

APPENDIX II

KEY TO DECIDUOUS WOODY PLANTS IN WINTER CONDITION

In this key, length of leaf-scar is the dimension parallel to the long axis of the stem; width is the dimension at right angle to the long axis of the stem. Thus the leaf-scar of maple is short and wide.

If petiole-base is persistent, vein-scars sometimes are not evident until this base is cut off.

KEY TO SECTIONS

- a Leaf-scars opposite or whorled (rarely subopposite). SECTION I, p. 498
- a' Leaf-scars alternate.
 - b Vines, with or without tendrils. SECTION II, p. 500
 - b' Not vines.
 - c Branches with prickles, spines, or thorns, or ending in thorns. SECTION III, p. 501
 - c' Branches without prickles, spines or thorns. SECTION IV, p. 502

SECTION I. LEAF-SCARS OPPOSITE OR WHORLED

- a Vein-scars several, in a complete or nearly complete circle or ellipse; trees.
 - b Terminal bud present; leaves opposite. **FRAXINUS**
 - b' Terminal bud lacking; leaf-scars of unequal size, in whorls of 3; pith continuous; long slender fruits often present. **CATALPA**
- a' Vein-scar 1, or several crowded in a straight, curved, or C-shaped line, appearing as 1. (See a".)
 - c Vines, without tendrils, but often with bands of aerial rootlets below nodes. **CAMP SIS**
 - c' Not vines.
 - d Stipules or stipule-scars present.
 - e Terminal bud present; stipules or stipule-scars minute; twigs often green, often lined from nodes, sometimes cork-winged; small trees or erect or prostrate shrubs. **EUONYMUS**
 - e' Terminal bud absent.
 - f Twigs with terminal thorns; buds appressed. **RHAMNUS**
 - f' Twigs without thorns; buds sunken in bark; leaf-scars sometimes whorled; stipules or their scars nearly or quite connecting leaf-scars. **CEPHALANTHUS**
 - d' Neither stipules nor stipule-scars present.
 - g Vein-scar 1; leaf-scar sometimes on persistent petiole-base.
 - h Twigs with decurrent ridge from middle of leaf-scar, thus appearing rather sharply 2- or 4-edged.
 - i Leaf-scar raised by enlarged node, vein-scar obscure; low, somewhat prostrate, shrubs; twigs very slender. **Hypericum hypericoides**
 - i' Leaf-scar not raised by enlarged node; erect shrubs. **HYPERICUM**
 - h' Twigs not as above.
 - j Buds fusiform, scales many; twigs orange, brown, or greenish. **FORSYTHIA**
 - j' Buds ovoid, scales about 4-6; leaf-scar raised.
 - k Leaf-scars often torn or obscure, connected or partly connected by a line; pith hollow or continuous; stems very slender. **SYMPHORICARPOS**
 - k' Leaf-scars not obscure, not connected; pith continuous. **LIGUSTRUM**
 - g' Vein-scars crowded in a transverse straight, curved, or C-shaped line.
 - l Trees; buds brown to almost black, or gray-hairy, lateral ones rounded at summit and flattened parallel to twig, terminal ones short-conic; twigs glabrous or pubescent, sometimes 4-angled. **FRAXINUS**
 - l' Shrubs; buds not as above.
 - m Twigs slender, often hairy; leaf-scar tiny, somewhat raised; small black berry-like fruits in panicles often present. **LIGUSTRUM**

