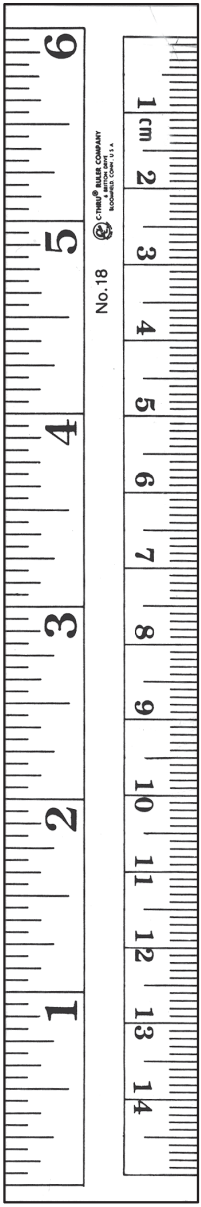
KNOW YOUR Trees

J. A. COPE and FRED E. WINCH, JR.
REVISED by E. A. COPE



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AUTHORS' ACKNOWLEDGMENTS

The descriptive text (List of 50 Trees) covering the tree characters is largely a compilation rather than the result of original investigations. *Trees in Winter*, by Albert Francis Blakeslee and Chester Deacon Jarvis, was freely consulted in the matter of bark characters; *Trees of New York State*, by H. P. Brown, furnished valuable suggestions in the way of uses; and *Common Trees of New York,* by J. S. Illick, was followed closely in many particulars.

The cuts for the bulletin were furnished through the courtesy of W. R. Mattoon of the Forest Service.

Common and scientific names follow the *Check List of Forest Trees of the United States*, by E. L. Little Jr., Agricultural Handbook No. 541 of the United States Department of Agriculture (1979).

ACKNOWLEDGMENTS FOR 2002 REVISION

Sherry Vance managed all the details of this revision with countless suggestions for improvements. Her dedicated and careful work is greatly appreciated; the revision would not have been completed without her.

Special thanks also go to Robert Dirig for his suggestions and comments and to Jennifer Svitko for image work.

INTRODUCTION

My grandfather, Joshua A. Cope, in his capacity as extension forester at Cornell University, published in 1927 a brief guide to the identification of common trees in the northeastern United States. It was revised twice under the original title *Fifty Common Trees of New York, Forestry for 4-H Club Boys and Girls*, with Gardiner Bump as coauthor. This popular bulletin was used and continues to be used by foresters, farmers, and nearly every budding agriculturist and scientist in New York State.

In 1948, Fred E. Winch Jr. joined J. A. Cope to revise the bulletin substantially into the familiar *Know Your Trees* booklet of today. After five printings, the bulletin was printed once again in 1998 with minor changes by Peter Smallidge of the Department of Natural Resources (formerly the Forestry Department). Sherry Vance and I revised this work last year and placed it on the World Wide Web. Now with minor adjustments, we have produced this printed copy of the web version. The improvements include updated nomenclature, major revisions to the keys, and a new short glossary of terms used in the keys. The core of the original guide—the ecological and geographical distributions, uses, descriptions, and illustrations of 50 species—remains largely intact, with only minor editing.

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Bailey Hortorium
Cornell University
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FOREST APPRECIATION

The greater portion of the land area of New York State is better adapted to growing trees than to any other use, making forestry a vital part of the state's agricultural programs. Work in forestry appeals to old and young alike because of its outdoor nature and the possibility of combining activities in nature study, conservation, camping, and woodcraft.

To develop an appreciation of the forest is to understand its importance to agriculture and industry, to acquire a thorough knowledge of the trees in the forest, and to know the relative values of these trees in producing crops of timber. The first step is to become familiar with the various kinds of trees, the dominant members of the forest community. Ideally the trees should be studied in the forest where conditions are most natural to their growth, but they can also be learned in the yard or parks. Each tree species has certain characteristics that distinguish it from other kinds of trees. In addition to the external characteristics, the wood of each tree species varies. In growing timber for a specific use or in choosing trees to be cut for a certain purpose, one must know what kinds of wood are required to best serve that purpose.

This bulletin has been prepared to help acquaint the reader with the forest trees in the neighborhood. Perhaps one hundred species of trees are native to the state, but some of them such as alder, pussy willow, and witch hazel are so small that they are scarcely more than shrubs in New York. Other species such as the willow oak and the sweet gum on Long Island, though of forest-tree size, are confined to very limited localities. No attempt has been made, therefore, to provide an all-inclusive list of trees in this publication. Instead, 50 common tree species have been selected. These species are generally distributed throughout the state and are likely to be found in the average woodlot.

With this bulletin as a guide, it should be possible for current and future landowners to become familiar with most forest trees in their neighborhood. As future woodland owners, this basic knowledge of forest trees will help them to better manage our state's private forests.

USING THIS BULLETIN

The best place to study trees, of course, is in the woods where the characters (bark, twigs, buds, leaves, and fruit) are most easily observed.

Pay considerable attention to the bark. It is always present, summer and winter, and even in the log you can tell the tree if you know the bark. Try to remember the points mentioned in the text, such as color and texture, whether smooth or furrowed, scaly or firm.

Twigs are interesting to study in the wintertime. They vary in color; some are brittle, whereas others are tough and pliable; some are slender, whereas others are coarse. A taste of the twig often helps to identify the tree, for example, the **cherries** or the **black birch**.

The buds go along with the twigs as part of the winter study of the trees. Frequently, it may be important to recognize a forest seedling in the early spring before the leaves are out, especially if you want to transplant the seedling. This also would be true if it were a valuable forest tree, such as a **sugar maple**, and it was desirable to clear around it to allow it more light. In such instances the buds are a helpful means of identification.

Study the winter twigs carefully. It is obvious that **hickories** have a terminal bud, as do the **maples** and the **ashes**. But be ready for **basswood**, **elms**, and **birches**. They may appear, at first glance, as if a terminal bud is present, but on closer examination it is evident that there is a leaf scar on the end of the twig and the bud is a little below and to one side. The color of buds is also helpful. For example, by a glance at the color of the bud you can tell at once whether the tree is a **soft** (red) or a **hard (sugar) maple.** The opposite or alternate arrangement of the leaves can also be applied to buds and helps you to distinguish some trees (page 9).

Leaves are the easiest to observe. Compare the leaves and look for the following points: Are they simple (one leaf to a stem) or compound? Are they arranged opposite on the twig or alternate? How is the margin of the leaf shaped? In some leaves the margin is entire (no breaks at all). In some, the margin is like the fine teeth of a carpenter's saw (*serrate* or saw-like) or it is doubly serrate. In others, the margin is more deeply notched, as in the **chestnut**, the **beech**, and the **bigtooth aspen.** In some **oaks** and others where the margin is very deeply cut, the leaves are described as *lobed*, and the hollows between are called *clefts* (page 8).

Trees have flowers as do most green plants, but the blooms are usually high up in treetops where you cannot easily see them to aid in identification. In addition, they are present only for a very brief season. In the interest of using available space for easily observed, more available characteristics, the flowers are not described here.

The fruit of the forest trees is an important item in the appreciation of the forest, not so much as a means of identifying the tree but for finding and recognizing the seeds from which the different forest trees develop. Fruit, it should be remembered, does not necessarily mean fleshy, edible products, such as apples or cherries, but includes any seed and the covering in which it develops, whether cone, pod, samara (winged seed), burr, or husk. Note in the species descriptions the time of year the seed matures.

The uses of each tree and where it occurs naturally are also mentioned briefly in the descriptions. This should round out the knowledge and appreciation of the trees of the forest.

Learning to know the names of the trees is like playing a detective game. With certain "clues," such as color of the bark, size and branching of the twig, shape of the bud, and form of the leaf, the names of the trees can be tracked down.

SUMMER AND WINTER KEYS

As a further help in identifying these 50 trees in both summer and winter conditions, keys have been created.

A key is a scheme for quickly and easily identifying any unknown object under observation. It is based usually on the most striking similarities and differences shown by the various parts of the object. For trees, the leaves (Plate 1) have been selected for the summer key and the twigs and buds (Plate 2) for the winter key because they present the most easily available parts of the tree for showing differences and similarities.

Two alternative characteristics are presented. These are the only choices possible. The two opposing characteristics are preceded in the key by the same number (1 and 1 or 2 and 2) and are set at the same distance from the left-hand margin of the page. Often, 1 and 1 are subdivided further into other groups on the basis of other differences; in every case, however, the characteristics are opposed. If you find the desired characteristic in the first group (1), there is no need to look in the second group, and study need be confined to the subdivisions of the first group only.

The following example shows how to use the summer key.

A branch with leaves from the tree in question is examined. The leaves are broad, so this falls under the second step 1 (note that each number is in pairs—two 1s, two 2s and so on—and that each step of a pair contains different characteristics or details). The twigs and leaves are in pairs (opposite), so this leads to the choices under the first step 11 (if the twigs were not opposite, second step 11, or alternate leaf arrangement would be chosen). The leaves are compound (several leaflets on one stem), so the next clue is in the first step 12. The leaflets have no stems, but sit tight on the main stem or petiole of the leaf (second step 13). The tree is **black ash**.

Another branch, observed in late fall, has no leaves and must be traced through the second step 1 of the winter key. If the twigs have no pitchy taste or wart-like branches found under the second step 2, but the buds and twigs are alternate, the second step 3 must be selected. If there is no terminal bud, it is necessary to turn to the first step 8. Close observation at the side or lateral bud may reveal many bud scales, which would lead to the second step 9. The buds are large and the twigs lack thorns, prompting the choice of the second step 11. At step 13, the choice is the first alternate because the buds are "lopsided" and greenish red. At last the trail has ended with the name of the tree, which is **basswood**.

The most important distinguishing characteristics of trees in the summer are the form, arrangement, shape, and margin of the leaves. In winter, the size, color, and arrangement of the twigs are important as are the position (terminal or not), size, shape, and color of the bud. Be sure you understand these illustrations thoroughly and learn the distinctions before you attempt to use the key or go into the field.

Once you have discovered the name of the tree in the key, you can find its description by going to the page with the corresponding name and number. For example, there is a complete description of **(6) Basswood** on page 21. If the description of the tree given

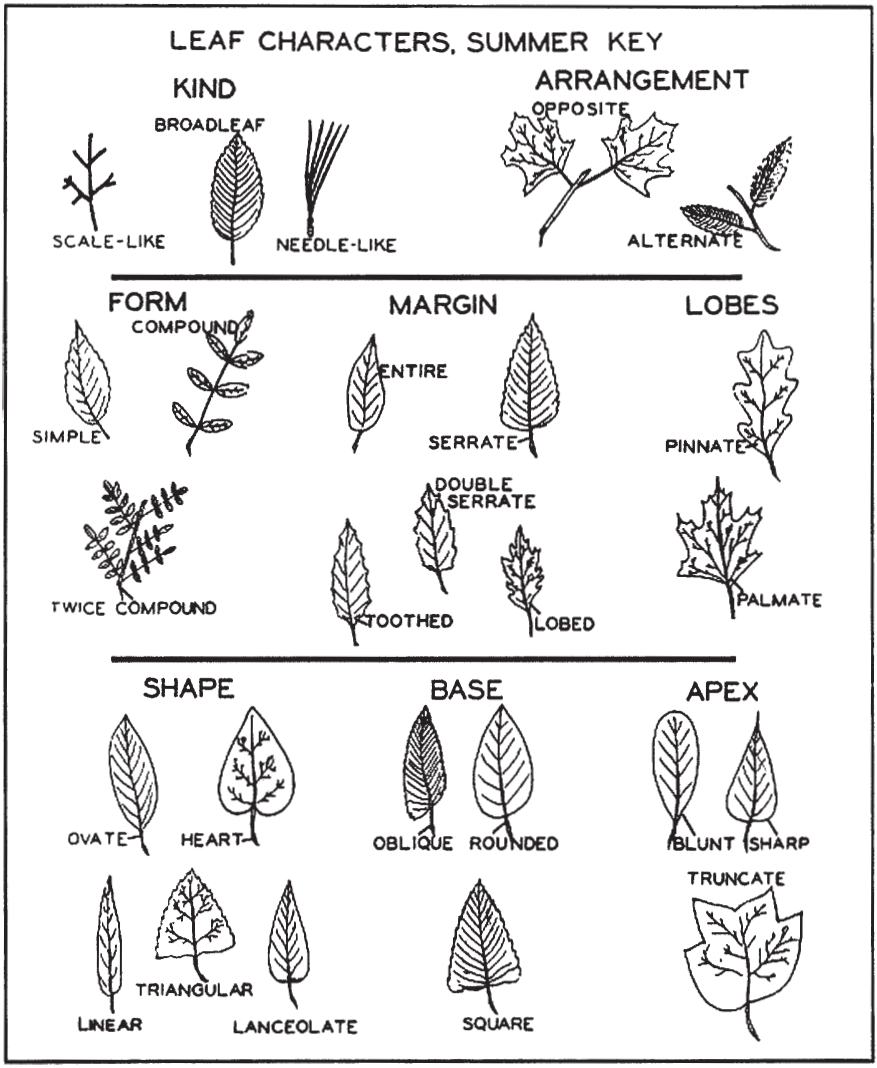

LEAF CHARACTERS, SUMMER KEY
KIND
BROADLEAF
SCALE-LIKE
NEEDLE-LIKE
ARRANGEMENT
OPPOSITE
ALTERNATE
FORM
COMPOUND
SIMPLE
TWICE COMPOUND
MARGIN
ENTIRE
SERRATE
DOUBLE SERRATE
TOOTHED
LOBED
LOBES
PINNATE
PALMATE
SHAPE
OVATE
HEART
TRIANGULAR
LINEAR
LANCEOLATE
BASE
OBLIQUE
ROUNDED
SQUARE
APEX
BLUNT
SHARP
TRUNCATE

Plate 1

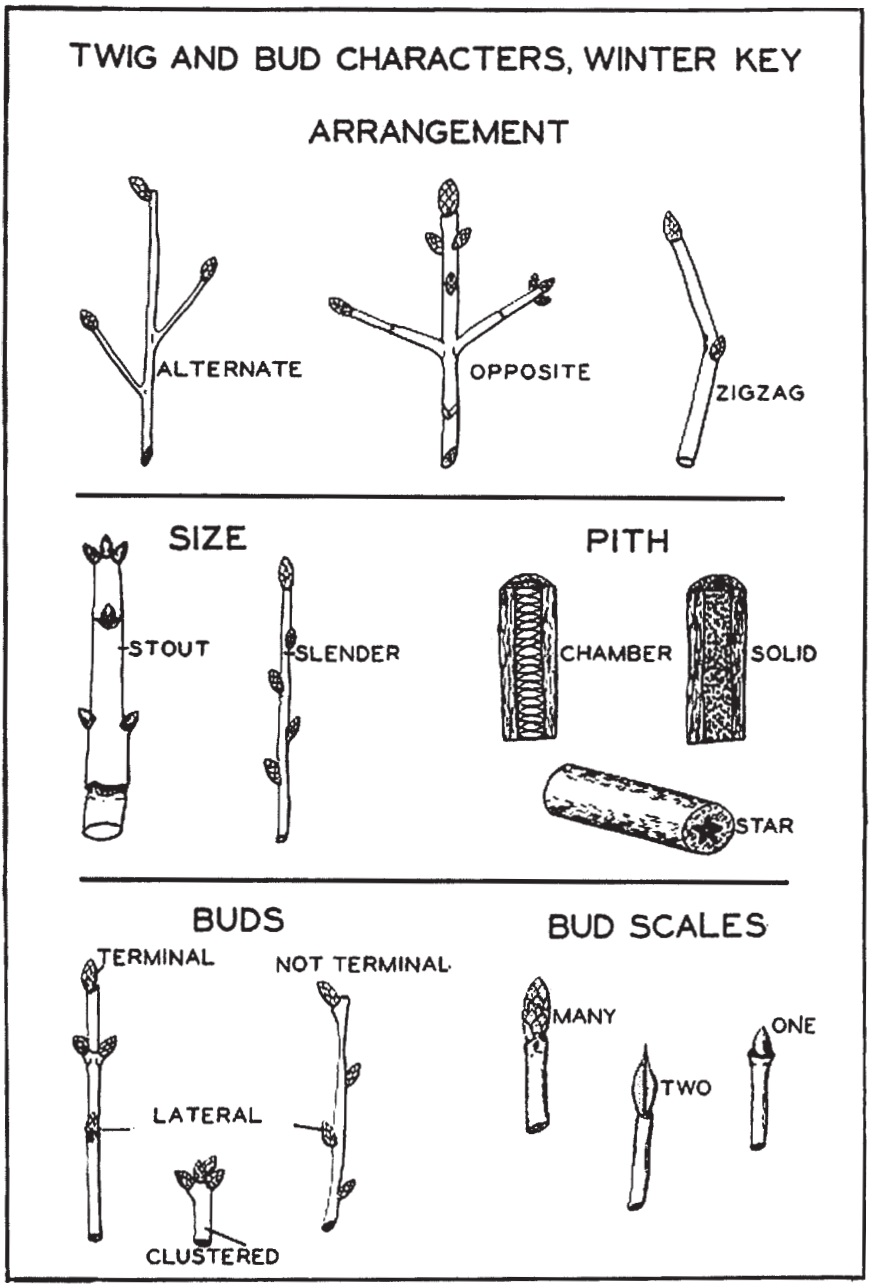

TWIG AND BUD CHARACTERS, WINTER KEY
ARRANGEMENT
ALTERNATE
OPPOSITE
ZIGZAG
SIZE
STOUT
SLENDER
PITH
CHAMBER
SOLID
STAR
BUDS
TERMINAL
NOT TERMINAL
LATERAL
CLUSTERED
BUD SCALES
MANY
TWO
ONE

Plate 2

does not match the twig, trace the specimen again through the key. A small clue may lead the trail in a new direction and finally to the right tree.

