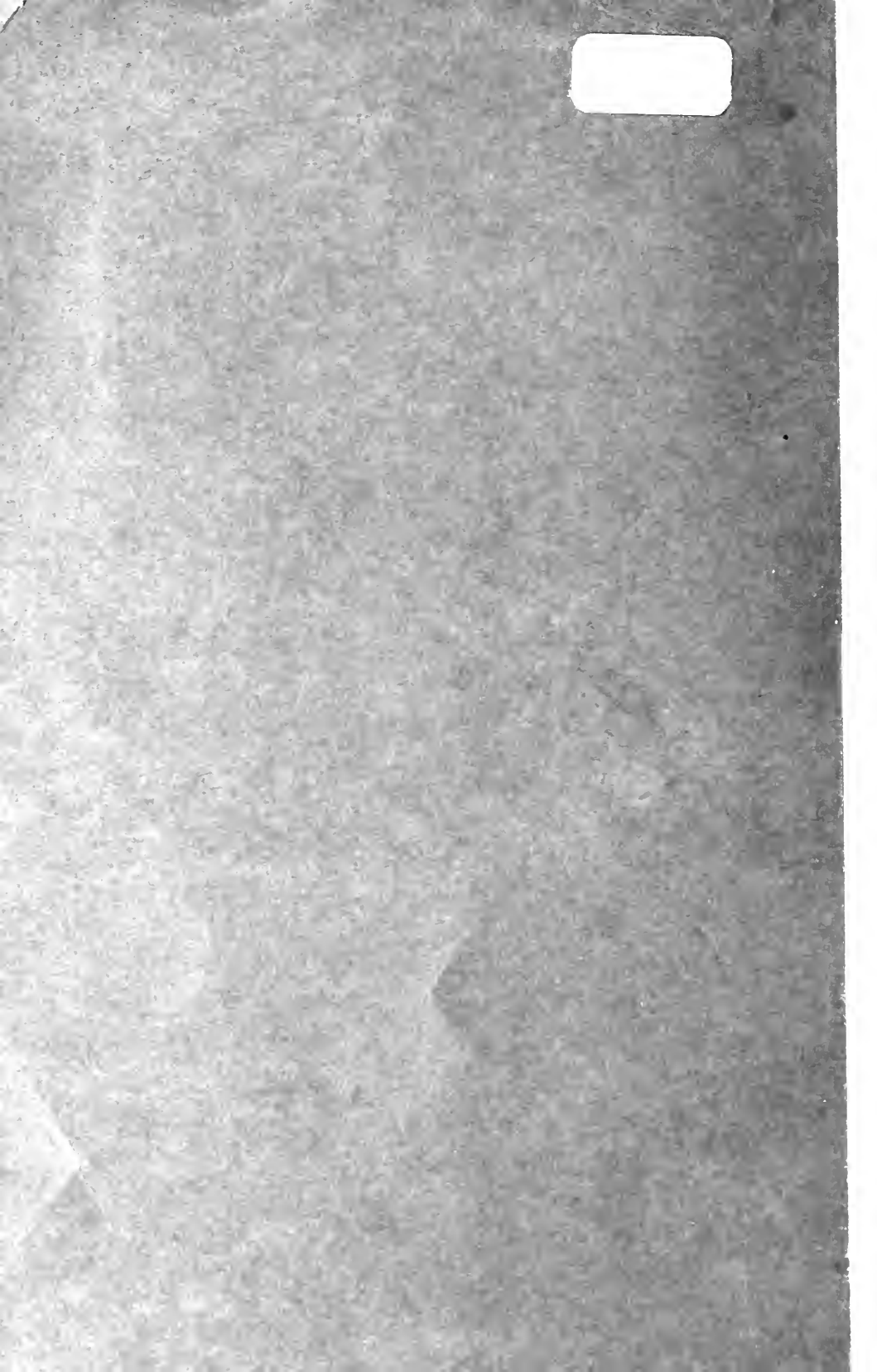


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A field key to the genera of the deciduous
and cultivated hardy trees of the north
U. S. and Canada. by

Mary Franklin Barnard.

Blomfield, N. S. 1931



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A FIELD KEY

TO

The Genera of the Wild and Cultivated
Hardy Trees of the Northeastern
United States and Canada

BY

MARY FRANKLIN BARRETT

formerly of the State Normal School and the State
Teachers' College, Montclair, New Jersey



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Price, Thirty-five Cents

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CONTENTS

Introduction	4
References	6
Key	7
Plate of Leaf and Twig Characters.....	28
Explanation of Terms as used here.....	29
Index to Scientific and English Names.....	37

INTRODUCTION

This KEY is a mechanical device for finding the names of trees by means of characteristics possessed by their leaves, stems and winter-buds. It is mechanical in the same sense as is a crossword puzzle: the leaves are grouped according to similarities in their external structure, and not with regard to their family relationships.

It is called a FIELD KEY because it is intended to be used where trees are growing, since some of the characteristic organs are too large to be carried away. Because leaves are of primary importance for identification the KEY can be used only when trees are in full leaf. The characters which have to do with stems are always on hand, summer and winter. New winter-buds are fully developed by late summer or autumn; but sometimes may be found at other times, unopened, on old twigs.

A tree is a woody plant, 12 feet or more in height, which has one main trunk rising an appreciable distance (a foot or so) above the ground before it branches. Thus it is differentiated from a shrub, which has more than one trunk, or perhaps has none at all above ground. However some shrubs have tree relatives, and these have been included, although their descriptions would not apply necessarily to the shrubs.

The range of the trees included runs from northern Canada to a line about as far south as central Virginia, and west to the Mississippi River. Many of the trees will extend farther south and west. Some genera will grow over most of the range, while others are restricted to a much smaller territory. Only those hardy in at least the southern part of the area have been listed.

Both wild and cultivated trees have been classified. The cultivated ones, many of which have been imported from other countries, often escape into the fields and woods by means of their seeds; and the native forms frequently are cultivated. Thus both kinds may be encountered in the same sort of place.

The KEY is intended to identify genera and not species: for example, the pines and the maples are mentioned, but not the **white** pine or the **sugar** maple. Apparent exceptions are due to the presence in the genus of only one species, which may then be named; to the variation of a species from the rest of its relatives in the genus; or to the fact that the stated name is applied to all the species in the genus. Occasionally large genera, such as PRUNUS, have been subdivided. The same genus may appear several times if its characteristics are so indefinite that a choice in the KEY is difficult, or if its species differ much as to leaves or twigs. In naming the genus the common names are put first, and then the scientific name in a parenthesis. No varieties of species, or hybrids, or doubtful species have been considered in characterizing the genera. The KEY includes most of the species mentioned

by Rehder in his "Manual of cultivated trees and shrubs" as belonging to the eastern part of his "Zones" I-VI and to the eastern and northern parts of Zone VII. With a few exceptions the names are as given by Rehder. There is listed only one genus poisonous to the touch, RHUS, the sumac, whose toxic species have pinnately compound leaves with entire margins and 7-15 leaflets. Other species of RHUS are harmless.

When using the KEY start with section 1; read all the descriptions, choose the one which fits the tree being studied, and then look up the section indicated by the number opposite to the description. Proceed in this way after the manner of a treasure-hunt until a name is reached. As a rule the most striking character is placed first in the description. If no characterization fits, take the best, or try all. Base the decision on a comparison of several leaves, twigs, etc.; not on one alone. Only actual statements in the KEY should be considered. Frequently the first part of a section is more detailed than those which follow it, either because fewer trees are governed by it, or because it is describing a single genus. Absence of these details in the other part or parts does not imply their opposite; it merely means that no general rule can be made as yet. Whenever a term is unfamiliar or doubtful it should be looked up in the EXPLANATION OF TERMS, as even common expressions may here be used in a slightly different sense from that usually understood. The EXPLANATION also gives suggestions for methods of examination. The species may be identified by using more detailed books, such as those listed as references.

The author will greatly appreciate the reporting of any mistakes or difficulties.

Grateful acknowledgement is made of the assistance of Mr. Percy Wilson, Assistant Curator of the New York Botanical Garden, and of the advice of Dr. Otis W. Caldwell of Columbia University. The descriptions in Rehder's MANUAL and Trelease's plates were invaluable in preparing the KEY.



REFERENCES

- Bailey, L. H. The cultivated evergreens. New York. The Macmillan Co. 1923. Keys and descriptions by Alfred Rehder. Illustrated.
- Bailey, L. H. ed. Standard cyclopedia of horticulture. New York. The Macmillan Co. 1914-1917. Keys and short descriptions, with a few illustrations. Cultivated trees, both native and imported, are included.
- Bailey, L. H., and Bailey, E. Z. Hortus. New York. The Macmillan Co. 1930. Keys and short descriptions of cultivated trees and other plants. An abridged encyclopedia, including culture.
- Blakeslee, A. F., and Jarvis, C. D. Trees in winter. New York. The Macmillan Co. 1913. Illustrations of native trees and descriptions.
- Illick, J. S. Tree habits, how to know the hardwoods. Washington. 1924. Illustrations, descriptions and keys to native deciduous trees. Good diagrams and plates, particularly of bark.
- Muenschner, W. C. Keys to woody plants. Ithaca, N. Y. 1922. Summer and winter keys to genera and species likely to be found in New York State. A small pamphlet.
- Rehder, Alfred. Manual of cultivated trees and shrubs hardy in North America. New York. The Macmillan Co. 1927. Very complete descriptions and keys to genera and species of native and imported trees. The main reference for this KEY.
- Rogers, J. E. The tree book. Doubleday, Page & Co. 1914. Descriptions and illustrations of wild and cultivated forms written in an entertaining style with many additional facts of interest.
- Trelease, W. Plant materials of decorative gardening. Urbana, Ill. 1926. Genera and species keys, and descriptions of native and imported trees. In brief form. Very complete.
- Trelease, W. Winter botany. Urbana, Ill. 1925. Keys to genera and species, short descriptions, and plates of twigs of deciduous trees and shrubs. Has been very valuable for this KEY.
- Wiegand, K. M., and Foxworthy, F. W. A key to the genera of woody plants in winter. Ithaca, N. Y. 1908. A pamphlet in key form for field use. Includes cultivated genera.
- Local material on trees published by State Experiment Stations, State Universities, or Departments of Forestry.