- m' Twigs moderate, glabrous or nearly so; leaf-scar of moderate size.
 - n Vein-scars in a C-shaped line, usually near middle of leaf-scar; buds superposed; lenticels conspicuous. **CHIONANTHUS**
 - n' Vein-scars in a straight or slightly curved line, usually above middle of leaf-scar; buds not superposed. **SYRINGA**
 - a'' Vein-scars 3 or more, separate.
 - o Bark with spicy fragrance; bud or bud-aggregate hairy, scales not distinguishable; leaf-scar deeply or shallowly U-shaped. **CALYCANTHUS**
 - o' Without the above set of characters.
 - p Many twigs ending in thorns; end-bud lacking; buds appressed. **RHAMNUS**
 - p' Twigs not ending in thorns; end-bud present or absent.
 - q Buds without scales, stellate-scurfy. *Viburnum lantana* & *V. alnifolium*
 - q' Buds with at least 1 scale, sometimes hidden by petiole-base.
 - r Axillary bud hidden or partly hidden by petiole-base, when hidden, later growing through it; vein-scars C-shaped; bud-scales 2, mostly hairy; end-bud lacking. **PHILADELPHUS**
 - r' Axillary bud not as above.
 - s Bud-scale 1 or appearing as 1.
 - t Buds plump, often rounded more on side away from twig; leaf-scars all opposite. *Viburnum opulus*
 - t' Buds slender, many of them subopposite or alternate. *Salix purpurea*
 - s' Exposed bud-scales 2 or more.
 - u Exposed bud-scales 2, valvate or rarely separated near base.
 - v Leaf-scar usually raised at first on persistent petiole-base which is later deciduous; twigs often brightly colored (red, green, yellow); globose terminal flower-buds present, or terminal buds slender; twigs and buds often with short hairs appressed parallel to long axis of twig. **CORNUS**
 - v' Leaf-scar not raised on petiole-base; terminal bud sometimes long and slender, sometimes widened at base but not globose; hairs of twigs absent or usually not as above.
 - w Buds not long and slender, not long-tapering at tip; vein-scars sometimes more than 3; buds and/or twigs downy or glabrous; small trees. *Acer spicatum*
 - w' Lateral buds long and narrow, appressed; terminal buds often flask-shaped; or buds not so long and narrow, then rufous- or brown-scurfy, or rarely glabrous; hairs sometimes stellate; vein scars 3; shrubs and small trees. *Viburnum lentago* & *V. prunifolium*
 - u' Exposed bud-scales more than 2.
 - x Twigs with a ridge decurrent from middle of line connecting leaf-scars. **DIERVILLA**
 - x' Twigs without such a ridge.
 - y Leaf-scars rather large, sometimes fan-shaped; vein scars 3, 5, or 7; lenticels conspicuous; tips of twigs usually dead; pith very large; shrubs. **SAMBUCUS**
 - y' Without the above set of characters.
 - z Terminal bud absent; stipule-scars conspicuous; bark of twigs white-streaked. **STAPHYLEA**
 - z' Terminal bud, remnant of last year's inflorescence, or scar of that inflorescence, present; stipule-scars absent.
 - aa Terminal bud ovoid, 1 cm long or more, with 12 or more visible scales (or twig terminated by inflorescence-scar); vein-scars

separate and more than 3 or in 3 groups;
twigs stout. **AESCULUS**

aa' Terminal bud smaller or with fewer scales;
other characters not as above.

bb Leaf-scars small, raised on petiole-
base; pith sometimes excavated;
vines and shrubs; vein-scars 3.
LONICERA

bb' Leaf-scars not small and
inconspicuous, rarely raised on
petiole-base.

cc Outer papery brown bark
easily separating from inner;
vein-scars 3 or, if more, buds
brown-woolly; dry corymbose
or paniculate clusters of
flowers or of capsules often
present. **HYDRANGEA**

cc' Outer bark not easily
separating; fruits, if present,
samaras or drupes; vein-scars
3; leaf-scars short, often like a
short wide V or U.

dd Visible bud-scales
usually more than 6; if
fewer than 6, one or
more of the following
characters present:
twigs green, brown, or
red-brown; twigs
glaucous; twigs with
milky sap; lateral buds
collateral; leaf-scars
meeting at upward-
pointing angle. **ACER**

dd' Visible bud-scales
usually not more than
4, rarely 6, the first 2
with bases connected;
lateral buds longer
than wide, somewhat
appressed; none of the
characters listed after
the colon above
present. *Viburnum*
acerifolium, *V.*
recognitum, *V.*
dentatum, *V.*
rafinesquianum & *V.*
molle

SECTION II. LEAF-SCARS ALTERNATE; PLANTS VINES

a Vines with tendrils.

b Tendrils attached to persistent petiole base; veins of stem scattered; monocots, usually prickly. **SMILAX**