A Nontechnical Summer Key to the 50 Trees

1. Leaves needle-like, awl-shaped, or scale-like; usually evergreen (conifers).
  2. Leaves awl-shaped or scale-like.
    3. Foliage both scale-like and awl-shaped; awl-shaped foliage particularly on young growth. (42) **Eastern Redcedar**
    3. Foliage scale-like, spray distinctly flattened and fan-like. (1) **Arborvitae**
  2. Leaves needle-like.
    4. Needles borne in clusters.
      5. Needles in clusters of 2–5 (pines).
        6. Needles in clusters of 5. (39) **Eastern White Pine**
        6. Needles in clusters of 2 or 3.
          7. Needles in clusters of 3. (40) **Pitch Pine**
          7. Needles in clusters of 2. (41) **Red Pine**
      5. Needles many (more than 5) in clusters on short spur-like lateral branches; not persistent through winter; on vigorous shoots needles borne singly. (28) **American Larch**
    4. Needles borne singly.
      8. Needles with short stems (petioles), flat, and blunt-pointed. (22) **Eastern Hemlock**
      8. Needles without stems (petioles).
        9. Needles flat, blunt-pointed. (20) **Balsam Fir**
        9. Needles 4-sided in cross section, sharp-pointed (spruces).
          10. Needles dark, yellowish green. (45) **Red Spruce**
          10. Needles bluish green or silvery white. (46) **White Spruce**
1. Leaves broad, not needle-like or scale-like; not persistent through winter.
  11. Arrangement of leaves opposite.
    12. Leaves compound (ashes).
      13. Leaflet with stems. (3) **White Ash**
      13. Leaflet without stems. (2) **Black Ash**
    12. Leaves simple (maples).
      14. Leaves pale green on lower surface, clefts rounded, lobes entire or with less prominent teeth. (33) **Sugar Maple**
      14. Leaves white, silver or pale on lower surface, clefts sharp-angled, margins with many small teeth.
        15. Leaves white or pale on lower surface, usually 3-lobed, clefts shallow and sharp-angled. (31) **Red Maple**
        15. Leaves silvery white on lower surface, usually 5-lobed, clefts deep (particularly the middle two). (32) **Silver Maple**

11. Arrangement of leaves alternate.
    16. Leaves compound.
        17. Leaves doubly compound, leaflets usually even in number. (30) **Honey-Locust**
        17. Leaves only once compound.
            18. Margins of leaflets entire; leaflets almost oval in shape. (29) **Black Locust**
            18. Margins of leaflets toothed.
                19. Leaflets 11–23 (walnuts).
                20. Base of leaf stem with a "mustache" of hairs where it joins the twig. (12) **Butternut**
                20. Base of leaf stem lacking a "mustache" of hairs where it joins the twig. (49) **Black Walnut**
                19. Leaflets 5–11 (hickories).
                21. Leaflets 7–11, long narrow, sharp-pointed. (23) **Bitternut Hickory**
                21. Leaflets 5–7.
                22. Upper 3 leaflets larger. (25) **Shagbark Hickory**
                22. Leaflets of nearly the same size. (24) **Pignut Hickory**
    16. Leaves simple.
        23. Leaves lobed.
            24. Leaves palmately lobed.
                25. Margins of the 3–5 shallow lobes sparsely toothed. (47) **Sycamore**
                25. Margins of lobes entire.
                26. Leaves 2–3 lobed or entire, with aromatic odor when crushed; leaf or lobe apex pointed. (43) **Sassafras**
                26. Leaves 3–4 lobed, the apex truncate. (48) **Tulip Tree**
            24. Leaves pinnately lobed.
                27. Twigs with thorns. (21) **Hawthorn**
                27. Twigs lacking thorns.
                28. Lobes rounded, not bristle-tipped.
                29. Clefts halfway to midrib; leaves dark green above, paler below. (38) **White Oak**
                29. Clefts very shallow, the leaf appearing coarsely toothed. (35) **Chestnut Oak**
                28. Lobes with bristle tips.
                30. Leaves dull green on upper side, hairy along midrib below. (34) **Black Oak**
                30. Leaves shiny, smooth on upper surface.
                31. Clefts extending halfway to midrib. (36) **Northern Red Oak**
                31. Clefts extending over halfway to midrib. (37) **Scarlet Oak**

23. Leaves not lobed or deeply cut.
    32. Leaves entire.
        33. Leaves ovate or egg-shaped (when not lobed), with aromatic odor when crushed. (43) **Sassafras**
        33. Leaves ovate (egg-shaped), lacking aromatic odor. (17) **Cucumber Tree**
    32. Leaves toothed.
        34. Leaves doubly serrate.
            35. Leaves triangular, with long tip. (9) **Gray Birch**
            35. Leaves ovate (egg-shaped).
                36. Base of leaves oblique (elms).
                37. Leaf surface very rough above and below. (19) **Slippery Elm**
                37. Leaf surface less rough, particularly above. (18) **American Elm**
                36. Base of leaves even, regular, not oblique.
                38. Twigs with wintergreen flavor.
                39. Bark on trunk black, not peeling off in papery layers. (8) **Black Birch**
                39. Bark on trunk yellowish, peeling off in papery layers. (11) **Yellow Birch**
                38. Twigs lacking wintergreen flavor.
                40. Bark scaly, scales easily rubbed off. (26) **American Hophornbeam**
                40. Bark smooth.
                41. Bark light gray, firm. (27) **American Hornbeam**
                41. Bark white, in papery layers. (10) **Paper Birch**
        34. Leaves coarsely toothed or serrate, not doubly serrate.
            42. Leaves linear or lanceolate.
                43. Leaves linear. (50) **Black Willow**
                43. Leaves lanceolate.
                44. Leaves coarsely toothed. (15) **American Chestnut**
                44. Leaves finely toothed, serrate.
                45. Leaves broadly lanceolate, with tufts of reddish hairs along midrib on lower surface. (13) **Black Cherry**
                45. Leaves narrowly lanceolate, lacking hairs along midrib. (14) **Pin Cherry**
            42. Leaves triangular, heart-shaped or ovate.
                46. Leaves heart-shaped or triangular.
                47. Leaves heart-shaped, nearly orbicular, the teeth many and small. (6) **Basswood**
                47. Leaves triangular, the teeth few and large.
                48. Leaves large, blunt-tipped. (4) **Bigtooth Aspen**
                48. Leaves small.
                49. Leaf base rounded. (5) **Quaking Aspen**
                49. Leaf base square. (16) **Eastern Cottonwood**

46. Leaves ovate.
    50. Leaves coarsely toothed, nearly lobed.
        51. Leaves with teeth rounded, not bristle-tipped. (35) **Chestnut Oak**
        51. Leaves with teeth sharp, bristle-tipped. (7) **American Beech**
    50. Leaves serrate.
        52. Leaves finely serrate; twigs lacking thorns. (44) **Shadbush**
        52. Leaves coarsely serrate; twigs with thorns. (21) **Hawthorn**

A Nontechnical Winter Key to the 50 Trees

1. Leaves persistent and green throughout the winter, needle-shaped, awl-shaped, or scaly (see summer key).
1. Leaves deciduous, not remaining on trees throughout winter.
    2. Twigs with lateral wart-like branches, slender, glossy brown, resinous. (28) **American Larch**
    2. Twigs lacking lateral wart-like branches.
        3. Arrangement of branches, leaf scars, and buds opposite.
            4. Twig stout, gray to brown in color; buds brown or black (ashes).
                5. Buds rusty brown; bark dark brown, corky in texture with diamond-shaped fissures. (3) **White Ash**
                5. Buds usually black; bark ashy gray without ridges, scaling off easily. (2) **Black Ash**
            4. Twigs slender, red to brown; buds red or brown (maples).
                6. Buds narrow, sharp-pointed, brown. (33) **Sugar Maple**
                6. Buds broad, blunt-pointed, reddish color, often clustered.
                7. Twigs lacking odor when broken. (31) **Red Maple**
                7. Fresh twigs with rank odor when broken. (32) **Silver Maple**
        3. Arrangement of branches, leaf scars, and buds alternate.
            8. Terminal bud absent (first lateral bud may seem terminal but is not).
                9. Bud with only one scale, forming cap over bud.
                10. Twigs stout, zigzagging, brown. (47) **Sycamore**
                10. Twigs slender, not zigzagging, green to brown. (50) **Black Willow**
                9. Bud with many scales.
                11. Buds very small, inconspicuous; twigs with spines or thorns.
                12. Twigs usually bearing spines in pairs at nodes; twigs slender, reddish to greenish brown, brittle. (29) **Black Locust**
                12. Twigs usually bearing branched thorns; twigs stout, zigzagging, smooth, glossy. (30) **Honey-Locust**
                11. Buds medium to large, conspicuous; twigs lacking spines or thorns.
                13. Buds lopsided or bulging on one side at the base, green to red; twigs zigzagging. (6) **Basswood**
                13. Buds symmetrical, lacking bulge at base, brown; twigs not zigzagging.
                14. Twigs stout, pith star-shaped. (15) **American Chestnut**
                14. Twigs slender, pith circular.

15. Bark of trunk scaly.
    16. Scales easily removed when rubbed.
        (26) **American Hophornbeam**
    16. Scales difficult to remove when rubbed (elms).
        17. Buds dark, chestnut-brown, with long rusty hairs at tip; twigs light gray, hairy, mucilaginous when chewed; inner bark of trunk with alternating white and dark layers.
            (19) **Slippery Elm**
        17. Buds light red-brown, mostly lacking hairs; twigs red-brown, smooth; inner bark uniform.
            (18) **American Elm**
15. Bark of trunk smooth.
    18. Bark dark bluish gray. (27) **American Hornbeam**
    18. Bark chalky white.
        19. Bark peeling off in thin papery layers, lacking triangular patches.
            (10) **Paper Birch**
        19. Bark not peeling off in papery layers, with distinct triangular patch below each branch where it joins the stem. (9) **Gray Birch**

8. Terminal bud present either surrounded by a cluster of buds or borne singly.
    20. Terminal bud surrounded by a cluster of buds at end of twig; fruit an acorn (oaks).
        21. Buds oval or rounded.
            22. Buds oval, rather blunt at top, somewhat woolly, especially upper half, red-brown; twigs light red. (37) **Scarlet Oak**
            22. Buds rounded, blunt-pointed, red-brown. (38) **White Oak**
        21. Buds sharp-pointed.
            23. Buds covered with dense yellow-gray wool. (34) **Black Oak**
            23. Buds smooth.
                24. Buds light yellow-brown; twigs light orange.
                (35) **Chestnut Oak**
                24. Buds red-brown; twigs red-brown to green-brown.
                (36) **Northern Red Oak**
    20. Terminal bud borne singly. (In the birches only the short spur-like lateral twigs have terminal buds, not the long shoots.)
        25. Buds with 3–4 dark brown smooth outer scales spreading away from bud; bark peeling in long strips. (25) **Shagbark Hickory**
        25. Buds variously colored with various number of scales; flattened against twig or spreading; bark usually tight, not peeling.
            26. Buds covered with close-fitting woolly scales.
                27. Twigs with chambered pith (walnuts).
                28. Pith cream colored; twigs lacking "mustache" of hair beneath bud.
                (49) **Black Walnut**
                28. Pith chocolate-colored; twigs with "mustache" of hair beneath bud.
                (12) **Butternut**

27. Twigs solid, lacking chambered pith.
    29. Twigs brittle, brown, smooth; buds dark brown.
        (17) **Cucumber Tree**
    29. Twigs tough, yellow to red-brown color, hairy toward end; buds yellow.
        (23) **Bitternut Hickory**
26. Bud scales smooth, not woolly.
    30. Bud with 2 scales united into a cap; twigs brittle with aromatic odor.
        (48) **Tulip Tree**
    30. Bud with more than two scales.
        31. Twigs with wintergreen flavor or aroma; terminal bud on spur-like lateral branches only.
            32. Twigs with strong wintergreen flavor, red-brown; bark black, smooth, lacking papery fringes. (8) **Black Birch**
            32. Twigs with slight wintergreen flavor, yellow-brown; bark yellow-gray with papery fringes. (11) **Yellow Birch**
        31. Twigs lacking wintergreen flavor and aroma; terminal bud on lateral branches.
            33. Lateral buds usually same size as terminal bud.
                34. Buds usually round, red to chestnut-brown; thorns on twigs.
                (21) **Hawthorn**
                34. Buds long, sharp-pointed.
                35. Buds tinged with purple; the lateral buds flattened against twig. (44) **Shadbush**
                35. Buds red-brown, the lateral buds bending away from twig.
                (7) **American Beech**
            33. Lateral buds smaller than terminal bud.
                36. Bark and twigs spicy aromatic. (43) **Sassafras**
                36. Bark and twigs odorless or with bitter almond odor, not spicy aromatic.
                37. Twigs and bark with bitter almond odor and taste, slender (cherries).
                38. Twigs red-brown; bark on trunks becoming scaly.
                (13) **Black Cherry**
                38. Twigs bright red; bark remaining smooth; buds very small.
                (14) **Pin Cherry**
                37. Twigs lacking bitter almond odor or taste.
                39. Twigs very tough; lacking rank odor.
                (24) **Pignut Hickory**
                39. Twigs brittle, with rather rank odor when broken (poplars).
                40. Lateral buds flattened against twig; twigs slender, red-brown. (5) **Quaking Aspen**
                40. Lateral buds spreading away from twig; twigs red brown or yellow.
                41. Buds large, shiny, often slightly resinous; twigs bright yellow. (16) **Eastern Cottonwood**
                41. Buds medium, dull, dusty looking; twigs red-brown.
                (4) **Bigtooth Aspen**

1. ARBORVITAE

northern white-cedar

Thuja occidentalis Linnaeus

Arborvitae (meaning "tree of life") is a medium-sized, slow-growing forest tree that is rather common in the northeastern part of the state, less frequent in the central and western parts. Dense arborvitae swamps are common in Madison County and northward and eastward. In the Adirondack region the tree also occurs frequently outside the swamps.

ARBORVITAE
Natural size

The wood is light, soft, brittle, coarse-grained, light yellowish brown in color, and durable in contact with the soil. It is used extensively for fence posts and small poles.

Bark: ashy gray to light reddish brown, separating in long, narrow, flat, shreddy strips, often more or less spirally twisted.

Twigs: decidedly flattened, arranged in fan-shaped clusters, and not to be confused with leaves that cover previous season's growth; with death of leaves in second season, twigs become reddish brown in color and shiny.

Winter buds: extremely minute, almost covered by scale-like leaves.

Leaves: scale-like, yellowish green in color, aromatic when crushed, borne in closely overlapping pairs; on leaves of leading shoots, glandular dot conspicuous in center of leaf.

Fruit: Oblong, erect cone, 1/2 inch long, reddish brown in color, persists through winter. Cone scales: 6 to 12, open to base at maturity in autumn of first season. Seeds: 1/8 inch long, in pairs, nearly surrounded by broad wings.

Distinguishing features: cones with few scales, dot in center of flat, scale-like leaf.

1a. **White-cedar** (*Chamaecyparis thyoides* (L.) *BSP*), a coastal plain tree, closely resembles the **arborvitae**.

2. BLACK ASH

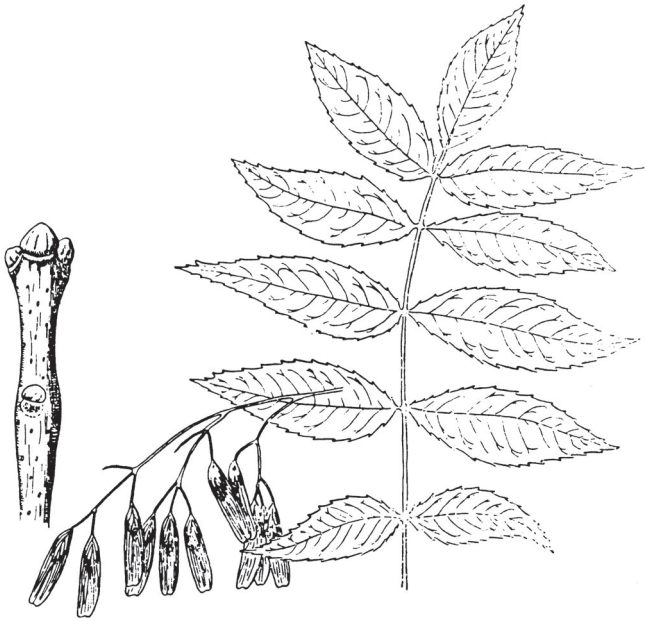
Fraxinus nigra Marshall

Black ash is most commonly found in deep swamps. Occasionally, though, it is found mixed with other hardwoods in moist, cold forests. Its wood is heavy, rather soft, tough, and coarse-grained and is used for hoops, chair bottoms, and baskets.

Bark: ashy gray in color, somewhat furrowed, forming thin, somewhat smooth scales that are easily rubbed off.

Twigs: very stout, similar to those of white ash but not shiny and usually lighter gray in color; leaf scar typically oval.

Winter buds: resembling those of white ash though usually decidedly black; terminal bud as long or longer than broad, sharp-pointed; lateral buds much smaller, blunt-pointed; last pair of lateral buds at some distance from terminal bud instead of nearly on a level, as in white ash.



BLACK ASH
Twig, natural size, leaf and fruit, one-third natural size

Leaves: opposite, compound, 10 to 14 inches long, with 7 to 11 leaflets similar to those of white ash but much longer in proportion to their width, without stems.

Fruit: winged seed, with wing broader and distinctly notched at tip; in clusters, ripening in early autumn.

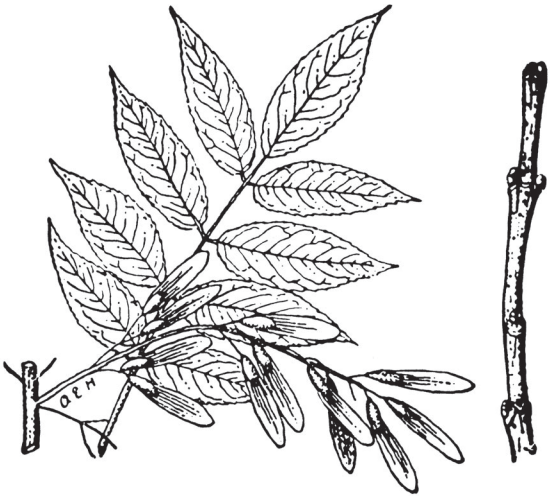
Distinguishing features: found in moist locations; leaflets without stems; black buds; notched tip in seed.

2a. **Red ash** (*Fraxinus pennsylvanica* Marshall) grows in wet spots but has the same uses as white ash. Red ash may be identified by slightly serrate leaflets, silky below, on a woolly leaf-stem, and by the woolly twigs marked by semicircular leaf scars.

3. WHITE ASH

Fraxinus americana Linnaeus

White ash is a valuable and rapid-growing tree in the woodlots of New York State. It is common throughout New York and is found up to an altitude of 2,000 feet in the Adirondacks. It prefers to grow in rich, moist woods and is common on abandoned agricultural lands. The wood is heavy, hard, strong, close-grained, and tough. Large quantities of white ash are used for agricultural implements, tool handles, oars, furniture, and sporting goods. In some locations, especially open edges and roadsides, branch dieback and tree mortality are common.



WHITE ASH
Leaf and fruit, one-third natural size; twig, one-half natural size

Bark: dark grayish brown in color, deeply furrowed with narrow, flat-topped, firm ridges that are somewhat scaly on older trunks; ridges in some instances tend to run together, enclosing diamond-shaped fissures.

Twigs: very stout, smooth, shining, grayish brown in color, brittle, flattened at leaf bases (nodes); leaf scar notched.

Winter buds: plump, blunt-pointed, dark brown or nearly black in color; terminal bud 1/5 inch long, larger than lateral buds; last pair of lateral buds almost on level with terminal bud.

Leaves: opposite, compound, 8 to 15 inches long, with 5 to 9 leaflets; leaflets sharp-pointed, 3 to 5 inches long, with slightly and sparsely serrate margins; borne on short stems; by this characteristic may be distinguished from black ash leaflets, which are stemless.

Fruit: winged seed, 1 to 2 inches long, broadly paddle-shaped with wing occupying position of blade; borne in long, open, drooping clusters, ripening in September, often not dropping off until early winter.

Distinguishing features: thick twigs; compound leaves with stemmed leaflets; brown buds; ashy-gray, older bark.

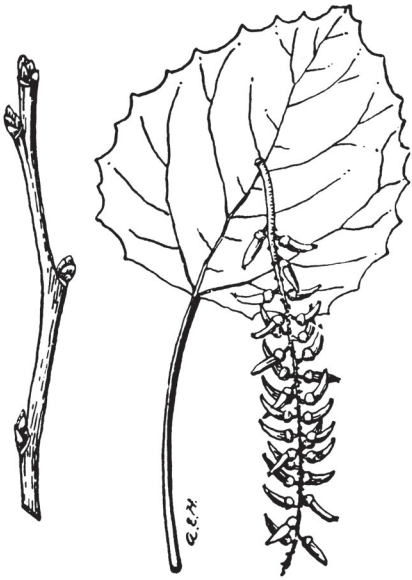
3a. **Green ash** (*Fraxinus pennsylvanica* Marshall var. *lanceolata* (Burkhausen) Sargent) is frequently confused with white ash. The former has narrower leaflets with more noticeable serrations that extend farther toward the base, the leaflets are greener beneath, the terminal bud is more pointed, and the leaf scar is not notched. It has the same uses as white ash.

