

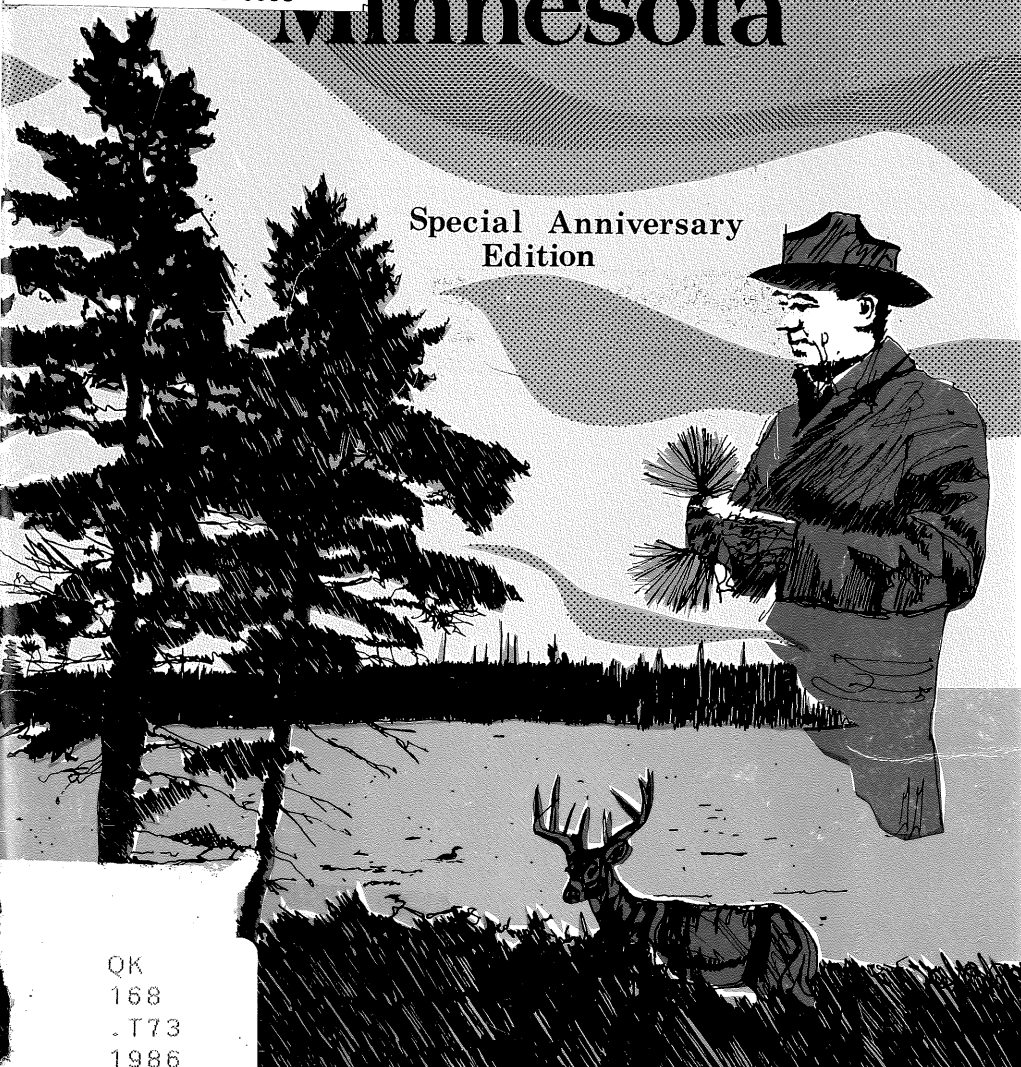
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- Trees of Minnesota



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of Minnesota

Special Anniversary
Edition



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DIVISION of FORESTRY
1911 — 1986
75th ANNIVERSARY

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STATE OF MINNESOTA
Department of Natural Resources
Division of Forestry

TREES OF MINNESOTA 1986

A special edition, commemorating the 75th anniversary of the Division of Forestry. This manual is designed as an aide in identifying and getting to know the native tree species of Minnesota.

The 75th or Diamond Anniversary Committee wishes to thank the following firms and organizations for their contributions which have helped make the publishing and distribution of this manual possible.

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The Forest Industries, together with private and public woodland owners of Minnesota, have historically worked closely in the management, protection and the promotion of multiple use on our forested lands. A strong and growing forest economy has a positive impact on every citizen in our state. Whether one is a consumer of a forest product; an occasional recreational user of forested land or directly employed within the forest oriented segment of the economy, we all share a common interest in Minnesota's forests, one of our greatest renewable natural resources.

Foreword

This booklet has been written to provide information to all those who in their spare moments cultivate that interest in living things, such as trees, which is innate in most normal human beings.

From the earliest time of man, wood has been one of the most common, most remarkable, and also one of the most useful of raw materials. The future of our forests depends on the continued application of the intelligent and planned conservation principles now being encouraged and practiced by state and federal forest services and forest industries.

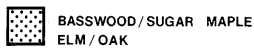
The scope of this booklet does not cover forest conservation but it is mentioned because wise use of our forests is a basic and vital problem facing the future of our trees. Man must produce timber as fast as he uses it. It is hoped that all who make use of this booklet will participate actively in promoting the control measures necessary to maintain our forest wealth.

For the 50 tree species herein covered which grow naturally within the limits of the state of Minnesota, the following information has been compiled:

- (1) Approved common and scientific names.
- (2) Non-technical and descriptive notes to assist in the identification of trees, and drawings showing leaf, twig, bud and fruit characteristics.
- (3) Distribution (range) of tree species in Minnesota.
- (4) Description of wood and notes on principal uses when commercially valuable and suitable for wood products.

We sincerely hope that the brief description of Minnesota's trees contained in this booklet will be helpful to you in their identification, and add to your pleasure in the study of trees.

NATURAL VEGETATION OF MINNESOTA



Key for Tree Identification

Conifers (evergreens)

Leaves needle-like or scale-like and persistent.

Leaves in groups of 2

¾ to 1¼ inches long—JACK PINE

3 to 5 inches long—NORWAY PINE

Leaves in groups of 5—WHITE PINE

Leaves in many-leafed clusters on short spur branches—TAMARACK

Leaves borne singly on branches

flat and in one plane—BALSAM FIR

in spirals on twigs—HEMLOCK

2 leaves pointed and sharp—SPRUCE

Leaves scale-like and flattened—WHITE CEDAR

Leaves awl-like, cone berry-like—RED CEDAR

Deciduous Trees (hardwoods)

Leaves compound

Leaflets 3 to 5—BOX ELDER

Leaflets 5 to many—ASHES

Leaflets ½ to 1 inch long, rounded tip—LOCUST

Leaves 7 to 16 inches long, leaflets strong smelling when crushed—
WALNUTS

Leaves simple

Leaves with lobes and no saw teeth, central veins with smaller side
veins—OAKS

Leaves with long, central stem—MAPLES

Leaves broad, saw-toothed, base uneven—ELM

Leaves broad, margin toothed once for each vein—BEECH

Leaves broad, margin toothed more than once for each vein—
IRONWOOD

Leaves oval and rough, three prominent veins not straight—
HACKBERRY

Leaves finely saw-toothed, smooth, similar to rose leaves—
JUNEBERRY

Leaves usually triangular shaped and broader than long—POPLARS

Leaves finely saw-toothed, rose-like, branches usually with thorns—
PLUM

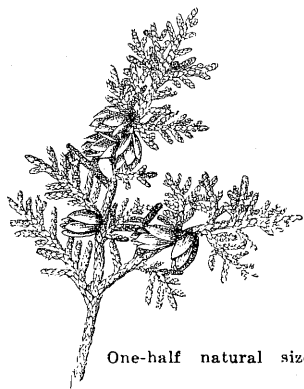
WHITE CEDAR (ARBOR VITAE)

[*Thuja occidentalis*]

FORM Compact, pyramidal; height sometimes 70', diameter 2 to 3'; trunk often twisted, strongly tapered, and frequently divided into two or more direct stems; branches short and nearly horizontal; sometimes forms almost impenetrable thickets, as dead branches are very stiff and persistent; in the open, develops a conical, symmetrical crown. There are numerous ornamental or garden varieties of Arbor Vitae.

BARK Gray to reddish brown, separating in long, vertical, narrow shreddy strips.

LEAF Scale-like; length $\frac{1}{8}$ to $\frac{1}{4}$ ", arranged to make the small branches flat; pleasant, aromatic scent when crushed; pungent to the taste.



One-half natural size

FRUIT Small, oblong cone ripens in fall of first year; yellowish-brown; size about $\frac{1}{2}$ " with six to twelve scales borne singly or in large clusters on ends of branches.

RANGE Native in northern part of state; grows usually in moist places where it is often found in dense pure stands; however, sometimes found on rather stony ground, singly or in small clumps as far south as Winona County.

WOOD Light, soft, brittle, coarse grained, durable, fragrant, and pale brown in color; especially important for making fence posts, building poles, rot-resistant lumber, and shingles.

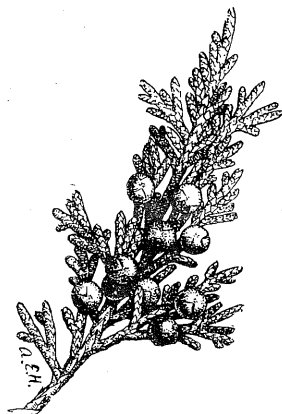
RED CEDAR (JUNIPER)

[*Juniperus virginiana*]

FORM Straight trunk more or less grooved and broad conical head; height 25 to 30' when growing in good locations; trunk may be very divided or nearly prostrate on poor, rocky, and dry soil.

BARK Thin, reddish brown, peeling off in long, vertical shred-like strips.

LEAF Two kinds usually found on same tree; more common kind is dark green, minute and scale-like, clasping the stem in four ranks so that stem appears square; second kind usually appears on young growth, on vigorous shoots, or on branches in deep shade; are awl-shaped, quite sharp-pointed, spreading, and whitened on under side.



Three-fourths natural size

FRUIT A dark blue berry-like cone; diameter $\frac{1}{4}$ ", enclosing one or two seeds in the sweet flesh; matures in one season; is a favorite winter food for some birds.

RANGE Dry, gravelly soil, and rocky ledges in southern half of state; most abundant on river bluffs in southeastern part where few other trees are found.

WOOD Red, fine-grained, soft, weak, fragrant, and very durable; used for interior woodwork, chests, closets, lead pencils, posts, and poles. Red Cedar spreads cedar rust of apples; therefore, it is not favorable to plant in or near orchards or anywhere in regions devoted to commercial apple production.

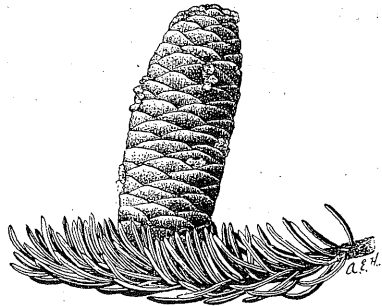
BALSAM FIR

[*Abies balsamea*]

FORM Medium size; height 40 to 80' with continuous straight tapering trunk from root to top; diameter 9 to 20" or more; spreading branches form a handsome, symmetrical, slender pyramid.

BARK Smooth, grayish, prominently marked by blisters filled with resin or balsam pitch.

LEAF Needle-like, but flat; length $\frac{1}{2}$ to 1" with rounded point, dark green and lustrous above and silvery white beneath; arranged on twig apparently in two ranks; resinous and fragrant.



One-half natural size

FRUIT Cones upright on branches, purple, oblong; length 2 to 4"; become ripe in autumn of first year; cone scale wider than long; seeds have very wide wings, and when ripe, fall together with scales of cone, leaving hard central axis standing upright on twig like a spike.

RANGE Found in forests of northern Minnesota and in a few scattered localities in southeastern corner of state; usually associated with white spruce from which it can easily be distinguished by its large upright cones and soft leaves; thrives in cool, damp, or shaded places.

WOOD Light, soft, not strong or durable, coarse grained; used only slightly for construction lumber; is mixed with spruce-wood for paper pulp; especially important as Christmas trees; not particularly desirable for ornamental planting.

HEMLOCK

[*Tsuga canadensis*]

FORM Height 50 to 75'; trunk straight, upright; branches spreading and nearly horizontal; leading shoot in young trees usually drooping; twigs slender.

BARK One-half to $\frac{3}{4}$ " thick, deeply divided into narrow rounded ridges, covered with thick, closely appressed scales, varying from cinnamon-red to grey.

LEAF (Needles) Length $\frac{1}{2}$ to $\frac{3}{8}$ ", width about $\frac{1}{16}$ "; flat but blunt, scattered and borne in many rows, but usually twisted into a two-rank arrangement; remain on twig for two or three years, but fall rapidly if twig is dried, leaving twigs roughened by woody, raised projections. Most buds are scaly and not resinous.