KEY

- 1 Leaves evergreen 2
- 1 Leaves deciduous (including evergreen-like forms) 30
- 2 Leaves usually more than 1 cm. wide, resembling deciduous
leaves in shape and veining 3
- 2 Leaves 1 cm. wide or less, not like deciduous leaves 12

BROAD-LEAVED EVERGREENS

- 3 Leaves opposite 4
- 3 Leaves spirally arranged or crowded near tip of twig..... 5
- 4 Leaves entire, blunt or notched at tip, 1-3 cm. long..BOX (BUXUS)
- 4 Leaves usually spiny-toothed, spiny-pointed, 2-6 cm. long
FRAGRANT OLIVE (OSMANTHUS)
- 5 Stipule-scars encircling twig at each node; buds one-scaled
BULL BAY (MAGNOLIA)
- 5 Encircling scars only at beginning of each year's growth; buds
showing more than one scale 6
- 6 Leaves spiny-toothed, at least part-wayHOLLY (ILEX)
- 6 Leaves toothed, although sometimes faintly, never spiny..... 7
- 6 Leaves entire 9
- 7 Only one bundle-scar in the leaf-scar.....HOLLY (ILEX)
- 7 Three bundle-scars in the leaf-scar 8
- 8 Leaves resinous-dotted; visible bud-scales about 2-4
WAX-MYRTLE (MYRICA)
- 8 Leaves not resinous-dotted; visible bud-scales more than 4
PORTUGAL LAUREL, CHERRY LAUREL (PRUNUS)
- 9 Largest buds showing 6 or more scales; leaves 8-20 cm. long
(RHODODENDRON)
- 9 Buds scaleless or showing not more than 6 scales..... 10
- 10 Bundle-scars 3, forming a triangle.....WAX-MYRTLE (MYRICA)
- 10 Bundle-scar one, compound, like a horizontal line 11
- 11 Leaves sharp-pointed, usually crowded at tip of twig
MOUNTAIN LAUREL (KALMIA)
- 11 Leaves blunt-tipped, not usually crowded....RED BAY (PERSEA)

NARROW-LEAVED EVERGREENS

- | | | |
|----|--|----|
| 12 | Conspicuous leaves needle-like; scale-like leaves sometimes also present | 13 |
| 12 | Leaves like scales, spikes or wedges; sometimes more than one type on a tree | 22 |
| 13 | Needles in spirally arranged clusters of 2-8 along twig
PINE (PINUS) ✓ | |
| 13 | Needles in whorls of 3 at nodes on twig. JUNIPER (JUNIPERUS) ✓ | |
| 13 | Needles in a whorl of 15-30 at tip of twig
UMBRELLA PINE (SCIADOPITYS) | |
| 13 | Needles in clusters on spurs and scattered singly on leading shoots CEDAR (CEDRUS) | |
| 13 | Needles always scattered, never in clusters or whorls..... | 14 |
| 14 | Leaves curved, with a keel or ridge on each surface; under surface not paler than upper
JAPANESE CEDAR (CRYPTOMERIA) | |
| 14 | Leaves not as just described | 15 |
| 15 | Twigs bearing cushions or ridges from which leaves grow..... | 16 |
| 15 | Twigs without cushions and almost smooth..... | 21 |
| 16 | Leaf-arrangement obviously spiral; each leaf growing from a peg of the leaf-cushion, usually sharp-tipped or 4-sided or both SPRUCE (PICEA) ✓ | |
| 16 | Leaf arrangement usually apparently 2-ranked or forming a V-shaped trough; leaves never on pegs but sometimes petioled | 17 |
| 17 | Leaves usually blunt-tipped or notched, sharp-tipped only when finely toothed or spirally arranged; short-petioled
HEMLOCK (TSUGA) | |
| 17 | Leaves always sharp-tipped, but not with above combination.... | 18 |
| 18 | Leaves finely toothed, not petioled, bearing white bands on under surface CHINA-FIR (CUNNINGHAMIA) | |
| 18 | Leaves entire, sometimes petioled | 19 |
| 19 | Twigs not opposite to one another; leaves sharp—but not spiny-tipped, paler on under than on upper surface but without light bands YEW (TAXUS) | |
| 19 | Twigs nearly opposite to each other; leaves sometimes spiny-tipped, always with light bands on under surface | 20 |

- 20 Leaves with a prominent mid-rib on upper surface, light bands
on under surface wider than green bands
PLUM-YEW (CEPHALOTAXUS)
- 20 Leaves without prominent mid-rib, light bands narrower than
green bands(TORREYA)
- 21 Leaf-scars oval, raised at lower end; leaf sometimes with an
indistinct petiole; buds never resinous
DOUGLAS FIR (PSEUDOTSUGA)
- 21 Leaf-scars round, not raised; leaf with a narrow or twisted
base but no petiole; buds sometimes resinous.....FIR (ABIES)
- 22 Leaves spirally arranged 23
- 22 Leaves in 3 or 4 ranks 24
- 23 Leaves spike-like, flaring out, but also curved in at tip towards
twig JAPANESE CEDAR (CRYPTOMERIA)
- 23 Leaves scale-like, flaring only slightly if at all
CALIFORNIA BIG-TREE (SEQUOIA)
- 24 Leaves in 3 or 4 ranks; twigs roundish or squarish 25
- 24 Leaves in 4 ranks; twigs almost flat 27
- 25 Leaves without whitish bands on either surface, leaf-margin
usually delicately fringed.....CYPRESS (CUPRESSUS)
- 25 Leaves usually with white bands on one surface, entire..... 26
- 26 Leaves 3- or 4-ranked, scale-like or spike-like or both, often
with one or more white bands on upper surface
JUNIPER, RED CEDAR (JUNIPERUS)
- 26 Leaves 4-ranked, always scale-like in mature trees, without
white bands on upper surface, sometimes with white marks
on under surface
WHITE CEDAR, FALSE CYPRESS (CHAMAECYPARIS)
- 27 Leaves scale-like, decurrent; internodes longer than wide, twigs
green on both surfaces....INCENSE CEDAR (LIBOCEDRUS)
- 27 Leaves not very decurrent; length and width of internodes
about equal, twigs often with white marks on under surface 28

- 28 Twigs 4-8 mm. wide; leaves rather spiky, spreading on sides of twig.....FALSE or HIBA ARBOR VITAE (THUJOPSIS)
- 28 Twigs 4 mm. wide or less; side leaves scale-like and appressed, not spiky and spreading except on vigorous shoots, immature plants and varieties. (The spiky form is called RETINISPORA or RETINOSPORA, but is not in a different genus) 29
- 29 Twigs 3-4 mm. wide, sometimes standing up vertically; side scales nearly covering middle ones....ARBOR VITAE (THUJA)
- 29 Twigs less than 3.5 mm. wide; side scales not much larger than middle ones unless leaves have white marks (not triangles) on under surfaces and one of the following conditions present: a tree trunk which peels in strips, or a gland on upper surface of leaf
WHITE CEDAR, FALSE CYPRESS (CHAMAECYPARIS) L

DECIDUOUS TREES

- 30 Leaves simple 31
- 30 Leaves compound 148
- 31 Leaves fan-shaped, almost parallel veined, sometimes cleft in the middle of the outer margin
MAIDENHAIR-TREE (GINKGO)
- 31 Leaves scale-like or very small, sometimes clasping twig
TAMARISK (TAMARIX)
- 31 Leaves needle-like 32
- 31 Leaves normal foliage leaves, netted veined, not like above descriptions 34
- 32 Leaves scattered along twig, never in clusters, appearing 2-ranked BALD CYPRESS (TAXODIUM)
- 32 Leaves in clusters on spurs, sometimes also scattered spirally.... 33
- 33 Leaves 3-7 cm. long, at least 3 mm. wide, long-pointed
GOLDEN or CHINESE LARCH (PSEUDOLARIX)
- 33 Leaves 1.5-4 cm. long, less than 3 mm. wide, blunt-tipped or short-pointed
LARCH, TAMARACK, HACKMATAK (LARIX)

34	Leaves opposite or whorled, but all members of a pair or group sometimes not quite on the same level; occasionally also single on spurs	35
34	Leaves spirally arranged, never 4-ranked, occasionally also clustered on spurs	51

SIMPLE OPPOSITE DECIDUOUS LEAVES

35	Leaves toothed, wavy-margined or lobed; or both lobed and toothed (or wavy)	36
35	Leaves entire, or angled with entire sides.....	42
36	Leaves palmately veined or palmately lobed or both.....	37
36	Leaves pinnately veined; not lobed	38

37	Leaves unlobed, wavy-toothed, somewhat heart-shaped, 5-10 cm. long; winter-buds appressed, end-bud absent, side-buds showing 1 or 2 scales	
----	--	--

KATSURA-TREE (CERCIDIPHYLLUM)

37	Leaves lobed, or if unlobed then differing from the above description of leaves and buds	MAPLE (ACER)
----	--	--------------

38	Winter-buds superposed; teeth of leaves mostly above middle	SWAMP PRIVET (FORESTIERA)
----	---	---------------------------