4. BIGTOOTH ASPEN

large-toothed aspen

Populus grandidentata Michaux

Bigtooth aspen is a medium-sized, rapid-growing, short-lived tree that develops best on deep moist soils but is more common on dry, upland, sandy, or stony sites, where it rapidly covers slashes and burns. Here it provides habitat for wildlife that use early successional cover. The wood is similar to that of the quaking aspen and is used for excelsior, pulp, woodenware, crates, and boxes.



BIGTOOTH ASPEN
Leaf, one-half natural size; twig, one-half natural size; fruit, one-half natural size

Bark: resembles that of quaking aspen, though small branches are of a more pronounced yellow color. Lower trunk generally more deeply furrowed than that of quaking aspen.

Twigs: stout, round, reddish or yellowish brown in color in early winter, often pale and downy as contrasted with those of quaking aspen, which are shiny.

Winter buds: usually larger than those of quaking aspen, terminal bud present; lateral buds generally bending away from twig, dull, dusty-looking, light chestnut brown in color.

Leaves: alternate, simple, 3 to 6 inches long, roughly triangular with square base, blunt apex, coarsely toothed margin in direct contrast to finely serrate margin of quaking aspen.

Fruit: very similar to that of quaking aspen (p. 20). Seeds: spread by wind.

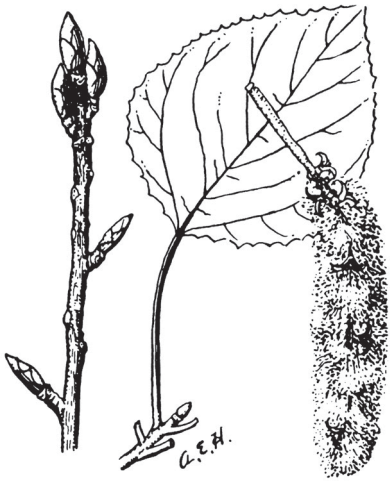
Distinguishing features: coarse teeth on leaf with square base; twigs downy.

5. QUAKING ASPEN

trembling aspen, popple, small-toothed aspen

Populus tremuloides Michaux

Quaking aspen is the most widely distributed tree in North America. It is common in most sections of New York State but is infrequent on the pine barrens of Long Island. It is a short-lived tree, but it has value as a cover tree in slashes, burns, and in old fields where it quickly establishes itself. The wood is soft, weak, not durable, light brown to white in color, and is used primarily in the manufacture of mechanical pulp, excelsior, crates, and boxes.



QUAKING ASPEN
Twig, natural size; leaf, one-half natural size; pistillate flower, natural size

Bark: on young trunks and branches yellowish green to whitish in color, on old trunks roughened with broad, flat, blackish ridges.

Twigs: smooth, shiny, reddish brown in color.

Winter buds: terminal bud 1/4 inch long, narrow, conical, often incurved, sharp-pointed, shiny, reddish brown in color; lateral buds smaller.

Leaves: alternate, simple, 1 1/2 to 3 inches in width, somewhat triangular in shape with rounded base, serrate margin, and flattened stem that allows slightest breeze to flutter leaves, from which this tree is named.

Fruit: scattered cluster of small, curved capsules, maturing in early spring. Seeds: within capsule, each with tuft of hairs, carried long distances by wind when capsule breaks open. (This explains why aspens spring up so quickly after fires on burned-over areas and in abandoned fields.)

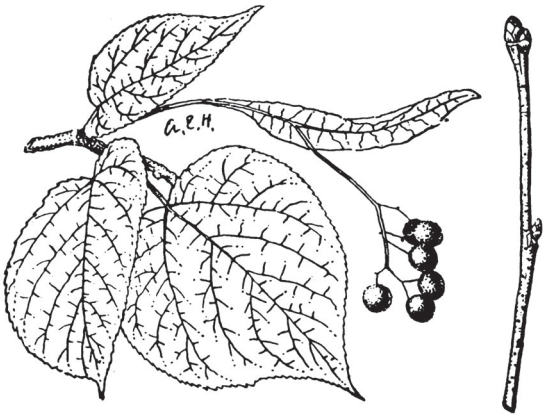
Distinguishing features: tiny teeth on margin of leaves; shiny twigs.

6. BASSWOOD

linden, whitewood

Tilia americana (Ventenat) Linnaeus

Basswood is a moderately common forest tree in New York State. It grows rapidly, and its lumber has a wide range of uses. It does best in the deep, moist soils of the woodlot sections but is generally distributed except in the high Adirondacks and Catskills. The wood is soft, even-grained, light, and fairly strong and is used for boxes, crates, inexpensive furniture, woodenware, and paper pulp; it is often used as a substitute for white pine.



BASSWOOD
Leaf and fruit, one-third natural size; twig, one half natural size

Bark: on young stems smooth, dark gray in color; on older trunks firm but easily cut, becoming furrowed into rather narrow, flat-topped ridges; on still older trunks furrows deeper, ridges more rounding and broader, surface scaly.

Twigs: rather slender, smooth, bright red or greenish in color or covered by gray skin, zigzag, slightly mucilaginous when chewed; fibers of bark on twigs very tough, may be used as rope.

Winter buds: terminal bud absent; lateral buds large, smooth, sometimes lopsided or humped, bending away from twigs, dark red or sometimes green in color.

Leaves: simple, alternate, heart-shaped, 5 to 10 inches long, sharp-pointed, coarsely serrate along margin; leaf base asymmetrical.

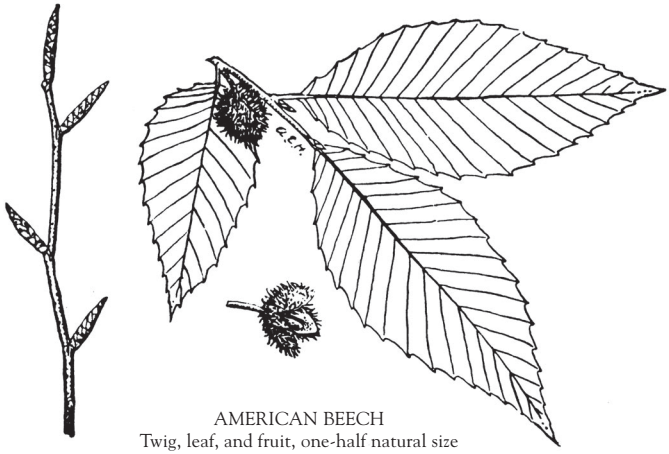
Fruit: round, woody nut, roughly pea-sized, borne singly or in clusters, with common stalk, attached midway to leafy bract, ripening in late fall but sometimes remaining on tree into winter. Bract acts as sail to scatter seed.

Distinguishing features: often found in clumps; usually large, heart-shaped leaf; hump-backed bud on zigzag twig; fruit a pea-like nut attached to a slender "parachute."

7. AMERICAN BEECH

Fagus grandifolia Ehrhart

American beech has perhaps the widest distribution of any forest tree in the state and for that reason is one of the best known. In the Adirondacks and Catskills, it forms an important part of the hardwood forest but is almost equally common throughout the rest of the state. Although the tree is of large and stately size, its wood is less valuable than that of many of its associates in the woodlot section of the state, with the result that it has been left standing. Because of its heavy shade, American beech has also excluded more valuable trees. Beech bark disease, which is a fungus that grows on injuries caused by a scale insect, infects and kills large numbers of beech trees in the Northeast. The wood is heavy, hard, strong, tough, and close-grained and is excellent as fuelwood. It also is used largely in the acid-wood industry, for baskets and crates, and to some extent for furniture.



AMERICAN BEECH
Twig, leaf, and fruit, one-half natural size

Bark: smooth, close, steel gray in color, easily recognized by this character.

Twigs: slender, zigzag, smooth, shining reddish brown in color, becoming gray on older twigs.

Winter buds: terminal bud present, slender, 3/4 inch long, sharp-pointed, covered with light brown scales; lateral buds not much smaller than terminal bud.

Leaves: simple, alternate, 3 to 4 inches long, ovate, coarsely toothed on margin, bristle tipped; at maturity very thin, dull green in color above, pale green beneath.

Fruit: stalked burr, covered with soft, curving prickles, containing a nut. Burrs: usually in pairs, open up to let nuts fall in early autumn, remain on tree into winter. Nut: triangular, pale brown in color, shining, with sweet, edible kernel.

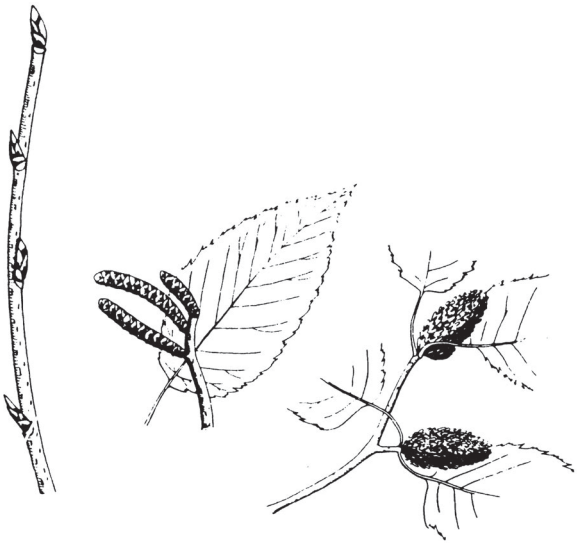
Distinguishing features: smooth, gray bark; coarse, sharp teeth on leaf margin; cigar-shaped buds.

8. BLACK BIRCH

cherry birch, sweet birch

Betula lenta Linnaeus

Black birch yields a variety of useful products. From the Hudson River Valley to Lake Erie, except along the higher mountains, in moist or dry, gravelly soils, this tree is well known to boys and girls for the wintergreen flavor of its twigs. The wood is heavy, strong, hard, close-grained, and dark brown in color with yellowish sapwood, and it is used for fuel and furniture, especially as a substitute for cherry or mahogany. Oil of wintergreen, used medicinally and for flavoring, is distilled from the twigs. Birch tea is made from scrapings of inner bark of twigs steeped in hot water.



BLACK BIRCH
Leaf and twig, one-third natural size; male flower buds one-half natural size

Bark: on branches smooth, close, not peeling, dark reddish brown in color with conspicuous, light-colored, elongated breathing pores; on older trunks breaking into long, thick irregular plates almost black in color.

Twigs: slender, smooth, light reddish brown in color, with numerous, short, spur-like lateral twigs; strong wintergreen flavor when chewed.

Winter buds: terminal bud present on spur-like lateral branches only, about 1/4 inch long, conical, sharp-pointed, reddish brown in color, buds on season's growth usually bending away from twigs.

Leaves: alternate, simple, ovate, 2 to 5 inches long, sharp-pointed, with fine doubly serrate margin, found usually in pairs, not opposite on lateral spurs.

Fruit: an erect, cylindrical, cone-like structure as in other birches, 1 1/2 to 2 inches long, without stalk; winged nutlets falling in autumn and winter.

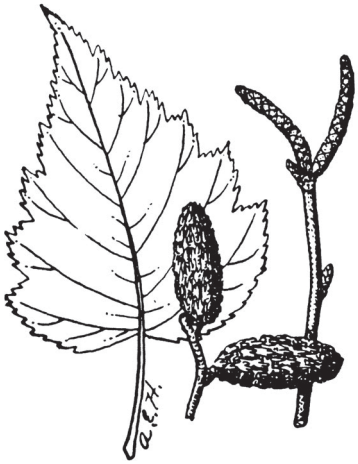
Distinguishing features: strong wintergreen flavor in twigs and bark; leaves usually in pairs on spurs.

9. GRAY BIRCH

old-field birch, poplar birch

Betula populifolia Marshall

Gray birch colonizes disturbed and harsh sites and is particularly abundant in the lower Hudson Valley where it grows chiefly on dry, gravelly soils of burned-over areas and abandoned farms. Though often confused with the true paper birch, it is far inferior to that species in size and value of the wood. Its white bark renders it more attractive than the aspens, and the characteristic clump effect of its growth is striking, particularly along streams. The tree is short-lived and is rarely as much as 8 inches in diameter. The wood is light and soft and decays quickly. In New York it is used for fuelwood and pulpwood only.



GRAY BIRCH
Leaf and twig, two-thirds natural size; fruit natural size; male flower buds at upper right

Bark: on small stems, reddish brown in color, becoming with age dull, chalky white, not peeling off in papery layers as in paper birch; with distinct black triangular patch below each branch where it joins stem.

Twigs: slender, reddish brown in color, becoming dull chalky white with age.

Winter buds: small, smooth, pointed, brownish in color, in many instances bending away from twigs; end bud on season's growth not terminal.

Leaves: alternate, simple, 3 to 4 inches long, triangular in shape, very long-pointed, shiny on upper surface, margin doubly serrate.

Fruit: slender, erect, cone-like structure, 3/4 inch long, 1/3 inch thick, on short stalk; consisting of winged nutlets and 3-lobed scales in alternate layers; both become detached from central stem in late autumn and winter. Seeds: minute, broad wings, spread by wind.

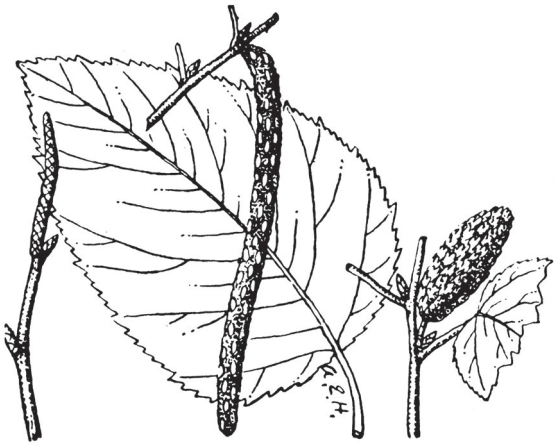
Distinguishing features: long-pointed, triangular leaf; dull, chalky-white bark, not peeling in thin layers.

10. PAPER BIRCH

canoe birch, white birch

Betula papyrifera Marshall

Paper birch is well known throughout the Adirondacks and the Catskills and along the highlands of the Susquehanna and Delaware drainage by its white, papery bark. This shade-intolerant tree grows on a wide range of soils; it thrives along lakes, streams, and swamps and maintains itself on the higher slopes of our mountains. Spools, woodenware,



PAPER BIRCH
Twig, one-half natural size; leaf and fruit, natural size; male flower buds in winter at leaft; male flower in center

shoe lasts, wood pulp, and fuelwood are made from its light, strong, tough, hard, light brown wood.

Bark: on young stems, golden to reddish brown in color, early becoming chalky white and peeling off in thin, papery layers that, once separated from tree, are never renewed. Because it is tough, resinous, durable, and impervious to water, paper birch was the choice of all northern Indians for their canoes. Now it is the choice of the souvenir hunter.

Twigs: stouter than those in gray birch, dull reddish brown in color.

Winter buds: terminal bud absent as in gray birch; lateral buds small, sharp-pointed, bending away from twig.

Leaves: simple, alternate, ovate, blunt-pointed rather than slender at apex, 2 to 3 inches long, coarsely serrate on margin; at maturity dull dark green in color above, paler below.

Fruit: a cone-like structure as in gray birch, 1 inch long, 1/3 inch thick, usually pendant rather than erect; nutlets and bracts falling in late autumn and winter as with other birches.

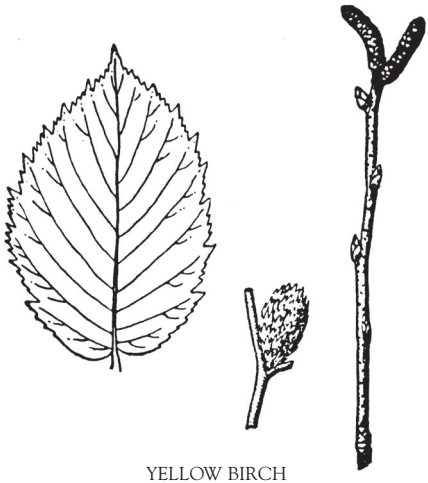
Distinguishing features: white bark peeling in papery layers in older trees, in saplings reddish brown; ovate leaves.

11. YELLOW BIRCH

silver birch

Betula alleghaniensis Britton

Yellow birch is an important and prominent timber tree in New York State. It is common throughout the state, except on Long Island, on rich, moist uplands in company with beech and sugar maple, but also is found with red spruce in the swamps and along waterways. The heavy, very strong, hard, close-grained, light brown wood is largely used for furniture, woodenware, flooring, interior finish, airplanes, and agricultural implements. Its value for fuelwood entitles it to a place in farmers' woodlots. Its seeds often sprout and grow from the tops of rotten stumps and logs.



YELLOW BIRCH
Leaf and twig, one-half natural size; fruit, one-fourth natural size; male flower buds at upper right

Bark: on young branches close, bright, silvery, yellowish gray in color; with age peeling into thin papery layers that roll back and extend up trunk in long lines of ragged fringe, making excellent tinder for starting fires in rain; on very old trunks becoming rough and furrowed, reddish brown in color.

Twigs: similar to those of black birch though more yellowish brown in color and often hairy, slightly wintergreen-flavored; abundant, spur-like laterals as in black birch.

Winter buds: similar to those of black birch.

Leaves: similar to those of black birch; undersurface somewhat hairy, particularly along veins.

Fruit: similar to that of black birch though usually wider in proportion to its length, falling in late autumn and throughout winter. Bracts: 3-lobed, distinctly hairy, whereas in black birch they are smooth.

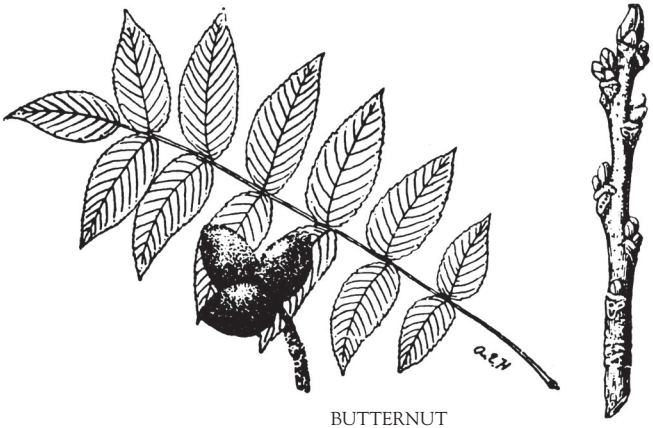
Distinguishing features: silvery gray to yellowish bark, peeling in thin sheets; slight wintergreen flavor in bark and twigs; undersurface of leaves hairy along veins.

12. BUTTERNUT

white walnut

Juglans cinerea Linnaeus

Butternut is a close kin to the black walnut though it is less valuable as a timber tree. It produces attractive wood and edible nuts, but it branches freely and seldom reaches a large size. It is common in moist soils, especially along fences and roads throughout the state, but is infrequent in the higher Adirondacks. The wood is light, soft not strong, coarse-grained, light brown in color, fairly durable, and easily worked and polished. It is used for interior trim, furniture, and fence posts. Many butternut trees are infected with a canker disease.



BUTTERNUT
Leaf, one-fifth natural size; twig, one-half natural size; fruit, one-third natural size

Bark: smooth on young trunks and branches, light gray in color; on older trunks deeply divided into long, broad, flat-topped, whitish ridges.

Twigs: stout, brittle, greenish gray in color, often hairy, easily identified by dark brown furry growth, or "mustache," found just above most leaf scars; chambered pith dark brown as contrasted with light brown chambered pith of black walnut.

Winter buds: terminal bud pale, downy, blunt-pointed 1/2 to 3/4 inch long, flattened, longer than wide; lateral buds smaller and shorter.

Leaves: alternate, compound, with 11 to 17 practically stemless long-pointed leaflets, margins serrate as in black walnut; leaves up to 2 1/2 feet in length; leaf stalk, hairy where it joins stem.

