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Bulletin 117 - Trees and Shrubs of the Campus

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Eastern Illinois State Teachers College

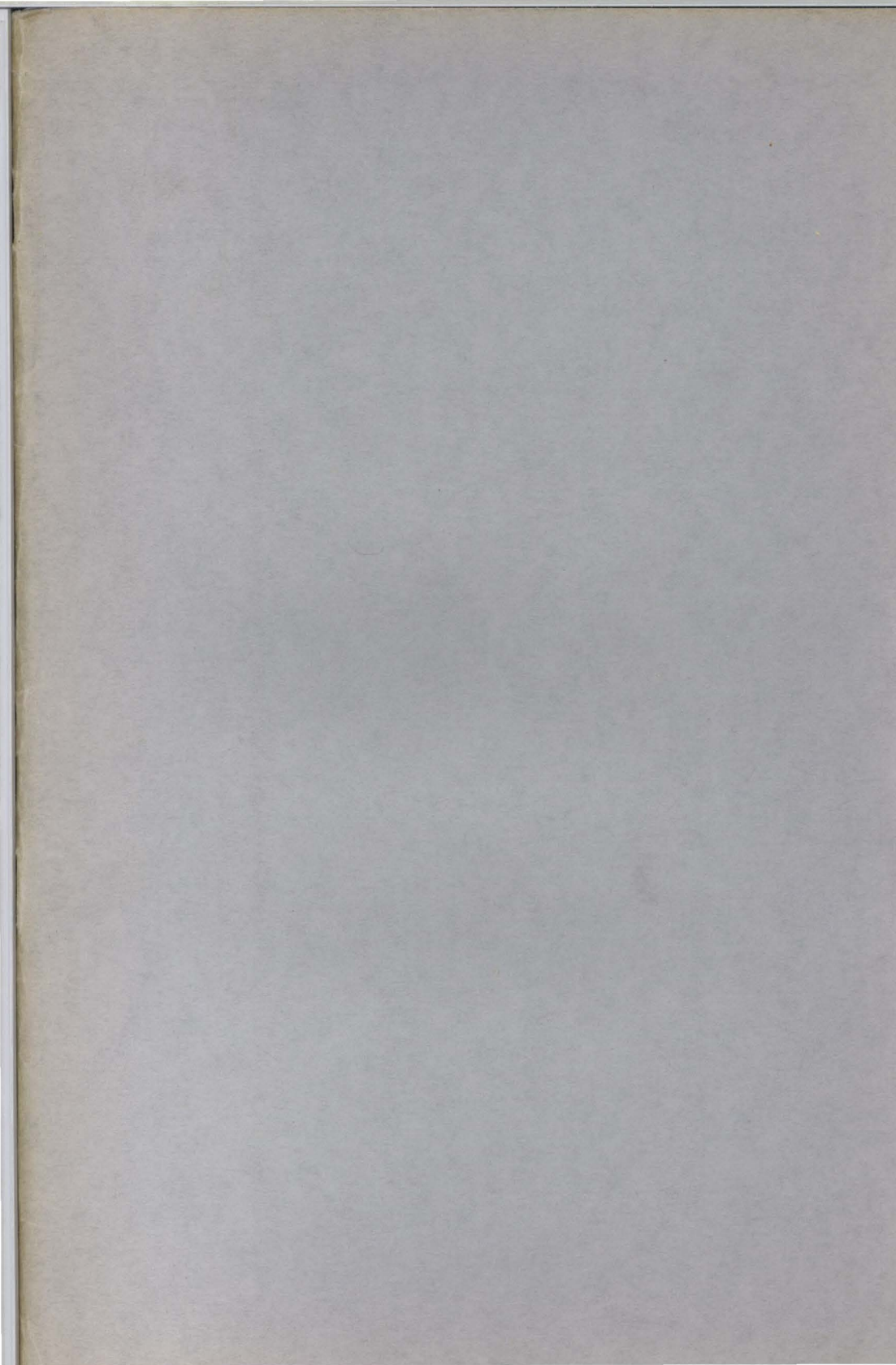
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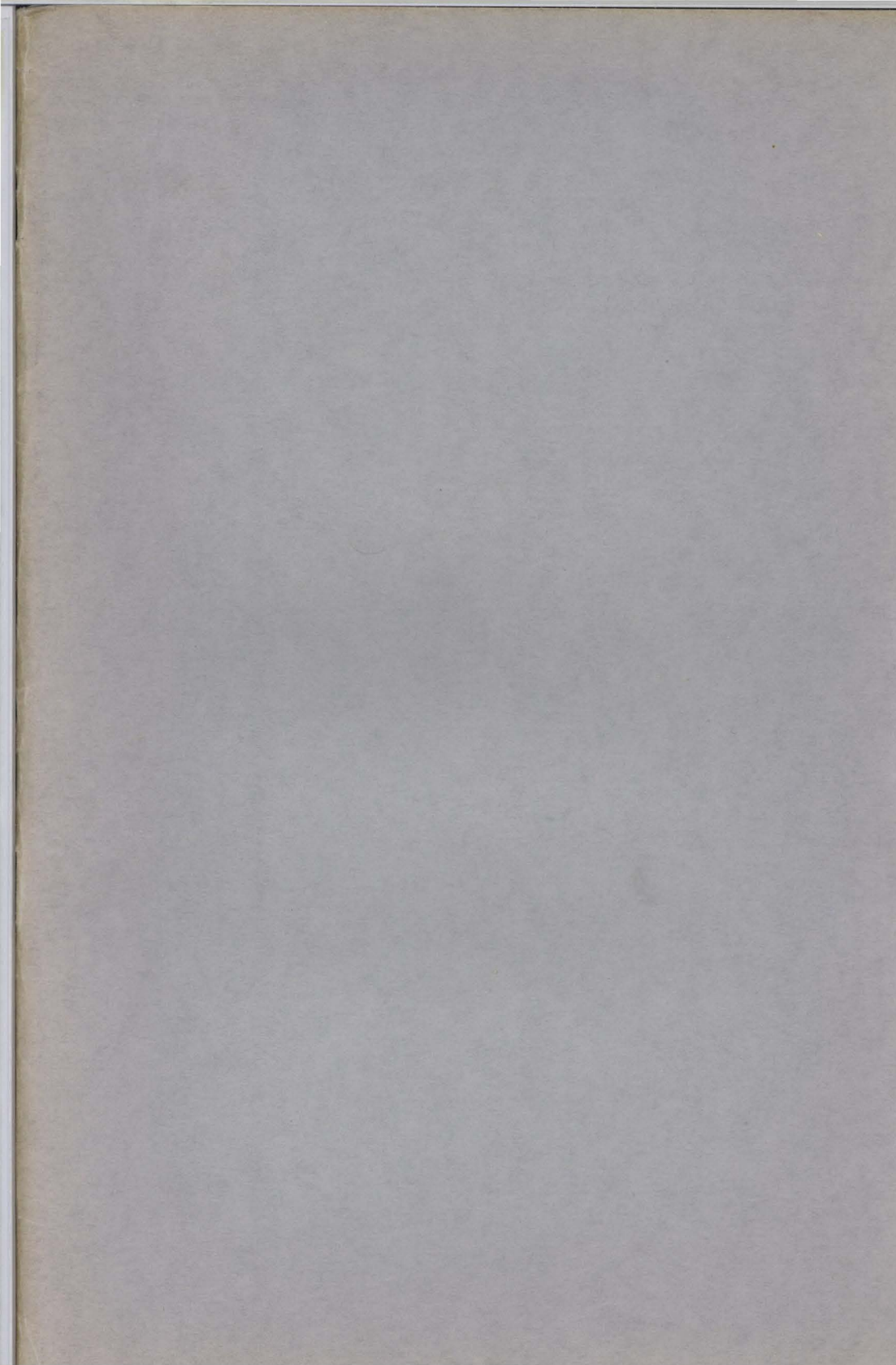
CHARLESTON