38	Winter-buds usually solitary or side by side; if superposed then teeth of leaves not as just described	39
----	--	----

39	Leaves double-toothed, or wavy-toothed and bark white-striped	MAPLE (ACER)
----	---	--------------

39	Leaves single-toothed or wavy; bark not white-striped.....	40
----	--	----

40	Winter-buds showing one pair of scales	BLACK-HAW, NANNY- or SHEEP-BERRY (VIBURNUM)
----	--	---

40	Winter-buds showing more than 2 scales	41
----	--	----

41	Twig typically brown, often ending in a spine; bundle-scars usually 3, or one forming a horizontal line through center of leaf-scar	BUCKTHORN (RHAMNUS)
----	---	---------------------

41	Twig typically green, not spiny; bundle-scar one, compound, near top of leaf-scar.....	SPINDLE-TREE (EVONYMUS)
----	--	-------------------------

- 61 Twigs hairy; leaves slightly hairy and dull green on upper surface, more hairy on under surface, 6-12 cm. long, faintly toothed or entireMEDLAR (MESPIUS)
- 61 Twigs and leaves not exactly as just described.....PEAR (PYRUS)

SIMPLE SPIRAL LEAVES, UNARMED TWIGS

- 62 Stipules or stipule-scars almost or quite encircling twig at base of each petiole 63
- 62 Encircling scars only at beginning of each year's growth..... 66
- 63 Base of petiole cone-shaped, covering winter-bud
SYCAMORE (PLATANUS)
- 63 Winter-buds visible in leaf-axils 64
- 64 Outer end of leaf square or notched as if tip were cut off
TULIP TREE (LIRIODENDRON)
- 64 Outer end of leaf pointed or rounded..... 65
- 65 Leaves thin, sometimes toothed, winter-buds showing several scales BEECH (FAGUS)
- 65 Leaves thick, entire, winter-buds showing one scale..(MAGNOLIA)
- 66 Juice of young leaves rubbery, making elastic cords when leaf is broken; leaf-margin toothed.....(EUCOMMIA)
- 66 Juice of young leaves gummy; leaf-margin entire
CHITTAM-WOOD, AMERICAN SMOKE-TREE (COTINUS)
- 66 Juice of young leaves milky; leaves varying in shape..... 67
- 66 Juice of young leaves watery, sometimes spicy or acid..... 68
- 67 Petioles 3-10 cm. long; visible bud-scales 2-3; tree-trunk smoothPAPER MULBERRY (BROUSSONETIA)
- 67 Petioles usually not more than 3 cm. long; visible bud-scales 3-6; tree-trunk usually scaly.....MULBERRY (MORUS)
- 68 Leaves entire 69
- 68 Leaves lobed; lobes entire or toothed 86
- 68 Leaves variously toothed or wavy-margined; not lobed..... 101

SIMPLE SPIRAL ENTIRE LEAVES

- 69 Leaves 15-30 cm. long; end-bud scaleless, others scaled, brown-hairyPAPAW (ASIMINA)
- 69 Leaves usually not more than 15 cm. long; if more, then end-bud scaled 70
- 70 Leaves palmately veined 71
- 70 Leaves pinnately veined 73
- 71 Upper side-veins curving towards tip of leaf; trunk often warty
HACKBERRY (CELTIS)
- 71 Upper side-veins straight or curving towards side-margin;
trunk not warty 72
- 72 Leaves silky on veins of under surface, spicy; leaf-scars not fringedSPICE BUSH (BENZOIN)
- 72 Leaves usually hairless on under surface, not spicy; leaf-scars fringed at top.....JUDAS-TREE, REDBUD (CERCIS)
- 73 Upper side-veins curving towards leaf-tip; twigs greenish
DOGWOOD (CORNUS)
- 73 Upper side-veins straight or curving towards side-margin, or else twigs not green 74
- 74 Juice of leaves spicy 75
- 74 Juice of leaves not spicy 76
- 75 Twigs and bud-scales brown; stipule-scars absent
SPICE BUSH (BENZOIN)
- 75 Twigs and bud-scales green; stipule-scars present..(SASSAFRAS)
- 76 Mature leaves hairy on both surfaces; young twigs hairy..... 77
- 76 Mature leaves hairless at least on upper surface..... 78
- 77 Winter-buds showing about 4 scales, all buds about same shape
PEAR (PYRUS)
- 77 Flower-buds showing about 12 scales, much larger than leaf-buds and of a different shape.....CORKWOOD (LEITNERIA)

- 78 Winter-buds scaleless, showing folded leaves
BUCKTHORN (RHAMNUS)
- 78 Winter-buds one-scaled; leaves sometimes downy on under
surface, not woolly WILLOW (SALIX)
- 78 Winter-buds 10-scaled or more 79
- 78 Winter-buds less than 10-scaled, if one-scaled then leaves
woolly on under surface 81
- 79 Winter-buds narrow, pointed, flaring away from twig; trunk
usually smooth, gray BEECH (FAGUS)
- 79 Above combination not present 80
- 80 One bundle-scar; end-bud much larger than side-buds
(RHODODENDRON)
- 80 Several bundle-scars irregularly scattered; end-bud not dispro-
portionately large
SHINGLE OAK, WILLOW OAK (QUERCUS)
- 81 Leaves about 4 times as long as wide; under surface covered by
a grayish mat of hairs
ALTERNATE-LEAVED BUTTERFLY-BUSH (BUDDLEIA)
- 81 Leaves not usually 4 times as long as wide; hairs sometimes
present 82
- 82 One compound bundle-scar forming a curved line
PERSIMMON (DIOSPYROS)
- 82 Three or more bundle-scars 83
- 83 Leaves woolly on under surface; 1 or 2 visible bud-scales
QUINCE (CYDONIA)
- 83 Leaves sometimes downy, but not woolly; more than 2 visible
bud-scales 84
- 84 Leaves arranged in 2 vertical ranks; base of blades showing 3
almost equal veins.....HACKBERRY (CELTIS)
- 84 Leaves in more than 2 ranks; veins not as described..... 85
- 85 Lower branches of tree usually drooping towards ground;
height of leaf-scars about half their length
SOUR GUM, BLACK GUM, PEPPERIDGE, TUPELO
(NYSSA)
- 85 Lower branches not drooping; leaf-scars narrower than those
just describedPEAR (PYRUS)

SIMPLE SPIRAL LOBED LEAVES

- 86 Leaves palmately veined; palmately or irregularly lobed..... 87
- 86 Leaves pinnately veined; pinnately or irregularly lobed..... 90

- 87 Lobes entire; leaf 3-lobed at tip and 3-veined at base of blade

SPICE-BUSH (BENZOIN)
- 87 Lobes toothed 88

- 88 Lobes 5-7, finely toothed; bark of branches sometimes showing

corky ridges.....SWEET GUM (LIQUIDAMBER)
- 88 Lobes 3-5, coarsely toothed; bark not corky 89

- 89 Under surface of leaves bearing a white mat of hairs

WHITE POPLAR (POPULUS)
- 89 Leaves with a few or no hairs on under surface

SHRUBBY ALTHEA (HIBISCUS)

- 90 Leaves mitten-shaped, with one or two "thumbs," varying from

oval to lobed on the same tree.....(SASSAFRAS)
- 90 Leaves not mitten-shaped or varying as much as above..... 91

- 91 Winter-buds stalked, showing 2 or 3 scales; leaf-scars half-

round or triangular, with 3 bundle-scars.....ALDER (ALNUS)
- 91 Winter-buds not stalked, but spurs sometimes present..... 92

- 92 Leaves 2-ranked 93
- 92 Leaves in more than 2 ranks 95

- 93 Winter-buds blunt and plump, showing more than 3 scales

HAZEL (CORYLUS)
- 93 Winter-buds usually sharp-pointed, somewhat plump, showing

2 or 3 scales 94

- 94 Leaves double-toothed; bark of trunk white or orange, spurs

sometimes present BIRCH (BETULA)
- 94 Leaves usually coarsely single-toothed; bark not white or

orange LINDEN, BASSWOOD (TILIA)

- 95 Bud-scales 10 or more; bundle-scars numerous, irregularly scat-

tered 96
- 95 Bud-scales not more than 10; bundle-scars 3 or in 3 groups..... 97

105	Trunk usually gray, smooth; winter-buds tall, narrow, pointed, many-scaled	BEECH (FAGUS)
105	Trunk and winter-buds not as just described	106
106	Leaf-buds (not catkins) stalked	107
106	Leaf-buds not stalked, sessile	111
107	Winter-buds scaleless, at least after sheathing stipules drop off	108
107	Winter-buds showing 2 or 3 scales	109
108	Leaves lop-sided at base; widest above middle, wavy-toothed WITCH-HAZEL (HAMAMELIS)	
108	Leaves not particularly lop-sided at base; usually widest near middle, fine-toothed	(SINOWILSONIA)
109	Leaf-buds hairy, red or scurfy; stipule-scars almost equal in size	ALDER (ALNUS)
109	Leaf-buds hairy but not red or scurfy; stipule-scars unequal....	110
110	Leaves wavy-toothed above middle, oval, hairy on both sur- faces, petioles 2-6 mm. long.....	(PARROTIA)
110	Leaves sharp-toothed, almost round, not hairy on upper surface when mature, petioles 6-12 mm. long.....	(PARROTIOPSIS)
111	End-bud scaleless, others 2-scaled; bark gray, shredding EPAULETTE-TREE (PTEROSTYRAX)	
111	All buds scaleless (end and side)	112
111	All buds scaled	114
112	Buds usually superposed; leaf-margin usually faintly toothed above middle	STORAX (STYRAX)
112	Buds solitary	113
113	Leaves rounded at base of blade, widest near middle; leaf-scar crescent-shaped CASCARA SAGRADA, INDIAN CHERRY (RHAMNUS)	
113	Leaves pointed at base of blade, widest above middle; leaf-scar shield-shaped with flaring upper corners FRANKLINIA (GORDONIA)	
114	Winter-buds showing one scale.....	WILLOW (SALIX)
114	Winter-buds (exclusive of catkins) showing more than one scale	115