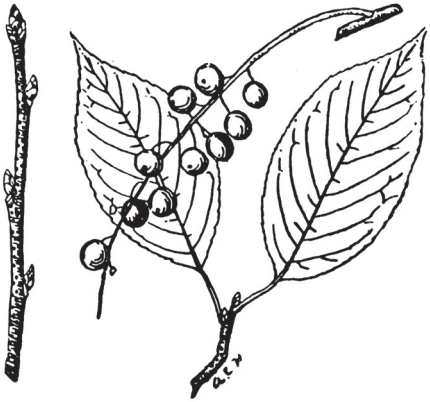
Fruit: rather large nut, 1 1/2 inches long, tapering at end, black with fine cut ridges, enclosed in sticky, green husk usually in clusters of 3 to 5, ripening in October of first season. Kernel: sweet, oily, but somewhat difficult to extract. The butternut has the advantage of curing without removing outer husk.

Distinguishing features: "mustache" above "monkey-faced" leaf scars; dark brown, chambered pith.

13. BLACK CHERRY

Prunus serotina Ehrhart

Black cherry is the largest and most valuable of the cherry trees in New York State. It prefers rich bottomlands and moist hillsides but also is found in drier situations. It is common in most sections of the state, though it is seldom found above an altitude of 3,000 feet in the Adirondacks. Its wood is light, strong, hard, close-grained with pale reddish-brown heartwood and is much in demand for cabinetmaking, interior finishing, tools, ties, and fence posts. It is a valuable, fast-growing timber and wildlife food tree and should be encouraged in woodlots.



BLACK CHERRY
Twig, two-thirds natural size; leaf, one-third natural size; fruit, one-half natural size

Bark: at first smooth, reddish brown in color, marked with easily seen, long, white breathing pores; with age becoming much roughened by irregular, close, dark, scaly circular plates with upturned edges.

Twigs: slender, smooth, reddish brown in color, with bitter almond taste that is characteristic of all cherries.

Winter buds: smooth, ovate, 1/8 to 1/6 inch long, sharp-pointed, chestnut brown in color; terminal bud present.

Leaves: alternate, simple, 2 to 5 inches long, lanceolate, broader than those of pin cherry, fairly long-pointed, margin finely serrate, tufts of hair along midrib on undersurface of leaf.

Fruit: single-seeded juicy fruit, about 1/2 inch in diameter, grouped on very short stems, in long, scattered, drooping clusters, purplish black when ripe in late summer. Birds and animals eat the fruit despite its bitter flavor.

Distinguishing features: long, white pores on young bark; dark, scaly, circular, saucer-like plates in older bark; hairy midrib below on leaf; fruit in short-stemmed clusters.

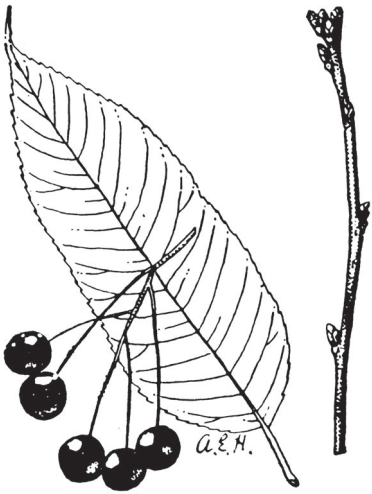
13a. **Sweet cherry** or **bird cherry** (*Prunus avium* Linnaeus) is an escaped cultivated cherry found in abandoned fields and hedgerows. Its shiny red bark and thick twigs are its outstanding features.

14. PIN CHERRY

wild red cherry, fire cherry

Prunus pensylvanica Linnaeus fils

Pin cherry thrives early on burned, cutover, and abandoned land throughout the state, except in the higher Adirondacks. It is not a timber-producing species, and its main value lies in its ability to cover wasteland and protect the soil until larger trees can establish themselves and crowd it out. The wood is light, soft, close-grained, with light brown heartwood, and is seldom used.



PIN CHERRY
Leaf and fruit, natural size; twig, one-half natural size

Bark: bright, reddish brown in color, mostly smooth, often slightly peeling around trunk, marked with numerous long, pale, breathing pores; in old trees somewhat roughened near base.

Twigs: slender, smooth, shiny, bright red in color, characteristic bitter almond taste, peculiar odor.

Winter buds: very small, reddish brown in color, characteristically clustered at twig tip and sometimes along sides; terminal bud present, usually smaller than lateral buds around it.

Leaves: alternate, simple, 3 to 5 inches long, narrowly lanceolate as contrasted with broader leaves of wild black cherry, sharp-pointed, with finely serrate margin.

Fruit: round, juicy, one-seeded, light red in color, about 1/4 inch in diameter, arrayed on long stems, 3 to 5 in each cluster, ripening in July. Birds often pick ripe fruit.

Distinguishing features: smooth, reddish-brown bark, with long horizontal pores; branches at almost right angles to trunk; fruit in long-stemmed clusters.

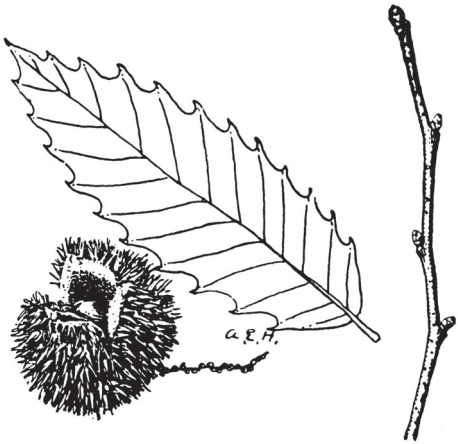
14a. **Chokecherry** (*Prunus virginiana* Linnaeus) is a bushy shrub, although sometimes a small tree, furnishing food for game in hedgerows. Its dark brown bark shows lighter streaks of gray.

15. AMERICAN CHESTNUT

Castanea dentata (Marshall) Borkhausen

American chestnut, once common across the state south of the Adirondacks, has succumbed to the deadly chestnut blight, so that there are practically no live trees more than 4 inches in diameter. Perhaps almost any other species could have been better spared in the farmer's woodlot because of its rapid growth, the many uses for its wood, and the fine crop of nuts it furnished. The wood is light, soft, coarse-grained, reddish brown in color, and durable in contact with the soil. It is now used largely for posts.

Bark: on young trunks smooth, reddish brown in color, with age broken by shallow fissures into long, broad, flat, more or less slanting ridges.



AMERICAN CHESTNUT
Twig, one-half natural size; leaf and fruit, one-third natural size

Twigs: stout, greenish yellow or reddish brown in color, somewhat swollen at base of buds; pith star-shaped in cross-section.

Winter buds: small, ovate, light chestnut brown in color, set at angle to leaf scar; terminal bud absent.

Leaves: simple, lanceolate, alternate, 6 to 8 inches long, sharp-pointed, widely toothed.

Fruit: light brown burr, sharp, spiny without and hairy within; opening at first frost and letting fall generally 3 nuts. Nuts: shiny, woolly at top; shell very thin; kernel solid, white, sweet, and excellent to eat.

Distinguishing features: stout twigs with star-shaped pith; long leaves with widely spaced, sharp teeth.

16. EASTERN COTTONWOOD

Populus deltoides Bartram ex Marshall

Eastern cottonwood is an exceedingly rapid-growing, moisture-loving species that is found locally in moist places and along streams and lakes throughout the state except at the higher elevations. The wood is light, soft, and weak and is dark brown in color with thick nearly white sapwood that warps badly in drying. It is used for pulp and boxes. The cottonwood has been extensively planted as an ornamental tree along streets, but as such it has few merits because it is short-lived and the roots often penetrate and clog drains and sewers. It is not easy to destroy because, even after being cut down, the stump continues to sprout vigorously.

EASTERN COTTONWOOD
Leaf and fruit, one half natural size;
twig, one-third natural size

Bark: smooth on young trunks and branches; light yellowish green in color, becoming thick, ashy gray in color and deeply furrowed with age.

Twigs: stout, round or ridged below bud, bright yellow or greenish yellow in color; rank odor when broken.

Winter buds: terminal bud present, large, resinous, glossy, smooth, chestnut brown in color; lateral buds smaller, in many instances bending away from twig.

Leaves: alternate, simple, broadly triangular, 3 to 5 inches long, coarsely serrate margin, square base, long and laterally flattened leaf stalk.

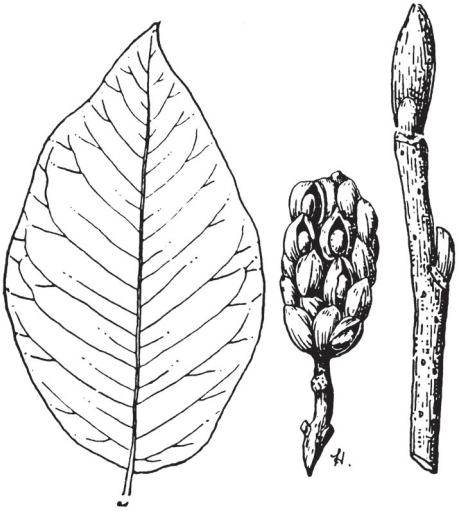
Fruit: scattered cluster of capsules as in aspens, though somewhat larger (3 to 6 inches long), arranged in long, drooping tassels. Seeds: within capsule, numerous, small, surrounded by mat of fine hairs, ripening in spring, conveyed long distances by wind. The tree derives its name from this cotton-like mat of fine hairs.

Distinguishing features: rank odor when twig is broken; incurved teeth on leaf margin of triangular leaf.

17. CUCUMBER TREE

Magnolia acuminata Linnaeus

Cucumber tree, so called because of its cucumber-like fruit, is the only magnolia that is at all common in New York State outside of Long Island. In rich woods, on moist slopes, and along stream courses, from the central part of the state westward and southward, it is found locally. The wood is light, soft, close-grained, brittle, and light yellowish brown in color. It resembles that of yellow-poplar and, besides wood carving, has much the same uses. Because of its yellowish-green flowers, large leaves, rapid growth, and red seeds, it is often grown in lawns and parks.



CUCUMBER TREE
Fruit and leaf, one-third natural size; twig and bud, two-third natural size

Bark: grayish brown in color, with long, narrow furrows separating into rather loose, scaly, flat-topped ridges.

Twigs: brittle, brown in color, smooth or shiny, aromatic odor.

Winter buds: terminal bud oblong, somewhat curved, thickly covered with pale, silky hairs, pointed, about 1/2 inch long; lateral buds smaller, blunt, also hairy.

Leaves: alternate, simple, ovate, pointed at tip, 4 to 10 inches long, entire margin. One of the few species of the state that has an entire-margined leaf.

Fruit: cone-like or cucumber-like, cylindrical mass, often curved, about 2 1/2 inches long, containing many scarlet, pea-like seeds that dangle from ends of short, white threads when ripe in early autumn.

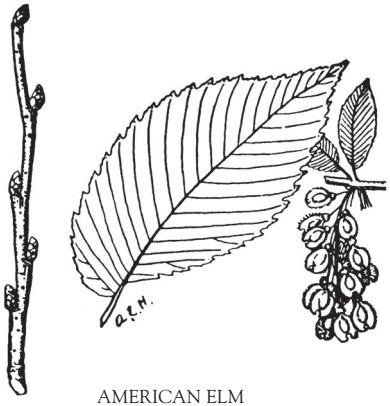
Distinguishing features: smooth margin of large leaf; aromatic odor of twigs; oblong terminal bud; branching like that of pear tree, fruit like cucumber.

18. AMERICAN ELM

white elm

Ulmus americana Linnaeus

American elm is one of the most beautiful, graceful, and best-known forest trees in New York. It occupies a wide range of sites, though it is typically a tree of the bottomlands, and it grows to be one of the largest trees in the state. (The Gowanda elm had a basal circumference of 39 feet.) The wood is heavy, hard, strong, tough, coarse-grained, difficult to split, and light brown in color; it is largely used for veneer, barrel staves and hoops, crates, and wheel hubs. The graceful symmetry of the crown makes the elm highly prized for ornamental planting. Unfortunately, this species has nearly disappeared from our parks and streets because of the lethal Dutch Elm disease. Improved resistant strains have been developed and planted ornamentally and in the wild in hopes that this majestic species can regain its former widespread occurrence.



AMERICAN ELM
Twig, leaf, and fruit, one-half natural size

Bark: dark gray in color, divided by irregular up-and-down furrows into broad flat-topped ridges, rather firm or occasionally flaking off in old trees; inner bark in alternate layers of brown and white.

Twigs: slender, smooth, reddish brown in color, not mucilaginous (like glue) when chewed.

Winter buds: winter twig obviously ends in leaf scar, hence larger bud near end of twig not truly terminal; lateral buds somewhat smaller, ovate, pointed, light reddish brown in color, smooth, 1/8 inch long.

Leaves: simple, alternate, 4 to 6 inches long, oblique at base, margin doubly serrate, at maturity dark green in color above, lighter beneath, midrib and parallel veins prominent; upper surface of leaf somewhat rough to touch, although not as pronounced as in slippery elm.

Fruit: flat, winged, deeply notched at end, 1/2 inch long, containing one small seed; in clusters, ripens in early May as leaf buds unfold, falling soon thereafter.

Distinguishing features: zigzag twigs; inner bark not mucilaginous, having alternate layers of brown and white; leaf slightly rough on upper side only; with oblique base.

19. SLIPPERY ELM

red elm

Ulmus rubra Muhlenberg

Slippery elm is a medium-sized forest tree of stream banks and low fertile slopes and is common south of the Adirondacks. The wood is hard, heavy, strong, coarse-grained, and fairly durable in contact with the soil. This tree is not an important commercial species but is used for fence posts, ties, and barrel staves and hoops.

SLIPPERY ELM
Leaf, one-third natural size; twig and fruit, one-half natural size

Bark: grayish brown in color, more or less deeply furrowed, ridges tending to lift more along one edge than in American elm; layers of outer bark reddish brown in color, shows no alternate layers of brown and white as in American elm; inner bark, next to wood, whitish, strongly mucilaginous (like glue), giving it the name "slippery elm."

Twigs: light gray in color, hairy, somewhat rough, characteristically mucilaginous when chewed.

Winter buds: terminal bud absent as in American elm; lateral buds 1/4 inch long, dark chestnut brown in color, covered at tip with long, rusty hairs.

Leaves: alternate, simple, oval, 5 to 7 inches long, oblique at base, margin doubly serrate; at maturity thick, dark green in color above, decidedly rough to touch, paler and white-hairy below; midrib and parallel veins prominent.

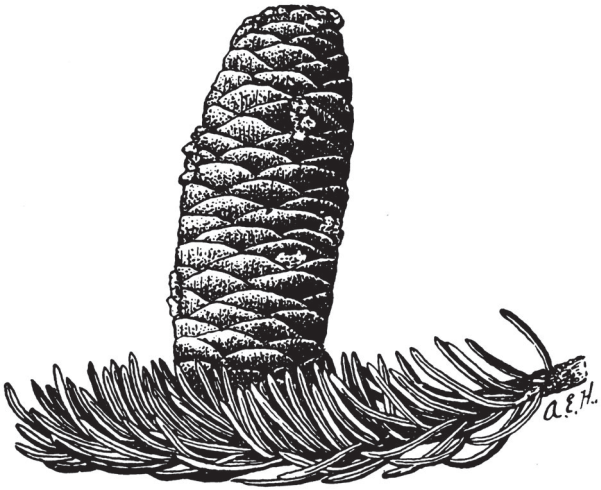
Fruit: flat-winged but not notched at end, 1/2 to 3/4 inch long, containing one seed; in clusters; maturing in late May or early June when leaves about half grown, falling soon thereafter.

Distinguishing features: inner bark chewy, without alternate layers of brown and white; leaf base oblique, rough above and below; twigs chewy; buds tipped with rusty hairs.

20. BALSAM FIR

Abies balsamea (Linnaeus) Miller

Balsam fir is a medium-sized forest tree generally distributed in deep, cold swamps throughout the state. The wood is light, soft, coarse-grained, not durable, pale brown in color, and of little value as a source of lumber. It is cut along with spruce for pulpwood and is desirable as a Christmas tree. Balsam pillows are made from the needles.



BALSAM FIR
Branchlet and cone, natural size

Bark: smooth, grayish brown in color, dotted with balsam blisters containing fragrant oily resin; in old trees becoming somewhat roughened with small scales.

Twigs: smooth with age, grayish in color.

Winter buds: small, almost spherical, glossy, clustered at end of twigs.

Leaves: borne singly and twisting so as to appear 2-ranked as in hemlock, flattened rather than 4-sided as in spruces, dark green in color above, pale below with 2 broad white lines, 3/4 inch long, blunt, not stalked, aromatic when crushed, persistent 2 to 3 years.

Fruit: an erect cone, 2 1/2 to 4 inches long, rounded at top, ripening in autumn of first year, purplish green in color. Cone scales: longer than broad, somewhat fan-shaped, falling in winter following maturity of cone and leaving only erect central stalk to which they were attached. Seeds: in pairs, winged, dark brown in color, 1/4 inch long, ripening in September.

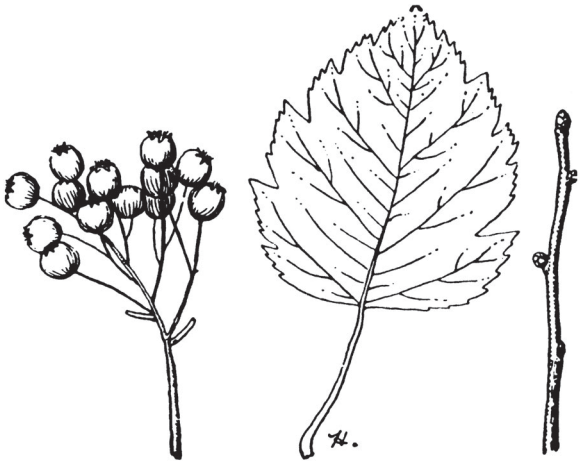
Distinguishing features: needles without stalks; blisters in bark; cone erect and falling apart when ripe.

21. THE HAWTHORNS

thornapple

Crataegus Linnaeus

Hawthorns comprise a large group of small-sized trees. More than 20 varieties are common in New York State. The differences are chiefly in flower and fruit, and it seems advisable in this publication to call attention to the general characteristics of the group without going into the minute differences that separate the many species. The very small



SCARLET HAWTHORN
Twig, leaf, and fruit, two-thirds natural size

size of the trees, generally less than 20 feet tall, makes them of no commercial value. In fact, some members of the group may be regarded as serious pests because of the rapidity with which they seed up old pastures, shading out available pasturage or making costly the preparation of the land for forest planting.

Bark: generally dark brown to gray in color, scaly.

Twigs: stiff, zigzag, armed with large, generally unbranched thorns 1 1/2 to 2 inches long.

Winter buds: round, chestnut brown in color; terminal bud usually present but no larger than lateral buds.

Leaves: simple, alternate, 3 to 4 inches long, 2 to 3 inches wide, serrate on margin; in some species leaves more or less ovate, others 5- to 9-lobed.

Fruit: berry-like, in a cluster, each fruit the size of a small cherry; when mature in early autumn, usually red, with 1 to 5 nutlets in center of fleshy covering; highly prized by birds in winter.

Distinguishing features: stiff thorns, 1 1/2 to 2 inches long; berry-like fruit, usually red.

22. EASTERN HEMLOCK

hemlock-spruce

Tsuga canadensis (Linnaeus) Carriere

Eastern hemlock is a valuable forest tree that is very widely distributed throughout the state. It is particularly common on northern exposures, shaded gorges, steep mountain slopes, and borders of deep swamps. The wood is light, not strong, coarse-grained, brittle, not durable, splinters easily, and is light brown in color. It is largely manufactured into construction lumber and is also in demand for mechanical pulp.