- b' Tendrils attached to stem, opposite leaf-scars; veins in a circle around central pith; dicots; not prickly; stipule-scars short and wide; vein-scars in an ellipse or a C-shaped line.
- c Pith brown, a diaphragm at each node; bark of older stems shredding; tendrils twining, not ending in disks. **VITIS**
- c' Pith white or green, without diaphragms; bark not shredding; buds globose to conic.
- d Tendrils usually ending in adhesive disks; pith continuous. **PARTHENOCISSUS**
- d' Tendrils twining, not ending in disks; pith eventually in thin plates. **AMPELOPSIS**
- a' Vines without tendrils; aerial rootlets sometimes present.
- e Vein-scar 1 or several confluent appearing as 1.
- f Minute stipules or stipule-scars present; bud-scales mucronate. **CELASTRUS**
- f' Stipules and stipule-scars absent.
- g Wartlike or spinelike projections at side of leaf-scar; bud acute. **WISTERIA**
- g' No projections at side of leaf-scar; bud obtuse, hairy. **SOLANUM** (See g".)
- g'' No projections at side of leaf-scar; bud an indistinguishable mass. **LYCIUM**
- e' Vein-scars more than 1, separate.
- h Leaf-scar short and wide, a thin line; vein-scars 3; usually prickly. **ROSA**
- h' Leaf-scar about as long as wide; vein-scars 3-many; not prickly; buds hairy.
- i Buds naked, single, not covered; with aerial roots; poisonous to touch. **TOXICODENDRON**
- i' Buds not naked, superposed, small, the lower under circular leaf-scar. **MENISPERMUM**

SECTION III. LEAF-SCARS ALTERNATE; NOT VINES; TWIGS BEARING PRICKLES, SPINES, OR THORNS, OR ENDING IN THORNS

- a Twigs with silvery or brown peltate scales. **ELAEAGNUS**
- a' Twigs without such scales.
- b Twigs with prickles and/or with branched or unbranched spines.
- c Leaf-scars short and wide, encircling the stout twigs halfway or more; vein-scars about 12 or more; prickles present. **ARALIA**
- c' Without the above set of characters.
- d Spines in position of leaf-scars, below buds or spurlike branches. **BERBERIS**
- d' Spines below leaf-scars or in position of stipules, or spines absent.
- e Spines below leaf-scars; prickles may be present, also. **RIBES**
- e' A pair of stipular spines at each node; buds woolly, superposed, hidden under leaf-scar; end-bud lacking; trees. **Robinia** (See e".)
- e'' Spines absent; prickles present, at nodes and/or between nodes.
- f A pair of stiff prickles in position of stipules; buds woolly, not hidden; end-bud present; petiole-base deciduous; shrubs or small trees. **ZANTHOXYLUM**
- f' Buds not woolly or, if so, then petiole-base persistent; shrubs.
- g Leaf-scar prominently raised on persistent petiole base. **RUBUS**
- g' Leaf-scar not so raised.
- h Exposed bud-scales about 6; twigs with decurrent ridges from nodes; outer bark shreddy. **RIBES**
- h' Exposed bud-scales 3 or 4; without decurrent ridges; leaf-scar very short, a thin line. **ROSA**
- b' Twigs with lateral branched or unbranched thorns and/or twigs ending in thorns.
- i Axillary buds superposed, the lower within the leaf-scar, later breaking through the covering; thorns usually branched, above leaf-scars. **GLEDITSIA**
- i' Axillary buds single, above leaf-scar, not covered.
- j Usually 1 thorn at each node, at side of axillary bud; vein-scars more than 3. **MACLURA**
- j' Lateral thorns fewer than nodes or absent; some or all twigs may end in thorns.
- k Vein-scar 1; buds an indistinguishable cluster; twigs 5-angled. **LYCIUM**
- k' Vein-scars usually 3; buds evident and distinguishable.
- l Buds rounded at tip or globose, projecting at rather wide angle from stem, with about 6 fleshy, often red, scales; lateral thorns prominent. **CRATAEGUS**

- l' Buds ovoid to lance-ovoid, acute or bluntly acute, appressed or ascending.
- m Stipule-scars absent; buds glabrous or hairy, the terminal usually present; twigs glabrous or hairy. **PYRUS**
- m' Stipule-scars or stipule-vestiges present; terminal bud absent.
- n Buds appressed, lance-ovoid, often opposite; thorns terminal. **RHAMNUS**
- n' Buds not strongly appressed, ovoid, alternate.
- o Buds small, scales few; stipule-scars round to half-round. **CHAENOMELES**
- o' Buds moderate in size, scales usually several; stipule-vestiges sometimes present; crushed twigs with odor of bitter almonds. **PRUNUS**