115	Lowest bud-scale directly above leaf-scar: at least one of following conditions also present; petiole flattened (at least at tip) at right angles to surface of blade, hairy or resinous winter-buds, woolly under-surface of leaf, yellow or red mid-rib	POPLAR (POPULUS)	
115	Above combinations not present		116
116	Winter-buds showing 2-4 scales		117
116	Winter-buds showing more than 4 scales		127
117	Leaf-scars showing only one bundle-scar (sometimes compound)		118
117	Leaf-scars showing 3 or more bundle-scars or groups of scars..		121
118	Bark of trunk smooth, red, peeling in large flakes; winter-buds sometimes superposed; bundle-scar round, near top of leaf-scar	WILD CAMELLIA (STEWARTIA)	
118	Bark of trunk not as just described		119
119	Length of mature leaves about 4 times their width, under-surface gray-woolly; visible bud-scales 2 ALTERNATE-LEAVED BUTTERFLY-BUSH (BUDDLEIA)		
119	Length of mature leaves not 4 times their greatest width; visible bud-scales usually 3		120
120	Winter-buds solitary; stipule-scars absent WHITE ALDER (CLETHRA)		
120	Winter-buds sometimes superposed; stipules or stipule-scars present	HOLLY (ILEX)	
121	End-bud present		122
121	End-bud usually absent except on spurs		123
122	Leaf-margin bearing bristle-like teeth; twigs usually round; stipule-scars equal in size..	WINTER HAZEL (CORYLOPSIS)	
122	Leaf-margin irregularly and sharply toothed; twigs often 3-sided	ALDER (ALNUS)	
122	Leaf margin coarsely toothed and sometimes bristled; twigs often ridged; stipule-scars unequal in size CHESTNUT (CASTANEA)		
123	Leaves 5-8 cm. long, in more than 2 ranks, margin finely toothed; bark of trunk flaky FLOWERING QUINCE (CHAENOMELES)		
123	Leaves 2-ranked, at least on horizontal twigs		124

- 124 Leaves with 3 almost equal veins near base of blade
HACKBERRY, SUGAR-BERRY (CELTIS)
- 124 Leaves strictly pinnate, not as just described 125
- 125 Leaves narrow-oval or oblong, coarsely toothed and sometimes
bristled CHESTNUT (CASTANEA)
- 125 Leaves somewhat heart-shaped or broad-oval or triangular, not
bristled, often finely toothed 126
- 126 Leaves broad-oval or triangular, not usually lop-sided, margin
irregularly and often doubly toothed; bark of trunk whitish
or brightly colored or dark, smooth or peeling or broken
into scales; lenticels often stretched sidewise; spurs com-
mon BIRCH (BETULA)
- 126 Leaves broad-oval or heart-shaped, usually lop-sided at base of
blade, margin usually regularly toothed; bark dark, other-
wise not as just described; lenticels not stretched; spurs
not common LINDEN, BASSWOOD (TILIA)
- 127 Bundle-scars a dozen or so, irregularly scattered
OAK (QUERCUS)
- 127 Bundle-scars 6-8, in horizontal line across top of leaf-scar; bud-
scales hairy at base (EUPTELEA)
- 127 Bundle-scar one 128
- 127 Bundle-scars 3-5 130
- 128 Winter-buds superposed, showing about 4 fleshy scales
SNOWDROP-TREE, SILVER-BELL TREE (HALESIA)
- 128 Winter-buds not as just described 129
- 129 Leaves 8-20 cm. long, distinctly toothed, with an acid taste;
winter-buds solitary
SORREL-TREE, SOURWOOD (OXYDENDRUM)
- 129 Leaves less than 8 cm. long unless teeth are very faint, sweet-
tasting; winter-buds solitary or superposed
SWEETLEAF (SYMPLOCOS)
- 130 Height of largest buds about 3 or 4 times their width 131
- 130 Height of largest buds less than 3 times their width 132
- 131 Winter-buds hairy or sticky, woolly inside; bud-scales not
twisted; leaves irregularly or doubly toothed
WHITE BEAM-TREE, MOUNTAIN-ASH (SORBUS)
- 131 Winter-buds not as just described; bud-scales sometimes twist-
ed; leaves singly toothed.....SHADBUSH (AMELANCHIER)

132	End-bud present	133
132	End-bud absent	139
133	Leaves 8-14 cm. long, bright-green on upper surface, hairy on under surface, somewhat heart-shaped, teeth single, long-pointed, petioles 3.6-7 cm. long; bud-scales about 6 in number, pale-bordered	(DAVIDIA)
133	Leaves not as just described	134
134	Stipules or stipule-scars present	135
134	Stipules and stipule-scars absent or indistinguishable.....	137
135	Winter-buds solitary but often crowded at tip of twig; leaves not as described below	CHERRY (PRUNUS)
135	Three winter-buds in an axil on flowering twigs; twigs often red or green; length of leaves usually at least 3 times their width, shape tapering from middle to tip.....	136
136	Leaves typically widest below middle and petioles 1.5-2.5 cm. long	ALMOND (PRUNUS)
136	Leaves typically widest at or below middle and petioles not more than 1.5 cm. long; leaves often curved and hanging down	PEACH (PRUNUS)
137	Twigs hairy; leaves hairy at least on under surface, oblong, 6-12 cm. long, finely toothed or nearly entire; buds dark-brown	MEDLAR (MESPILUS)
137	Twigs and leaves not as just described	138
138	Buds usually pointed and flaring from twig; bud-scales slightly pointed, without a border; leaves single-toothed, often hairless	PEAR (PYRUS)
138	Buds oval, blunter than those described above, appressed, often red and hairy; bud-scales sometimes blunt and bordered; leaves usually irregularly or doubly toothed	APPLE, CRABAPPLE (MALUS or PYRUS)
139	Buds usually blunt, catkins present; leaves somewhat heart-shaped, sometimes doubly toothed.....	HAZEL (CORYLUS)
139	Buds usually sharp-pointed, if blunt then no catkins present, catkins not always present with sharp buds	140
140	Winter-buds showing 4 or more scales; scales ridged and bristled; leaves largest above middle, single-toothed, hairy on under surface	(PHOTINIA)
140	Winter-buds not as just described	141

141	Leaves in more than 2 ranks	142
141	Leaves 2-ranked	145
142	No stipule-scars visible	143
142	Stipule-scars present	144
143	Twigs warty; bud-scales often pitted; leaves somewhat heart-shaped, with double, long-pointed teeth MADDEN CHERRY (MADDENIA)	
143	Twigs not warty; both scales and leaves not as just described 137 and 138	
144	Buds showing dark scales with white hairs around the margin APRICOT (PRUNUS)	
144	Scales of buds without contrasting white hairs, sometimes pitted PLUM (PRUNUS)	
145	Bud-scales numerous, arranged in 4 ranks.....	146
145	Bud-scales about 6 in number, in 2 ranks or spiral.....	147
146	Leaves single-toothed; bark of trunk scaly.....(ZELKOVA)	
146	Leaves irregularly or doubly toothed; bark of trunk gray, ridged like muscles on an arm HORNBEAM, BLUE BEECH (CARPINUS)	
147	Bud-scales striped vertically; catkins often present; leaves not very lop-sided at base of blade IRONWOOD, HOP-HORNBEAM (OSTRYA)	
147	Bud-scales not striped, but smooth or hairy; catkins not present; leaves lop-sided at base of bladeELM (ULMUS)	

COMPOUND LEAVES

148	Most or all leaves made up of only 3 leaflets.....	149
148	Most or all leaves made up of more than 3 leaflets.....	153
149	Leaves opposite, but not always quite on the same level.....	150
149	Most or all leaves spirally arranged	151
150	Winter-buds showing 2 or 4 scales; leaflets finely toothed; upper margin of leaf-scars almost straight BLADDERNUT (STAPHYLEA)	
150	Winter-buds many-scaled and leaflets variously toothed, or 2- or 4-scaled and leaflets coarsely or doubly toothed; upper margin of leaf-scars curving down.....MAPLE (ACER)	