TREES AND SHRUBS OF THE
CAMPUS

By

ERNEST L. STOVER, Ph. D.
Head of Department of Biological Sciences





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TREES AND SHRUBS OF THE CAMPUS

First Revised Printing

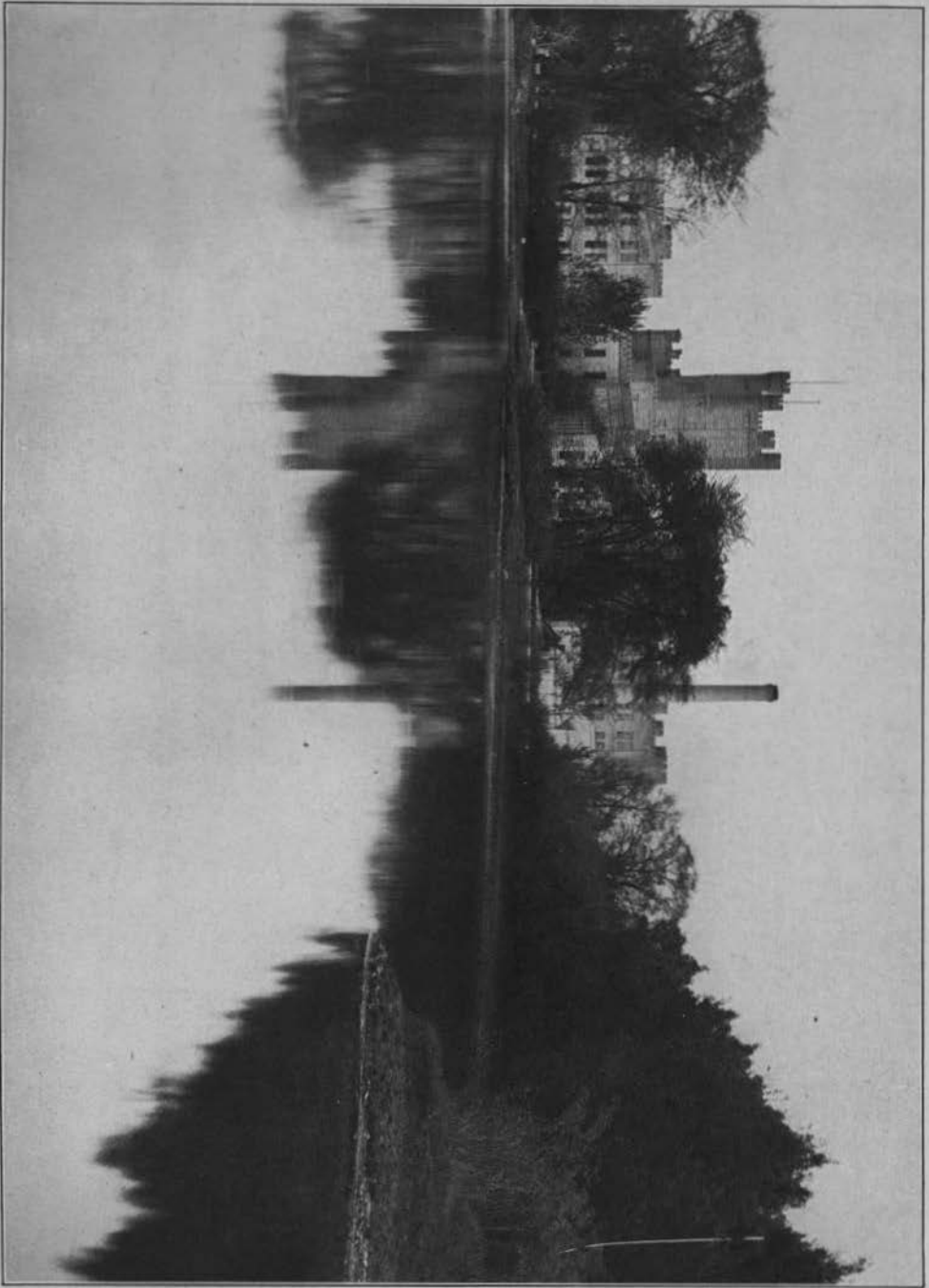
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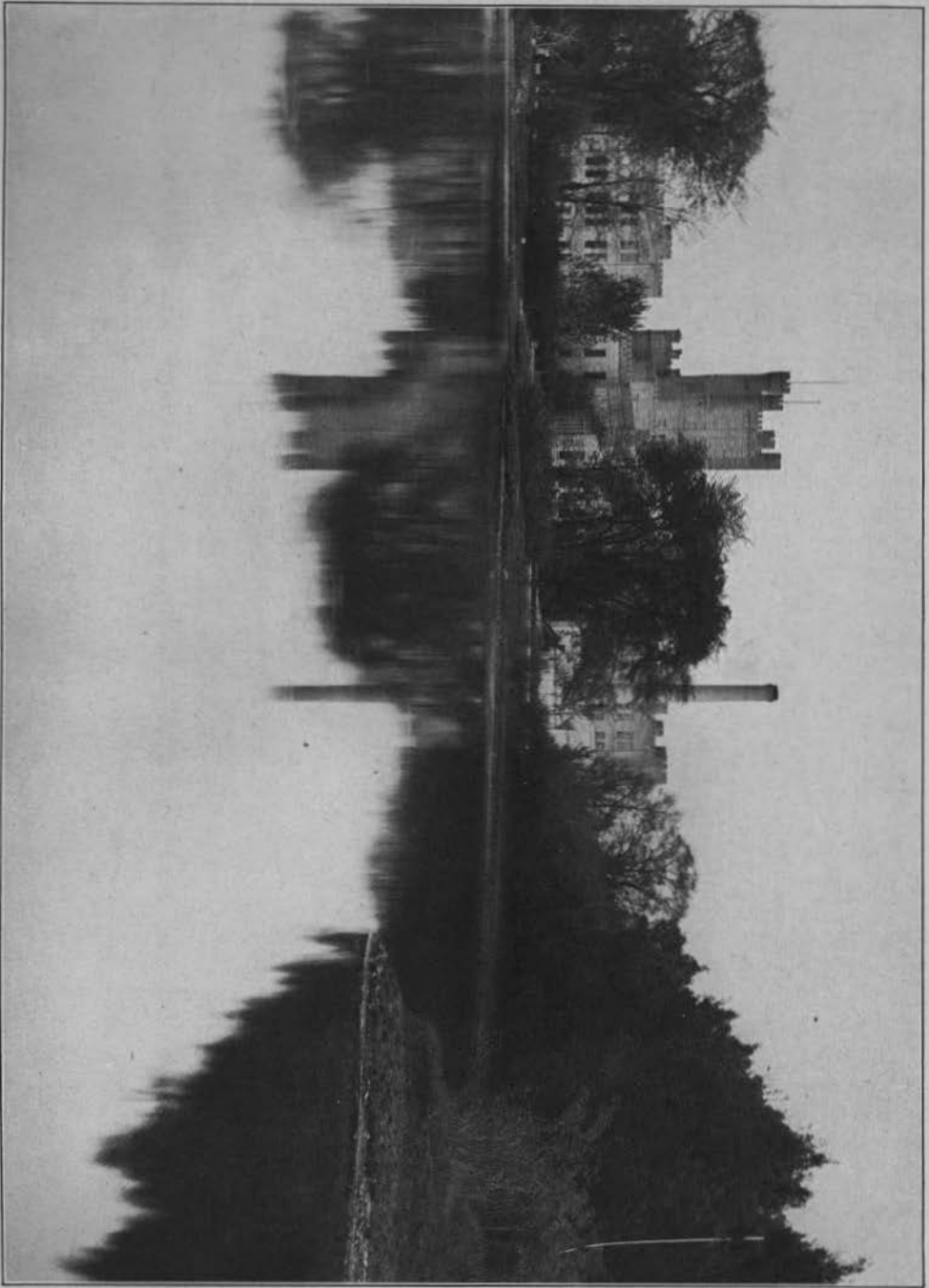
HEAD OF DEPARTMENT OF BIOLOGICAL SCIENCES