SECTION IV. LEAF-SCARS ALTERNATE; NOT VINES; WITHOUT PRICKLES, SPINES, OR THORNS

- a Twigs covered with small branch-scars left by abscission of the featherlike dwarf branches; tiny and inconspicuous leaf-scars present also; gymnosperms. **TAXODIUM**
- a' Branch-scars absent or, if rarely present, then leaf-scars conspicuous.
- b Stipule-scars meeting or extending 3/4 the distance around twigs.
- c Buds more than 1 cm long, fusiform, the lateral ones oblique to twig; bud-scales many; stipule-scars extending about 3/4 distance around twig. **FAGUS**
- c' Buds with 1 or 2 scales; stipule-scars meeting around twig.
- d Leaf-scar ringlike, nearly surrounding bud; end-bud lacking; twigs zigzag; bud scale 1. **PLATANUS**
- d' Leaf-scar not ringlike, not nearly surrounding bud.
- e Scales of terminal bud 2, valvate; bud somewhat 2-edged. **LIRIODENDRON**
- e' Scale of terminal bud 1, bearing a leaf-scar; bud not 2-edged. **MAGNOLIA**
- b' Stipule-scars absent or not as above.
- f Leaf-scars not 2-ranked.
- g Buds superposed, in silky craters; pith pink-brown; vein-scars about 3-5; end-bud lacking; twigs stout. **GYMNOCLADUS**
- g' Without the above set of characters.
- h Axillary buds superposed, covered by leaf-scar, or the upper one not covered.
- i Buds glabrous; pith pale or pinkish. **GLEDITSIA**
- i' Buds woolly; pith brown; twigs sometimes bristly or glandular. **ROBINIA**
- h' Axillary bud replaced or hidden by branch-scars or -vestiges. **HIBISCUS** (See h'')
- h'' Axillary bud hidden or almost hidden under persistent petiole-base. (See h''')
- j Twigs aromatic; bark not shredding; petiole-base terete, not 3-nerved. **Rhus aromatica**
- j' Twigs not aromatic; bark shredding; petiole-base flat, 3-nerved. **POTENTILLA**
- h''' Axillary bud evident, not hidden; petiole-base sometimes persistent.
- k Buds so hairy that scales, if present, are indistinguishable; pith not diaphragmed, not 5-angled.
- l Leaf-scar strongly raised, it and vein-scars often obscure; small shrubs.
- m Vein-scar 1; twigs often woolly. **SPIRAEA**
- m' Vein-scars 3 in base of petiole-stub; twigs often bristly. **RUBUS**
- l' Leaf-scar not strongly raised on petiole-base; vein-scars evident.
- n Leaf-scar ring- or U-shaped, encircling bud or bud-group on 3 sides or more.
- o Twigs stout, smooth or densely hairy; pith large; bud single; vein-scars more than 3. **RHUS**
- o' Twigs moderate; buds superposed.
- p Buds 2 at a node, a low conical mass; vein-scars 3; flat circular winged fruits sometimes persistent. **PTELEA**
- p' Buds usually 3 at a node, uppermost longest, lowermost shortest; vein-scars 3-7; twigs brown, smooth. **CLADRASTIS**
- n' Leaf-scar not ring-shaped or U-shaped.