EASTERN HEMLOCK
Branchlet and cone, natural size

Bark: reddish to grayish brown in color, with shallow, broad connecting ridges; inner bark bright cinnamon red in color. High tannin content of bark of commercial value in tanning leather.

Twigs: slender, yellowish to grayish brown in color, rough when needles are shed.

Winter buds: very small, reddish brown in color, not resinous-coated.

Leaves: borne singly, twisting to appear 2-ranked with third row pointing forward on top of twig; with distinct short stalk, flat, 1/2 inch long, rounded or notched at apex, dark green in color above, paler below with 2 white lines, persisting 2 to 3 years.

Fruit: a cone, stalked, pendant, 3/4 inch long, ripening in one year, grayish brown in color when mature, falling during winter following maturity. Cone scales: with rounded entire margins. Seeds: in pairs, winged, light brown in color, 1/16 inch long, ripening in September.

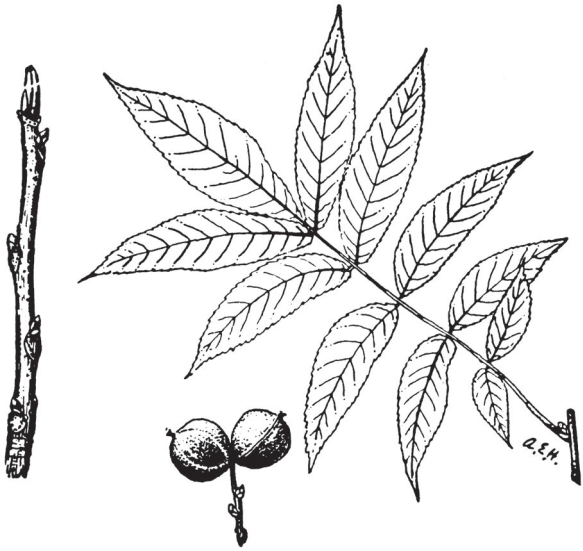
Distinguishing features: needles with tiny stalks; small cones.

23. BITTERNUT HICKORY

swamp hickory, water hickory, tightbark hickory

Carya cordiformis (Wangenheim) K. Koch

Bitternut hickory is occasional in most sections of the state except the higher Adirondacks or Catskills. It is by preference a bottomland tree growing on wet sites in pastures, fields, and along streams, though it is occasionally found on hillsides and ridgetops in small, moist depressions. It grows well on moist, rich soil such as that found in many farm woodlots. The wood is heavy, very hard, strong, tough, and dark brown in color with paler sapwood. It is inferior to that of the other hickories but is used for practically the same purposes.



BITTERNUT HICKORY
Twig, one-half natural size; leaf, one-third natural size; fruit, one-half natural size

Bark: thin, close, with shallow furrows and narrow regular ridges, usually does not scale or shag off, light gray in color.

Twigs: slender, often yellowish in color, hairy toward end; grayish or orange-brown in color during first winter; pith brown and unlike any other hickory in this respect.

Winter buds: long, flattened, blunt-pointed, covered by 4 sulfur-colored scales; terminal bud from 1/3 to 3/4 inch long.

Leaves: alternate, compound, 6 to 10 inches long, with 7 to 11 long, narrow, sharp-pointed leaflets that are smaller and more slender than those of other hickories.

Fruit: a nearly round nut, thin-husked, brown in color, 3/4 to 1 inch long, without ridges. Kernel: bitter, not edible. Husk: clings to nut after falling. Shell is so thin that it easily can be crushed between fingers.

Distinguishing features: smooth bark and usually straight stem; sulfur-colored bud; 7 to 11 small leaflets.

24. PIGNUT HICKORY

pignut, brown hickory

Carya glabra (Miller) Sweet

Pignut hickory is a fair-sized upland species found mostly on dry ridges and hillsides throughout the state, except in the Adirondack region where it is found only at the lower elevations. The wood is strong and very tough. Its uses are similar to those of shagbark hickory.

PIGNUT HICKORY
Leaf and fruit, one-third natural size; twig, one-half natural size

Bark: typically close-fitting, dark gray in color, marked with shallow furrows and narrow ridges that are seldom shaggy, though sometimes becoming detached at end. Bark characteristics are quite variable.

Twigs: comparatively slender, smooth, tough, and pliable, reddish brown to gray in color.

Winter buds: small, oval, blunt-pointed, covered with reddish-brown scales, outer pair of which often drop off in winter; terminal bud less than 1/2 inch long, much smaller than terminal bud of shagbark hickory.

Leaves: alternate, compound, 8 to 12 inches long, with 5 to 7 leaflets, all nearly same size.

Fruit: pear-shaped to nearly round, thin-husked, buff-colored nut without ridges, 1 inch long, thick shelled. Kernel: at first sweet, later somewhat bitter. Husk: contrasted with shagbark hickory, all or part usually clings to nut after it has fallen to the ground.

Distinguishing features: 3 to 5 leaflets, all nearly same size; lacy design in bark; small terminal bud like that of rose.

25. SHAGBARK HICKORY

scalybark hickory

Carya ovata (Miller) Koch

Shagbark hickory is the best known and most valuable of the hickories in this state. It is common in deep, moist soils throughout New York though rare in the higher Catskills and Adirondacks and is not reported from the pine barrens of Long Island. In the forest it

SHAGBARK HICKORY
Leaf, one-third natural size; twig, one-half natural size; fruit, one-third natural size

is a tall, straight-branched tree, but in open fields and along hedgerows where it often grows it usually forks near the ground into stout ascending limbs. The wood is very heavy, tough, elastic, close-grained, and is used chiefly for handles, vehicles, agricultural implements, and fuel. The fruit is important for wildlife.

Bark: light gray in color, smooth and seamy, becoming shaggy with age and peeling off into long strips that are loose at both ends and attached in middle, thus giving rise to the name "shagbark hickory."

Twigs: covered with numerous light dots, extremely tough and pliable, reddish brown to gray in color.

Winter buds: large, ovate, blunt-pointed, with papery, dark brown, loose bud scales; outer scales much darker, persistent through winter; terminal bud usually more than 1/2 inch long.

Leaves: alternate compound, 8 to 14 inches long, with 5 to 7 leaflets, 3 upper ones largest.

Fruit: smooth, white, 4-angled nut, enclosed in thick, round husk that splits into 4 sections as nut falls after heavy autumn frosts. Kernel: large, sweet.

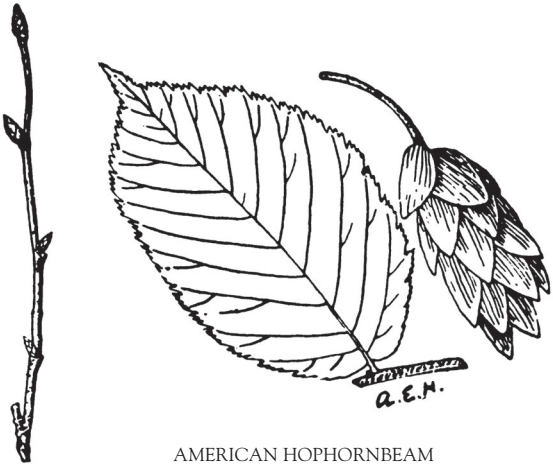
Distinguishing features: large terminal bud; 5 to 7 leaflets, outer 3 much larger; bark peeling in long plates.

26. AMERICAN HOPHORNBEAM

ironwood, eastern hophornbeam

Ostrya virginiana (Miller) Koch

American hophornbeam is closely related to the American hornbeam and is rather generally distributed throughout New York State on dry, gravelly, and stony soils of slopes and ridges, sometimes taking possession of woodlots in central New York to the exclusion



AMERICAN HOPHORNBEAM
Twig,leaf, and fruit, one-half natural size

of other species. The tree is slow-growing and is rarely found larger than 10 inches in diameter. The wood is very heavy, hard, and strong, hence the name "ironwood." It is used for tool and implement handles and for levers and makes excellent fuelwood when seasoned.

Bark: thin, very markedly flaky; light grayish brown in color, broken into narrow, flattish pieces, loose at ends.

Twigs: fine, reddish brown in color, smooth, and shiny; very easy winter character for identification of tree, particularly of young saplings.

Winter buds: terminal bud absent as in birches and elms; lateral buds small, light reddish brown in color, bending away from twig.

Leaves: alternate, simple ovate, 3 to 5 inches long, doubly and finely serrate on margin.

Fruit: small, seed-like nutlet, enclosed in inflated, sac-like bract. Bracts: in clusters 1 to 2 inches long, resembling hops, hence the name "hophornbeam." Fruit usually falls before winter.

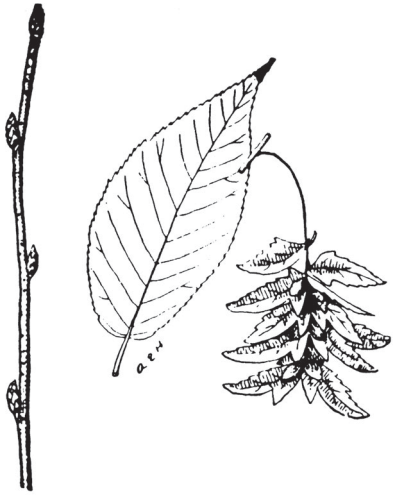
Distinguishing features: shreddy bark; shiny, reddish-brown twigs; papery fruit like a hop.

27. AMERICAN HORNBEAM

ironwood, blue-beech, water-beech

Carpinus caroliniana Walter

American hornbeam is a small-sized, bushy tree, found frequently along watercourses and the edges of swamps generally throughout the state. It is rarely more than 6 inches in diameter. The wood is very heavy, hard, strong, close-grained and is occasionally used for mallets on account of its hardness.



AMERICAN HORNBEAM
Twig, leaf, and fruit, one-half natural size

Bark: smooth, thin, dark bluish gray in color, close-fitting, with smooth, rounded, lengthwise ridges that resemble tensed muscles.

Twigs: very slender, dark red in color, shining.

Winter buds: terminal bud absent; lateral buds small, often angled in cross-section, narrowly ovate, pointed, covered with many reddish-brown scales.

Leaves: simple, alternate, ovate, 2 to 4 inches long, finely and doubly serrate on margin.

Fruit: a small prominently ribbed nutlet, 1/3 inch long, enclosed in 3-lobed leaf-like bract. Bracts with their enclosed nutlets are in long, drooping clusters that ripen and fall before winter.

Distinguishing features: "muscles" in bark; fruit a nutlet enclosed in 3-part "dress."

28. AMERICAN LARCH

tamarack, hackmatack

Larix laricina (Du Roi) Koch

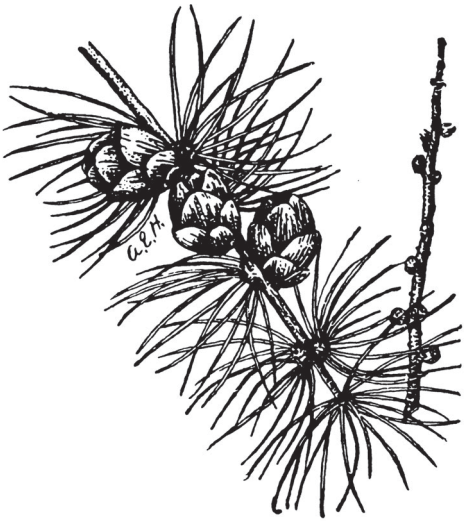
American larch is a forest tree of the swamps. In the mountainous sections of the state, it is frequently found well up the slopes but is confined to cold swamps in eastern, central, and western New York. The wood is very heavy, hard, and strong, light brown in color, and durable in contact with the soil. It is used for fence posts, telegraph poles, and railroad ties.

Bark: smooth, light gray in color on young trunks; with age becoming roughened with thin reddish-brown scales.

Twigs: slender, smooth, glossy brown in color, with short lateral wart-like branches.

Winter buds: scattered along past season's twigs and at ends of short lateral branches, small, rounded, reddish brown in color, shining.

Leaves: borne singly on twigs of previous season's growth; on spurs of older twigs in clusters of 10 or more, flat, slender, pale green in color, about 1 inch long, falling off in autumn of first year.



AMERICAN LARCH
Branchlet and cone, natural size

Fruit: cone, 1/2 inch long, borne on short, curving stalks, maturing in autumn of first year, chestnut brown in color, standing upright from twigs, staying on tree for several years. Cone scales: concave in shape. Seeds: in pairs, winged, light brown in color, 1/8 inch long, ripening in early autumn.

Distinguishing features: many needles in cluster, dropping in autumn; small, stiff cone on incurved stalk.

28a. **European larch** (*Larix decidua* Miller), which is one of several species that are difficult to distinguish, has been planted for many years on lawns and more recently in forest plantations. It has infrequently naturalized. Its cones are 1 to 1 1/2 inches long, standing out from the twig. It grows on well-drained soils much more rapidly than the American larch.

29. BLACK LOCUST

yellow locust, white locust

Robinia pseudoacacia Linnaeus

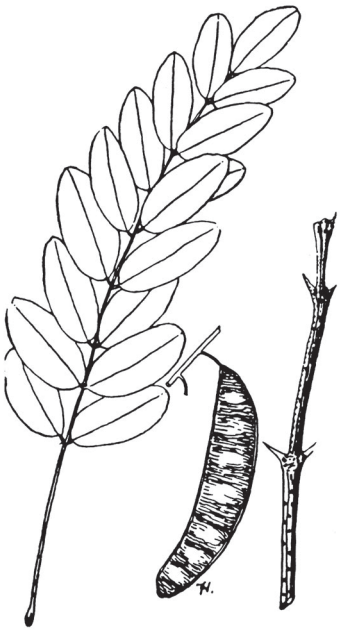
Black locust is not a native of New York but was a great favorite with early settlers as a dooryard tree from where it has escaped to form dense thickets along roadsides in many sections of the state. In favorable locations it spreads rapidly by means of root suckers. It grows with exceptional rapidity on well-drained fertile soils, and in such locations it seems better able to survive attacks of the locust borer, which have rendered the tree worthless in some areas. The wood is very strong, heavy, hard, and extremely durable in contact with the soil. As a post wood it has no equal and is also used for ties and fuelwood and, formerly, for insulator pins on pole lines.

Bark: rough even on young trunks, yellowish brown in color, becoming deeply furrowed into distinct, thick, rounded ridges that are not scaly.

Twigs: slender, brittle, reddish to greenish brown in color; generally bearing short, stiff spines 1/4 to 1/2 inch long, in pairs at base (node) of leaves.

Winter buds: terminal bud absent; lateral buds very small, in a cavity below leaf scars, rusty brown in color, covered with down.

Leaves: alternate, compound, 8 to 14 inches long, with 7 to 19 entire leaflets arranged along central stem; leaflets usually odd in number, short-stalked, oval in shape, 1 1/2 to 2 inches long.



BLACK LOCUST
Leaf and fruit, one-third natural size;
twig, two-thirds natural size

Fruit: a pod, flat, smooth, brown in color, 2 to 4 inches long, containing 4 to 8 small brown or black seeds, ripening in September. Pods: hang on into winter and are finally torn off by wind in halves with seeds attached; dried pod acts as sail to carry seed considerable distances.

Distinguishing features: compound leaves with oval leaflets; small, downy buds depressed in bark; short, stiff spines; papery pods.

30. HONEY-LOCUST

sweet-locust

Gleditsia triacanthos Linnaeus

Honey-locust, though native to western New York only, has been widely introduced as a hedge and ornamental tree and is hardy and scattered throughout the state except in the mountains. The wood is hard, strong, and coarse-grained but not as durable in contact with the soil as is the black locust. Its habit of growing in open rather than forest situations gives its wood a knotty character.

HONEY-LOCUST
Leaf and fruit, one-fourth natural size;
twig, three-fourths natural size

Bark: on young branches smooth, grayish brown in color, with age becoming roughened into firm, broad, blackish ridges with edges that curve outward.

Twigs: rather stout, smooth, glossy, zigzag; usually bearing stiff, sharp-branched thorns 3 to 4 inches long (lacking in most horticultural varieties), above leaf base (node).

Winter buds: terminal bud absent; lateral buds very small, not easily seen.

Leaves: alternate, simply or, more usually, doubly compound, 6 to 8 inches long; if singly compound, with 18 to 28 leaflets; leaflets usually even in number, elliptical, 1 1/2 to 2 inches long; if doubly compound, with 4 to 7 pairs of secondary leaf stems.

Fruit: flat pod, usually twisted, reddish brown in color, 10 to 18 inches long, 1 1/2 inches wide, 2 to 3 in each cluster, ripening in late autumn but staying on tree well into winter; each pod containing 10 to 20 brown oval seeds, 1/3 inch long. Fleshy part of pod is sweet, hence the name "honey-locust."

Distinguishing features: branched, stout thorns; usually doubly compound leaves, with elliptical leaflets; large, reddish-brown pod.

THE MAPLES

Maples (*Acer* spp.) are an important group of forest trees in New York State. Sugar maple is the state tree, and maples provide syrup, valuable hardwood timber, wildlife foods, beautiful fall colors, lawn trees, and watershed protection.

Of the 16 or more maples east of the Rocky Mountains, 8 are found with moderate to high frequency in some parts of the state. These include sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), silver maple (*Acer saccharinum*), striped maple (*Acer pensylvanicum*), Norway maple (*Acer platanoides*), box-elder (*Acer negundo*), mountain maple (*Acer spicatum*), and black maple (*Acer nigrum*). Only the first three will be described in this list. Other maples in the state that are less common and typically escaped from horticultural plantings include hedge maple (*Acer campestre*), Amur maple (*Acer ginnala*), Japanese maple (*Acer palmatum*), and sycamore maple (*Acer pseudoplatanus*).

Maples as a group are readily distinguishable from other trees by their opposite arrangement of buds, leaves, and twigs, together with the characteristically shaped simple maple leaf (box-elder is the only exception, having compound leaves). The fruit of the maple group is also distinctive. Without exception the fruit are winged seeds, borne in pairs and clusters of pairs, and commonly called samaras.

Striped maple is an increasingly abundant species in the maturing and shady forests of the state. It thrives in shade and is restricted to the subcanopy. Striped maple reproduces easily and sometimes forms a dense understory that inhibits the reproduction of other species. This species is distinguished by bright green bark with white stripes, large goose foot–shaped leaves, and its samaras with wide-reaching wings.

Norway maple has been widely planted in residential areas, now overplanted, and is considered an invasive weed in some of the many areas of the state where it has naturalized. There are many other more appropriate species that should be considered for ornamental planting. Norway maple is recognized by large, blunt terminal buds, interlacing and often spiraling black bark ridges, and a broad leaf on a long stalk. The leaf stalk has a milky sap when broken. The species was removed from some sections of New York City and Long Island during an infestation of the Asian longhorned beetle (*Anoplophora glabripennis* Motschulsky), an exotic insect that feeds on and reproduces in Norway maple, other maples, and a variety of other hardwoods.

Box-elder is a medium-sized tree found in moist locations at lower elevations, occasionally common, and its greatest value is stream bank stabilization and shading of streams. It is one of a few maple species with a compound leaf. It has no commercial value, and its weak wood makes it unsuitable for residential areas.

Mountain maple is recognized by the downy hairs on current-year twigs and buds and by its small size. Common only to moist ravines, steep slopes, and higher elevations, it has no commercial value but is a pleasant tree to encounter when hiking.

Black maple is similar to sugar maple and often considered only a variety of sugar maple. Black maple is distinguished with difficulty from sugar maple by its drooping leaf edges and tips, hairy lower surface of the leaves, and orange-brown dull twigs. Black maple's fall color is typically yellow compared to the brilliant orange to amber of sugar maple.