Eastern Illinois State Teachers College at Charleston

(Printed by authority of the State of Illinois)



"I THINK THAT I SHALL NEVER SEE
A POEM LOVELY AS A TREE."—Joyce Kilmer.



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A POEM LOVELY AS A TREE."—Joyce Kilmer.

INTRODUCTION

The object of this bulletin is to list the remarkable number of woody plants on our campus and to provide a means for their identification by our students and any one interested in them. There are about two hundred woody plants, about half of them trees and the rest shrubs and woody vines. The writer has prepared a key for the identification of each group based upon the leaf and stem characters using as few technical terms as possible, so that any one with a little study can identify these groups of plants on our campus and anywhere else that they occur.

The students in the botany department are very fortunate in having such a complete outdoor laboratory for the study of trees and shrubs. Most of the native trees and shrubs are on the campus, as well as many of the cultivated forms used in ornamental planting, and a variety of introduced and strictly cultivated species and varieties.

The attempt has been made to include all of the species, but not all of the varieties, for instance, of the honeysuckles, roses and willows. Any one wishing to know the numerous varieties should consult some standard work, as Bailey's *Encyclopedia of Horticulture*.

The college is indebted to the noted landscape architect, Mr. Walter Burley Griffin, for the original plans for this campus, and to Mr. Walter H. Nehrling for his skill and care in keeping the campus one of the beauty spots of this region. We are also indebted to two of the former botanists of this school, Dr. Otis W. Caldwell and Dr. E. N. Transeau, for the additions which they made to the flora of this campus.

The writer wishes to thank Mr. Walter H. Nehrling and to acknowledge his aid in preparing the check list for this bulletin, and to thank Miss Blanche C. Thomas for her painstaking care in correcting this material for the printer.