One-half natural size

FRUIT (Cones) Length $\frac{1}{2}$ to $\frac{3}{4}$ " with scales almost as wide as long; ripens first autumn; opens at maturity and discharges seeds. Seeds are winged, slightly resinous, and about $\frac{1}{16}$ " long; flowers in spring.

RANGE Usually grows on acid soil containing considerable organic matter; the hemlock barely reaches Minnesota, occurring native in Carlton County just southwest of Lake Superior; also a few scattered trees in Aitkin and St. Louis Counties.

WOOD Light reddish-brown; soft, coarse, brittle, splintering, and not durable; largely manufactured into coarse lumber for outside finish of buildings; inner-bark used for tanning leather; oil of hemlock distilled from young branches.

JACK PINE

[*Pinus Banksiana*]

FORM Straight trunk; height 30 to 70'; diameter rarely exceeds 2'; top or crown of spreading branches and scant or open foliage. Small dead branches often remain on trees for many years.

BARK Dark brown; irregularly divided into small scales.

LEAF Shorter than either white or Norway pine needles; length about 1", ridged; sharply-pointed; two in a bundle and slightly twisted; remain on branchlets for about three years.



Two-thirds natural size

FRUIT Cones—length about 1½"; often strongly curved, brown when ripe, turning gray later, sometimes remaining on branches unopened and containing good seeds for many years; small winged triangular seeds which may be carried far in strong winds. Many trees have ripe cones when seven years old.

RANGE Found in abundance in north central and northeastern Minnesota; occurs generally in pure stands on poor sandy soil; usually first of pines to spring up and occupy land following fire; hardy and thrives on soil too poor for white or red pine.

WOOD Light, soft, not strong, close grained, clear pale brown with thick, nearly white sapwood; used for laths, box material, craft paper, firewood, and increasingly for lumber; used for windbreaks because of its hardness; least beautiful of the native pines of Minnesota.

NORWAY PINE (RED PINE)

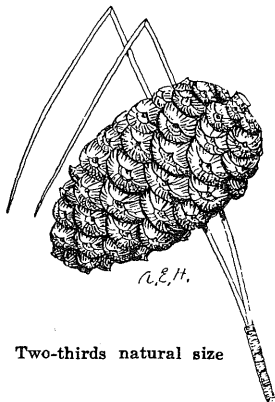
(Minnesota's State Tree)

[*Pinus resinosa*]

FORM Height sometimes 100', diameter 30 to 40"; straight trunk; branches on mature trees form an open rounded picturesque head.

BARK Becomes divided into large reddish brown plates as it matures, which gives tree its characteristic appearance and one of its common names, red pine.

LEAF Occurs in clusters of two each; dark green; 4 to 6".



FRUIT A cone—length about 2"; light brown fading to gray. The thin, slightly concave cone-scales are without spines or prickles and are free from resin. Like all pines, it requires two years for cones to ripen; ripen about the middle of September but stay on branchlets until following spring or summer; seeds small, length about $\frac{1}{8}$ ", dark or mottled brown, winged and widely scattered by the wind.

RANGE Native of state; found in pure stands in many parts of northern and northeastern Minnesota; increasing in popularity for forest planting; because of its general freedom from disease and insect attack, recommended in many instances to take place of white pine. Rate of growth:—about the same as white pine; thrives on sandy loam or dry, rocky ridges.

WOOD Pale red with thin, nearly white sapwood; medium heavy, hard, coarser grained and harder than white pine; used in construction of bridges and buildings and for pilings.

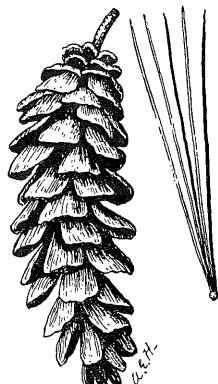
WHITE PINE

[*Pinus strobus*]

FORM Straight trunk and regular pyramidal shape with soft gray-green foliage; clear of branches for many feet, when growing in forest; branches extend horizontally in whorls in young trees, i. e., arranged in circles on stem, marking successive years of upward growth. White pine may still be found in Itasca Park 130' in height and up to 44" in diameter.

BARK Thin, smooth and greenish-gray on young trees, but thick and deeply furrowed and grayish-brown on older trees.

LEAF Length 3 to 5"; bluish-green on upper surface, and whitish beneath; occurs in bundles of five which distinguish the trees from other Minnesota pines.



One-half natural size

FRUIT Cone—length 4 to 6", cylindrical with thin and usually very gummy scales, each containing two small winged seeds. Cone matures at end of second season.

RANGE Important throughout the northern, central, and eastern parts of state; also found scattered along Mississippi River as far south as Houston County; thrives on fertile, well-drained soil.

WOOD Light, soft, not-strong, light brown in color, often tinged with red; easily worked; manufactured into lumber, shingles and laths; used for construction purposes—cabinet making, interior finish of buildings, and wooden ware.

BLACK SPRUCE

[*Picea mariana*]

FORM Small tree; straight trunk and somewhat drooping branches; mature tree reaches height of 20 to 30'; however, in better soil same tree might attain height of 70 to 80'; often associated with tamarack, balsam, and white cedar. In cold swamps the growth is practically stagnant and trees 2" in diameter have been found to be 127 years old.

BARK Dark, scaly, and similar to white spruce.

LEAF Bluish-green, short, pointed, four-sided; length $\frac{1}{2}$ "; found scattered thinly over branches; shorter than those of white spruce.



One-half natural size

FRUIT Cones oval shaped; length $\frac{1}{2}$ to $1\frac{1}{2}$ ", young cones purple; mature cones dark brown, remain on trees indefinitely and open in the fall to liberate seeds; seeds small, dark brown and winged, mature in one season.

RANGE Northern and northeastern parts of state, extending as far south as northern Anoka County.

WOOD Yellow-white, light, soft, and medium strong; used more extensively for paper pulp than any other tree; also used extensively for Christmas trees; not recommended for ornamental planting.

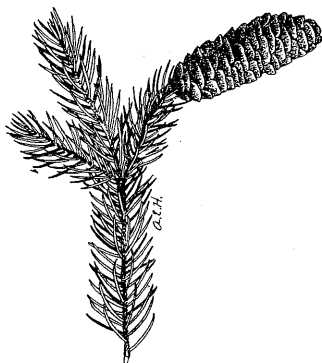
WHITE SPRUCE

[*Picea glauca*]

FORM Height attained, occasionally 100' with a diameter of 2'; straight trunk; long, stout branches form broad conical head.

BARK Dark gray or gray-brown and scaly.

LEAF Four-sided and crowded along branchlets; length $\frac{1}{2}$ to $\frac{3}{4}$ "; pale bluish when young; dark bluish-green when mature; sharply pointed, having a slightly disagreeable odor when crushed.



One-half natural size

FRUIT Slender cone; length about 2"; cone scales round and soft at ends; thin and flexible when mature; narrow-winged seeds mature in one season; cones drop during winter after opening and shedding seeds.

RANGE Extensively found in forests of northern Minnesota, reaching outward to the St. Croix Valley; thrives on dry soils associated with pine, and on moist soils and in swamps with balsam and tamarack; also found associated with mixed hardwoods.

WOOD Light, strong, soft, straight grained yellow-white; used in the manufacture of various products, most important of which is paper. Largest trees are sawed into lumber and used for general construction—airplanes, furniture parts, canoe paddles and sounding boards for musical instruments; planted quite extensively for ornamental purposes, windbreaks, and shelter belts; ranks high as a Christmas tree.

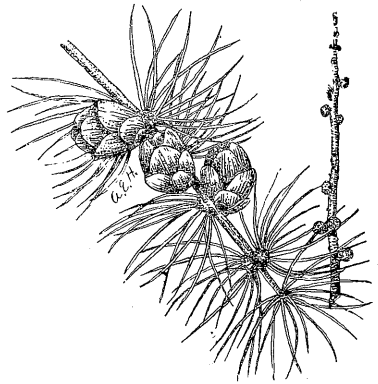
TAMARACK (LARCH)

[*Larix laricina*]

FORM Straight, upright trunk, extending to top of tree; spreading or ascending branches; height 30 to 70', diameter 14 to 24" in some instances. Large trees are rare as most old specimens were killed years ago by the larch sawfly.

BARK Rough and separates on the surface into thin, reddish-brown scales. Twigs are light brown and covered with numerous tiny spurs or short branches.

LEAF Flat, soft, slender; length about 1"; borne in clusters on spur-like branches and distributed singly on terminal shoots; bright green in spring, soft and flexible, turning dull yellow in September or October just before falling; Tamarack is the only conifer in Minnesota that sheds all its leaves each fall. When in foliage, it is very beautiful.



Three-fourths natural size

FRUIT Young cones red or greenish; mature cones light brown; width $\frac{1}{2}$ ", length $\frac{3}{4}$ "; nearly spherical; open in the fall to liberate small winged seeds. Cones often remain on trees several years.

RANGE Chiefly in swamps in northern part of state in region of coniferous forests; occasionally in drier localities where it reaches larger size; found southward scattered in cold swamps throughout the hardwood region as far south as the Twin Cities.

WOOD Light yellowish-brown, heavy, hard and very durable in contact with soil; used for posts, poles, ties, cribbing, fuel, kraft paper, and locally for lumber.

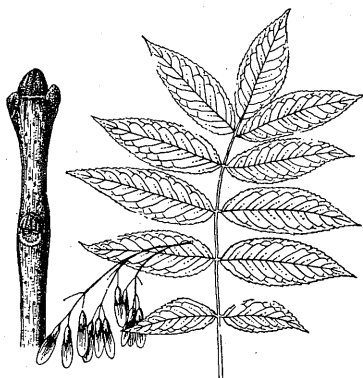
BLACK ASH

[*Fraxinus nigra*]

FORM Medium sized tree; height 35 to 75', diameter 1 to 2'.

BARK Grayish on older portions of tree, furrowed and somewhat separated into thin scales which are easily rubbed off; new growth of light green color.

LEAF Opposite on stem; compound, consisting of 7 to 11 leaflets; oblong in shape and not stalked except the terminal leaflet; terminal bud is large and pointed; leaves smooth on both surfaces.



One-fourth natural size

FRUIT Usually twisted; generally similar to that of all ashes, except that the thin wing nearly surrounds the seed part; seeds usually germinate and start growth the second year.

RANGE Fairly plentiful in state except in western half; most abundant in cold, moist locations and along low banks of streams.

WOOD Medium dark brown, sapwood of lighter color, coarse grained, heavy, somewhat soft but fairly durable in contact with soil; not as strong or valuable as green or white ash; easily separated into thin layers furnishing excellent material for baskets, hoops, etc.; also used in cabinet making and for fence posts; does not grow rapidly.

RED ASH

[*Fraxinus pensylvanica*]

FORM Height 40 to 60'; diameter rarely exceeds 18 to 20"; stout, upright branches form compact irregularly shaped head.

BARK Trunk grayish-brown, rather prominently ridged but not quite as rough as white ash.

LEAF Length 10 to 12", compound with 7 to 9 oblong leaflets, each of which gradually narrows at apex into a long slender point, not symmetrical at base; light yellowish-green above, paler below, conspicuous middle-rib and branching veins; turns yellow or rusty brown before falling. Flowers appear late in spring as leaves begin to unfold.



One-half natural size

FRUIT Winged and in clusters; length 1 to 2½", width ¼ to ½"; seed located at base of wing.

RANGE Grows mostly on low ground throughout state but is much less common than green ash.

WOOD Heavy, hard, rather strong, brittle, coarse-grained, light brown with thick lighter brown sapwood streaked with yellow; uses similar to those of the more valuable white ash.

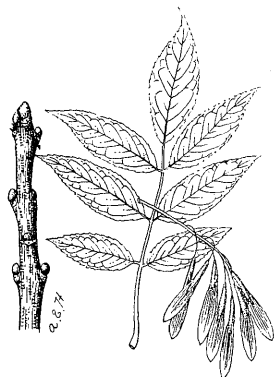
GREEN ASH

[*Fraxinus pensylvanica* var: *lanceolata*]

FORM Height 50', diameter 2' or more; slender spreading branches forming a round top.

BARK About $\frac{1}{2}$ " thick; dark brown or gray, tinged with red; strongly furrowed or ridged.

LEAF Length 10 to 12"; compound, and opposite on stem; each compound leaf has from seven to nine stalked leaflets; pointed and slightly toothed on margin; differs from white ash in having leaves that are bright green or yellow-green on both sides.



One-fifth natural size

FRUIT Flat and winged; length 1 to $2\frac{1}{4}$ ", width $\frac{1}{4}$ to $\frac{1}{2}$ ", with winged portion extending well down past middle or seed-bearing part; slightly notched at outer end; wing has a somewhat square appearance.