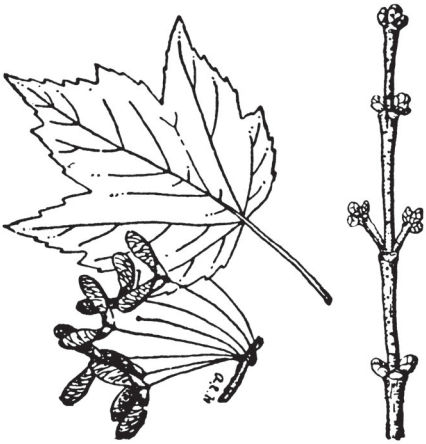
The other maples that occur in New York State are seldom encountered in the woods but may be found near residential areas where seeds from planted specimens have become established.

31. RED MAPLE

swamp maple, soft maple

Acer rubrum Linnaeus

Red maple derives its name from its brilliant autumn foliage. Though it is common in swamps all over the state, it is also abundant on moist slopes and increasingly common in partially cut woodlots. It is an extremely rapid-growing tree, furnishing a fairly strong, close-grained wood that is extensively used for cheap furniture, in the manufacture of baskets and crates, for mine props, railroad ties, and fuelwood.



RED MAPLE
Twig, one-half natural size; leaf and fruit, one-third natural size

Bark: on young trunks smooth, light gray in color, often resembling beech; with age becoming darker and roughened into long ridges, often shaggy or scaly on surface; bark character extremely variable on different trees in same stand.

Twigs: rather slender, bright or dark red in color, without odor when cut or broken.

Winter buds: broad, blunt-pointed, clustered, short stalk, red in color; terminal bud slightly larger than lateral buds; numerous large, plump flower buds along twig.

Leaves: simple, opposite, from 3 to 4 inches long, fully as wide, usually 3-lobed; clefts between lobes shallow and sharp angled as contrasted with deep clefts of silver maple; margins of leaf lobes coarsely serrate; at maturity leaves light green in color above, pale greenish-white below.

Fruit: samaras, in clusters on long stalks, ripening in May or early June. Seeds: joined more or less end on end. Wings: diverge at wide angles.

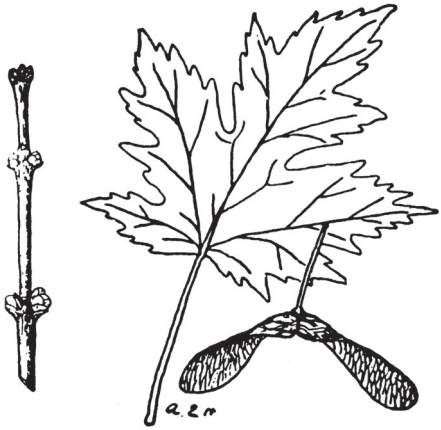
Distinguishing features: red buds and twigs, sharp angle between leaf lobes; leaf margin with teeth.

32. SILVER MAPLE

white maple

Acer saccharinum Linnaeus

Silver maple is generally distributed throughout the state but is not nearly as common as red maple. It prefers the same general moist soil conditions, and the wood is used for the same purposes as the red maple with which it is included under the term "soft maple" by lumbermen. Silver maple is frequently planted as a shade tree owing to its rapid growth, but because of its weak wood it shouldn't be planted near homes or cars.



SILVER MAPLE
Twig, one-half natural size; leaf and fruit, one-third natural size

Bark: on young trunks smooth, gray in color with reddish tinge; with age becoming reddish brown in color, more or less furrowed, surface separating in long, thin flakes that become free at ends and flake off.

Twigs: similar to red maple but has distinctly rank odor when broken or crushed.

Winter buds: similar to red maple but larger, usually very dense clusters of lateral buds.

Leaves: simple, opposite, 3 to 5 inches long, fully as wide, 5-lobed; margins of lobes coarsely serrate; clefts between lobes, particularly middle two, very deep; at maturity leaves pale green in color above and silvery white below, hence the name "silver maple."

Fruit: samaras, much larger than in red maple though maturing at about same time in spring. Wings: more widely divergent than those of red maple. Sometimes only one side of samara develops.

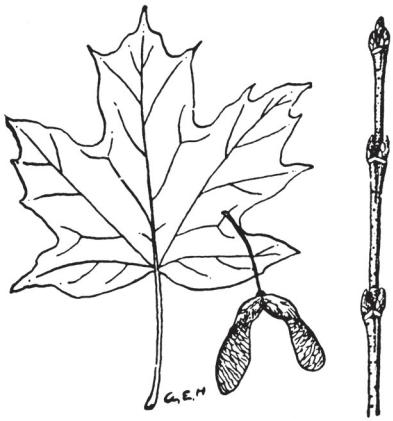
Distinguishing features: silvery bark on upper limbs; deeply cut clefts between coarse-toothed lobes; rank odor from crushed twig; large-winged samaras.

33. SUGAR MAPLE

hard maple, rock maple

Acer saccharum Marshall

Sugar maple, the official state tree of New York, is a magnificent forest tree abundant everywhere in the state outside of Long Island. Besides providing beautiful borders to many miles of highway and hundreds of thousands of gallons of maple syrup from the many thousands of sugar bushes in all parts of the state, it yields a wood of high grade. It is hard, strong, close-grained, and tough, with a fine, satiny surface, and is in great



SUGAR MAPLE
Leaf, one-third natural size; fruit and twig, one-half natural size

demand for flooring, veneer, interior finish, furniture, shoe lasts, rollers, and as a fuelwood of the best quality.

Bark: on young trees dark gray in color, close, smooth, and firm, becoming furrowed into long, irregular plates lifting along one edge.

Twigs: slender, shining, color of maple sugar.

Winter buds: very narrow, sharp-pointed, brown in color, terminal buds much larger than laterals.

Leaves: simple, opposite, 3 to 5 inches long and fully as wide, 3 to 5 shallow lobes with wide-spaced coarse teeth, dark green in color above, paler below; clefts rounded at base.

Fruit: samaras, in short clusters, ripening in September. Seeds: join each other in straight line. Wings: turn down almost at right angles.

Distinguishing features: rounded cleft between lobes of leaves; leaf lobes lacking small teeth; sharp-pointed, brown buds; brown twig.

THE OAKS

Of the 300 oaks known in the world, 55 are native to North America, and most of these are in the eastern United States. The oaks make up the largest group of forest trees native to New York. Sixteen species of oaks are native to this state. They grow under a wide range of conditions and show wide variations in form and other distinguishing characteristics. The oaks of New York do not thrive in the high forests of the mountains; therefore, representatives of the family found in the Adirondack section are in the sheltered valleys of the foothills. South and westward in the drainages of the Susquehanna, Genesee, and Alleghany Rivers, they become plentiful in variety and number.

The best way to become acquainted with New York oaks is to divide them into two major groups, the one comprising the white oaks and the other the black oaks. It is easy to place the oaks of New York in these two groups by remembering the following characteristics of each:

The white oaks: The leaves have rounded lobes (not bristle-tipped), and the kernels of the acorns are usually sweet. All the oaks of this group mature their acorns in a single season; for this reason they are sometimes called "annual oaks." The most important members of the group in New York are **white oak, swamp white oak, bur oak, post oak,** and **chestnut oak.**

The black oaks: The leaves are bristle-tipped (not round-lobed), and the kernels of the acorns are usually bitter. All the oaks in this group require two seasons to mature their acorns; for this reason they are sometimes called "biennial oaks," which means two-year oaks in contrast with the one-year white oaks. The immature acorns are very helpful in recognizing the members of the black-oak group, especially during the winter months when the trees are without leaves. The most important members of this group in New York are **black oak, red oak, scarlet oak,** and **pin oak.**

34. BLACK OAK

yellow oak

Quercus velutina Lambert

Black oak is another dominant forest tree of the southern part of the state, though not as valuable or fast growing as northern red oak. It is usually found in gravelly soils and on drier sites than red oak. The wood is hard, heavy, and strong but is not considered as valuable as red oak. It is used chiefly for ties, construction, and fuelwood.

Bark: on young stems smooth, dark brown in color, soon becoming dark gray to black, very rough, broken by deep furrows into thick ridges that are further divided by cross furrows; roughened especially at base of trunk even in quite young trees; inner bark orange yellow in color, rich in tannin, yields yellow dye.

Twigs: stout, reddish brown in color mottled with gray.

Winter buds: cone-shaped, sharp-pointed, 1/4 to 1/2 inch long, covered with yellowish-gray wool, clustered at end of twig.

BLACK OAK
Leaf, one-third natural size; twig and fruit, one-half natural size

Leaves: simple, alternate, 4 to 10 inches long and 3 to 6 inches wide, with 5 to 7 lobes, toothed, bristle-tipped, separated by wide, rounded clefts, extending over halfway to midrib; at maturity leaves thick, dark green in color and shining above, paler and woolly beneath (particularly along midrib).

Fruit: acorn, borne singly or in pairs, with or without stalks, maturing in autumn of second year. Nut: reddish brown in color, 1/2 to 3/4 inch long, enclosed about 1/2 its length in light brown cup. Meat: yellow, very bitter.

Distinguishing features: orange-yellow inner bark; leaf unbalanced, heavier on outer end, woolly along midrib beneath; acorn small, half enclosed in cup. Lower branches usually remain below half height of tree.

35. CHESTNUT OAK

rock oak

Quercus montana Willdenow

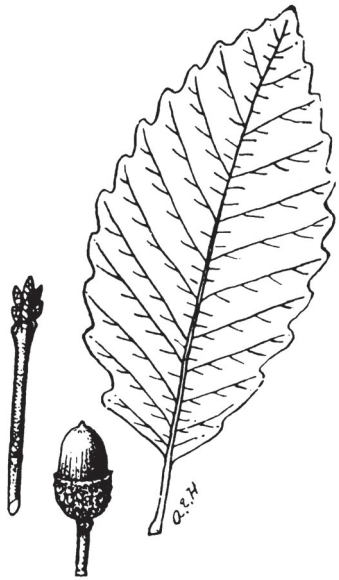
Chestnut oak is named for its chestnut-like leaves. It is found principally on dry, rocky ridges and hillsides and is very common on such soils in the lower Hudson Valley. The wood is similar though somewhat inferior to white oak and is used generally for ties, posts, and rough construction. The lumber is too hard for interior finish.

Bark: on young branches smooth, thin, yellowish brown in color; with age becoming dark brown to black in color, deeply furrowed into long, more or less continuous thick, rough ridges that are sharp and angular. At bottom of furrow, bark may be reddish brown in color. The thick bark of mature trees is an important source of tannin.

Twigs: stout, light orange or reddish brown in color.

Winter buds: clustered at ends of twigs, sharp-pointed, light yellowish brown in color, 1/4 inch long.

Leaves: simple, alternate, thick, yellowish green in color above, somewhat paler beneath, 5 to 9 inches long, coarsely toothed as in chestnut, but teeth rounded and without bristle tips.



CHESTNUT OAK
Leaf, twig, and fruit, one-third natural size

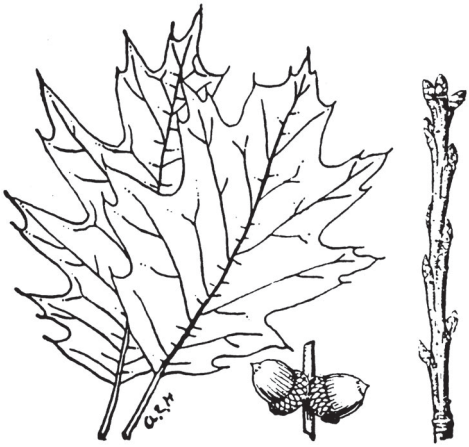
Fruit: acorn, borne singly or in pairs on short stalks, maturing in September of first season, starts sprouting soon after falling; one of our largest native acorns. Nut: shiny, light chestnut brown in color, 1 to 1 1/2 inches long, 1/3 enclosed in cup. Meat: white, somewhat bitter.

Distinguishing features: orange streak between ridges of bark; round teeth or scallops on leaf margin; long, slim acorn.

36. NORTHERN RED OAK

Quercus rubra Linnaeus

Northern red oak is the fastest-growing and largest of all the oaks native to New York State. It shows adaptability to a wide variety of soil conditions and ranges farther north than any other oak common to the state. The wood is heavy, hard, strong, light reddish brown in color, and is used for furniture, interior finish, ties, piling, ships, and general construction, though it is less durable than white oak.



NORTHERN RED OAK
Leaf, one-third natural size; twig an dfruit, one-half natural size

Bark: on young trees smooth, gray green in color; with age tardily breaking into rather regular, firm, elongated, flat-topped ridges with shallow furrows between. Smooth ridge tops markedly lighter in color than furrows. On very large trees, this characteristic is lost at base but is evident higher up trunk. Inner bark red in color.

Twigs: stout or slender, reddish to greenish brown in color.

Winter buds: clustered at ends of twigs, oval, sharp-pointed, 1/4 inch long, generally smooth (particularly on lower half).

Leaves: alternate; simple, 5 to 9 inches long, 4 to 6 inches wide, with 7 to 9 lobes; lobes sparsely toothed, bristle-tipped; wide rounding clefts extending halfway to midrib. At maturity thin, dark, shiny green in color above, paler and smooth below.

Fruit: an acorn, borne solitary or in pairs, either with or without stalk, maturing in autumn of second year; one of our largest acorns. Nut: chestnut brown in color, 3/4 inch long, only 1/5 enclosed in wide, shallow cup. Meat: pale yellow in color, bitter.

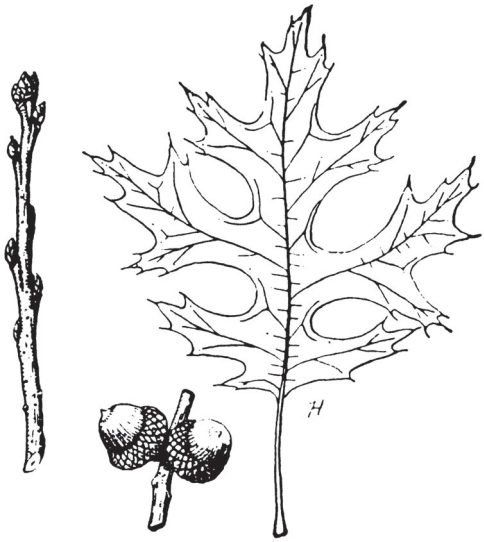
Distinguishing features: reddish inner bark; leaf balanced (no heavier at outer than inner end); large fat acorn with flat cup. In thick woods, lower branches usually are self-pruned to more than half height of tree.

37. SCARLET OAK

Quercus coccinea Muenchhausen

Scarlet oak, so called from its brilliant-colored autumn foliage, is most commonly found on poor soils. The wood is hard, heavy, strong, and coarse in texture. It is of inferior commercial value except in props, ties, and fuel. Because of the characteristic habit and brilliant autumn coloring it is often used for ornamental purposes.

Bark: on young trunks, smooth, light brown in color; with age dividing into irregular ridges with shallow furrows between; in general, ridges not as regularly flat-topped as in northern red oak or as roughly broken up as in black oak; inner bark reddish in color.



SCARLET OAK
Leaf, one-third natural size; twig and fruit, one-half natural size

Twigs: medium stout to slender, light red in color.

Winter buds: broadly oval, blunt at top, clustered at end of twig, dark reddish brown in color, somewhat woolly.

Leaves: simple, alternate, 3 to 6 inches long and 3 to 5 inches wide, with 5 to 9 lobes; lobes toothed, separated by wide, rounding clefts, extending well over halfway to midrib; at maturity leaves thin, firm, shiny, dark green in color above, paler below.

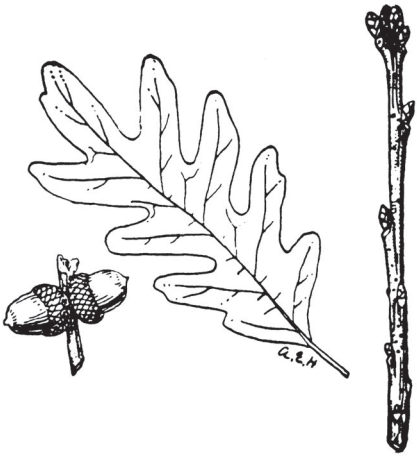
Fruit: acorn, borne singly or in pairs, with or without stalks, maturing in autumn of second year. Nut: oval, reddish brown in color, 1/2 to 1 inch long, 1/2 to 1/3 enclosed in reddish-brown cup. Meat: pale yellow, bitter.

Distinguishing features: clefts between lobes of leaves extending nearly to midrib; lower branches persistent for many years, down curving.

38. WHITE OAK

Quercus alba Linnaeus

White oak is an important forest tree in the southern two-thirds of the state, growing to large size and producing lumber of high grade and value. It is found in moist as well as dry locations and was once particularly abundant on what are now the best farmlands of the Genesee Valley. The wood is hard, heavy, strong, and durable. It is highly prized for furniture, flooring, implements, ties, and in general construction where strength is required, especially in piling and ships. White oak acorns are an important food for wildlife.



WHITE OAK
Leaf and fruit, one-third natural size; twig, one-half natural size

Bark: ashy gray in color, broken by shallow furrows into long, irregular, thin scales that readily flake off; on old trunks furrows frequently become deep.

Twigs: medium in thickness, greenish red to gray in color, smooth, sometimes covered with a bloom.

Winter buds: clustered at end of twigs, blunt, reddish brown in color, 1/8 inch long.

Leaves: alternate, simple, 5 to 9 inches long, with 5 to 9 rounded lobes, generally deeply cleft toward midrib, dark green in color above, paler below, frequently staying on tree over winter.

Fruit: acorn, either with short stalk or stalkless, maturing in one year. Nut: light brown in color, 3/4 inch long, 1/4 enclosed in cup, falling in September, frequently starts sprouting in late autumn. Meat: white, slightly bitter.

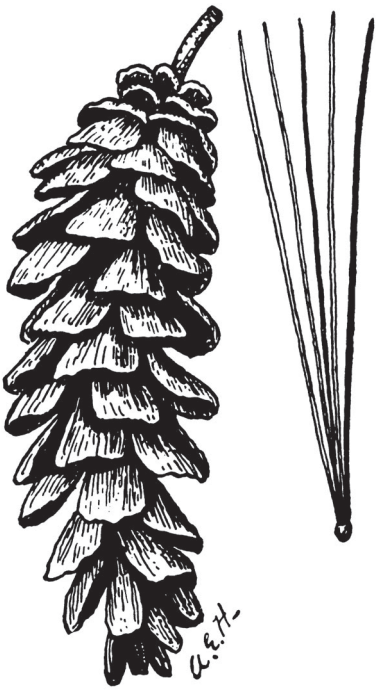
Distinguishing features: ashy gray, flaky bark; deeply cleft lobes in leaves; acorn 1/4 enclosed in cup.

38a. **Swamp white oak** (*Quercus bicolor* Willdenow) is a tree of the moist bottomlands with leaves wider at outer ends and rounded teeth. The bark on young branches and twigs separates into curling scales. The acorn cups are long-stalked and deeply saucer-shaped. The wood has the same uses as that of white oak, and its acorns are also important for wildlife.

39. EASTERN WHITE PINE

Pinus strobus Linnaeus

Eastern white pine is one of the most widely distributed, beautiful, and useful forest trees native to New York. It grows naturally in a wide range of sites, from the steep mountainsides in the Adirondacks to the hillsides and valley swamps of central and western New York. The miles of stump fences still standing in the southwestern section of the state are evidence of the abundance of the tree at one time in this region. The wood is soft, even-textured, very light brown in color, and easily worked. The lumber has a wide range of uses for interior trim, sash and doors, boxes, and buckets. In fact, no other wood in the United States has such a wide range of uses.