E. L. STOVER

July 1, 1925

FIRST REVISED PRINTING

In order to increase the usefulness of this bulletin the main keys have been revised and species keys have been added for some of the more difficult genera. The names follow those in Gray's *New Manual of Botany* (7th revised edition), except for the cultivated shrubs not included in this Manual. The names of the cultivated shrubs not included in Gray's Manual follow those in Bailey's *Manual of Cultivated Plants*. The shrubby conifers have all been included in the tree key.

E. L. S.

July 1, 1932

HOW TO USE THE KEYS

In using the keys one must decide first whether the plant to be identified is a tree, shrub, or vine, and then turn to the proper key. In this there are co-ordinate sets of characters given identical numbers, and one must choose the character accurately describing the plant in hand. The number in parentheses at the end of that line chosen tells where to read next; and here again one chooses the correct character of the set listed there. Success in using the key depends entirely upon the accuracy with which one selects at each step in the key the correct description fitting the plant being identified. One should always consider all the groups of characters preceded by the same number, for in some cases there are three or four sets of characters to consider and decide between. This is made necessary by the difficulty of making a key based entirely upon leaf and stem characters.

After tracing through the key for a given plant the name found is the name of the genus; for example, it is an oak, or a maple, but the key does not tell what kind of oak or maple. When the genus has been determined by the key, the number given after the generic name will tell on what page to find the descriptions of the species occurring on the campus. In the section of the bulletin giving the description of species the common name is in blackface type followed by the scientific name in parentheses. The abbreviation following the scientific name indicates the authority who first named the plant.

Students who wish to make a more extensive study of the trees and shrubs should learn to use the following books:

Bailey, *Encyclopedia of Horticulture*

Bailey, *Manual of Cultivated Plants*

Gray, *Field, Forest, and Garden Botany*

Gray, *New Manual of Botany*, 7th revised edition

Hough, *Handbook of the Trees of the Northern United States and Canada*

Sargent, *Manual of the Trees of North America*

LIST OF TREES OF THE CAMPUS

| | PAGE NO. |
|---|----------|
| Ailanthus (Tree of Heaven)..... | 27 |
| Alder: Hoary..... | 32 |
| Apple..... | 26 |
| Arborvitae (Flat-leaved Cedar)..... | 24 |
| Ash: American or White, Blue, Black and Green, European..... | 34-35 |
| Bald Cypress..... | 23 |
| Basswood (Linden, Linn) American and European..... | 25 |
| Beech: American and Copper..... | 30 |
| Birch: American and European White, and River..... | 32 |
| Bladdernut..... | 28 |
| Blue Beech or Muscle Wood..... | 32 |
| Buckeye..... | 28 |
| Catalpa..... | 35 |
| Cherry: Black, Choke, and Dwarf..... | 26 |
| Chestnut..... | 30 |
| Crab: Flowering and Double Flowering..... | 26 |
| Dogwood or Cornel: Flowering, Alternate-leaved, and Pan- icled, Rough-leaved..... | 35 |
| Douglas Fir..... | 12 |
| Elm: American or White, English, Red or Slippery, and Scotch..... | 29-30 |
| Fringe-Tree..... | 35 |
| Hackberry..... | 30 |
| Haw..... | 26 |
| Hawthorn or White Thorn (several species)..... | 26 |
| Hemlock..... | 23 |
| Hickory: Bitternut, Pignut, and Shell-bark..... | 33 |
| Horse-Chestnut..... | 28 |
| Ironwood or Hop Hornbeam..... | 32 |
| Juniper or Red Cedar and varieties..... | 24 |
| Kentucky Coffee Tree..... | 27 |
| Larch..... | 24 |
| Locust: Black or Clammy, Honey, Pink Flowering..... | 27 |
| Magnolia..... | 25 |
| Maiden-hair Tree or Ginkgo..... | 23 |
| Maple: Black, Box-elder or Ash-leaf, Japanese, Cutleaf, Nor- way, Silver, Sugar, Sycamore..... | 28-29 |
| Mountain Ash..... | 26 |
| Mulberry: Red, Weeping, and White..... | 30 |