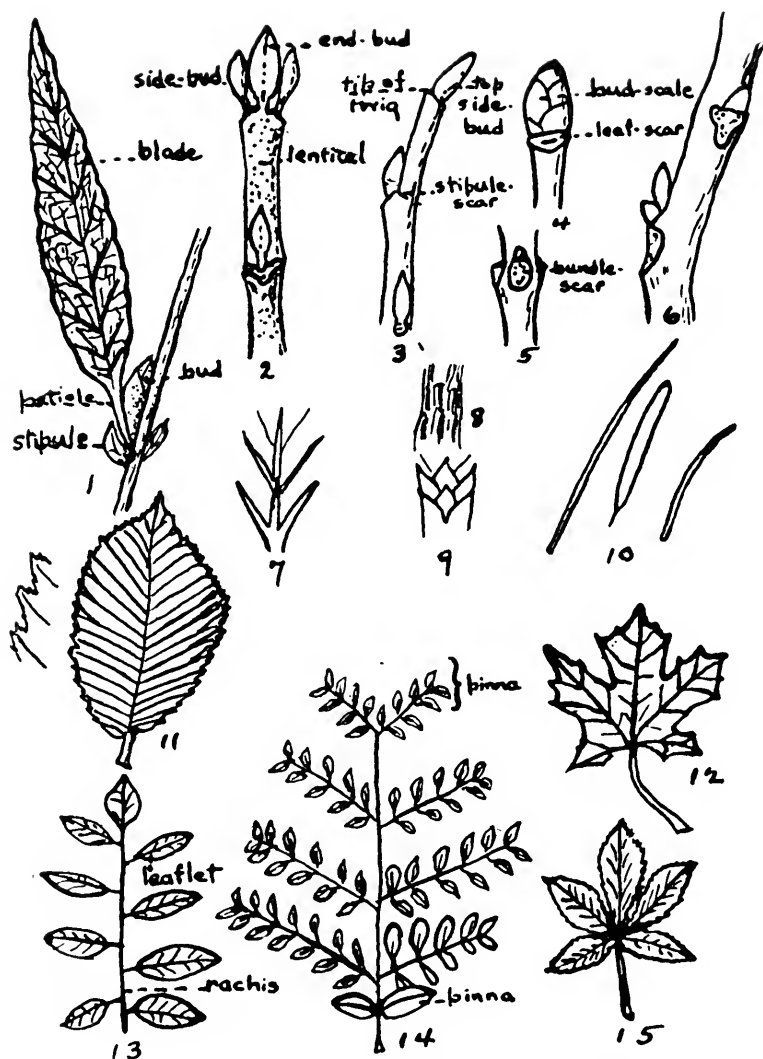
151	Leaflets showing no almost transparent dots in their blades.....	152
	GOLDEN-CHAIN (LABURNUM)	
151	Leaflets showing such dots	152
152	Twigs green, with a spine at each node; buds hairless, red	
	HARDY ORANGE (PONCIRUS)	
152	Twigs tan-colored, spineless; buds hairy....	HOP-TREE (PTELEA)
153	Leaves palmately compound	154
153	Leaves pinnately compound	156
153	Leaves bipinnately (twice) compound	180
154	Leaves spirally arranged	(ACANTHOPANAX)
154	Leaves oppositely arranged	155
155	Mature leaves more than 10 cm. wide; winter-buds showing more than 4 scales	
	HORSE-CHESTNUT, BUCKEYE (AESCULUS)	
155	Mature leaves 5-10 cm. wide; winter-buds showing 2 or 3 scales	
	MAPLE (ACER)	
156	Leaves opposite but not always quite on the same level.....	157
156	Leaves spirally arranged	161
157	Leaflets showing almost transparent dots in their blades.....	158
157	Leaflets showing no such dots	159
158	Each winter-bud almost surrounded by petiole of leaf; leaf- scars horseshoe-shaped..	CORK-TREE (PHELLODENDRON)
158	Each winter-bud exposed in axil of leaf; leaf-scars broadly crescent-shaped	(EVODIA)
159	Leaflets coarsely toothed, some usually lobed; upper margin of leaf-scar curving down; bundle-scars not more than 7; winter-buds 2-scaled	BOX-ELDER (ACER)
159	Leaflets never lobed, not always coarsely toothed; bundle-scars more than 7 if upper margin of leaf-scar curves down.....	160
160	Buds showing 3 or more pairs of scales; upper margin of leaf- scar curving up; bundle-scars not more than 7	
	ELDER (SAMBUCUS)	
160	Winter-buds showing 1-3 pairs of scales; upper margin of leaf- scar straight or curving down; bundle-scars more than 7	
	ASH (FRAXINUS)	

161	Leaf made up of an even number of leaflets.....	162
161	Leaf made up of an odd number of leaflets	164
162	Tree unarmed; leaflets 10-22 in number, 8-15 cm. long FALSE CEDAR (CEDRELA)	
162	Tree spiny or prickly	163
163	More than one partly concealed bud in a leaf-axil; usually a spine above the axil and spines on older branches and the trunk HONEY-LOCUST (GLEDITSIA)	
163	Only one bud in an axil; no spines on trunk, spines at each side of leaf-scar, representing stipules....PEA-TREE (CARAGANA)	
164	Twigs prickly or spiny	165
164	Tree unarmed	166
165	Leaflets showing almost transparent dots in blades PRICKLY ASH (ZANTHOXYLUM)	
165	Leaflets without such dotsLOCUST (ROBINIA)	
166	All leaflets alternate on rachis YELLOW-WOOD (CLADRASTIS)	
166	Most leaflets exactly or almost opposite on rachis	167
167	Leaf-margin entire except for 2-4 coarse teeth near base; leaf- lets 13-35 in number, 7-15 cm. long TREE OF HEAVEN (AILANTHUS)	
167	Leaf-margin entire or wavy	168
167	Leaf-margin toothed and sometimes lobed	172
168	Twigs, petioles and rachis reddish-brown with sticky hairs CLAMMY LOCUST (ROBINIA)	
168	Twigs, petioles and rachis not as just described	169
169	Some leaflets more than 8 cm. long or else juice of young leaves milky	170
169	No leaflets more than 8 cm. long	171
170	Rachis winged or leaves crowded at tip of twig; winter-buds solitary; 7-21 leaflets, juice of young leaves milky; some species POISONOUS.....SUMAC (RHUS)	
170	Rachis never winged; leaves sometimes crowded at tip of twig, but buds superposed; 5-9 leaflets, juice watery ENGLISH WALNUT (JUGLANS)	

- 171 Leaflets not usually more than 5 cm. long, usually with hairs or prominent veins on the under surface; buds superposed, partly concealed by leaf-scar
JAPAN PAGODA-TREE (SOPHORA)
- 171 Leaflets 2-8 cm. long, not always hairy; winter-buds solitary, showing 2 or more often pale-margined scales.....(MAACKIA)
- 172 Leaves irregularly and coarsely toothed, sometimes lobed
PRIDE OF INDIA, VARNISH-TREE (KOELREUTERIA)
- 172 Leaves toothed regularly although sometimes slightly, not lobed 173
- 173 Leaflets not more than 13.....HICKORY (CARYA)
- 173 Leaflets 7-31 174
- 174 Buds often scaleless; juice of young leaves usually sticky or milky SUMAC (RHUS)
- 174 Buds and juice both not as just described 175
- 175 Under surface of leaflets paler than upper, leaflets usually hairless when mature 176
- 175 Both surfaces of about the same shade or else hairy 177
- 176 Height of buds more than twice their width; leaf-scar narrow with down-curved upper margin
MOUNTAIN-ASH (SORBUS)
- 176 Height of buds not twice their width; leaf-scar wide, upper margin almost straight
CHINESE BUCKEYE (XANTHOCERAS)
- 177 Leaflets 4-10 cm. long, doubly toothed(PLATYCARYA)
- 177 Leaflets usually single-toothed, or else more than 10 cm. long.. 178
- 178 Lower margin of leaf-scar raised prominently above twig; mature leaves hairy on under surface, especially on mid-rib and in axils of veins....WALNUT, BUTTERNUT (JUGLANS)
- 178 Lower margin of leaf-scar not much raised; mature leaves not so hairy as above 179
- 179 Buds 2-scaled; bundle-scars several, in 3 groups
PECAN (CARYA)
- 179 Buds usually scaleless; bundle-scars 3, hooked or curved
WING-NUT, CAUCASIAN WALNUT (PTEROCARYA)

TWICE-COMPOUND LEAVES

- | | | |
|-----|--|-----|
| 180 | Leaflets about 6 mm. long, 40-60 to a pinna | |
| | SILK-TREE, JULIBRIZZIN (ALBIZZIA) | |
| 180 | Leaflets usually longer, or if shorter then not so many to a pinna | 181 |
| 181 | Margin of leaflets entire or wavy | 182 |
| 181 | Leaflet-margin distinctly toothed and sometimes lobed | 183 |
| 182 | Tree usually spiny; lowest pinnae compound like the others | |
| | HONEY-LOCUST (GLEDITSIA) | |
| 182 | Tree unarmed; lowest pinnae are simple leaflets | |
| | KENTUCKY COFFEE-TREE (GYMNOCLADUS) | |
| 183 | Bark prickly; leaves 40 cm. to 1 meter long | |
| | ANGELICA-TREE, HERCULES' CLUB (ARALIA) | |
| 183 | Bark unarmed; leaves up to 35 cm. long | |
| | VARNISH-TREE, PRIDE OF INDIA (KOELREUTERIA) | |



CHARACTERS OF LEAVES AND TWIGS

- 1 Simple netted-veined leaf with bud in its axil, wavy-margined.
- 2 Opposite stalked buds, 4-ranked; lenticles on stem.
- 3 Spiral sessile side-buds, 3-ranked.
- 4 Compound bundle-scars forming a line.
- 5 Whorled leaf-scars; bundle-scars dots.
- 6 Superposed buds.
- 7 Spike-like evergreen leaves, 3-ranked.
- 8 Leaf-cushions.
- 9 Scale-like evergreen leaves.
- 10 Needle-like evergreen leaves.
- 11 Pinnately veined leaf, double-toothed, base lop-sided.
- 12 Palmately veined leaf, lobed, coarsely toothed.
- 13 Pinnately compound leaf, leaflets odd in number, entire, alternate.
- 14 Bipinnately compound leaf, leaflets even in number, opposite.
- 15 Palmately compound leaf, singly fine-toothed.

EXPLANATION OF TERMS AS USED IN THE KEY

ALTERNATE ARRANGEMENT. Only one leaf, leaflet or leaf-scar at a node. Literally: 2-ranked.

ANGLED MARGIN. Not entirely curved. With some straight places and corners.

APPRESSED. Lying closely to the twig; usually flat.

ARRANGEMENT. See LEAF ARRANGEMENT.

AXIL. The angle made with the twig by the upper surface of the leaf, or by the upper margin of the leaf-scar.