RANGE Common throughout state except in western prairie region; most abundant in valleys and along streams; best and most abundant of the ashes in Minnesota.

WOOD Heavy, hard, rather strong, brittle, coarse grained; light brown, with broad layer of lighter sapwood; commercially valuable and used for the same purposes as those of the white ash; used extensively for ornamental and farm forest plantings; fairly fast growing and will withstand severe conditions of both soil and climate; rapidly grown from seed.

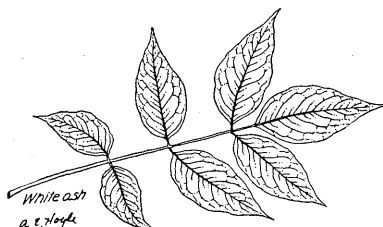
WHITE ASH

[*Fraxinus americana*]

FORM Large tree; tall and often graceful trunk; average height 50 to 90', diameter 1 to 2'; however, in many instances larger trees are found. Stout, upright branches form a narrow crown in the forest, and with sufficient space, a round-topped or pyramidal head.

BARK Dark, and nearly smooth on young twigs and branches; greenish-brown on older trees; narrow ridges are separated with marked regularities by deep diamond-shaped fissures.

LEAF Length 8 to 10"; compound and opposite on stem, consisting of 5 to 9 (usually 8) plainly stalked, sharp pointed leaflets; dark green and smooth above, pale green or whitish beneath.



One-half natural size

FRUIT Winged; length 1 to 1½"; resembles canoe paddle blade with seed toward handle end. Seeds mature in autumn; distributed effectively by the wind.

RANGE Found only in southeastern part of state; grows best in rich moist soil.

WOOD Light brown, close grained, heavy, tough and elastic; preferred to all native woods for making tool handles and athletic and sports equipment; also used for agricultural implements, furniture, interior finishes, posts, ties, fuel and for ornamental purposes. Its fairly fast growth makes it desirable for farm forest plantings.

MOUNTAIN ASH

[*Sorbus americana*]

FORM Shrub or small tree; height sometimes 20 to 30', diameter 4 to 12"; spreading, slender branches form narrow round-topped head.

BARK About $\frac{1}{8}$ " thick; smooth, light gray surface, irregularly broken by small appressed plate-like scales.

LEAF Compound; length about 6 to 8", composed of 13 to 17 leaflets; each leaflet 3 to 4" long and about 1" wide at the middle; leaflets have long points with toothed edges, bright green above, turning bright yellow in fall.



One-third natural size

FRUIT Bright orange, rounded berry; diameter about $\frac{1}{4}$ "; has thin layer of sour flesh; fruit gives tree ornamental appearance.

RANGE Found scattered in woods of northern Minnesota as far south as Pine and Mille Lacs Counties; best development in northeastern Minnesota; numerous along edges of swamps; does best in moist locations, thriving fairly well in drier areas and on thinner soils.

WOOD Light, soft and weak; pale brown, with light colored sapwood; slow growth gives it very close grain; has no commercial value, except for ornamental purposes and medicinal qualities of inner bark.

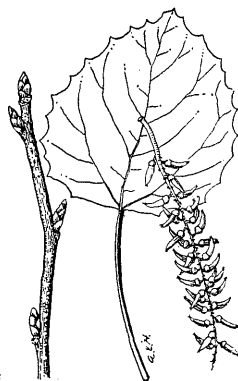
LARGE-TOOTH ASPEN (POPLAR)

[*Populus grandidentata*]

FORM Medium to large; height sometimes 60 to 80', diameter 10 to 20"; slender rather rigid branches form narrow round-topped head.

BARK Smooth, gray or yellowish-green; furrowed and dark brown at base of old trees.

LEAF Coarse-toothed; length 2 to 4"; dark green upper surface; appears one to two weeks later than that of quaking aspen, and at first is silvery white. Buds are light gray, downy, and larger than those of quaking aspen.



Two-thirds natural size

FRUIT Similar to that of popple or quaking aspen; matures in May and set free as leaves unfold; easily propagated by "cuttings."

RANGE On sandy or rich soils that are moist; common, except in southwestern and northeastern parts of Minnesota.

WOOD The use of aspen has increased dramatically over the past few years which has changed its status from a "weed" tree to the most highly used species in Minnesota. It is the primary raw material source for the pulp and paper, hardboard, wafer board and oriented strand board industries. Other industries use it in the production of lumber matchsticks, lath and shavings. The residue generated at these industries is used in the production of densified wood fuels (pellets) or burned directly as green fuel.

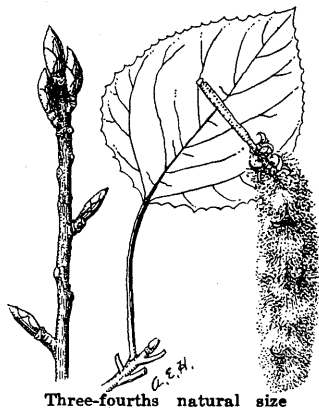
QUAKING ASPEN (POPPLE)

[*Populus tremuloides*]

FORM Small to medium size; may reach height of 65' and diameter of 12 to 20", but usually somewhat smaller. Young branchlets are reddish-brown and shiny, becoming gray and roughened after first year.

BARK Thin, green, white to gray-green, almost smooth with black areas around base of limbs; has bitter inner bark.

LEAF Alternate along stem; small, broadly oval, short-pointed at end and finely toothed along margin; green and shiny above, dull green below; usually ranges in size from 1 to 2" but often 4" or more in length as well as in width on vigorous young shoots. Leaf stalks are flattened at right angles to leaves, causing leaves to quake or tremble in a very slight breeze.



Three-fourths natural size

FRUIT Ripens in late spring (May or June) before full expansion of leaves; consists of cottony mass containing tiny round light brown seeds that usually germinate in a few hours after released from trees.

RANGE Found in all parts of Minnesota; one of first species to appear after cutting or fire; found commonly on cut-over land, grows well on sandy, gravelly soils, but thrives better on good soil.

WOOD Light brown, surrounded by heavy nearly-white sapwood; light, soft, not strong; short-lived; may be propagated by "cuttings", seeds or suckers; used extensively in manufacture of pulpwood for book, and magazine papers, and low grade lumber. (See page 20 also)

BALM OF GILEAD (BALSAM POPLAR)

[*Populus balsamifera*]

FORM May attain height of 50 to 80' and diameter of 1½ to 3' or more; grows upright with narrow, straight top which later becomes somewhat broad.

BARK Smooth, brown-gray color, deeply furrowed, gray-black color on old trunks.

LEAF Ovate, long pointed, edges finely-toothed, dark green and shiny above; pale and often rusty tinged beneath. Buds are large, pointed golden-yellow resembling balsam, and covered generously with varnish-like resin or pitch; gives off strong, pungent aroma.



One-half natural size

FRUIT Small, cotton-like, easily carried by wind for long distances; appears in May or June.

RANGE Found throughout northern part of state, along streams and edges of swamps or in other cool localities.

WOOD Heavy when green, light when dry; soft, not very strong, close grained, light brown, sapwood white; used for pulp, boxes, packing cases and rough lumber, rots readily in contact with ground.

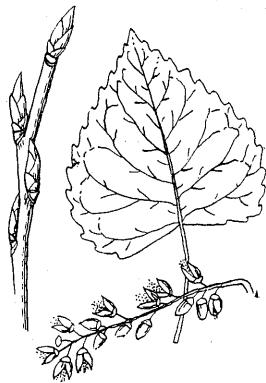
COTTONWOOD

[*Populus deltoides*]

FORM Height may reach 50 to 80', diameter 3 to over 4'; long pyramidal or crown; grows rapidly; therefore, often planted to furnish shade quickly.

BARK Light gray on young trees and dark gray and rough on older trees.

LEAF Alternate; broadly ovate or triangular, pointed, square at base; finely toothed or wavy on edges, 3 to 5" across each way; covered with soft white hairs on underside and flattened with slender stems from 2 to 3" long; winter buds covered with chestnut-brown, resinous scales.



One-half natural size

FRUIT Two to four, valved, thin capsules borne on short stock in drooping "catkins"; seeds, when set free in late May or June, minute, pale, brownish-white, enclosed in cluster of white cottony hairs which carry them for long distances. There are two kinds of flowers borne separately on different trees; female trees throw cotton.

RANGE Throughout Minnesota, often forming extensive groves; will grow on dry locations but makes most rapid progress on moist sites.

WOOD Soft, light-weight; warps easily when drying and rots readily; used for boxes, fencing, fuel, rough lumber for inside use, making high-grade magazine paper for printing half-tone illustrations; grown extensively for windbreaks owing to rapid growth and adaptability to soil; usually propagated by "cuttings" or seedlings; found along water courses.

BASSWOOD (LINDEN)

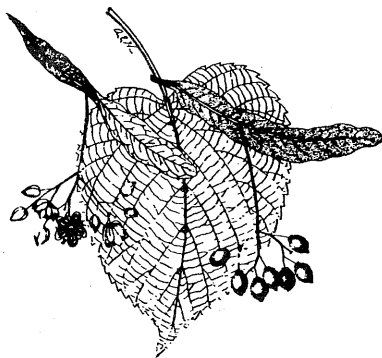
[*Tilia americana*]

FORM Height 60 to 80 ', diameter 1 to 3'; trunk often continues straight into top of dense rounded crown.

BARK Light brown with shallow, vertical ridges.

LEAF Length 3 to 6", width about 3 to 6", heart-shaped, thin, saw-toothed, sharp-pointed at tip; at maturity thick, shiny, green above, paler underneath.

FRUIT Rounded, nut-like; 1 to 2 seeds; nut $\frac{1}{4}$ to $\frac{1}{2}$ " in diameter, covered with short, thick, brownish wool, attached in clusters to a leafy bract which later acts as a wing to carry seeds away on wind; fruit often hangs on tree long into winter. Flowers are fragrant, and from them choice-grade honey is made by bees. Difficult to propagate from seed.



One-third natural size

RANGE Common throughout state except in extreme northeastern part; grows chiefly on rich, alluvial soil.

WOOD Light, soft, tough, not durable, light-brown with scarcely distinguishable sapwood; used in manufacture of paper pulp, wooden ware, furniture, trunks, crating, drawing boards, kegs, barrel heads, and lumber. Basswood trees are recommended for ornamental plantings.

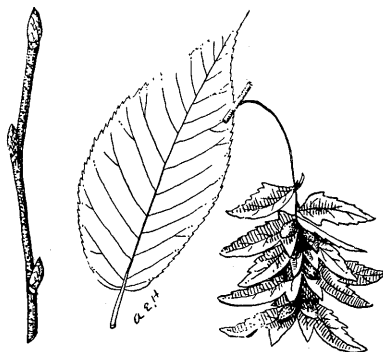
BLUEBEECH (HORNBEAM)

[*Carpinus caroliniana*]

FORM Small, slow-growing, bushy tree with spreading top of slender, crooked or drooping branches; height rarely 40'. It is also known as Ironwood Hornbeam, and Water Beech.

BARK Light gray-brown, smooth, sometimes marked with broad, dark-brown horizontal bands; fluted on trunk with irregular ridges extending up and down.

LEAF Alternate; oval, long-pointed double-toothed along margin; length 2 to 3"; veins prominent similar to those of the Hop Hornbeam, pale bronze-green when young; at maturity, thin and firm, and pale, dull-green above, light yellow-green below.



One-half natural size

FRUIT Clusters with leaf-like bracts, each with nutlet about $\frac{1}{3}$ " long attached to outside; leaf-like bract may act as wing in aiding seed distribution by wind; blossoms in April and May; fruit ripens in August.

RANGE In moist woods, especially along streams, common throughout southern half of state extending north into Itasca Park and White Earth Indian Reservation.

WOOD Tough, close-grained, heavy, hard and strong; light brown, with thick white sapwood; used for levers, tool handles, wooden cogs, mallets, wedges and fuel.

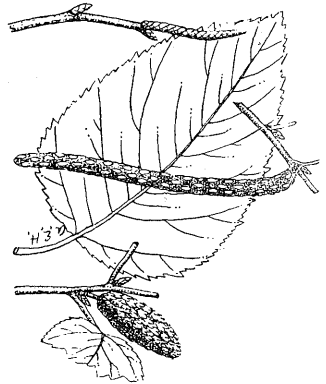
PAPER BIRCH (Canoe Birch—White Birch)

[*Betula papyrifera*]

FORM Height 65 to 70', diameter 14 to 20"; twigs dull orange or red during first winter, later become brown.

BARK Thin, papery; becomes pure white with age, marked by many pores or "lenticels"; separates into thin sheets which often roll up; bark thickens on old trees, becoming dark (nearly black) and scaly.

LEAF Length 2 to 3", width 1 to 2"; oval or heart-shaped, pointed, rounded at base, irregular toothed; becomes thick and leathery in texture; dull on upper side and yellowish-green on lower side.