| | PAGE NO. |
|---|----------|
| Oak: Black, Bur, Chestnut, Pin, Red, Scarlet, Shingle, Swamp White, and White..... | 30-32 |
| Osage Orange..... | 30 |
| Papaw..... | 25 |
| Peach..... | 26 |
| Pear..... | 26 |
| Persimmon..... | 34 |
| Pine: Austrian, Scotch, White, and Mugo..... | 24 |
| Plum..... | 26 |
| Poplar: Cottonwood or Yellow, Large-toothed Aspen, and Lombardy..... | 33 |
| Redbud..... | 26 |
| Retinospora..... | 25 |
| Sassafras..... | 25 |
| Smoke Tree..... | 42 |
| Spruce: Canadian, Colorado-blue, and Norway..... | 23 |
| Sweet Gum or Liquidambar..... | 29 |
| Sycamore: American and Oriental..... | 29 |
| Tulip Tree..... | 25 |
| Wafer-Ash..... | 27 |
| Walnut: Black and Butternut or White Walnut..... | 32 |
| Willow: Black, White, Goat, Laurel-leaved, Brittle, and Weeping..... | 34 |
| Yellow Wood..... | 27 |
| Yew..... | 12 |

NOTE: The staghorn sumac is often tree-like but is included in the shrub key.

LIST OF SHRUBS AND VINES OF THE CAMPUS

(Those marked * are vines)

| | PAGE | NO. |
|--|------|-----|
| Abelia..... | 48 | 48 |
| Alder, black or Winterberry..... | 42 | 42 |
| Allspice Bush..... | 39 | 39 |
| Aralia: Hercules' Club and Angelica Bush..... | 44 | 44 |
| Aucuba..... | 45 | 45 |
| Barberry: Japanese and Purple-leaved..... | 39 | 39 |
| *Bittersweet..... | 43 | 43 |
| Blackberry..... | 41 | 41 |
| Bladder Senna (Colutea)..... | 42 | 42 |
| Buckthorn (2 species)..... | 43 | 43 |
| Bush Honeysuckle (3 species and several varieties)..... | 47 | 47 |
| Buttonball Bush..... | 46 | 46 |
| Canby's Mountain Lover..... | 43 | 43 |
| Chaste Tree..... | 46 | 46 |
| Coral Berry or Indian Currant..... | 47 | 47 |
| Currant (2 species)..... | 40 | 40 |
| Deutzia (3 species)..... | 40 | 40 |
| Dogwood: Red Osier, Panicked and Flowering..... | 45 | 45 |
| Elder (3 species)..... | 46 | 46 |
| *English Ivy..... | 44 | 44 |
| False Indigo..... | 42 | 42 |
| French Mulberry or Callicarpa..... | 46 | 46 |
| Golden Bell or Forsythia (2 species)..... | 44 | 44 |
| Gooseberry..... | 40 | 40 |
| *Grape (2 or 3 species)..... | 43 | 43 |
| Hazelnut..... | 39 | 39 |
| Hibiscus (2 species)..... | 44 | 44 |
| Hydrangea (2 species)..... | 40 | 40 |
| *Ivy: Boston, Poison, Five-leaved or Virginia Creeper..... | 43 | 43 |
| Japanese Quince..... | 41 | 41 |
| Kerria or Rhodotyphus..... | 41 | 41 |
| Lilac: Common, Japanese, and Persian..... | 45 | 45 |
| Mock Orange and Dwarf Mock Orange..... | 40 | 40 |
| *Moonseed Vine..... | 39 | 39 |
| New Jersey Tea..... | 43 | 43 |
| Ninebark..... | 42 | 42 |
| Oleaster..... | 40 | 40 |

| | PAGE NO. |
|---|----------|
| Pearl Bush..... | 41 |
| Prickly Ash..... | 42 |
| Privet: California, Regal, and varieties (4 species)..... | 45 |
| Rhodotyphus..... | 41 |
| Rose (several species and varieties)..... | 41 |
| Rose of Sharon..... | 43 |
| Siberian Pea or Genista..... | 42 |
| Silver Bell..... | 44 |
| *Smilax or Green Brier (2 species)..... | 39 |
| Snowberry..... | 48 |
| Spice Bush or Fever Bush..... | 39 |
| Spiraea (6 species)..... | 41 |
| Sumac: Aromatic, Cut-leaved, Staghorn, *Poison Ivy, Smooth..... | 42 |
| Sweet Pepperbush or White Alder..... | 44 |
| Tamarix (Tamarisk)..... | 39 |
| *Trumpet Vine..... | 45 |
| Viburnum: Japanese, Lantana or Wayfaring Tree, Maple- leaved, High-bush Cranberry, Sheepberry, and Snowball..... | 46-47 |
| Wahoo: American, European, Winged, and Climbing*..... | 43 |
| Weigela and Variegated Weigela..... | 47 |
| Witch-hazel..... | 40 |

NOTE: The shrubby conifers have all been included in the tree list and key.