- q Vein-scars 3 or confluent in a line; stipule-scars present; twigs rather slender. **RHAMNUS**
- q' Vein-scars 5 or more, sometimes grouped or in an ellipse; stipule-scars absent; twigs moderate to stout; plants poisonous to touch. **TOXICODENDRON**
- k' Bud with scales, the scales distinguishable, or, if not, then pith diaphragmed or 5-angled; scales rarely valvate, rarely leaflike.
 - r Bud-scale 1; twigs often with brittle zones. **SALIX**
 - r' Bud-scales 2 or more.
 - s Vein-scars 2; leaf-scars crowded on dwarf branches or scattered on more elongate twigs. **GINKGO**
 - s' Vein-scars 1 or several confluent, appearing as 1. (See s".)
 - t Leaf-scars crowded on dwarf branches or scattered on more elongate twigs; leaf-bases decurrent on elongate twigs; gymnosperms. **LARIX**
 - t' Leaf-scars not crowded on typical dwarf branches; angiosperms.
 - u Leaf-scar raised on clasping 3-nerved petiole-base; stipules persistent. **POTENTILLA**
 - u' Leaf-scar not raised on such a petiole-base.
 - v Twigs green and aromatic, often branching the first year; buds sub-globose. **SASSAFRAS**
 - v' Twigs not green and aromatic.
 - w Twigs covered with silvery or brown peltate scales. **ELAEAGNUS**
 - w' Twigs not covered with such scales.
 - x Stipules or stipule-scars present.
 - y Buds usually superposed; axillary fruits (small red drupes) usually present; tiny pointed stipules often persistent. **ILEX**
 - y' Buds not superposed.
 - z Buds small, hairy; twigs usually puberulent; disklike or cuplike bases of dry capsules often present; small shrubs. **CEANOTHUS**
 - z' Buds not as above, but with ciliate scales; fruits, if present, blackish drupes; small trees. **RHAMNUS**
 - x' Stipules and stipule-scars absent.
 - aa Terminal bud or remnant of terminal inflorescence present.
 - bb Small trees; buds sometimes superposed; pith chambered; twigs sometimes with stellate pubescence. **HALESIA**
 - bb' Shrubs; buds not superposed; pith not chambered.
 - cc Buds (and branches) crowded toward tip of annual stem-segments; terminal flower-buds much larger than lateral buds. **RHODODENDRON** (Azaleas)
 - cc' Buds not crowded toward tip of annual stem-segments.
 - dd Twigs sometimes pubescent (always, in wild species), sometimes with

decurrent lines from leaf-scars;
leaf-scars tiny, often raised;
remnant of inflorescence often
present; buds often pubescent.

SPIRAEA

dd' Twigs glabrous, more or less
glaucous, without decurrent
lines; bud scales ciliate.

NEMOPANTHUS

aa' Terminal bud absent.

ee Trees.

ff Bark with deep fissures
surrounding polygons; outer bud-
scales 2, much overlapping.

DIOSPYROS

ff' Bark not as above; outer bud-scales
more than 2.

gg Buds conical-globose,
projecting at wide angle; fruits
in large terminal panicle.

OXYDENDRUM

gg' Buds ovoid, ascending,
sometimes superposed; fruits
axillary. **HALESIA**

ee' Shrubs; buds usually with more than 2
outer scales, usually of two sizes,
flower-buds larger.

hh Flower-buds resin-dotted.
GAYLUSSACIA

hh' Flower-buds not resin-dotted; bud-
scales mucronate, the outer often
with long sharp points.
VACCINIUM

s'' Vein-scars 3 or more.

ii Pith diaphragmed; trees.

jj Pith hollow between diaphragms, brown; buds superposed.
JUGLANS

jj' Pith solid between diaphragms, white; buds sometimes superposed.
NYSSA

ii' Pith not diaphragmed.

kk Vein scars 3 or in 3 groups.

ll Twigs usually bearing catkins in winter; pith small, 3-sided.

mm Buds stalked; new staminate and carpellate catkins and
old conelike carpellate ones usually present, old ones
with persistent woody scales. **ALNUS**

mm' Buds sessile or somewhat stalked; new cylindrical
staminate catkins and sometimes also old carpellate
ones usually present, scales of old ones deciduous;
twigs sometimes with wintergreen flavor; bark
sometimes separating in white, pink, tan, or brown
layers. **BETULA**

ll' Catkins absent in winter; pith not 3-sided.

nn Twigs spicy-aromatic, without glandular spots.

oo Buds often superposed, often clustered; leaf-scars not
conspicuously crowded toward tip of annual stem-segment. **LINDERA**

