries eaten by insectivorous birds.
Sycamore, *Platanus occidentalis*	Fair	Fair	Fair	Fair	Fair	Aesthetic; high water content when green; hard to split.
Yellow-poplar, *Liriodendron tulipifera*	Fair	Fair	Fair	Fair	Fair	Aesthetic.
Willows, *Salix spp.*	Fair	Fair	Fair	Fair	Fair	Attractive to northern wildlife.
Flowering Dogwood, *Cornus florida*	Excellent	Excellent	Good	Fair	Excellent	Hardy only in York County; high aesthetic qualities.

***Fur & Game Mammals**: Rabbits, squirrels, foxes, skunks, etc.

Definition of Mast: Nuts or larger seeds which serve as an important source of nutrition for animals, especially bear and squirrels.

Source: USDA FOREST SERVICE Northeastern Forest Experiment Station

PROPERTIES OF WOOD

Wood, since the early recorded history of man, has served for building structures and for many other purposes useful to man. It is one of the most versatile of raw materials.

1. Wood as it comes from the living, standing tree, and when first sawn into boards is more or less saturated with water, and for most uses must be seasoned before further processing.

2. Wood that has been properly seasoned is light in weight, easily handled, and may be transported long distances at reasonable cost.

3. Wood expansion or contraction is little influenced by temperature changes.

4. Wood is a poor transmitter of sound, heat and electricity.

5. Wood members can be easily and securely fastened together with glues, nails, screws, and bolts.

6. Wood pores and fibers facilitate the holding of paint, lacquer, varnish and other finishing materials.

7. Wood may be worked into intricate shapes using simple tools.

8. Wood does not rust. Neither does it corrode in the presence of sea water.

9. Wood neither crystallizes nor becomes brittle like many metals subjected to repeated stress reversals.

10. Wood defects generally can be detected by visual means.

11. Wood is limited in its hardness.

12. Wood is an organic material and as such is often subject to decay and boring insects.

13. Wood is a combustible material.

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TREES

I think that I shall never see
A poem lovely as a tree.

A tree whose hungry mouth is prest
Against the earth's sweet flowing breast;

A tree that looks at God all day
And lifts her leafy arms to pray;

A tree that may in summer wear
A nest of robins in her hair;

Upon whose bosom snow has lain
Who intimately lives with rain.

Poems are made by fools like me
But only God can make a tree.

Joyce Kilmer

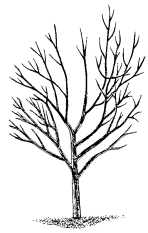
WHICH WOOD BURNS BEST?

Beech wood fires are bright and clear
If the logs are kept a year.
Chestnut's only good, they say,
If for long it's laid away.
Birch and fir logs burn too fast,
Blaze up bright and do not last.
Elm wood burns like a churchyard mould;
E'en the very flames are cold.
Poplar gives a bitter smoke,
Fills your eyes and makes you choke.
Apple wood will scent your rooms,
With an incense like perfume.
Oak and maple, if dry and old,
Keep away the winter cold.
But ash wood wet and ash wood dry,
A King shall warm his slippers by.

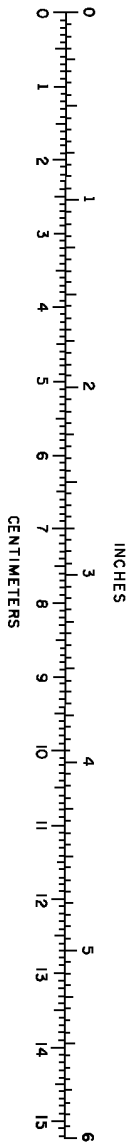
C.P. Ackers

Adapted from "Practical British Forestry."

Field Notes



Leaf measurements do not include the petiole of simple leaves.



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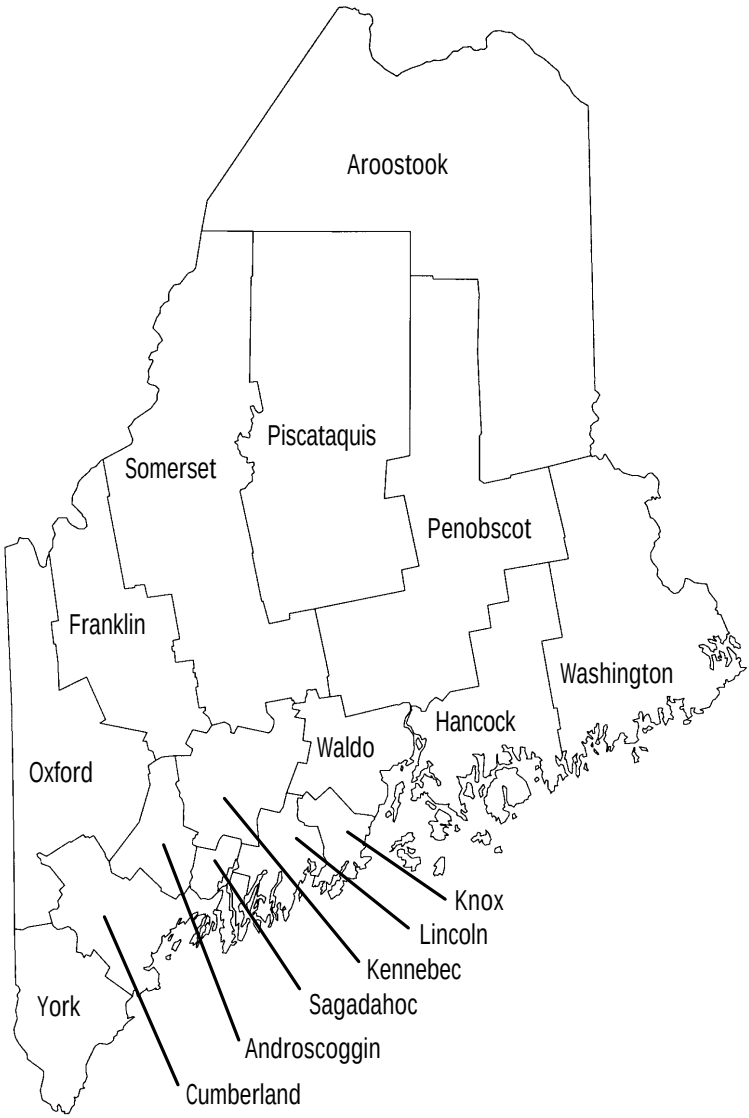

To report a wild fire, call **1-888-900-3473**
To confidentially report an arsonist, call
1-800-987-0257.