BARK. The woody outside covering of a tree. As the part covered grows in diameter the bark must stretch or split. If it stretches it remains almost smooth and the lenticels are pulled sidewise, so that they form horizontal lines instead of dots. If the bark splits it becomes rough or scaly or furrowed.

BARK SCALES. The pieces into which bark sometimes breaks. They may be large or small; and they may remain on the tree, or flake off in pieces, or peel either up and down or around the stem.

BASE. The inner or lower end, as of a leaf or a twig. The opposite of **TIP**.

BIPINNATELY COMPOUND. Twice or doubly compound. A pinnately compound leaf made up of leaflets most or all of which are themselves pinnately compound.

BLUNT. Rounded. The opposite of **POINTED**.

BRANCHES. The twigs of a few years ago. The side divisions of the main stem.

BRISTLES. Stiff hairs.

BUDS. See **WINTER-BUDS**.

BUD-SCALES. The coverings of buds. Winter-buds may be scaleless or may have from one to many scales. If there are only two they usually meet without overlapping. If there are several they resemble shingles on a roof. The **KEY** refers to the largest buds (exclusive of catkins), and considers only those scales which are visible from a single point of view.

BUNDLE-SCARS. The dots or lines found in a leaf-scar. They indicate the location of strands which were concerned with the food supply of the leaf. They are best examined in a leaf-scar of a previous year, and if obscured by dirt will show more clearly if scratched by a knife or a finger-nail.

CATKIN. A usually long, narrow flower-cluster; ex. willow. Here it is used to denote the bud containing the cluster. A catkin is not included in the descriptions of winter-buds, as it differs so decidedly in size, number of scales, etc.

CLASPING. Growing around an object.

CLEFT. Having a wedge-shaped hole.

CM. The abbreviation of centimeter, a unit of length equal to $\frac{2}{5}$ of an inch. Two connected figures, as 2-6, mean that the range of size includes both 2 and 6.

COMPOUND BUNDLE-SCAR. Made up of several scars, whether apparent or not.

COMPOUND LEAF. A leaf whose blade is divided into parts called leaflets. Each leaflet may have a stalk, or petiolule; stipels, corresponding to stipules; and of course a blade. As distinguished from a simple leaf on a twig, a leaflet has no bud in its axil.

CONE-SHAPED. A round, hollow base with sides tapering up to a point.

CULTIVATED TREE. Tended by man. Applied to native or imported trees.

CUSHION. See LEAF-CUSHION.

DECIDUOUS LEAVES. Remaining only one growing season. Falling usually in the autumn, like maple and elm, and at the latest in early spring. Thus the term here includes semi-evergreen. Deciduous leaves are found only on twigs of the present season (including spur-tips).

DECURRENT. Continued down the twig, towards its base.

DOUBLE-TOOTHED. Each tooth cut into one or more smaller teeth.

DOWNY. Bearing soft, short hairs.

ENCIRCLING. Making a circle around.

END-BUD. A bud which covers the tip of the twig. See SIDE-BUD.

ENTIRE. A margin without teeth or indentations.

EVERGREEN. Remaining longer than one growing season. Eventually falling in two or more years. Found alive in winter and on twigs of the present and of some of the past seasons.

FLAKY. Falling off in small pieces.

FLARING AWAY. Pointing away at an angle from the part bearing it.

FLESHY. Not hard or dry; soft and watery.

FOUR-SIDED. The easiest way to determine this in a leaf is to cut the leaf across at the widest place and look down on the cut end. In a twig the angles may usually be seen or felt.

FRINGED. Edged with fine hairs.

FURROWED. Marked like plowed ground with alternate longitudinal ridges and grooves. The ridges and grooves usually intersect.

GENERA. The plural of genus. See GENUS.

GENUS. The plural is genera. A genus, like a species, is hard to define, but easy to illustrate. Examples of genera are oaks, maples, etc. In writing the scientific name the genus name is placed first.

GLAND. Usually seen as a tiny lump or nodule.

GROWING SEASON. From spring to autumn for deciduous trees, most of the growth occurring by middle summer.

HAIRY. Here applied to any kind of hair. See also **DOWNY** and **WOOLLY**.

HALF-ROUND LEAF-SCAR. The upper margin straight and the lower a semi-circle.

HARDY. Able to withstand, without special protection, the extremes of temperature in the regions named.

HEART-SHAPED. Here used to denote a broad-oval leaf with a rounded or two-lobed base and a long tip.

HYBRID. A plant resulting from a cross between two parents of different genera, species or varieties. This **KEY** includes practically no hybrids.

IMMATURE PLANTS. Young plants which have not yet attained the size and characteristics of full-grown ones. They should not be examined with this **KEY** because they often differ so decidedly from the characteristics of their elders. Young trees may usually be recognized as such by their small size and unusually large leaves and buds.

INTERNODE. The part of a stem between two joints (nodes). Sometimes covered by leaves, but marked then by the space between the bases of the leaves in a vertical row, since leaves grow only at nodes.

IRREGULARLY TOOTHED. Teeth unequal in size and distance apart.

KEEL. A longitudinal ridge.

LEADING SHOOTS. The main-stem and the branches themselves—not side-branches or twigs.

LEAF. See **LEAVES**.

LEAF-ARRANGEMENT. The position of leaves on a twig. (See **OPPOSITE** and **SPIRALLY ARRANGED**.) The leaves to be determined should be those on a rapidly growing horizontal twig; not a young shoot.

LEAF-AXIL. See **AXIL**.

LEAF-CUSHION. The raised base of the leaf, adherent to the twig; forming a platform which may be seen readily in old twigs from which the leaves have dropped off.

LEAFLET. A section of the blade of a compound leaf.

LEAF-SCAR. The mark left on a twig by a leaf when it falls. The shape reproduces the outline of the part of the leaf (petiole or base of blade) which touched it. Leaf-scars are best studied in a twig of the previous season, as those left by living leaves which have been pulled off are incomplete and difficult to decipher. For the marks in a leaf-scar see **BUNDLE-SCARS**.

LEAVES. Typically the parts of a plant which form the foliage. In a deciduous tree they are thin and flat and expanded. In an evergreen tree they may be small scales or little spikes or needles, or leaves in shape like those of deciduous trees. They are usually thick and tough. A leaf consists typically of a stalk or petiole; of a broader part, the blade; and of two stipules, little leafy append-

ages at the base of the petiole. Any one of these parts may be missing or transformed into something with a different appearance, as a spine. The stipules, even if originally present, usually fall off before very long. Leaves grow at nodes on the twigs, and theoretically each has one bud in its axil.

LENTICELS. The breathing pores of the stem. Seen usually as dots on twigs, but occasionally forming horizontal lines because of the stretching of the bark as the branch grows in diameter.

LOBED. A margin with indentations deeper than teeth but not extending to the midrib or the petiole. A lobe is a section between two indentations.

LONG. Refers, in a leaf, to the distance from the twig to the tip of the blade.

LONGITUDINAL. The direction from base to tip.

LOP-SIDED. Unequally divided at the base (of a leaf) by the midrib.

LOWER. See **UNDER.**

MARGIN. The boundary line of the blade of a leaf or of a bud-scale.

MATURE. Full-grown. Mature leaves are to be found a little way back from the tip of the twig, not at the tip itself. All are usually of much the same shape, but not always of the same size. Mature buds are developed by late summer.

METER. One hundred centimeters. It equals about 40 inches, or 3 1/3 ft.

MIDDLE. Halfway up the side margins.

MIDRIB. A prominent vein running longitudinally through the center of the blade of a leaf; often better seen on the under surface than on the upper surface.

MM. Abbreviation for millimeter. 1/10 of a centimeter. 1/1000 of a meter.

NEEDLE-LIKE LEAVES. NEEDLES. Very narrow evergreen leaves with almost parallel side margins. The needles may be round like a thread-needle or flat like a tape-needle. They may be sharp-pointed or blunt.

NETTED-VEINED. With the smallest veins interlacing. Best seen by holding the leaf up to the light and looking through it.

NODE. A joint on a stem (branch or twig) at which one or more leaves and buds grow or have grown. Each leaf should have one or more buds in its axil.

NOTCHED. The tip of the leaf having a little v-shaped slit where the tip might have been; not pointed.

OBLONG LEAF. Side margins tending to be parallel for at least part of their length. Leaves wider than those called needles.

OPPOSITE. Two leaves or twigs facing each other at a node on a stem. The next pair (if leaves) will be at right angles to the first, making four vertical ranks up and down the stem. The next pair but one will be over the first pair.

ORGAN. Stem, leaf, bud, etc.

OUTER. The direction away from the base of the leaf or the twig.

OVAL LEAF. Here used to indicate either an ellipse, like the letter O, or an egg-shaped figure. In any case the opposite margins curve and the leaf is not so narrow as an oblong leaf.

PALMATELY COMPOUND. Divided into leaflets radiating from the tip of the petiole and separate from each other. The leaflets are pinnately veined.

PALMATELY LOBED. A margin deeply cut into segments which are united at the base of the leaf like fingers at the palm of a hand. Palmately veined.

PALMATELY VEINED. Several large veins of almost equal size radiating from the base of the leaf.

PARALLEL-VEINED. The smallest veins in the leaf running almost in the same direction. Contrasted with netted-veined. Best seen by holding a leaf up to the light and looking through it.

PEG. A stiff stalk attached more closely to the cushion from which it grows than to the leaf which it supports. Often a different color from the leaf proper.

PETIOLE. The stalk of the leaf; belonging to it and falling with it in simple leaves. Not all leaves have petioles.

PINNA. Here used to denote that part of a doubly compound leaf which corresponds to a leaflet. It is usually made up of secondary leaflets.