The fringe-tree and smoke tree although often shrub-like are included in the tree key.

KEY TO THE TREES OF THE CAMPUS

| | PAGE NO. |
|---|-------------------------------|
| A. Leaves needle-like or scale-like, usually evergreen (1) | |
| B. Leaves broad (not needle-like or scale-like), deciduous (8) | |
| 1. Leaves scale-like (7) | |
| 1. Leaves needles (2) | |
| 2. Needles on dwarf branches 2 to many in a bundle (3) | |
| 2. Needles borne singly (4) | |
| 3. Needles 2 to 5 in a bundle..... | PINES 24 |
| 3. Needles many in a bundle..... | LARCH 24 |
| 4. Leaves 2-ranked (5) | |
| 4. Leaves not 2-ranked (6) | |
| 5. Needles and dwarf branches deciduous, needles yellowish green and pointed..... | BALD CYPRESS 23 |
| 5. Needles evergreen, round-tipped, $\frac{1}{2}$ to $\frac{2}{3}$ in. long, two white lines on under side..... | HEMLOCK 23 |
| 5. Needles evergreen pointed $\frac{3}{4}$ to 1 in. long, distinctly petioled, a single dark green line on under side. YEW* | |
| 6. Needles sharp pointed and 4-angled..... | SPRUCE 23 |
| 6. Needles sharp pointed rather flat, somewhat 2-ranked, 1 to $1\frac{1}{4}$ in. long..... | DOUGLAS FIR* |
| 7. Leaves and young stems flattened; leaves not sharp pointed, opposite in pairs..... | ARBORVITAE 24 |
| 7. Stems round, leaves opposite in pairs, sharp pointed... .. | RETINOSPORA 25 |
| 7. Leaves in whorls of three at each node, sharp pointed... .. | JUNIPER 24 |
| -8- | |
| 8. Leaves in whorls of three, large and heart shaped.... | CATALPA 35 |
| 8. Leaves opposite (9) | |
| 8. Leaves alternate (14) | |
| 9. Leaves simple (10) | |
| 9. Leaves compound (12) | |
| 10. Leaves pinnately veined (11) | |
| 10. Leaves palmately veined, margin lobed..... | MAPLE 28 |
| 11. Leaves ovate to elliptic, 2 to $4\frac{1}{2}$ in. long... .. | DOGWOOD 35 |
| 11. Leaves oval to oblong, 3-8 in. long.... | FRINGE-TREE 35 |
| 12. Leaves pinnately compound (13) | |
| 12. Leaves palmately compound (five-parted) leaves large... .. | BUCKEYE and HORSE-CHESTNUT 28 |
| 13. Leaves trifoliate, entire or finely serrate... .. | WAFER-ASH 27 |
| 13. Leaves with 3-5 leaflets, twigs green.... | BOX-ELDER 28 |
| 13. Leaves with 5-13 leaflets..... | ASH 34 |
| -14- | |
| 14. Leaves compound (15) | |
| 14. Leaves simple (20) | |

*No description.

| | PAGE NO. |
|---|-------------------------|
| 15. Leaves with 3 leaflets, entire margins. | BLADDERNUT 28 |
| 15. Leaves with 5 or more leaflets (16) | |
| 16. Leaflets entire (17) | |
| 16. Leaflets serrate (saw-toothed) or dentate (toothed) (19) | |
| 17. Trees with thorns on small branches or on trunk of tree..... | LOCUST 27 |
| 17. Trees without thorns (18) | |
| 18. Bark of tree rough and fluted, fruit a large bean..... | KENTUCKY COFFEE TREE 27 |
| 18. Bark of tree rather smooth, not fluted, base of leaves entirely covering buds..... | YELLOW WOOD 27 |
| 19. Leaves of 5 to 13 leaflets, large trees..... | HICKORY 33 |
| 19. Leaves with 11 to 17 leaflets, obtuse or short-pointed... | MOUNTAIN ASH 26 |
| 19. Leaves with 11 to 23 leaflets, long pointed, pith of twigs brown, partitioned..... | WALNUT 32 |
| 19. Leaves very large of 11 to 41 leaflets, green glands on under side of basal teeth of leaflets.... | AILANTHUS 27 |

-20-

| | |
|--|--------------|
| 20. Leaves fan-shaped, veins numerous and many of them forked or split into two veins..... | GINKGO 23 |
| 20. Leaves palmately veined, i. e., with five main veins (21) | |
| 20. Leaves pinnately veined (22) | |
| 21. Leaf margins, entire, heart shaped..... | REDBUD 26 |
| 21. Leaf margins serrate, heart shaped..... | BASSWOOD 25 |
| 21. Leaf margins lobed, star shaped, branches often corky ridged..... | SWEET GUM 29 |