Two-thirds natural size

FRUIT Resembles cone, containing many tiny seeds; length about $\frac{1}{4}$ "; ripens in August and September; readily propagated by seeds which may even be scattered on the snow.

RANGE Generally abundant throughout state, except southwestward.

WOOD Hard, strong, tough, light in weight, brown tinged with red, nearly white sapwood; used for spools, toothpicks, toys, snowshoe frames, handles, paper pulp, flooring, firewood, and interior finish. Years ago, birch bark was extensively used by northern Indians for canoes and wigwams, and for making baskets, cups, bags, and other useful utensils.

RIVER BIRCH (RED BIRCH)

[*Betula nigra*]

FORM Normally large; height 80 to 90', almost as large as yellow birch; however, in Minnesota it is of medium size, often forming extensive thickets.

BARK Dark brown at base of old trunks, deeply furrowed; higher up on main stem and on larger branches, becomes lustrous reddish-brown; peels more or less freely; twigs, reddish color.

LEAF Alternate; length 2 to 3"; more or less triangular with double toothed edges; upper surface dark green, and lower surface pale yellow-green.



Two-thirds natural size

FRUIT Cone shaped catkin; length about 1"; densely crowded with little winged nutlets; blossoms in April and May; ripens in late spring or early summer.

RANGE Grows along rich bottom lands of streams and rivers in southeastern corner of state, especially in Mississippi and Root River Valleys; common along Mississippi River as far as Wabasha County; also reported near Mankato.

WOOD Light brown, close-grained, hard and strong; used in manufacture of furniture; however, since this tree is scattered in its distribution and mostly confined to banks of streams, it does not figure largely in commercial lumbering, but is used to a great extent for fuel.

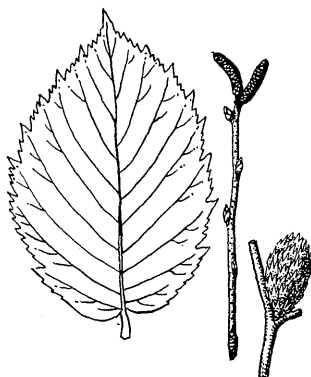
YELLOW BIRCH

[*Betula lutea*]

FORM Large; height occasionally 85', diameter 2 to 3'; however, it may have a short or crooked trunk.

BARK Yellow-gray or straw color; peeling freely into thin papery layers which produce a ragged appearance on the main stem and lower branches; twigs light brown, lustrous, and slightly aromatic with oil of wintergreen.

LEAF Alternate; oval to oblong, deeply and finely toothed; length 3 to 5"; dull dark green on upper surface and paler beneath; much larger than paper birch.



Two-thirds natural size

FRUIT Cone; length about 1", contains chestnut-brown winged seeds when ripe.

RANGE Common in the northern half of state on better soils where cool, moist conditions prevail.

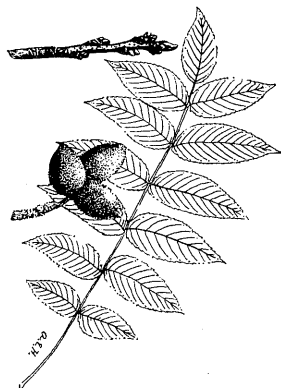
WOOD Heavy, strong, hard, close-grained, light brown; takes good polish; used for flooring, interior finish, veneers, wooden ware, furniture, and small wooden novelties; excellent for fire wood. Oil of wintergreen may be obtained from bark.

BUTTERNUT (WHITE WALNUT)

[*Juglans cinerea*]

FORM Smaller than black walnut, though often reaches height of 80' and diameter of 3'; trunk usually forked or crooked; top develops into open, broad crown; may be distinguished from black walnut by velvet collars just above scars left by last year's leaves.

BARK Divided into ridges, light gray on branches and trunks of small trees; becomes darker on large trees.



One-fifth natural size

LEAF Length 15 to 30", each with 11 to 17 sharply pointed, alternate, oblong, finely-toothed leaflets each 2 to 3" long, yellowish-green above and hairy underneath.

FRUIT Light brown nut enclosed in oblong, somewhat pointed, sticky, yellowish-green husk about 2" long; husk covered with short, rusty, clammy, sticky hairs. Nut has rough, grooved shell and oily edible kernel.

RANGE Found naturally in same range as black walnut (southern Minnesota) but ranges farther northward in state; grows as far north as Mille Lacs County. Within its range, this tree should be planted in greater numbers on land not needed for agriculture.

WOOD Light, soft, not strong; coarse grained, light brown; takes good polish; used for furniture and interior finish for houses. A yellow dye can be made from husks of the nuts and from the inner bark.

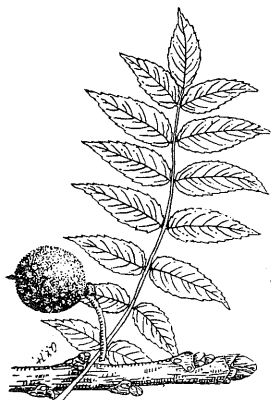
BLACK WALNUT

[*Juglans nigra*]

FORM Handsome forest tree when growing singly in forest; height often 100', diameter 3 to 5'; straight and clear of branches for half its height; when grown in the open, stem short, crown broad and spreading.

BARK Thick and very dark brown; divided by rather deep fissures into round ridges.

LEAF Alternate on stem; compound, 1 to 2' long, consisting of 7 to 11 pairs of yellow-green leaflets, each sharply pointed; smooth above, pale and hairy underneath; leaflets about 3" long, extremely tapered at ends and toothed along margin.



One-fourth natural size

FRUIT A large, round nut borne singly or in pairs and enclosed in solid green husk, which is not sticky and does not spread open even after nut is ripe. The nut is black with very hard, thick, finely-ridged shell, enclosing a rich, oily kernel which is edible and highly nutritious; matures in fall.

RANGE Grows on rich bottom lands and moist, fertile, hillsides in southern part of state; is easily propagated from nuts and grows rapidly in good soil.

WOOD Rich chocolate-brown heartwood is of superior quality and value; heavy, hard, strong, and comparatively free from warping and checking, takes a high polish and is very durable; highly prized for a great variety of uses such as furniture, gun-stocks, and airplane propellers; finest veneers are made from burls and roots; small trees consist mostly of sapwood, which is light-colored and not durable.

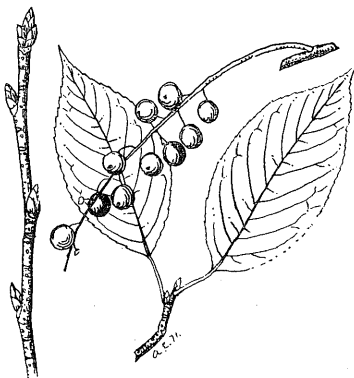
BLACK CHERRY

[*Prunus serotina*]

FORM Largest of cherry trees; height 30 to 70', diameter 8" to 2'; long clear trunk with little tapering when grown in forest; when grown in open, tree has short trunk with many branches and irregular spreading crown.

BARK On young trunk smooth and bright, reddish-brown, marked by conspicuous narrow, white horizontal lines; has bitter almond taste; on older trunks, thin, dark brown, rough and broken into thick irregular plates.

LEAF Alternate; simple, oval, thick, shiny above, paler below; edges broken by many fine incurved teeth.



One-half natural size

FRUIT Borne in long, hanging clusters resembling choke cherries; dull purplish-black about the size of a pea; is edible but somewhat astringent; ripens in late summer; has some medicinal value.

RANGE Fairly common in Minnesota hardwood region; grows to commercial size only in southeastern part of state.

WOOD Reddish-brown with yellowish sapwood, medium-heavy, strong, fine-grained; does not warp or split in seasoning; has exceptional lustre and color; used for furniture, interior furnishing, tools, and implement handles; next to black walnut, black cherry has highest value of any hardwood in Minnesota.

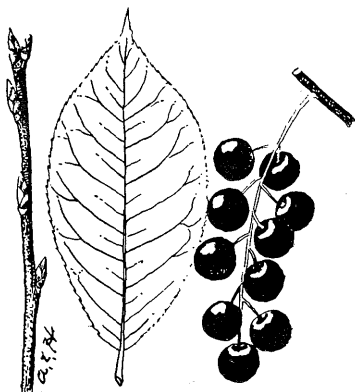
CHOKE CHERRY

[*Prunus virginiana*]

FORM A shrub or small tree; height usually not over 20 to 25', diameter 4 to 8"; straight trunk, small, erect or horizontal branches.

BARK Thin, grayish-brown; becomes roughened with age; inner bark has bitter cherry flavor and aroma.

LEAF Alternate on twig; broadly oval, abruptly and sharply pointed, fine-toothed, bright green above, paler underneath; length 2 to 4", width 1 to 2". Flowers appear in dense clusters; length 3 to 6"; petals round and white; flower buds open in May or June.



Three-fourths natural size

FRUIT Reddish, turning nearly black when fully ripe; skin of fruit thick; flesh thin and dark, very astringent to the taste.

RANGE Common throughout state along streams, open woods, cut-over and brush areas.

WOOD Heavy, hard, not very strong; of no commercial value in Minnesota; popular tree for birds; used extensively for ornamental planting.

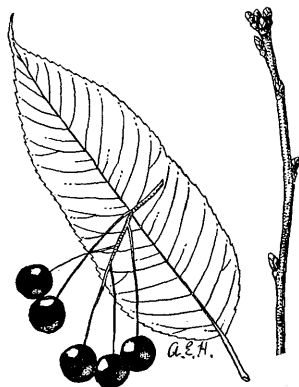
PIN CHERRY (WILD RED CHERRY)

[*Prunus pennsylvanica*]

FORM Shrub or medium-sized tree.

BARK Reddish-brown, breaking into papery layers; marked by irregular, horizontal bands of orange color lenticels.

LEAF Length 3 to 4"; width about 1"; oblong; pointed; finely incurved teeth along edge shiny green when fully grown.



Two-thirds natural size

FRUIT Diameter about $\frac{1}{4}$ "; thick, light red skin; thin sour flesh surrounding oblong stone; flesh used in homes for making jellies; fruit borne on long-stocked clusters; ripens in middle or late summer. White flowers borne in clusters, usually appear in early May when leaves are about half grown.

RANGE Common in woods throughout state except in southwestern portion; often abundant in cut-over lands, old fields, and along roadsides.

WOOD Medium light, medium soft, brownish with yellowish sapwood has no special commercial value; tree is hardy; furnishes home and feeding ground for our more useful song birds and is especially suited for home beautification.

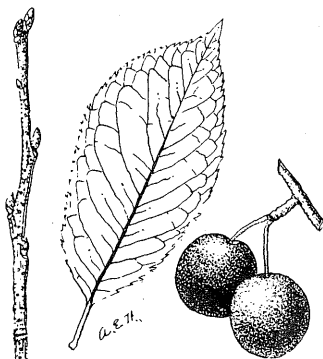
WILD PLUM

[*Prunus americana*]

FORM Shrub or small tree; height usually 15 to 25'; maximum diameter 10"; trunk usually short and thorny and divides a short distance from the ground.

BARK Thin, reddish-brown, broken into thin plates.

LEAF Alternate; somewhat oval, long and narrow-pointed, doubly toothed along edge; dark green above, paler below; length 2 to 5", width about 2". Beautiful, white or pink, fragrant flowers appear in April or May usually before the leaves.



Two-thirds natural size

FRUIT $\frac{3}{4}$ " in diameter; outer skin orange-red when ripe, with yellowish sweet flesh; flesh clings to seed; fruit ripens in late summer. Fruit is prized highly for jellies and preserves.

RANGE Found generally scattered over the state in thickets, particularly along banks of streams; grows best on rich soil or in moist locations, however, will grow elsewhere. Its hardiness also fits it for rather severe locations.

WOOD Strong, hard, close-grained; dark brown with light-colored sapwood, tree has no special commercial value other than for ornamental purposes and fruit.

AMERICAN ELM

[*Ulmus americana*]

FORM Large tree; height 80 to 90'; diameter 2 to 4'; wide spreading branches with more or less drooping branchlets.

BARK Dark green; divided into irregular, flat-topped, thick ridges; generally firm, although on older trees it tends to come off in flakes.

LEAF Alternate; length 4 to 6"; rather thick, somewhat one-sided; doubly toothed on margin, generally rough above, smooth below; veins very pronounced and run in parallel lines from midrib to edge of leaf.



One-half natural size

FRUIT Winged, light green, oval, and wafer-like in appearance; seed portion in center surrounded entirely by wings; outer end of each wing deeply notched; seeds hang in clusters; ripen in spring; widely scattered by wind.

RANGE Fairly common throughout state; more abundant on rich bottom lands in southern half of Minnesota.