EASTERN WHITE PINE
Cone, one-half natural size; needles, natural size

Bark: thin, smooth, and greenish in color on young trees, becoming deeply furrowed and grayish brown in color on older trees.

Twigs: rather slender, brittle, light brown in color.

Winter buds: sharp-pointed, yellowish brown in color.

Leaves: needle-like, in clusters of 5, 3 to 5 inches long, bluish green in color, soft, flexible, staying on twigs for 2 years.

Fruit: cone, 5 to 10 inches long, with short stalks, drooping, cylindrical, 1/2 inch in diameter, tending to curve from stem to apex, requiring 2 years to mature. Seeds: 2 under each scale, winged, ripening in September.

Distinguishing features: needles in clusters of 5; long, limber cone.

40. PITCH PINE

hard pine, yellow pine

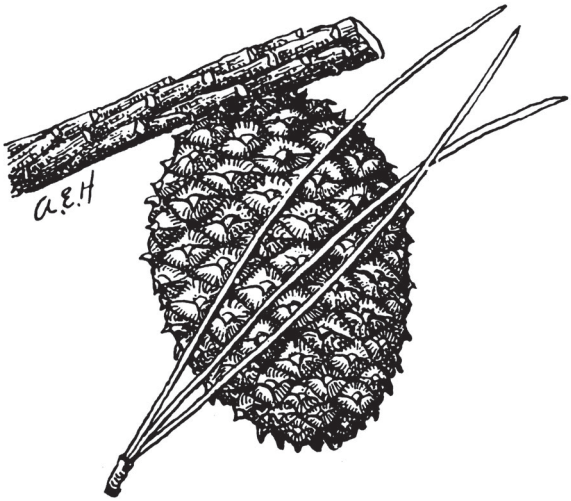
Pinus rigida Miller

Pitch pine is found on dry ridges and slopes in the northeastern section of the state and on Long Island and infrequently elsewhere. The wood is coarse-grained and brownish red in color. The tree seldom reaches a large size and the lumber is generally knotty. Its chief uses are for rough framing lumber, ties, mine props, and crates.

Bark: early becomes very rough and reddish brown to very dark brown in color; with age becoming deeply furrowed into broad, flat-topped ridges separating on surface into loose, dark reddish-brown scales. Unusual thickness of bark makes it New York's most fire-resistant tree. Clusters of needles very commonly found on main trunk.

Twigs: coarse, brittle, golden-brown in color.

Winter buds: conspicuous, pointed, reddish brown in color, resin-coated.



PITCH PINE
Cone and needles, natural size

Leaves: needle-like, in clusters of 3, 3 to 5 inches long, yellowish green in color, very stiff, staying on twigs 2 to 3 years.

Fruit: cone, 2 to 3 inches long, somewhat egg-shaped, without stem, requiring 2 years to mature; persists on tree for many years. Cone scales: each carries stiff recurved prickle. Seeds: 2 under each scale, dark brown in color, ripening in September.

Distinguishing features: needles in 3s; sharp prickles on tip of cone scale.

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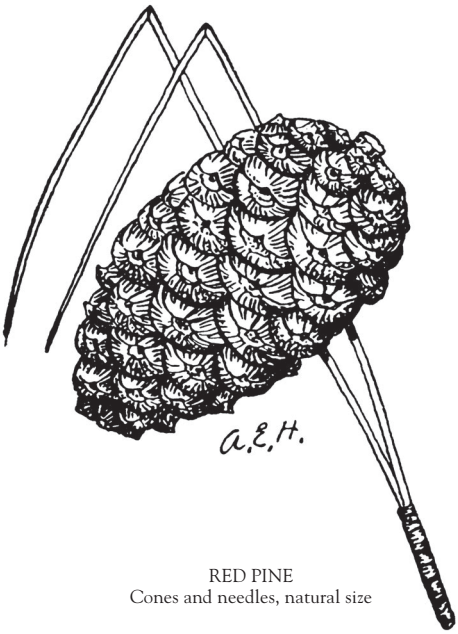
41. RED PINE

Norway pine

Pinus resinosa Aiton

Red pine is a valuable, fast-growing timber tree that is less generally distributed than eastern white pine. It is found commonly on the sandy soils adjacent to the Adirondacks and frequently on dry benches in west-central New York. The wood is light, medium in texture, close-grained, pale red in color, and is often sold as white-pine lumber. Because of its rapid growth and relative freedom from insects and diseases, it has been commonly planted on many of the thousands of acres of idle land in the state. This species does not grow well on poorly drained soils.



RED PINE
Cones and needles, natural size

Bark: reddish brown in color, with shallow, flat ridges separating into thin, flaky scales.

Twigs: coarse, reddish brown in color, roughened at base of year's growth.

Winter buds: rather inconspicuous, with pointed reddish-brown scales.

Leaves: needle-like, in clusters of 2; 3 to 6 inches long, dark green in color, slender, remaining on twigs 3 to 4 years.

Fruit: cone, 2 inches long, without stem, requiring 2 years to mature, light brown in color when ripe, staying on tree into next season. Cone scales: without spines or prickles. Seeds: 2 under each scale, winged, light chestnut brown in color, 1/8 inch long, ripening in September.

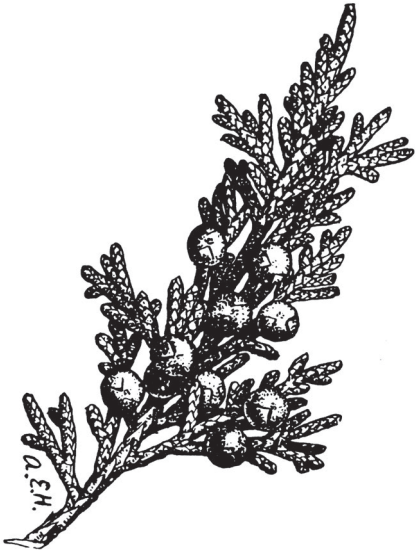
Distinguishing features: needles in 2s, breaking cleanly when bent; nearly round cone without prickles.

41a. **Scotch pine** *(Pinus sylvestris* Linnaeus*)* from Europe has been planted extensively throughout the state. It has naturalized from many of these plantings and is found in a variety of habitats. Its blue-green, twisted flat needles in clusters of 2, tapering cone 2 to 3 inches long with greenish scales, and the orange-brown bark on upper stem and branches are its main characters. It is used for pulpwood, framing lumber, ties, and Christmas trees.

42. EASTERN REDCEDAR

Juniperus virginiana Linnaeus

Eastern redcedar, a small-sized, slow-growing forest tree, is common to the poor, dry soils of the lower Hudson and Mohawk Valleys, is not common in the higher Adirondack region, and is infrequent in central and western New York, except on barren soils adjoining the Finger Lakes. It is found growing only in open woods and pastures where plenty of sunlight is obtained. The wood is soft, light, fragrant, brittle, dull red in color with contrasting white sapwood, extremely durable in contact with the soil, and easily worked. It is largely used in the manufacture of pencils, cedar chests, cabinet work, and interior finish. As a post wood, it has few superiors.



EASTERN REDCEDAR
Natural size

Bark: light reddish brown in color, separating in long, narrow, shreddy strips fringed along edges.

Twigs: generally 4-sided on mature trees, green in color from covering of minute leaves, not flattened or arranged in fan-shaped clusters, becoming reddish brown in color after fall of leaves.

Winter buds: minute, covered by overlapping scale-like leaves.

Leaves: various shades of green to reddish brown in color, persistent 3 to 4 years, of 2 kinds: (1) scale-like, closely overlapping, opposite in pairs, making twig appear 4-sided; (2) awl-shaped, 1/2 to 3/4 inch long, usually on young trees or more vigorous shoots and yellowish green to light bluish green in color, sharp-pointed.

Fruit: berry-like cone, 1/4 inch in diameter, light blue in color, with bloom at maturity in the autumn of first year. Fruit remains on tree during winter, highly prized by birds. Seeds: 1 to 2, wingless, brown in color, covered with thin, sweet flesh that has resinous flavor.

Distinguishing features: berry-like fruit; 2 kinds of leaves, sharp and awl-like and flat and scale-like.

43. SASSAFRAS

Sassafras albidum (Nuttall) Nees

Sassafras is a small to medium-sized, shade-intolerant tree, best known, perhaps, for its bark and root, which have long been used for making sassafras tea. It is rare or absent in the higher Adirondacks and Catskills but is locally common on the sandy soil between these mountain ranges and is abundant on the hills along the lower Hudson River Valley

SASSAFRAS
Twig, one-half natural size; leaf, and fruit one-third natural size

and on Long Island. Its wood is soft, weak, brittle, coarse-grained, aromatic, and very durable in contact with the soil. It is used locally for fence posts.

Bark: reddish brown in color, deeply furrowed even in young trees, with flat-topped ridges crossed by horizontal cracks; inner layers bright cinnamon red in color.

Twigs: slender, brittle, spicy to smell, at first light yellowish green in color, later becoming reddish brown.

Winter buds: terminal bud present, 1/3 to 3/5 inch long, pointed, greenish in color; lateral buds much smaller.

Leaves: alternate, simple, 4 to 6 inches long, entire margined, varying greatly in shape on same tree, some ovate, others mitten-shaped (both left and right handed), still others 3-lobed, more rarely 5-lobed.

Fruit: berry-like, small, dark blue in color, containing a stony seed 1/4 inch long, on a stout red stem, usually in clusters; ripens early in autumn.

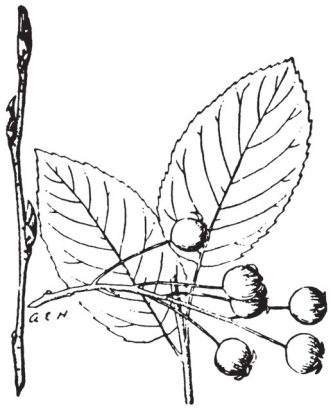
Distinguishing features: leaves with 3 different shapes; inner bark cinnamon red; spicy smell of twigs.

44. SHADBUSH

juneberry, serviceberry

Amelanchier canadensis (Linnaeus) Medikus

Shadbush is an attractive tree though not of value for timber because of its small size. In the spring when the shad are ascending the rivers, its small white flowers are commonly noticed along the drier banks of the streams, along fencerows, and on hillsides in open woods. It is common throughout most parts of the state, particularly in the central and



SHADBUSH
Twig, leaf, and fruit, one-half natural size

southern highlands. Its wood is heavy, harder than white oak, strong, close-grained, and dark brown in color often tinged with red. It is occasionally used for tool handles and is highest of all native woods in heat value.

Bark: very smooth, grayish brown in color, with age often marked with dark lengthwise streaks.

Twigs: slender, somewhat zigzag, olive green to purplish brown in color, smooth, but usually covered by thin grayish outer layer.

Winter buds: terminal bud 1/4 to 1/2 inch long, slender, sharp-pointed, greenish or purplish brown in color; lateral buds somewhat smaller than terminal bud or undeveloped.

Leaves: alternate, simple, ovate, 2 to 4 inches long, sharp-pointed, finely serrate on margin.

Fruit: a berry, sweet, reddish purple in color, about 1/3 inch in diameter, contains many seeds; borne in clusters; ripening in June or July; a favorite food for birds.

Distinguishing features: gray bark marked with streaks; finely serrate leaves; cluster of edible red berries.

45. RED SPRUCE

Picea rubens Sargent

Red spruce is a common and valuable forest tree of the Adirondacks and Catskills and occasionally is found at high elevations (2,000 feet) in eastern New York (Schoharie, Delaware, and Otsego Counties). The wood is light, close-grained, soft, and in great demand for chemical wood pulp. It has a peculiar resonant quality that makes it exceedingly valuable for the sounding boards of musical instruments. It is used also for framing.

RED SPRUCE
Branchlet and cone, one-half natural size

Bark: very thin, peeling off in small reddish-brown scales.

Twigs: slender, reddish brown in color, usually coated with fine, pale hairs.

Winter buds: small, pointed, reddish brown in color.

Leaves: needle-like, borne singly rather than in clusters as with pines, but coming out all around stem, 1/2 inch long, without stalk, yellowish green in color, blunt-pointed, 4-sided in cross-section, remaining on twigs 5 to 6 years.

Fruit: a cone, 1 1/2 to 2 inches long, dark brown when ripe, borne on short stalk, pendant, maturing in one year, mostly falling off before next season. Cone scales: thin, entire-margined. Seeds: dark brown in color, winged, 1/8 inch long, ripening in September.

Distinguishing features: lack of rank odor from crushed needles; cone dark brown and falling early from tree.

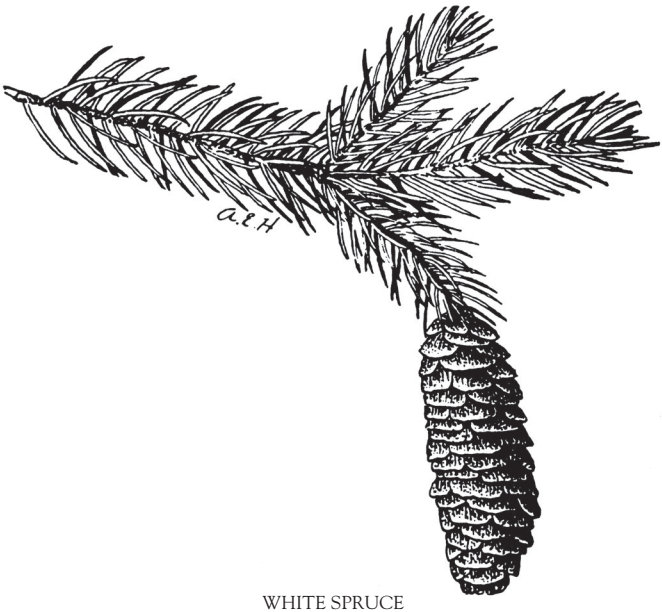
45a. **Black spruce** (*Picea mariana* (Miller) BSP) closely resembles red spruce and covers the same general range but is largely confined to swamps. It is used for pulpwood. The cones, unlike red spruce, remain on the tree for 2 or 3 years.

46. WHITE SPRUCE

cat spruce

Picea glauca (Moench) Voss

White spruce is confined in its natural distribution to the Adirondacks, reaching its best development in the so-called "spruce flats" but extending also far up the mountain slopes. The wood is in great demand for chemical pulp. Its attractive foliage makes it prized as an ornamental tree, for which purpose it is planted far south of its natural range. It is also planted for Christmas trees.



WHITE SPRUCE
Branchlet and cone, natural size

Bark: grayish to pale reddish brown, separating in thin scales.

Twigs: smooth, slender, yellowish brown in color.

Winter buds: small, blunt-pointed, light brown in color.

Leaves: needle-like, borne singly and densely crowded on twigs, light shiny green in color when young, becoming blue-green, 1/2 inch long, 4-sided in cross-section, without stalk, remaining on twig from 8 to 10 years. Odor: strong and rank when crushed.

Fruit: cone with very small stalk, pendant, 1 1/2 to 2 1/2 inches long, pale brown in color when ripe, maturing in one year. Cone scales: thin, rounded, papery, entire margined. Seeds: 2 under each scale, brown in color, winged, 1/8 inch long, ripening in September.

Distinguishing features: papery cone scales; rank odor from crushed needles.

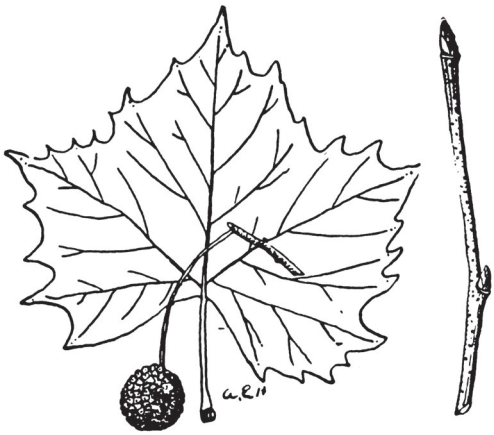
46a. The **Norway spruce** (*Picea abies* (Linnaeus) Karsten) from Europe, the common ornamental spruce of lawns and cemeteries throughout the state, also is used extensively in forest plantations. It has naturalized and is sometimes considered a troublesome weedy species. The cones, more than 6 inches in length, easily distinguish it from our native spruces.

47. SYCAMORE

buttonball, buttonwood, plane tree

Platanus occidentalis Linnaeus

Sycamore is a large-sized forest tree that is common throughout the state except in the Adirondacks and higher Catskills and on Long Island. This species is most often found wherever the soil is moist and fertile, along streams, on river bottoms, in low, damp woods, and occasionally in drier places. Its wood is heavy, tough, hard, not strong, coarse-grained, reddish brown in color, and difficult to split or work. It is used for crates, tobacco boxes, butchers' blocks, novelties, and occasionally for furniture and interior woodwork.



SYCAMORE
Leaf, one-third natural size; twig and fruit, one-half natural size

Bark: dark brown in color at base of older trunks, shallowly furrowed into broad ridges that are broken up into small plate-like scales; higher up on trunk and branches, peeling off in large, thin plates exposing areas of whitish, yellowish, or greenish inner bark that are very striking in winter.

Twigs: rather stout, somewhat shiny, zigzag, at first green in color and fuzzy, later grayish or brownish and smooth.

Winter buds: terminal bud absent; lateral buds conical, dull-pointed, smooth, reddish brown in color, 1/4 inch long, only 1 scale visible, forming cap over bud.

Leaves: alternate, simple, broad, from 4 to 10 inches across, with 3 to 5 shallow lobes, thin, firm, smooth, bright green in color above, pale green and white woolly below, base of the stalk surrounding bud.

Fruit: ball, brown in color, about 1 inch in diameter, borne on long stem, made up of tiny seeds. Seeds: each furnished with long tuft of hairs; seed balls seldom break up before spring.

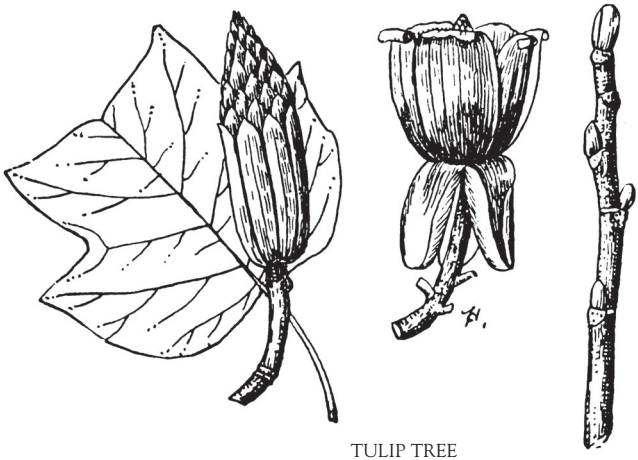
Distinguishing features: whitish to greenish under-bark on upper trunk and limbs; bud with 1 scale forming cap; broad leaves, woolly below; fruit a brown, pebbly grained ball.

48. TULIP TREE

yellow-poplar, tulip-poplar, whitewood

Liriodendron tulipifera Linnaeus

Tulip tree is one of our most distinctive and attractive trees. It is native from Saratoga and Rensselaer Counties westward along Lake Ontario to Lake Erie and becomes more abundant southward in deep, rich, moist soils. It is named for its large, tulip-like, greenish-yellow flowers. The wood is light, soft, brittle, not strong, straight-grained, light yel-



TULIP TREE
Flower, fruit, and leaf, one-half natural size; twig, two-thirds natural size

low or brown in color. It is largely made into lumber and interior finish and used where a soft, easily worked wood is required. Veneer of yellow-poplar is highly prized in airplane construction.

Bark: on young trees, smooth, ashy gray or brown in color; on older trunks, light gray to brown, thick, distinctly and regularly furrowed and ridged.