PINNATELY COMPOUND. Divided into leaflets which are separate from each other but united to the rachis (the part which corresponds to the midrib).

PINNATELY LOBED. Having deep indentations which run almost to the midrib of a pinnately veined leaf.

PINNATELY VEINED. Feather-like. Having a strong central vein, the midrib, from which branch side veins.

PITTED. Marked with little spots or holes.

POINTED. Sharp-tipped.

PRICKLE. A sharp-pointed outgrowth of the outer covering of a twig or branch. Not usually found at a node.

RACHIS. The middle part of a pinnately compound leaf. The leaflets are attached to it. It corresponds to the midrib of a simple leaf.

RANKS. The longitudinal rows in which leaves and leaf-scars are arranged. To determine use a string as described in SPIRALLY ARRANGED, or look down the twig from the tip.

RESINOUS. Here used as a synonym of sticky. The substances referred to as resin are found especially in young leaves, buds and twigs. They are often located in dots on the leaf-blade.

SCALELESS. Without bud-scales. The contents are visible, but are usually so covered with hairs that their outlines are obscured and they are sometimes taken for fuzzy scales.

SCALES. See BUD-SCALES, SILVERY SCALES, BARK SCALES, SCALES (LEAVES).

SCALES (LEAVES). Usually evergreen. Small, usually overlapping like shingles, pressed against the twig so as to cover it; opposite margins not parallel, often curved; too broad and curved to resemble spikes.

SCURFY. Coated with small scales or granules.

SESSILE. Literally, sitting. Growing directly from the twig (if leaves) without petiole.

SHAPE. Outline as traced by the margin of a surface.

SHEATHING. Enveloping.

SHREDDING. Peeling off in strips.

SHRUB. A bushy woody plant having several stems instead of one trunk; often less than 12 ft. (4 m.) high.

SHRUBBY. Broad and low, but fulfilling the requirements for a tree.

SIDE-BUD. A bud growing from the side of the twig. The top side-bud often looks like an end-bud, but may be told from it, if the end-bud is absent, by the tip of the stem alongside it.

SILVERY SCALES. Tiny flakes, sometimes glistening, found on twigs, leaves and buds.

SIMPLE LEAVES. Blade undivided into separate sections; indentations, if any, not reaching to midrib. A simple leaf differs from a leaflet because it has a bud in its axil.

SOLITARY BUD. Only one bud in a leaf-axil.

SPECIES. A division of a genus. The word is the same in singular and plural. Hard to define, but easy to illustrate. Ex. a sugar maple is a species of the genus maple. In writing the scientific name the species name stands after that of the genus and usually begins with a small letter. This KEY does not extend to species. They may be found in the books listed under REFERENCES.

SPIKES, SPIKE-LIKE, SPIKY. Having sides which slant towards each other, making a sort of long triangle. Spikes usually flare away from the twig.

SPINE. A sharp-pointed projection or thorn which takes the place of a leaf, a bud, or a twig; and so is located at or near a node, or at the end of a twig.

SPINY-POINTED, SPINY-TOOTHED. The tip or the teeth of the leaves ending in sharp, pricking projections.

SPIRALLY ARRANGED. Only one leaf at a joint on a twig. A string touching such a leaf and then going in turn to each leaf above it would make a spiral. If the third and first leaves were in the same straight line the arrangement would be two-ranked. If the fourth leaf were over the first the arrangement would be three-ranked, etc. Four ranks are never found in a spiral arrangement.

- SPUR.** A dwarf branch, sometimes modified to form a spine. Since the dwarf branch grows little in length, such leaves or leaf-scars as it bears are crowded and their arrangement is difficult to make out. Reference should be made to a young, rapidly growing twig.
- STALKED BUD.** A bud raised above the twig on a little stem. Since only one leaf or leaf-scar is found it is distinguished from a spur.
- STEM.** Includes trunk, branches and twigs. Most winter-buds develop into twigs and so are embryo stems.
- STIPULES.** The more or less leafy outgrowths at the base of a leaf. Sometimes there are none, sometimes they drop off very early and leave a scar, sometimes they are attached to the petiole and so leave no trace after it drops, sometimes they are seen as spines, and often they form scales of winter-buds.
- STIPULE-SCARS.** The tiny, more or less horizontal marks often found at each side of the leaf-scar after the stipules have dropped off. If the stipules were very large the scars may meet around the twig, forming a ring. Sometimes they are unequal in size.
- SUPERPOSED BUDS.** Two or more buds arranged one over another.
- SURFACE.** The outside of a leaf or other part of a tree.
- TIP.** The outer end of the leaf or twig; the part farthest from the stem. The opposite of **BASE**.
- TOOTHED.** A margin cut into points. As used here it implies single points (see **DOUBLE-TOOTHED**). Not indented deeply enough to make lobes.
- TREE.** Here considered to be a woody plant at least 13 ft. (4 meters) high, having one main trunk, which branches into others at a perceptible distance from the ground. Plants which are ordinarily shrubs are included in the **KEY** if they have these characteristics.
- TRUNK.** The lower part of a tree before it breaks up into branches. Sometimes it runs through the tree, giving off branches on the sides.
- TWICE COMPOUND.** See **BIPINNATELY COMPOUND**.
- TWIG.** Here applied to the most recent growth of the stem, the end of a branch, unless qualified by such a word as "older." It is marked at the outer end by a winter-bud or by its own tip, and at the inner end by a series of encircling rings which are the remains of the winter-bud which gave rise to it.
- UNARMED.** Without spines or prickles.
- UNDER.** The direction towards the bottom or the inside of the tree.
- UPPER.** The direction towards the top or the outside of the tree.
- USUALLY.** Implies "not always." Indicates that there is at least one species which does not agree with the description.
- VARIETIES.** Sub-divisions of species, differing only slightly and unessentially from well-marked species. They are not included in this

VEINING. The arrangement of the strands which conduct the food supply. Often forming ridges, especially on the undersurface of a leaf. The largest veins determine whether a leaf is pinnately or palmately veined; and the smallest ones whether it is parallel- or netted-veined.

VISIBLE. Seen from one point of view without turning the object.

WARTY. Bearing roundish lumps of bark.

WAVY. A margin which is not quite entire; scalloped or uneven; not sharp-toothed.

WEDGE-LIKE, WEDGES. See **SPIKE**.

WHORLED. An arrangement of more than two leaves at a node.

WIDTH. The distance across the surface of a leaf from one side margin to the other. The term implies the greatest width. Also the distance from one end of a leaf-scar to the other across the twig.

WILD. Growing without care from man. Applied principally to native trees.

WINGED RACHIS. A rachis with a thin flat border on each side.

WINTER-BUDS. Those buds which remain on the trees all winter. As some of them were contained in the winter-buds of the previous year they can be seen, if they are not concealed under the bark, as soon as those buds open in the Spring. They reach their full size and mature texture in the summer. For examination purposes unopened buds of the previous year may often be found. The **KEY** descriptions refer to the largest buds, with the exceptions of catkins.

WOOLLY. Densely hairy, with long, interwoven hairs.

YEAR'S GROWTH. This begins with several encircling scars, the remains of a bud of the previous year. It ends with similar scars; or, if the newest wood, with an end-bud, or a top side-bud and the tip of the twig. The most recent year's growth usually differs from the others in the appearance of the bark.

INDEX

The numbers refer to the sections.

- ABIES, 21.
ACANTHOPANAX, 54, 154.
ACER, 37, 39, 46, 47, 150, 155, 159.
AESCULUS, 155.
AILANTHUS, 167.
ALBIZZIA, 180.
ALDER, 91, 109, 122.
ALMOND, 136.
ALNUS, 91, 109, 122.
ALTERNATE-LEAVED
BUTTERFLY-BUSH, 81, 119.
ALTHEA, SHRUBBY, 89.
AMELANCHIER, 131.
AMERICAN SMOKE-TREE, 66.
ANGELICA-TREE, 183.
APPLE, 138.
APRICOT, 144.
ARALIA, 183.
ARBOR VITAE, 29.
ASH, 160.
ASIMINA, 69.
BALD CYPRESS, 32.
BASSWOOD, 94, 126.
BEAM-TREE, WHITE, 131.
BEECH, 65, 79, 105, 131.
BENZOIN, 72, 75, 87.
BETULA, 94, 126.
BIG-TREE, CALIFORNIA, 23.
BIRCH, 94, 126.
BLACK GUM, 85.
BLACK-HAW, 40.
BLACK OAK group, 96:
BLADDERNUT, 150.
BLUE BEECH, 146.
BOX, 4.
BOX-ELDER, 159.
BROUSSONETIA, 67.
BUCKEYE, 155.
BUCKTHORN, 41, 78.
BUDDLEIA, 81, 119.
BUFFALO-BERRY, 42.
BULL BAY, 5.
BUTTERFLY-BUSH, 81, 119.
BUTTERNUT, 178.
BUTTON-BUSH, 48.
BUXUS, 4.
CALIFORNIA BIG-TREE, 23.
CAMELLIA, WILD 118.
CARAGANA, 163.
CARPINUS, 146.
CARYA, 173, 179.
CASCARA SAGRADA, 113.
CASTANEA, 122, 125.
CATALPA, 50.
CAUCASIAN WALNUT, 179.
CEDAR, 13.
CEDRELA, 162.
CEDRUS, 13.
CELTIS, 71, 84, 104, 124.
CEPHALANTHUS, 48.
CEPHALOTAXUS, 20.
CERCIDIPHYLLUM, 37.
CERCIS, 72.
CHAENOMELES, 123.
CHAMAECYPARIS, 26, 29.
CHERRY, 99.
CHERRY LAUREL, 8.
CHESTNUT, 122, 125.
CHINA-FIR, 18.
CHINESE BUCKEYE, 176.
CHINESE LARCH, 33.
CHIONANTHUS, 48.
CHITTAM-WOOD, 66.
CHRIST-THORN, 55.
CLADRASTIS, 166.
CLAMMY LOCUST, 168.
CLERODENDRON, 50.
CLETHRA, 120.
CORK-TREE, 158.
CORKWOOD, 77.
CORNUS, 43, 73.
CORYLOPSIS, 122.
CORYLUS, 93, 139.
COTINUS, 66.
CRABAPPLE, 58, 100, 138.
CRATAEGUS, 58.
CRYPTOMERIA, 14, 23.
CUNNINGHAMIA, 18.
CUPRESSUS, 25.
CYDONIA, 83.
CYPRESS, 25.
DAVIDIA, 133.
DIOSPYROS, 82.
DOGWOOD, 43, 73.
DOUGLAS FIR, 21.
ELDER, 160.