WOOD Light brown, heavy, hard, strong, tough, and difficult to split; used for saddle trees, boats and ships, furniture, barrel staves and hoops, and veneer for baskets and crates. Very susceptible to Dutch Elm disease.

ROCK ELM

[*Ulmus thomasii*]

FORM Height 80 to 100', diameter 2 to 4'; straight trunk; somewhat conical head with long graceful branches.

BARK About 1" thick, ash-gray; divided by deep fissures into broad, flat ridges.

LEAF Resemble those of the American Elm, but are more regular in shape, smaller, smoother on both sides, and more leathery.



Three-fourths natural size

FRUIT Length $\frac{1}{2}$ ", ovate, wafer-like; contains one seed; slightly notched at outer end; ripens in early summer.

RANGE Commonly found on bottom lands in eastern and south central parts of state, especially in Minnesota River Valley and continues as far northward as Clearwater County.

WOOD Most valuable of elms; close grained, compact and strong; light reddish-brown with thick, light colored sapwood; used for agricultural implements, sills, ties, wheel chairs, hockey sticks and furniture. Susceptible to Dutch Elm disease.

SLIPPERY ELM

[*Ulmus rubra*]

FORM Large tree; height 40 to 65', diameter 16 to 24"; main branches frequently extend at right angles to trunk from broad, open, flat-topped head.

BARK Frequently 1" thick; dark greenish-brown; broken by shallow fissures, into flat ridges. New twigs scurfy; winter buds covered by brown, silky hairs.

LEAF Alternate on stem; 4 to 6" in length; ovate, sharp-pointed, base not symmetrical, double toothed on edges; thick, dark green and rough on both sides; turns to yellowish color before falling.



One-half natural size

FRUIT Seed surrounded by thin, broad, greenish wing; diameter about $\frac{1}{2}$ "; ripens when leaves are about half grown.

RANGE Frequently found throughout southern half of state, especially in the Big Woods; less common northward.

WOOD Dark brown with light colored sapwood; close grained, tough, strong, heavy, hard, moderately durable; used for fence posts, ties, agricultural implements, ribs for small boats and other purposes; inner bark of trunk and branches used to some extent for medicinal purposes; fairly fast growing tree. Susceptible to Dutch Elm disease.

HACKBERRY

[*Celtis occidentalis*]

FORM Height 40 to 75', diameter 10" to 3'; limbs often crooked and angular; tree-head made up of slender pendant branches or short, bristly, stubby twigs when growing in forest; in the open, crown is generally symmetrical.

BARK Grayish-brown, much roughened with prominent, short, corky ridges.

LEAF Alternate on twig; length 2 to 4"; ovate and sharply toothed toward end of leaf; oblique at base; prominent veins; hairy on upper side.



One-half natural size

FRUIT Berry like drupe, $\frac{1}{4}$ to $\frac{1}{2}$ " in diameter; thin, purplish skin; sweet yellowish flesh; sometimes called sugar berry; ripens in September; frequently hangs on tree most of winter.

RANGE Found sparingly in southern part of state, and western part northward through the Red River Valley; most abundant on rich alluvial soil, but will grow on various types of soil from the poorest to the richest; never found in pure forest stands.

WOOD Heavy, rather soft, weak, and coarse grained; fairly durable in contact with soil; light yellow or greenish-brown with narrow white sapwood; used in manufacture of cheap furniture, fuel, and only occasionally for lumber. It is a good shade tree and is often used in ornamental planting in southern Minnesota.

BITTERNUT (SWAMP) HICKORY

[*Carya cordiformis*]

FORM Tall and slender with straight, green trunk, broadly pyramidal crown; height 40 to 75', diameter 10 to 25".

BARK Granite-gray, faintly tinged with yellow; broken into thin, plate-like scales; not as rough as most hickories; bark does not strip off as that of shag-bark hickory. Winter buds are compressed, scurfy, bright yellow, $\frac{1}{2}$ " or more in length and are often without scales.

LEAF Alternate; compound; length 6 to 10"; composed of 5 to 9 leaflets, with each leaflet relatively much smaller and more slender than that of other hickories.



One-fourth natural size

FRUIT Nut usually thin shelled, smooth, brittle; length about 1" with thin husk which usually splits only partly down side. Nut is broader than long; kernel is very bitter.

RANGE In rich, moist woods, common southward and extending through the Big Woods north to Mille Lacs and infrequently to the upper Mississippi and the tributaries of the St. Louis River .

WOOD Hard, strong, heavy, and reddish-brown, used for hoops, fuel and farm implements. Considered somewhat inferior to the other hickories.

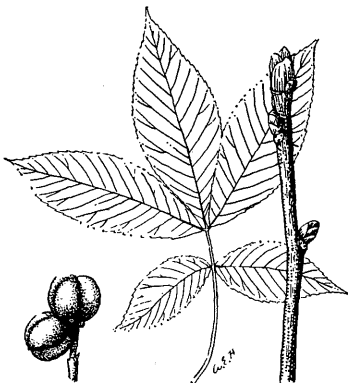
SHAGBARK HICKORY

[*Carya ovata*]

FORM A large tree; height 60 to 100', diameter 1 to 2'.

BARK Rougher than that of other hickories; shaggy, light grey, and separates into thick, vertical strips which are only slightly attached to tree. Terminal winter buds are egg-shaped; outer bud scales have narrow tips that drop off early in spring.

LEAF Alternate on stem; compound; length 8 to 15" and composed of five, rarely seven, ovate leaflets; twigs are smooth or clothed with short hairs.



One-fourth natural size

FRUIT A nut borne singly or in pairs, globular in shape, enclosed in husk which is thick and deeply grooved at seams and splits entirely into four parts. Nuts compressed or flattened and light-colored; known as "shagbarks" of commerce. Shell is thin and kernel sweet.

RANGE Confined entirely to southeastern corner of state, extending northward into Wabasha County; thrives on rich, damp soil and is found along streams and on most hillsides; only a small amount of hickory found in state.

WOOD Heavy, hard, tough and very strong; used largely in manufacture of agricultural implements, tool handles; makes very good fuel and is best of all woods for smoking meats.

IRONWOOD (HOP HORNBEAM)

[*Ostrya virginiana*]

FORM Height 20 to 40', diameter 5 to 12"; top generally rounded; foliage resembling that of birch; branches long and slender, drooping at ends. The tree receives its common names from the quality of its wood and hop-like fruit.

BARK About $\frac{1}{4}$ " thick; light grey-brown; finally divided into thin scales which are easily rubbed off.

LEAF Alternate; generally oblong with narrow tips, sharply toothed along margin—sometimes doubly toothed—length 2 to 4"; dark, dull, yellow-green above and light yellow-green below. It resembles somewhat the leaves of the elm.



One-half natural size

FRUIT In clusters resembling that of common hop vine; each sack contains one flattened, ribbed, hard nutlet about $\frac{1}{8}$ " long and $\frac{1}{16}$ " wide; blossoms in April and May; fruit ripens in July and August.

RANGE Found mostly in rich, not too dry, soil throughout state, except in northern Roseau and Lake of the Woods County in vicinity of Lake of the Woods; seldom found close to shores of Lake Superior.

WOOD Very strong, hard, heavy, durable, light brown, with thick, pale sapwood; used for fence posts, handles of tools, mallets and other small articles, and fuel.

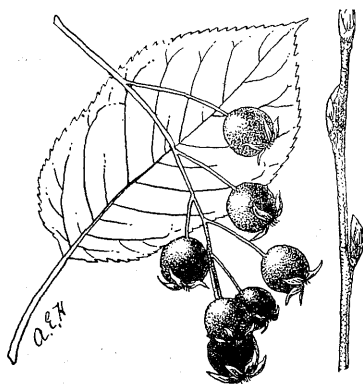
JUNE BERRY OR SERVICE BERRY

[*Amelanchier canadensis*]

FORM A small tree; height seldom over 20', diameter 4 to 8"; rather narrow rounded top.

BARK Thin, usually grey, smooth on branches and upper part of stem, breaking into shallow fissures on short trunk.

LEAF Alternate; slender-stocked, ovate, rounded, fine-toothed; length 2 to 4"; purplish-brown until nearly mature; light green covered with scattered, silky hairs when mature. White flowers appear in erect or drooping clusters in April or May before or with leaves.



Two-thirds natural size

FRUIT Sweet, edible, round, dark purple when ripe; diameter $\frac{1}{8}$ to $\frac{1}{2}$ "; ripens in July or August. Birds and people are very fond of this fruit.

RANGE Common throughout state, but best development is along banks of streams, shores of lakes, or open upland woods.

WOOD Heavy, hard, strong, close-grained, dark brown; has no commercial importance; desirable as ornamental tree and habitat for birds.

HONEY LOCUST

[*Gleditsia triacanthos*]

FORM Medium sized tree; height 30 to 50'—taller under very favorable conditions—may reach diameter of 16"; slender, spreading, somewhat pendulous branches form broad, open, rather flat top head.

BARK Dark grey or brown on old trees; divided into thin, tight scales; strong, brown, straight, sharp, shiny thorns appear on one-year-old wood and remain for many years.

LEAF Compound or feather-like with 18 to 28 leaflets or twice-pinnate consisting of 4 to 7 pairs of pinnate or secondary leaflets each 6 to 8" in length.



One-third natural size

FRUIT A pod; length 10 to 18", width $\frac{1}{2}$ to $1\frac{1}{2}$ "; flat, dark brown or black when ripe, containing seeds and yellow-whitish pulp; pod often becomes twisted as seeds ripen; seeds are hard and each is separated from the others by the pulp. Pods are eaten by many animals.

RANGE Occurs in scattered stands or as individual trees, especially in southern Minnesota in counties along the Root River Valley and Mississippi bottom lands; found in forest, but is more common in waste places beside roads and fields.

WOOD Reddish-brown, coarse-grained, hard, strong, not durable in contact with ground; however it is used for fence posts, cross ties, and fuel; has been planted to some extent for windbreaks and hedges in southern Minnesota; not a hardy tree; sprouts readily from the root.

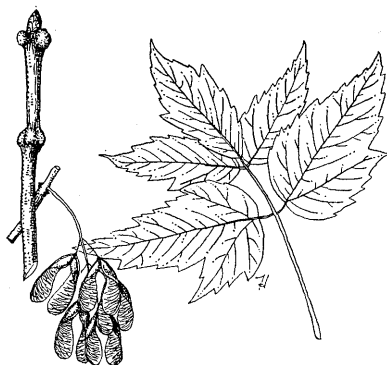
BOX ELDER

[*Acer Negundo*]

FORM Height 30 to 60' on favorable soils, diameter may reach 18"; rather bushy on unfavorable soils; limbs and branches fragile; tree somewhat subject to fungus disease and attack by insects.

BARK Smooth and green on young branches; thin grayish to light brown and deeply divided on old trees.

LEAF Length 5 to 8"; compound, usually with three leaflets (rarely 5 to 7) which are opposite on stem, smooth, lustrous green; length of leaflets 2 to 4", width 1 to 2".



One-half natural size

FRUIT Cluster, winged and similar to that of sugar maple, but smaller; ripens in late summer or early fall; often stays on trees all winter.

RANGE Common throughout the state; less abundant in northeastern part; grows naturally along streams and in cool ravines; a fairly rapid-growing tree, prolific in reproduction; however, many young trees are destroyed by grazing and cultivation; hardy tree for severe locations.

WOOD Creamy white, soft, light and close-grained; decays rapidly in contact with heat and moisture; used occasionally for fuel; has no general commercial value.

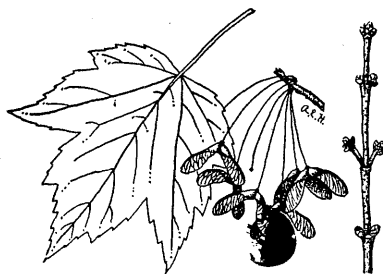
RED MAPLE

[*Acer rubrum*]

FORM Medium sized shade tree; height 40 to 65', diameter 10" to 2'.

BARK Smooth, light grey on young stems, dark grey and rough on old limbs and trunk; old bark divided by shallow, flaky ridges at surface, making tree look shaggy.

LEAF Opposite on stem; length 2 to 5"; has 3 to 5 pointed saw-toothed lobes separated by sharp angular openings; upper surface when mature, light green; lower surface whitish and partly covered with pale down; first of maple to turn in color in fall to brilliant shades of red, orange, and yellow. Winter buds are small, red, and somewhat rounded.



One-half natural size

FRUIT Consists of pairs of winged seeds $\frac{1}{2}$ to 1" in length on long, drooping stems; red, reddish-brown, or yellow; ripens in late spring or early summer.

RANGE Distributed throughout eastern half of state as far south as Houston County and west to a line running south from Mahanomen to Redwood Falls.