- oo' Buds not superposed, not collateral; leaf-scars conspicuously crowded toward tip of annual stem-segment. **COTINUS**
- nn' Twigs not spicy-aromatic.
- pp Lowest bud-scale situated above middle of leaf-scar; branch- and stipule-scars present; pith 5-pointed. **POPULUS**
- pp' Lowest bud-scale not above middle of leaf-scar; branch-scars not regularly present; stipule-scars present or absent.
- qq Leaf-scar raised on persistent petiole-base; pith large, brown, crenate or 5-angled; shrubs. **RUBUS**
- qq' Without the above set of characteristics.
- rr Stipule-scars present.
 - ss Buds superposed; panicles of short resin-dotted oblong pods usually present; shrubs. **AMORPHA**
 - ss' Buds not superposed; panicles of such pods not present.
 - tt Low shrubs; twigs or buds or both pubescent or puberulent; disklike or cuplike bases of capsules often present. **CEANOTHUS**
 - tt' Taller shrubs or trees; fruits of the above sort not present.
 - uu Exposed bud-scales 2 or 3; pith 5-pointed; trees, introduced; native species now only sprouts or young trees. **CASTANEA**
 - uu' Exposed bud-scales usually more than 3; trees or shrubs; pith round or only slightly angled.
 - vv Older bark shreddy; leaf-scars decurrent; buds appressed; fruit clusters (aggregates of follicles) sometimes present. **PHYSOCARPUS**
 - vv' Bark not shreddy; leaf-scars not decurrent; fruits, if present, not aggregates of follicles.
 - ww Crushed bark and wood of twigs with odor of bitter almonds. **PRUNUS**
 - ww' Such odor not present.
 - xx Leaf-scars short; buds projecting at rather wide angle from stem, scales somewhat fleshy, often reddish; fruits if present, pomes. **CRATAEGUS**
 - xx' Leaf-scars half-elliptic; buds-scales ciliate; sometimes remnants of fruits (small drupes) in axils. **RHAMNUS**
- rr' Stipule-scars absent.
 - yy Leaf-scars large, shield-shaped, triangular, or 3-lobed; vein-scars several; terminal bud large, sometimes appearing naked because valvate scales are leaflike, sometimes with overlapping

- scales; buds sometimes superposed; pith 5-pointed. **CARYA**
- yy' Leaf-scars, vein-scars, and twigs not as above.
- zz Outer bark shreddy; leaf-scars decurrent; shrubs. **RIBES**
- zz' Bark not shreddy; leaf-scars not decurrent.
- aaa Twigs brown, green, or reddish; lateral buds very small; leaf-scars mostly toward summit of annual stem-segment (more easily seen on 2-year-old twigs). **CORNUS**
- aaa' Without the above set of characters.
- bbb Pith star-shaped; bud-scales appearing varnished; vein-scars conspicuous; branches cork-winged. **LIQUIDAMBAR**
- bbb' Without the above set of characters.
- ccc Buds globose- or oblong-ovoid; scales fleshy, often red. **CRATAEGUS**
- ccc' Buds ovoid, tip not rounded. (See c".)
- ddd Leaf-scar wide, a thin line. **ROSA**
- ddd' Leaf-scar about as wide as bud; bud sometimes hairy. **PYRUS**
- ccc" Buds elongate, appressed, often red.
- eee Buds long-pointed, about three times as long as wide, often hairy at tip or at edges of scales. **AMELANCHIER**
- eee' Buds short-pointed; scales often edged with glands. **ARONIA**
- kk' Vein-scars more than 3, not in 3 groups.
- fff Buds clustered at ends of branches; bud-scales 5-ranked, often many, closely imbricated; pith 5-angled or -lobed. **QUERCUS**
- fff' Buds not clustered at ends of branches; bud-scales not as above.
- ggg Leaf-scars shield-shaped, triangular, or 3-lobed, large.
- hhh Terminal bud present.
- iii Pith 5-lobed or -angled; buds sometimes superposed; end-bud with overlapping scales or appearing naked because valvate scales are leaflike. **CARYA**
- iii' Pith circular; plants poisonous to touch. *Toxicodendron vernix*
- hhh' Terminal bud absent; pith brown; twigs stout; buds hemispheric; vein scars about 9. **AILANTHUS**
- ggg' Leaf-scars crescent-shaped or short; vein-scars not more than 7.

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smooth; trunks and larger branches fluted; no aments
present in winter. **CARPINUS**

yyy' Bud-scales not 4-ranked; buds not of two sizes, not 4-
angled; aments present in winter.

zzz Bud-scales striate; bark finely furrowed and
scaly; small trees. **OSTRYA**

zzz' Bud-scales not striate; buds blunt at apex; shrubs
or small trees. **CORYLUS**