Twigs: smooth, shiny, rather stout, reddish brown in color, often branching first year, aromatic odor, very bitter taste.

Winter buds: terminal bud smooth, flattened, about 1/4 inch long, simple, blunt, covered by 2 reddish-brown bud scales giving appearance of a mitten; lateral buds similar but much smaller.

Leaves: alternate, simple, 4 to 6 inches long, almost square in outline, usually 3- or 4-lobed with truncate tip; most distinctive and unusual leaf of any of our native forest trees.

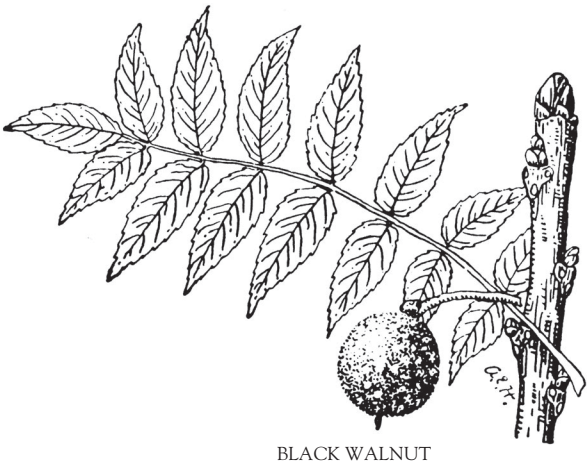
Fruit: cone, light brown in color, upright, pointed, 2 to 3 inches long. Seeds: long winged, ripening in September, and mostly falling soon after; outer ring of winged seeds may stay on tree into next season.

Distinguishing features: unusual leaf, with "cutoff" tip; bitter taste, aromatic odor of twigs; mitten-like terminal bud.

49. BLACK WALNUT

Juglans nigra Linnaeus

Black walnut is a valuable timber tree native to some areas of New York State. It can reach a large size and produces highly prized wood and large, edible nuts. It is common at low elevations in rich, well-drained bottomlands north to Saratoga and Jefferson Counties and west to Lake Erie. The wood is heavy, hard, strong, durable, rich dark brown in color, easily worked, and takes a fine polish. It is largely used in cabinetmaking, interior trim, and for gunstocks. It deserves protection and planting in suitable locations.



BLACK WALNUT
Leaf, one-fifth natural size; twig, three-fourths natural size; fruit, one-third natural size

Bark: thick, dark, deeply furrowed with rounded ridges between; grayish brown in color; inner bark dark chocolate brown in color.

Twigs: at first hairy, later smooth, stout, brittle, orange brown in color, cream-colored chambered pith.

Winter buds: terminal bud pale, downy, scarcely longer than broad, blunt-pointed, less than 1/3 inch long; lateral buds less than 1/6 inch long.

Leaves: alternate, compound, with 13 to 23 leaflets; leaflets 3 to 4 inches long, sharp-pointed, serrate along margin, usually stalkless; leaves up to 2 feet in length.

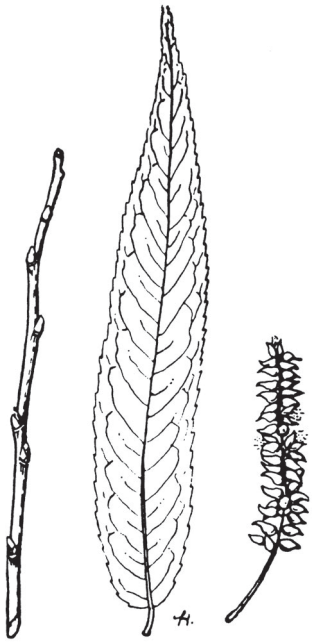
Fruit: a round nut, 1 1/2 inches in diameter, black, surface roughened by rather coarse ridges, enclosed in a yellowish green, fleshy husk, usually solitary or in clusters of 2, ripening in October. Kernel: sweet, edible, and when properly cured somewhat easier to extract than butternut. Outer husk must be removed if nuts will be stored.

Distinguishing features: large round nut; cream-colored, chambered pith.

50. BLACK WILLOW

Salix nigra Marshall

Black willow is the largest and most widely distributed of the native willows, although it is rare above an altitude of 2,000 feet in the Adirondacks and in the pine barrens of Long Island. It prefers moist or wet soils along streams or lakes but is sometimes found on fresh, gravelly or sandy soils where it can get plenty of light. It is of little importance as a timber tree because it often divides into several crooked, medium-sized trunks close to the ground and the wood is soft and weak. It is used chiefly for boxes, excelsior, pulp, and also for artificial limbs because of its lightness.



BLACK WILLOW
Twig, leaf, and fruit, two-thirds natural size

Bark: thick, rough with wide ridges covered by thick scales, varying in color from light to dark brown.

Twigs: slender, smooth, somewhat drooping, very brittle at the base, reddish brown in color; may take root and grow if they fall to the ground.

Winter buds: terminal bud absent, lateral buds small, sharp-pointed, reddish brown in color; only 1 bud scale.

Leaves: alternate, simple, linear, sharp-pointed, finely serrate margin, dark green in color above, pale green below.

Fruit: a smooth capsule, about 1/8 inch long, occurring in large numbers on drooping tassels, ripening in spring, reddish brown in color. Seeds: within capsule, covered with dense tuft of long, silky hairs.

Distinguishing features: narrow leaves; small buds with 1 bud scale.

50a. The **shining willow** (*Salix lucida* Muhlenberg) is an attractive small tree of moist soils, used extensively for holding soil in place where erosion is to be feared and also for ornamental plantings. Its shiny, broad leaves and yellowish-brown twigs will help to distinguish it from the black willow.

COMMON AND SCIENTIFIC NAMES OF OTHER TREES MENTIONED

Common Name	**Scientific Name**
1a. White-cedar	*Chamaecyparis thyoides* (Linnaeus) BSP (page 16)
2a. Red ash	*Fraxinus pennsylvanica* Marshall (page 17)
3a. Green ash	*Fraxinus pennsylvanica* Marshall var. *lanceolata* (Burkhausen) Sargent (page 18)
13a. Sweet cherry or Bird cherry	*Prunus avium* Linnaeus (page 28)
14a. Chokecherry	*Prunus virginiana* Linnaeus (page 29)
28a. European larch	*Larix decidua* Miller (page 43)
Striped maple	*Acer pensylvanicum* Linnaeus (page 46)
Norway maple	*Acer platanoides* Linnaeus (page 46)
Box-elder	*Acer negundo* Linnaeus (page 46)
Mountain maple	*Acer spicatum* Lambert (page 46)
Black maple	*Acer nigrum* F. Michaux (page 46)
Bur oak	*Quercus macrocarpa* Michaux (page 50)
Pin oak	*Quercus palustris* Muenchhausen (page 50)
Post oak	*Quercus stellata* Wangenheim (page 50)
38a. Swamp white oak	*Quercus bicolor* Willdenow (page 55)
41a. Scotch pine	*Pinus sylvestris* Linnaeus (page 58)
45a. Black spruce	*Picea mariana* (Miller) BSP (page 62)
46a. Norway spruce	*Picea abies* (Linnaeus) Karsten (page 63)
50a. Shining willow	*Salix lucida* Muhlenberg (page 67)

MAKING A TREE COLLECTION

This bulletin, as originally published, was designed for use by participants in 4-H forestry projects. The following sections are designed specifically for 4-H projects and contests. These sections, however, have broader applications for those who have a general interest in the study of forestry or botany.

The main requirement of the forest appreciation project is to make a collection of (1) the leaves and (2) the winter twig with the buds of *each* of at least 15 *forest* trees. This collection is the check on whether a club member has learned to identify his or her tree neighbors. Such collections also may be used for exhibit material at school and county fairs and in nature study programs. Fruits are not required to complete this project but add to the interest of the collection.

Collecting the specimens for mounting

WHEN TO COLLECT

Leaves. Because this project begins in the autumn, many trees will have dropped their leaves. Green leaves are the best to use in the collection, so leaves of all but the conifers should be collected after the end of May.

Fruits. Most fruits should be collected in the autumn when seeds are matured. The collection can be completed in spring and summer with seeds from the few trees that fruit in these seasons.

Twigs. Small branches may be collected anytime in the autumn or winter after the leaves have dropped. Of course, conifers that keep their leaves (all but the larches) have full-sized buds by October. A twig from one of these trees bears the leaves and occasionally the fruit as well.

WHERE AND WHAT TO COLLECT

Leaves. Specimens of average size should be selected; those that are extra large and found on sprouts or vigorously growing seedlings should not be taken. In specimens that have compound leaves (locusts, walnuts, hickories, ashes), the **whole** leaf, not just the leaflet, should be obtained. Leaves of **black walnut, butternut,** the **hickories**, or **honey-locust** may be too large to mount easily, so smaller but typical specimens should be gathered.

Twigs. The twig should be cut about 5 inches long, from a live side branch (not from the top shoot, which would spoil the tree). Sprout growth should be avoided. Lower branches that are heavily shaded may not show typical features. The specimen should include the terminal bud (if present in the species) and several side (lateral) buds. Dead branches, of course, are not acceptable.

The twigs should be cut on a slant to expose the pith. This is particularly important for **black walnut, butternut,** and **American chestnut**. If several twigs are collected on any one day, each should be tagged to prevent identification mistakes.

Fruits. Many fruits, such as nuts from **hickories** and **walnuts**, samaras of **maples**, seeds of **white ash,** balls of **sycamore**, and pods of **locusts** are easy to find and collect. However,

a close watch must be kept for many others. The fruits of **cucumber** and **tulip** trees are usually high up near the tops of the trees. The worm-like fruits of **poplars** and **willows** drop quickly and must be gathered within a few days after ripening. (Care should be taken not to gather the flowers instead of the fruits.) Catkins of **birches** are often mistaken for the cone-like fruits. It is best to collect several fruits, as well as twigs and leaves, from which to select one or more good-looking specimens for mounting, and to have others in case of accident.

Preparing the specimens for mounting

Leaves. When gathering leaves, carry a good-sized notebook to hold the specimens without crushing them. A good substitute is a large catalog. For each tree, select two or more leaves, taking foliage without holes, galls, or unnatural shapes. For **sassafras**, a sample of each of the three shapes should be collected.

Keep the leaves of each tree together with a piece of paper bearing the name.

Carefully dry and press the leaves as soon as they are brought from the woods. This may be done in a press similar to that used in school for flowers and leaves. A simple press can be made at home by placing the leaves, well spread out and not overlapping, between sheets of newspaper on a flat surface and placing a weighted board on the pile of papers. Specimens can be kept in the press until you are ready to mount them. Dip **hemlock** and **spruce** in shellac to hold the needles.

Twigs. These small branches, except for those of the conifers, should be kept, properly tagged, in a cool, dry place where they will dry gradually. The twigs of conifers should be mounted at once or the leaves will drop off.

Fruits. Many of the fruits are fragile, such as the cones of **birches** and **balsam fir** (which should be collected green) and **sycamore** balls, and should not be pressed. Such fruits, if dipped in paraffin, rubber cement, or white shellac, will remain in good condition. Delicate fruits of **willows** and **poplars** keep well if placed in small cellophane or oiled paper bags, which can be mounted complete.

Mounting the specimens on paper

EQUIPMENT

A set of outside covers, paper or cardboard sheets for mounting each tree sample, corrugated cardboard, magic tape or thin strips of bond paper, a small bottle of white glue, a small jar of white shellac, and letter envelopes are used in mounting specimens. All of the items on this list may not be required, depending on the specimens collected and the method of mounting.

If you obtain your own mounting sheets, use heavy buff or white paper or cardboard, punched to fit the covers. Plain writing paper will wrinkle and warp too greatly for good appearance.

Cut the corrugated cardboard into strips 1 inch wide and 10 1/2 inches long to create "fillers" to be punched and placed between the mounting sheets to make the book level. For large fruits, such as pine cones and nuts, two or three fillers may be needed to bring the sheets even.

Names and uses of trees

Each sheet is to bear the specimens from one tree only. Each specimen should be labeled. In the lower righthand corner of the sheet (or on a separate piece of paper that is then glued in the lower righthand corner), write the scientific name of the plant. Write a sentence or two describing that habitat and associated species. Write the exact location of the plant: state, county, township, road or roads, mileage from a city or intersection.

The uses of the tree may be listed. Some trees such as thornapple and pin cherry have no commercial uses but may furnish cover and food for game, serve as erosion control, or function as a "nurse crop" to prepare a good seedbed for the more valuable trees. Write the name of the collector (in most cases, this is you) or collectors, assign a number to the collection, and write the date of the collection.

Method of mounting

Mount the leaves with tape or glue. If you use tape only, cut and set aside a supply of narrow strips 1 1/2 to 2 inches long. Arrange the leaf on the paper, and fasten the points and stem in place with tape (see page 72). Be sure to leave space for the twig and the fruit and the name and uses of the tree.

If you use white glue, apply it to the leaf surface that will adhere to the paper, put the leaf in place, and gently rub with the hand on a piece of scrap paper placed over the leaf or needles. This pressure assures contact of the leaf or needle with the paper. Remove the piece of paper and throw it away. If a specimen breaks, use one of the extra samples collected. Finally, fasten the leaf at tips and stem with tape or glued paper strips. Mount the other leaf (if simple) in the same way but with the undersurface showing.

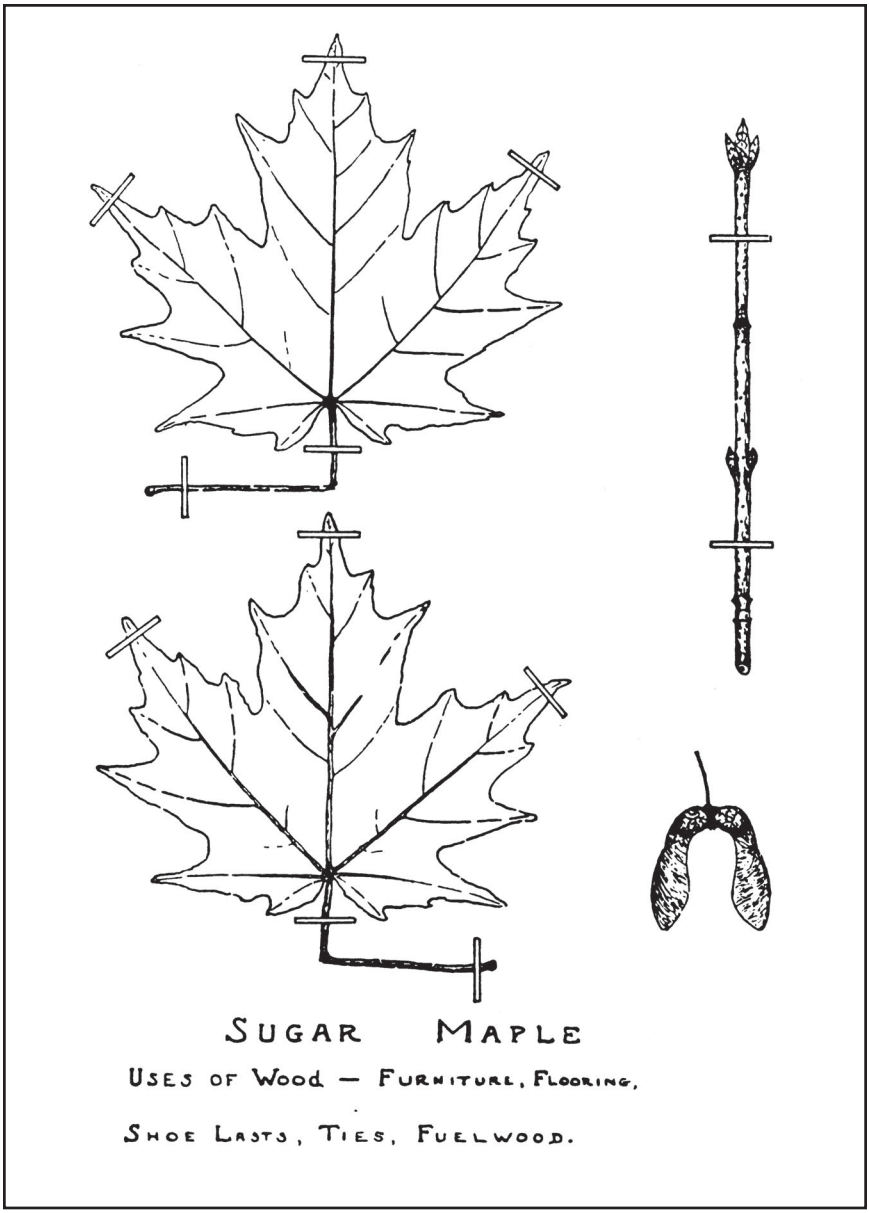
For compound leaves, it is unnecessary to mount two whole leaves because a leaflet may be turned over to show the undersurface. This should be done when the leaf is put into the press. With long leaves such as those of the walnuts the leaf stem may be bent in the middle so that the whole leaf can be mounted on the sheet.

Twigs are best mounted with tape (see page 72), or they may be held on the paper by thread that is sewn through the paper from above and tied beneath.

Large fruits (pine cones, nuts, and the fruit of cucumber) that are round and difficult to mount may be cut in half lengthwise. These can be fastened with glue, shellac, or tape. Nuts can be halved or cross-sections cut with a fine saw. Fragile fruits may be placed in small transparent enclosures (e.g., sandwich bags) that can be mounted on the paper. For instance, the cones of pines, pods of locusts, and husks and burrs of nut trees should be included. It is good to separate an individual seed and mount it by itself with glue.

Finishing the collection book

Finally, place the mounted sheets between the outside covers. Write your name, address, and county on the top cover. Fasten the collection together attractively with string, cloth tape, small ribbon, rawhide, or, to make it more "woodsy," use small rootlets from hemlock or bark from basswood branches.



The top leaf shows the upper surface; the bottom leaf the lower surface

Plate 3

GLOSSARY

Alternate	One (leaf or bud) at a node; placed singly at different heights on the stem.
Blade	The expanded part of a leaf; the leaf excluding the petiole.
Chambered pith	Pith in transverse plates with air cavities between them.
Compound leaves	Those in which the blade consists of two or more separate parts (leaflets).
Deciduous	Falling off in autumn or before.
Entire	Having a continuous unbroken margin, not toothed, notched, or divided.
Lanceolate	Several times longer than wide, broadest near the base and narrowed to the apex.
Leaflet	One part of a compound leaf.
Leaf scar	A scar left on the twig when a leaf falls.
Linear	Long and narrow with parallel margins; line-shaped.
Lobed	Divided into segments about halfway to the middle; segments are larger than teeth.
Margin	The edge of a leaf.
Midrib	The main or central vein of a leaf or leaflet or leaf-like part, a continuation of the petiole.
Node	A joint or place where leaves are attached to a stem.
Oblique (leaves)	Having unequal sides or a base with sides of unequal lengths.
Opposite	Two (leaves or buds) at a node, on opposite sides of an axis.
Ovate	Of the shape of a longitudinal section through a chicken egg, with the broad end toward the base.
Palmate	Radiating fan-like from approximately one point.
Persistent	Remaining attached; leaves not all falling off at the same time.
Pinnate	Arranged feather-like on each side of a common axis.
Serrate	Having sharp teeth pointing forward, saw-toothed.
Simple leaves	Those in which the blade is all in one piece; may be lobed or cleft but not divided all the way to the midrib.
Spur	A short, slowly grown branchlet.
Terminal bud	The bud formed at the tip of a twig.
Thorn	A modified stem or branch with a sharp point.
Truncate	Ending abruptly as if cut off transversely.

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NOTES

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Timber Management for Small Woodlands (147IB180)
Trees: Dead or Alive (147L22)
Wildlife and Timber from Private Lands: A Landowner's Guide to Planning (147IB193)

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