ELEAGNUS, 52.
 ELM, 147.
 EMPRESS-TREE, 49.
 ENGLISH WALNUT, 170.
 EPAULETTE-TREE, 111.
 EUCOMMIA, 66.
 EUPTELEA, 127.
 EVODIA, 158.
 EVONYMUS, 41.
 FAGUS, 65, 79, 105.
 FALSE ARBOR VITAE, 28.
 FALSE CEDAR, 162.
 FALSE CYPRESS, 26, 29.
 FIR, 21.
 FLOWERING ALMOND, 99.
 FLOWERING QUINCE, 123.
 FORESTIERA, 38.
 FRAGRANT OLIVE, 4.
 FRANKLINIA, 113.
 FRAXINUS, 160.
 FRINGE-TREE, 48.
 GINKGO, 31.
 GLEDITSIA, 163, 182.
 GOLDEN-CHAIN, 151.
 GOLDEN LARCH, 33.
 GORDONIA, 113.
 GUM, BLACK, 85.
 GUM, SOUR, 85.
 GUM, SWEET, 88.
 GYMNOCLADUS, 182.
 HACKBERRY, 71, 84, 104, 124.
 HACKMATAK, 33.
 HALESLA, 128.
 HAMAMELIS, 108.
 HARDY ORANGE, 152.
 HAW, BLACK-, 40.
 HAWTHORN, 58.
 HAZEL, 93, 139.
 HEMIPTOLEA, 59.
 HEMLOCK, 17.
 HERCULES' CLUB, 183.
 HIBA ARBOR VITAE, 28.
 HIBISCUS, 89.
 HICKORY, 173.
 HIPPOPHAE, 52.
 HOLLY, 6, 7, 120.
 HONEY-LOCUST, 163, 182.
 HONEY-TREE, 103.
 HOP-HORNBEAM, 147.
 HOP-TREE, 152.
 HORNBEAM, 146.
 HORSE-CHESTNUT, 155.
 HOVENIA, 103.
 ILEX, 6, 7, 120.
 INCENSE CEDAR, 27.
 INDIAN BEAN, 50.
 INDIAN CHERRY, 113.
 IRONWOOD, 147.
 JAPAN PAGODA-TREE, 171.
 JAPANESE CEDAR, 14, 23.
 JAPANESE RAISIN-TREE, 103.
 JUDAS TREE, 72.
 JUGLANS, 170, 178.
 JUJUBE, 55.
 JULIBRIZZIN, 180.
 JUNIPER, 13, 26.
 JUNIPERUS, 13, 26.
 KALMIA, 11.
 KATSURA-TREE, 37.
 KENTUCKY COFFEE-TREE, 182.
 KOELREUTERIA, 172, 183.
 KUSAGI, 50.
 LABURNUM, 151.
 LARCH, 33.
 LARIX, 33.
 LEITNERIA, 77.
 LIBOCEDRUS, 27.
 LILAC, 45.
 LINDEN, 94, 126.
 LIQUIDAMBER, 88.
 LIRIODENDRON, 64.
 LOCUST, 165, 169.
 LOCUST, CLAMMY 169.
 MAACKIA, 171.
 MACLURA, 56.
 MADDENIA, 143.
 MALLERIA, 143.
 MAGNOLIA, 5, 65.
 MAIDENHAIR-TREE, 31.
 MALUS, 58, 100, 138.
 MAPLE, 37, 39, 46, 47, 150, 155.
 MEDLAR, 61, 137.
 MESPIUS, 61, 137.
 MORUS, 67.
 MOUNTAIN-ASH, 97, 131, 176.
 MOUNTAIN LAUREL, 11.
 MULBERRY, 67.
 MYRICA, 8, 10.
 NANNY-BERRY, 40.
 NYSSA, 85.
 OAK, 80, 96, 127.
 OLEASTER, 52.

OSAGE ORANGE, 56.
 OSMANTHUS, 4.
 OSTRYA, 147.
 OXYDENDRUM, 129.
 PAGODA-TREE, JAPAN, 171.
 PALIURUS, 55.
 PAPAWE, 69.
 PAPER MULBERRY, 67.
 PARROTTIA, 110.
 PARROTIOPSIS, 110.
 PAULOWNIA, 49.
 PEA-TREE, 163.
 PEACH, 136.
 PEAR, 61, 77, 85, 100, 138.
 PECAN, 179.
 PEPPERIDGE, 85.
 PERSEA, 11.
 PERSIMMON, 82.
 PHELLODENDRON, 158.
 PHOTINIA, 140.
 PICEA, 16.
 PINE, 13.
 PINUS, 13.
 PLATANUS, 63.
 PLATYCARYA, 177.
 PLUM, 60, 144.
 PLUM-YEW, 20.
 PONCIRUS, 152.
 POPLAR, 89, 115.
 POPULUS, 89, 115.
 PORTUGAL LAUREL, 8.
 PRICKLY ASH, 165.
 PRIDE OF INDIA 172, 183.
 PRUNUS, 8, 60, 99, 135, 136, 144.
 PSEUDOLARIX, 33.
 PSEUDOTSUGA, 21.
 PTELEA, 152.
 PTEROCARYA, 179.
 PTEROCELTIS, 104.
 PTEROSTYRAX, 111.
 PYRUS, 58, 61, 77, 85, 100, 138.
 QUERCUS, 80, 96, 127.
 QUINCE, 83.
 RAISIN-TREE, JAPANESE 103.
 RED BAY, 11.
 REDBUD, 72.
 RED CEDAR, 26.
 RED OAK group, 96.
 RETINISPORA, 28.
 RETINOSPORA, 28.
 RHAMNUS, 41, 78, 113.
 RHODODENDRON, 9, 80.
 RHUS, 170, 174.
 ROBINIA, 165, 168.
 SALIX, 78, 114.
 SAMBUCUS, 160.
 SASSAFRAS, 75, 90.
 SCIADOPITYS, 13.
 SEA-BUCKTHORN, 52.
 SEQUOIA, 23.
 SHADBUSH, 131.
 SHEEP-BERRY, 40.
 SHEPHERDIA, 42.
 SHINGLE OAK, 80.
 SHRUBBY ALTHEA, 89.
 SILK-TREE, 180.
 SILVERBELL-TREE, 128.
 SINOWILSONIA, 108.
 SMOKE-TREE, AMERICAN, 66.
 SNOWDROP-TREE, 128.
 SOPHORA, 171.
 SORBUS, 97, 131, 176.
 SORREL-TREE, 129.
 SOUR GUM, 85.
 SOURWOOD, 129.
 SPICE-BUSH, 72, 75, 87.
 SPINDLE-TREE, 41.
 SPRUCE, 16.
 STAPHYLEA, 150.
 STEWARTIA, 118.
 STORAX, 112.
 STYRAX, 112.
 SUGAR-BERRY, 104, 124.
 SUMAC, 170, 174.
 SWAMP PRIVET, 38.
 SWEET GUM, 88.
 SWEET-LEAF, 129.
 SYCAMORE, 63.
 SYMPLOCOS, 129.
 SYRINGA, 45.
 TAMARACK, 33.
 TAMARISK, 31.
 TAMARIX, 31.
 TAXODIUM, 32.
 TAXUS, 19.
 TETRACENTRON, 102.
 THUJA, 29.
 THUJOPSIS, 28.
 TILIA, 94, 126.
 TORREYA, 20.
 TREE OF HEAVEN, 167.
 TSUGA, 17.

TUPELO, 85.	WHITEWOOD, 94, 126.
ULMUS, 147.	WILD CAMELLIA, 118.
UMBRELLA PINE, 13.	WILLOW, 78, 114.
VARNISH-TREE, 172, 183.	WILLOW OAK, 80.
VIBURNUM, 40.	WING-NUT, 179.
WALNUT, 170, 178.	WINTER HAZEL, 122.
WALNUT, ENGLISH, 170.	WITCH HAZEL, 108.
WAX-MYRTLE, 8, 10.	XANTHOCEROS, 176.
WHITE ALDER, 120.	YELLOW-WOOD, 166.
WHITE BEAM-TREE, 131.	YEW, 19.
WHITE CEDAR, 26, 29.	ZANTHOXYLUM, 165.
WHITE OAK group, 96.	ZELKOVA, 146.
WHITE POPLAR, 89.	ZIZYPHUS, 55.

TUPELO, 85.
ULMUS, 147.
UMBRELLA PINE, 13.
VARNISH-TREE, 172,
VIBURNUM, 40.
WALNUT, 170, 178.
WALNUT, ENGLISH,
WAX-MYRTLE, 8, 10.
WHITE ALDER, 120.
WHITE BEAM-TREE,
WHITE CEDAR, 26, 29
WHITE OAK group, 9
WHITE POPLAR, 89.