WOOD (Soft maple) Heavy, close-grained, rather weak, light-brown; used in the manufacture of cheap furniture, woodenware, and fuel; wood has little commercial value; the bark is sometimes used in dyeing. Shape and beautiful foliage colors make this an important ornamental tree.

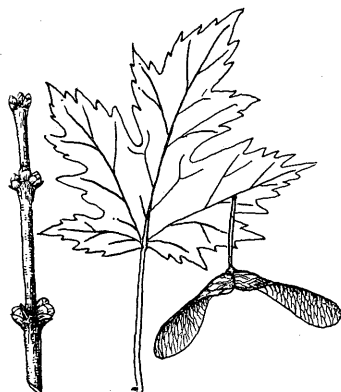
SOFT MAPLE

[*Acer saccharinum*]

FORM Height 100' or more, diameter 3' or more; trunk usually short, divided into a number of long ascending limbs which are again divided and their small branches droop, but turn upward at tips.

BARK On young branches smooth and varies in color from reddish to a yellowish-grey; on old branches dark grey and broken into long flakes or scales.

LEAF Opposite on stem; 3 to 5 lobes ending in long points with toothed edges and separated by deep, angular openings; pale green on upper surface and silvery underneath; buds rounded and red or reddish-brown.



One-third natural size

FRUIT A pair of winged seeds, wings 1 to 2" long on slender, flexible, thread-like stems about an inch in length.

RANGE Common in southern Minnesota; scattered northward to the upper Mississippi, Vermillion Lake, etc.

WOOD Light-brown, strong, fairly hard, even texture, rather brittle, easily worked; decays readily when exposed to weather or soil; occasionally used for flooring, furniture, and fuel; often mixed with red maple for commercial purposes; extensively planted as shade and ornamental tree.

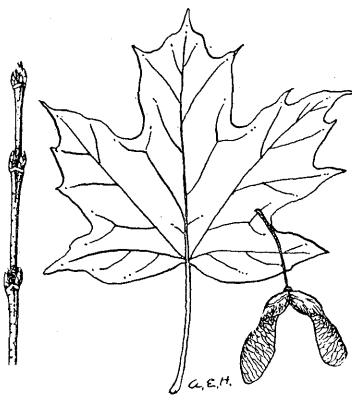
SUGAR MAPLE

[*Acer saccharum*]

FORM Height 80' or more, diameter about 2'; symmetrical; heavy crown affords dense shade.

BARK On young trees light grey to brown and somewhat smooth; on older trees grey to almost black with irregular plates or scales. Twigs are smooth and reddish-brown with sharp-pointed winter buds.

LEAF Width 3 to 5", opposite on stem; 3 to 5 pointed, smooth-edged lobes; division between lobes rounded; dark green on upper surface, lighter green below; in autumn turns to brilliant shades of dark red, scarlet, orange, or yellow.



One-third natural size

FRUIT Consists of two slightly connected divergent wings, each containing one seed; length about 1"; easily carried by the wind.

RANGE Grows in cool, rich locations in eastern half of state.

WOOD Light brown, hard, heavy, strong, close-grained; known commercially as hard or rock maple; used in the manufacture of flooring, furniture, shoe lasts and numerous small articles, maple syrup, maple sugar, and fuel; important for ornamental plantings.

BLACK OAK

[*Quercus velutina*]

FORM Height 35 to 75', diameter 9 to 30"; clear trunk for 20' or more on large trees; crown wide and irregular shaped.

BARK On young trees, smooth and dark brown; thick and black on older trees, with deep furrowed and rough broken ridges; inner bark bright yellow and bitter owing to tannic acid.

LEAF Alternate; length 5 to 10", width 3 to 8"; lobed half way to midrib with triangular, bristle-pointed lobes from 5 to 7"; crimson in spring, silvery when half-grown, brown in autumn; when mature, thick dark green and shiny on upper surface, and pale on lower; covered more or less with down; conspicuous rusty brown hairs in forks of veins.



One-half natural size

FRUIT Light brown nut matures the second season; length $\frac{1}{2}$ to 1"; shape somewhat round; one-half to three-fourths of nut enclosed in thin, dark-brown, scaly cup; kernel yellow and extremely bitter.

RANGE Found almost wholly in southeastern Minnesota on dry ridges.

WOOD Hard, heavy, strong, coarse-grained, not tough, checks easily; bright reddish-brown with thin outer edge of paler sapwood; principally used for fuel; tannin and yellow dye made from bark.

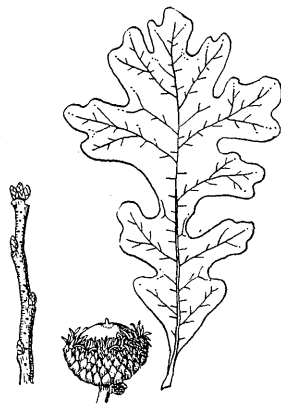
BURR OAK

[*Quercus macrocarpa*]

FORM Height 80' or more under favorable conditions, diameter 3 to 4 or more; under unfavorable conditions not over 15' in height with gnarled branches covered with corky tissues; in dense forests trunk straight with short branches; however, tree usually has broad top of heavy spreading branches and relatively short body; takes its name from fringe around cup of acorn.

BARK Thick, deeply furrowed on surface into irregular plate-like broken scales often slightly tinged with red.

LEAF Length 6 to 12", width 3 to 6"; crowded at ends of twigs; resembles common white oak; each species has pair of deep indentations near base and wavy notches on broad middle and upper portions.



One-half natural size

FRUIT Acorn set deeply or almost enclosed in fringed, burr-like cup ovoid in shape. The diameter may reach 1" or more; however, it varies widely in respect to size and degree to which the nut is enclosed in the mossy fringed cup. Seed is bitter.

RANGE One of the commonest trees in Minnesota, extending far out on the prairies in western part of state; usually grows singly in open stands and in fields; requires moist, well-drained soil; easily propagated, but grows slowly.

WOOD Heavy, hard, strong, tough, durable; rich brown; uses similar to those of white oak.

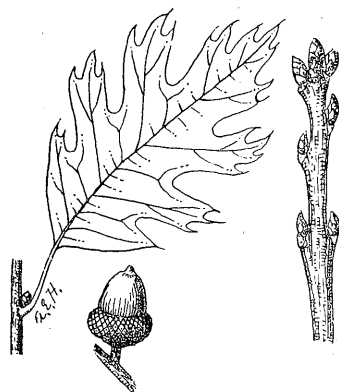
RED OAK

[*Quercus borealis*]

FORM Height 55 to 80'; diameter ranges from 2 to 3'; tall and straight with clear trunk and narrow crown.

BARK On young stems smooth, dark grey to dark brown; on older trees; thick and brown, broken by shallow fissures into regular, flat smooth-surfaced, vertical plates.

LEAF Alternate; length 5 to 9", width 4 to 6", broader toward the tip; divided into 7 to 9 lobes each extending one-half way to the mid-rib; each lobe somewhat coarsely toothed, bristle-tipped, firm; dull green above, paler below, often turning a brilliant red in fall. Buds thick and pointed at top.



One-third natural size

FRUIT Large, bitter acorn, maturing the second year; length $\frac{3}{4}$ to nearly 2"; blunt-topped, flat at base, with base enclosed in a very shallow, dark-brown cup.

RANGE Grows throughout Minnesota, but is most common and of best quality in rich soil of southern, central, and southeastern Minnesota.

WOOD Light, reddish brown; hard, strong and coarse; used for construction and finish of houses, cheap furniture, and fuel; grows more rapidly than most oaks; therefore, production is widely encouraged in southern portions of state for both timber and shade.

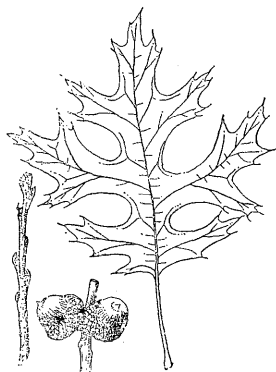
SCARLET OAK (JACK OAK)

[*Quercus coccinea*]

FORM Height 40 to 65'; diameter 2 to 3', occasionally larger; trunk tapers rapidly; branches droop at ends forming a narrow, open crown.

BARK Rather smooth, divided by shallow fissures into irregular ridges and plates; greyish to dark brown, inner bark reddish.

LEAF Alternate; somewhat oblong or oval; length 3 to 6", width $2\frac{1}{2}$ to 4"; usually seven lobed; lobes bristle-pointed and separated by rounded openings, extending at least $\frac{2}{3}$ of distance to midrib giving leaf a very deeply cut or lacy appearance; bright red and hairy in early spring, turning green later, and a bright scarlet in autumn.



One-half natural size

FRUIT Bitter acorn taking two years to mature; length $\frac{1}{2}$ to 1"; reddish-brown, often stripped and about half enclosed in cup.

RANGE Usually grows on dry ridges in southeastern part of state and as far north as Cass Lake, except on limestone soils; not abundant in Minnesota.

WOOD Heavy, hard, strong, coarse-grained and reddish-brown; used mostly for fuel and as an ornamental tree; easily grown from seed.

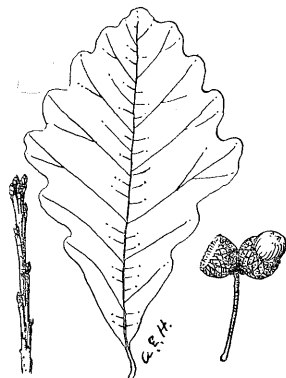
SWAMP WHITE OAK

[*Quercus bicolor*]

FORM Height may reach 65'; in general appearance much like that of true white oak.

BARK Thick, deeply and irregularly divided by fissures into broad ridges; greyish-brown; bark on twigs ragged and often peeling.

LEAF Length 5 to 6", width 2 to 4"; often crowded toward ends of twigs; broad at middle (pear-shaped) and wedge-shaped at base; wavy and indented along margin; dark green and shiny above, greyish and fuzzy beneath; turns brown in autumn.



One-third natural size

FRUIT Nut or acorn; length about 1", width $\frac{3}{8}$ ", enclosed for about one-third of its length in thick, narrow cup. Usually in pairs on slender dark brown stocks which are 2 to 4" long.

RANGE Common in river bottoms in extreme southeastern corner of state and in southern part of Minnesota River Valley; rarely grows as far north as St. Paul; requires moist soil, as name implies.

WOOD Light brown, hard, strong, tough and durable; commercially, its uses and properties are similar to white and burr oak.

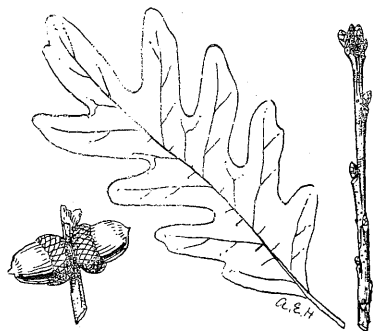
WHITE OAK

[*Quercus alba*]

FORM Height 60 to 100', diameter 2 to 3' and may become larger. Tall and naked in forest; short in the open, and crowned by broad, rounded top with limbs spreading irregularly; well-grown specimens are strikingly beautiful.

BARK Pale grey, scaly, but not deeply fissured; astringent and sometimes used in medicine and for tanning.

LEAF Alternate; length 5 to 9" and about half as broad; crowded toward ends of twigs, deeply divided into 5 to 9 finger-like lobes; young leaf soft, silvery-grey, and yellow or red while unfolding, later becoming light green above and much paler below; sometimes remains on tree most of winter.



One-third natural size

FRUIT A light brown acorn maturing the first year; length $\frac{3}{4}$ to 1", about $\frac{1}{4}$ enclosed in warty cap; germinates in a few weeks after ripening and falls to ground sending down a long, deep root before winter.

RANGE Abundant in southeastern Minnesota as far north as the Twin Cities, often forming woodlands almost to the exclusion of other trees; less abundant northward to Mille Lacs and northwestward to vicinity of St. Cloud; absent from northern and western parts of the state; grows on heavy, well-drained acid soil; slow growing; difficult to transplant after passing seedling state. A fine permanent tree that should be planted wherever the soil is suitable.

WOOD Light brown; hard, durable; one of our most useful woods for heavy construction; used for ships, railway ties, interior finish, furniture, and fuel.

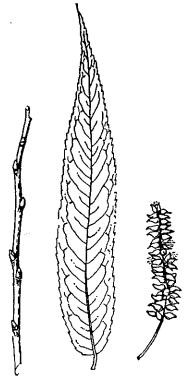
WILLOW

[*Salix species*]

FORM A large family of trees and shrubs, some varieties not commonly distinguished from each other; become large when growing along streams and other moist places; scraggly, dwarfed shrubs when growing in drier, less favorable sites. The black and peach-leaf willows are native, and the white and crack willows were originally foreign or exotic. On favorable sites, some trees are often 35 to 50' high, with a diameter of 6 to 24". The peach-leaf willow may attain a height of 60 to 70' and 2' in diameter. The black willow may be 30 to 40' high and again it may be only a shrub; usually short trunk, stout, spreading branches, and a broad, rather irregular open crown. The peach-leaf willow is somewhat greenish-yellow; twigs somewhat drooping.

BARK Dark brown to grey on large trees; thick, rough, furrowed and flaky.

LEAF White willow and crack willow leaves—whitish on lower surface; crack willow—recognized by large saw-toothed leaves and twigs that crack or break from branches very easily; white willow leaves—smaller, finely toothed, and often permanently silky; black willow—very narrow leaves, green on both sides; peach-leaf willow—long, pointed, lance-shaped leaves, whitish underneath, borne on long, slender, somewhat twisted stems.



One-half natural size

FRUIT Flowers in dense, elongated clusters known as "catkins"; flowers usually appear with leaves in spring. Willows may be propagated with "cuttings" more easily than with seeds. Seeds are minute, maturing in late spring or early summer.

RANGE Many varieties occur over a wide range in Minnesota and the United States from moist conditions to dry upland prairies. Many European and ornamental varieties have been introduced.

WOOD Light brown, soft, weak, flexible, coarse-grained; thin, whitish sapwood used for fuel, erosion control, and ornamental planting, wind-breaks, baseball bats, and charcoal; large, good trees with straight grain are used in the manufacture of artificial limbs.

Forestry Briefs

Thirty-one and a half million acres or 62% of the area of Minnesota was originally forests. Today we have two-thirds of that area in forest land including old and second growth timber and pulpwood and areas which are being restored to timber through natural reforestation and the planting of trees.

Proper Management of state forests insures that trees are harvested in a manner which will allow future crops of timber for a variety of uses.

When trees are crowded each one seeks to outgrow the other in order to secure more sunlight. That is why trees in a dense forest are usually straight and free of low limbs. Trees in the open are rounder with limbs extending in all direction.

State forestry personnel supervise the cutting of all state-owned timber. By enforcing sound forestry practices, ample timber is left to produce another crop and to insure sufficient game cover.

Trees help store rainwater and melted snow in underground reservoirs so that it will flow evenly into our lakes and streams and hold ground moisture for agriculture.

In a well managed forest you will find trees of all sizes varying from small seedlings to trees large enough to be sold for pulpwood or saw timber.

"Hardwood" does not necessarily mean the wood of the tree is hard. It is simply a term meaning broadleaf trees.

All characteristics of young plants differ from those of older trees, a fact which makes young trees difficult to identify.

Care and Planting of Trees

To obtain the best results, trees should be planted when they are dormant. This is evident by the closed buds on evergreens and by the leafless condition of hardwoods. Spring planting is preferred because growing conditions are better. Trees respond to care and soil conditions the same as farm crops. The better the soil, the better the growth. Soil preparation may be accomplished well in advance of the actual planting. If a tree is to be set in sandy soil, place enough heavy soil around the tree roots to increase the water-holding capacity of the sand. If the soil is heavy clay, mix sand with it to make it more porous to permit oxygen to percolate in to the soil with the rain.

Trees should be planted at the same depth at which they originally stood in the nursery. The tendency is to plant large trees. This is a mistake. The shock of transplanting is not as great to a small tree as it is to a larger tree. At the end of three or four years young seedlings will have outgrown the larger planting stock. Be sure to obtain trees that just recently have been dug from the nursery; the importance of the period between the time a tree is dug until it is again placed in the ground cannot be over-emphasized. Exposure of tree roots to hot sunlight and drying winds for three to five minutes may be fatal. If the bark is at all shriveled, it is an indication of excessive drying out of the tree and possible cell collapse.

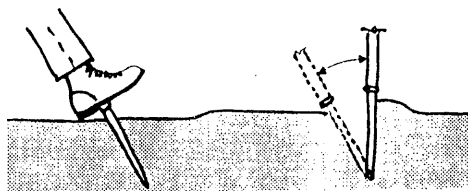
The period between the time of digging the trees in the nursery and the time of planting is a most critical one. Anything that can be accomplished to shorten this period will increase the chances of survival of the trees.

Mature trees should be carefully pruned when planted to bring about a balance between the crown and the roots. Conifers should never be pruned by an amateur. Sod should be cleared at least two feet from the trunk and the area mulched or loosened frequently after planting to conserve moisture so necessary for good growth.

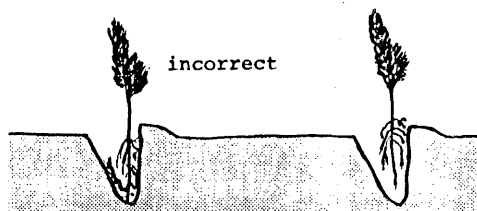
Spring planting of trees will give the best results, with early fall the second choice. Spring planting may be started as soon as frost is out of the ground and may continue as long as the trees to be planted have not started new growth. Fall planting should not be started until the nursery stock has stopped growing and has become practically dormant. Small trees, six to twelve inches in size, will recover from the shock of transplanting more readily than larger trees.

Trees respond to cultivation. Weeds or grasses retard tree growth.

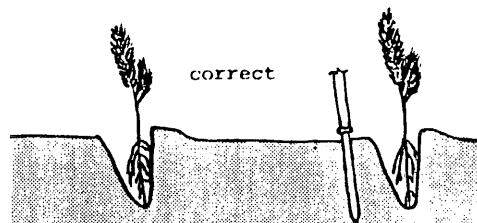
Tree Planting Steps (Bar or small shovel)



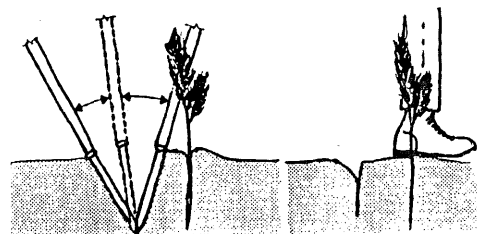
1. Plunge planting bar or shovel into ground at angle shown and push inward to upright position.



2. Insert tree at same depth it grew in nursery. If planted too deep, roots will become curled which will prevent proper growth. If planted too shallow, some roots will be exposed to the air and cause death to the seedling.



3. On correctly placed seedling, plunge bar or shovel into ground about 3-4 inches from hole.



4. Work bar forward and pull back. Using your feet, tamp and fill in last hole and any remaining loose soil around tree roots to prevent air pockets.

Record Trees **(3-1-1986)**

Tree Species	Circum.	Hgt.	Crm. Sprd.	Total Pts.	Location	County
Ash, Black	111"	101'	52'	225	Lot 5 30-69-26	Koochiching
Ash, Green	152.5"	73'	63'	241	NE SE 12-31-25	Anoka
Ash, Mountain	56"	30	15'	82	Brainerd, MN 56401	Crow Wing
Ash, White	125.6"	85'2"	30'	218	Oscar Gabriel's yard Brownsdale, MN	Mower
Aspen, Bigtooth	78"	102'	53'	193	SW NE 13-112-15	Goodhue
Aspen, Trembling	100.5"	112'	37.9'	221.9	SE 1/4 SW 1/4 31-67-24	Koochiching
Balm of Gilead	110"	91'	34.5'	209.6	NE SE 30-155-27	Koochiching
Basswood	182.5"	81'	43'	274	SW 1/4 NW 1/4 7-31-19	Washington
Beech, Blue	39.6"	24'	32.4'	71.7	SW 1/4 NE 1/4 10-105-13	Isanti
Birch, Paper	108.5"	67'	80'	195	Osmond Parson's yard Near Grand Portage, MN	Cook
Birch, River (Red)		No Contender or Records				
Birch, Yellow	139"	63'	50'	214 1/2	SE of NE 35-52-23	Aitkin
Boxelder	155"	60'	82'	235 1/4	SW 1/4 21-126-48	Traverse
Butternut	111"	61'	72'	190	W 1/2 SW 1/4 22-111-26	LeSueur
Cedar, Red	75"	48'	30'	130	NW NW 13-119-26	Lesueur
Cedar, White	132.0"	82'	20'	219	Lot 5 12-66-25	Koochiching
Cherry, Black	104"	95'	65'	215	SW SW 4-109-31	Brown
Cherry, Choke	32"	39'	25'	77	Michael Nitchals yard Wilmar, MN	Kandiyohi
Cherry, Pin	22.3"	45'	18.5'	71.9	SE NE 27-129-37	Douglas
Coffee Tree, Kentucky	124"	57'	60'	196	28-28-23	Hennepin
Cottonwood, Eastern	365"	88'	81'	473	NE SE 21-109-19	Rice
Elm, American	233.5"	104'	81'	357.75	SE 1/4 SE 1/4 11-143-30	Cass
Elm, rock	171.75"	65'	45'	248	W 1/2 of SW 1/4 22-111-26	LeSueur
Elm Slippery	192"	60'	70'	270	SE 1/4 NE 1/4 28-110-17	Goodhue
Fir, Balsam	68"	94'	24'	168	NE SW 30-164-37	Roseau
Hickory, Shagbank	114"	58'	53'	185	SE SE 2-102-5	Houston
Hackberry	183"	70'	60'	268	Medalia	Watsonwan
Hickory, Bitternut	67"	95'	44'	173	SW NE 27-118-23	Hennepin
Hemlock, Eastern	63.25"	68"	20'	136	NE NE 14-43-25	Mille Lacs
Juneberry	27"	26'	20'		NENESWNE 19-42-25W	Mille Lacs
Locust, Honey	82"	79'	45'	172	Hampton	Dakota
Maple Red		Champion Cut For Firewood - No Contender				
Ironwood	76"	52'	29'	135	Maplewood State Park	Ottertail
Maple, Silver	242"	79'	99'	346	605 So. Cedar Street Owatonna, MN	Steele
Maple, Sugar	125"	89'	80'	234	NW 1/4 NE 1/4 18-142-27	Cass
Red Mulberry	23.9"	36'	41.6'	70.3	SW 1/4 32-107-13	Olmsted
Oak, Black	149"	55'	45'	215	Taylor Falls	Chisago
Oak, Bur	162"	88'	83'	271	27-107-7 Winona	Winona
Oak, Pin	180"	66'	54'8"	259.7	SW NE 15-31-20	Washington
Oak, Red	159"	85'	75'	263	NW 1/4 NE 1/4 24-105-13	Olmsted
Oak, Scarlet	93"	58'	15.93'	166.9	SW 1/4 32-107-13	Olmsted
Oak, White	169.8"	68'	67'	255	NW NE 22-113-25	Scott
*Pine, Jack	110"	50'	58'	175	26-161-46 Boundary of Lake Bronson State park	Kittson
Pine, Norway	116"	120'	36.4'	245	SE 1/4 of SW 1/4 of SWSW 15-143-36W -lt. State Park	Clearwater
Pine, White	173"	112'	48.75'	297.7	16-143-36	Clearwater
*Spruce, Black	60"	83'	20'	148	Itasca State Park NW 1/4 SE 1/4 17-63-1E	Cook
*Spruce, White	116.2"	128'	24.75'	250	North of Grand Marais NE 1/4 SE 1/4 36-67-25	Koochiching
Tamarack	103"	75'	39.5'	188	NW SE 36-49-18	Carlton
Black Walnut	159"	89'	110"	276	SE SW 8-108-14	Olmsted
Willow, Black	284"	80'	70'	382	Como Pk. Golf Course St. Paul	Ramsey
Willow, Peachleaf	126"	55'	78'	201	NW-NW 36-110-34	Redwood

*World Champions

DO YOU KNOW THAT—

The Minnesota Department of Natural Resources was empowered by the 1947 Legislature to furnish trees for planting upon privately owned as well as public lands. This change in the nursery laws permits the distribution of coniferous and deciduous trees for use in all phases of conservation work. Trees are distributed at approximately cost of planting upon private lands, while public lands may receive trees free of charge from our nurseries.

Two-thirds of the area of Minnesota is forest land?

The timber industry of Minnesota is of more benefit to the rank and file of the people of the state today than was the harvesting of the cream of the crop in early logging days?

The auxiliary forest law provides that certain tracts of land may be dedicated to forestry purposes with a small fixed tax per acre paid each year upon establishment and the main tax collected when the timber crop is cut?

Pulpwood can be grown in 20 years and saw logs in 40 years?

By enforcing sound forestry practices ample timber is left to produce another crop and to insure sufficient game cover?

Forest camp grounds in our state forests serve to concentrate campers in small developed areas thereby reducing the risk of fires?

The Division of Forestry provides technical assistance to private woodland owners in the proper management of their woodlots.

The Division of Forestry operated tree nurseries are the Badoura Nursery located near Akeley and the General Andrews Nursery at Willow River. Tours are provided for groups.

In 1985, a total of 31,870,000 trees or about 40,400 acres of land were planted on all types of land ownership in Minnesota.

Aspen is the key tree species for the management of deer and ruffed grouse.

Trees For Schools

School Forests - Outdoor Laboratories

At a time when the demand for new school facilities is at an all-time high, there is irony in the fact that hundreds of "natural schools" are being overlooked by Minnesota educators.

With this in mind, the Division of Forestry of the Minnesota Department of Natural Resources is contacting school officials throughout the state in a concerted effort to establish more school forests.

Since the beginning of the 19th century, trees have played a major role in the well-being of Minnesota citizens.

Trees have added great beauty to Minnesota. They provide food and cover for wildlife, protect the soil from erosion, furnish lumber and wood products and support a vast recreational resource.

There are now 70 well-distributed school forests in Minnesota comprising some 5,723 acres of land and water areas. These school forests are managed for wildlife, recreation, water conservation, timber production and, of course, as outdoor classrooms.

The father of the school forest concept is Dr. C. V. Hobson, professor of geography at Bemidji State College. Dr. Hobson began working for the school forest law more than two decades ago and was eventually rewarded for his efforts when the School Forest Law was passed in 1949. Under the law, a school district, university, college, junior college or other public educational institution may establish and maintain school forests.

The first step in establishing such a site is for the school board to appoint a "school forest committee". Members should include individuals representing the board, faculty, students and, of course, a state forester.

The proposed site should be accessible by an all-weather road and within close proximity of the school. It should have a variety of natural features, recreational potential, various kinds of trees, plants and shrubs, wildlife habitat, open areas, etc. A very important feature is water: pond, stream or lake.

The Division of Forestry provides in-depth information on the forest tract, which includes a management plan for all existing resources, and provides continuing assistance and expertise on development of the site. Trees are provided by the State at no cost to the schools, but *only for planting on school lands*.

After a tentative site is selected and plan prepared, the school must then make application to the Commissioner of Natural Resources for final approval.

State foresters will also provide some assistance to schools in the organization and presentation of various educational activities. Such topics may include forest development, protection and management, tree and plant identification, wildlife identification, wildlife habitat improvement, soil studies, recreational development, watershed protection and studies of aquatic life and natural areas.

The school forest is a living laboratory. Here, the student can touch, listen, smell and even taste the things around him. Certainly, this makes for a much better learning experience than reading textbooks or listening to lectures.

Food and Cover Plantings for Wildlife

The most necessary work to be done in Minnesota for better conservation of upland game is permanent food and cover planting.

During the summer months game birds consume berries, succulent vegetation and insects. In winter months they resort to buds, twigs, seeds, acorns, nuts and dried fruits. Obviously, the wider the variety of trees and shrubs in an area the greater the source of food supply for game birds.

Food-bearing trees, valued by wildlife include: oak, walnut, bluebeech, ironwood, basswood, poplar, birch, mountain ash, locust, willow, cherry trees and the like.

Vines, including bittersweet, grape, Virginia creeper and smilax are of great value.

Shrubs are most important of all. For example, the sand cherry grows readily on poor soil and bears fruit close to the ground easily reached by game. Shrubs that might well be planted for the benefit of wildlife include: wolfberry, hazelnut, dogwood, bladdernut, hop, rose, buttonball, native holly, sumac, thornapple, prickly ash, and such berries as cranberry, dewberry, raspberry, snowberry, elderberry and blueberry.

Small evergreens are important for cover, shielding game from winged predators and from wet and drifting snows.

Triangular planting is recommended since this plan permits sunlight to strike each side of the stand throughout every season of the year.

Sportsmen of Minnesota are giving increasing attention to permanent food and cover planting for wildlife. With the continuance of such programs the game life will be able to hold its own and increase in numbers. Managing wildlife means managing the habitat. An important part of habitat management is a well planned planting program.

How To Prevent Forest Fires

The Forest fire hazard in Minnesota is extremely high compared to other states. This is due to our geographic location, the soil and timber types, the topography and general climate, all of which combine to create conditions under which fires start easily and spread rapidly. Particularly this is true in the vast timber regions of the state.

Adequate fire protection is the basis of all conservation. If we are to preserve our forests—which means if we are to continue to enjoy hunting, fishing, camping, and the beauties of the out-of-doors as well as the economic advantages of woods industries—we must all do our part in preventing forest fires.

It seems a simple thing to ask a man to be careful in handling fire in the woods. Scarcely anyone would think of throwing a burning match or cigarette on the rug in the home of a friend; neither would one stand idly by and see such an act without making an effort to extinguish the blaze and reprimand the offender for his carelessness. One should be as careful in the woods as in the home.

Actually, fire prevention requires only a little good judgement. Campfires should be built on mineral soil with all leaves and duff cleared back for a 5-foot radius. All fires should be attended while they are burning. Before leaving the fire, enough water should be poured on it to kill it completely. It is a good policy to feel the ashes with the hand to make sure they are dead. Never bury a campfire with duff or litter since this only holds the fire, allows it to smoulder in readiness to start up later. Never throw away burning cigarettes and cigar stubs, pipe ashes or matches in the woods. Motorist, camper, hunter, fisherman, berrypicker, farmer or anyone who frequents the forest areas of Minnesota should *first* be careful of himself, then *second* preach fire prevention to his neighbor. He should extinguish all small fires with which he comes in contact, and report all the large ones to the nearest forest officer.

You Violate A Forest Law If You—

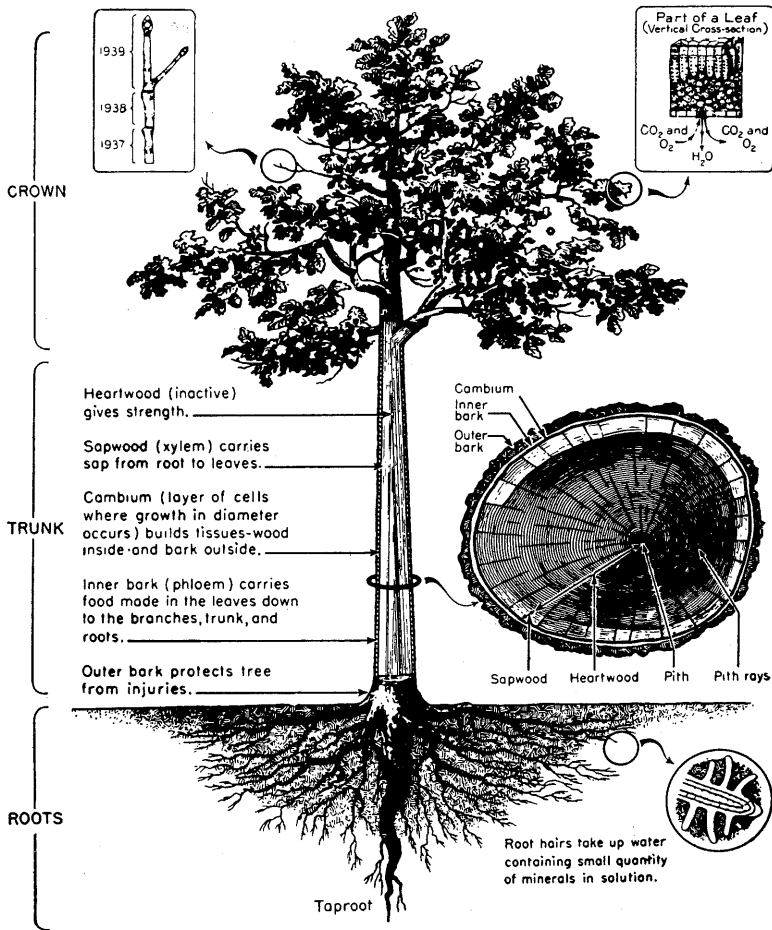
1. Leave a fire unquenched near forest, brush or prairie land.
2. Throw or drop a burning match, lighted cigarette or cigar or pipe ashes.
3. Drive over forest lands without a muffler on the exhaust pipe of your car or tractor.
4. Burn without a permit.
5. Fail to report a fire.
6. Allow a fire to spread.
7. Cut state timber without valid permit.
8. Fail to clear the ground of combustible matter within a radius of five feet from a campfire.
9. Fail to report timber cutting.

The destruction, injury, or defacing of any sign, guide post, building or property of any kind belonging to the state is unlawful.

HOW A TREE GROWS

Trees increase each year in height and spread of branches by adding on a new growth of twigs

Light and heat are required by the leaves in the preparation of food obtained from the air and soil. The leaves give off moisture by transpiration.



The buds, root tips, and cambium layer are the growing parts. The tree takes in oxygen over its entire surface through breathing pores on leaves, twigs, branches, trunk, and roots.

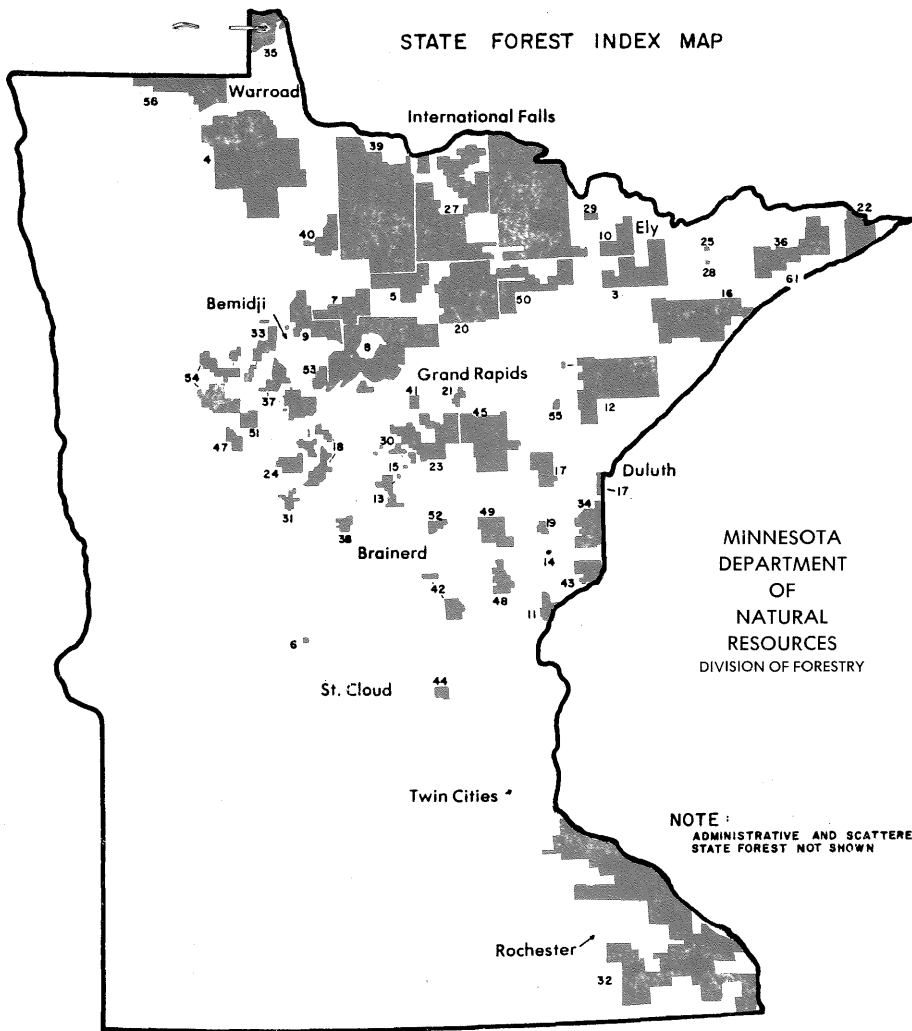
Courtesy U. S. Forest Service

75 YEARS OF
SERVICE



1911-1986
DIVISION OF FORESTRY

STATE FOREST INDEX MAP



1. Badoura
2. Battleground
3. Bear Island
4. Beltrami
5. Big Fork
6. Birch Lakes
7. Blackduck
8. Bowstring
9. Buena Vista
10. Burntside
11. Chengwatana
12. Cloquet Valley
13. Crow Wing
14. D.A.R.

15. Emily
16. Finland
17. Fond Du Lac
18. Foothills
19. General C.C. Andrews
20. George Washington
21. Golden Anniversary
22. Grand Portage
23. Hill River
24. Huntersville
25. Insula Lake
26. Kabetogama
27. Koochiching
28. Lake Isabella

29. Lake Jeanette
30. Land O'Lakes
31. Lyons
32. R.J. Dorer Mem. Hdw.
33. Mississippi Headwaters
34. Nemadji
35. Northwest Angle
36. Pat Bayle
37. Paul Bunyan
38. Pillsbury
39. Pine Island
40. Red Lake
41. Remer
42. Rum River

43. St. Croix
44. Sand Dunes
45. Savanna
46. Smokey Bear
47. Smokey Hills
48. Snake River
49. Solana
50. Sturgeon River
51. Two Inlets
52. Wealthwood
53. Welsh Lake
54. White Earth
55. Whiteface
56. Lost River