-22-

| | |
|--|---------------|
| 22. Lobed and non-lobed leaves on same tree (23) | |
| 22. Leaves all lobed (24) | |
| 22. Leaves not lobed but may be dentate (toothed) (28) | |
| 23. Margins of lobes entire, leaves aromatic, twigs green... | SASSAFRAS 25 |
| 23. Margins of lobes irregular, leaves with juice, twigs yellow or brown..... | MULBERRY 30 |
| 24. Lobes of leaves serrate or dentate (toothed) (26) | |
| 24. Lobes of leaves entire (25) | |
| 25. Leaves with 3 prominent veins, usually 4 lobes..... | TULIP TREE 25 |
| 25. Leaves with one main vein, with more than 4 lobes that may be rounded or bristle tipped..... | OAK 30 |
| 26. Leaves large with three main veins..... | SYCAMORE 29 |
| 26. Leaves rather small with one main vein (27) | |
| 27. Trees with thorns..... | HAWTHORN 26 |
| 27. Trees without thorns, bark of trees chalky white or yellow to orange..... | BIRCH 32 |

-28-

| | | |
|-----|---|-----------------|
| 28. | Margins of leaves entire (29) | |
| 28. | Margins of leaves serrate or toothed (33) | |
| 29. | Trees with thorns | OSAGE ORANGE 30 |
| 29. | Trees without thorns (30) | |
| 30. | Buds clustered at tips of branches | OAK 30 |
| 30. | Terminal bud absent, entire leaves often hairy beneath, pith may be chambered | PERSIMMON 34 |
| 30. | Terminal bud present (31) | |
| 31. | Terminal bud naked, brown silky haired | PAPAW 25 |
| 31. | Terminal bud covered with scales (32) | |
| 32. | Leaves pointed with complete stipular rings (lines en- circling stem at base of petiole) | MAGNOLIA 25 |
| 32. | Leaves rounded at tip, with milky sap | SMOKE TREE 42 |

-33-

| | | |
|-----|---|---------------|
| 33. | Buds clustered at tips of branches, pith 5-angled | OAK 30 |
| 33. | Terminal bud absent (34) | |
| 33. | Terminal bud present (42) | |
| 34. | Leaves serrate or toothed (35) | |
| 34. | Leaves doubly serrate (39) | |
| 35. | Trees with thorns | HAWTHORN 26 |
| 35. | Trees without thorns (36) | |
| 36. | Leaves with 3 main veins | HACKBERRY 30 |
| 36. | Leaves with 1 main vein (37) | |
| 37. | Leaves toothed, long and pointed | CHESTNUT 30 |
| 37. | Leaves serrate (38) | |
| 38. | Leaves oval | PLUM 26 |
| 38. | Leaves long and slender with deciduous stipules, buds covered by one scale | WILLOW 34 |
| 39. | Trees with thorns | HAWTHORN 26 |
| 39. | Trees without thorns (40) | |
| 40. | Leaves oblique to the petiole at base | ELM 29 |
| 40. | Leaves not oblique at base (41) | |
| 41. | Bark of tree white or orange exfoliating in thin sheets | BIRCH 32 |
| 41. | Bark of tree gray, smooth | BLUE BEECH 32 |
| 41. | Bark of tree brown, shredding lengthwise | IRONWOOD 32 |

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| | | |
|-----|--|----------|
| 42. | Buds long pointed and brown | BEECH 30 |
| 42. | Buds not long pointed (43) | |
| 43. | Leaves serrate (44) | |
| 43. | Leaves doubly serrate (48) | |
| 43. | Leaves toothed or wavy margined (50) | |
| 44. | Buds stalked, pith 3-angled, woody cones on tree | ALDER 32 |

| | PAGE NO. |
|---|--------------|
| 44. Buds not stalked (45) | |
| 45. Petioles of leaves with glands (46) | |
| 45. Petioles without glands (47) | |
| 46. Glands knob-like, twigs with very pungent odor, lenticles horizontal..... | CHERRY 26 |
| 46. Glands disk-shaped; twigs red or green..... | PEACH 26 |
| 47. Trees with prominent lateral thorns..... | HAWTHORN 26 |
| 47. Trees without thorns, buds and lower surface of leaves hairy..... | APPLE 26 |
| 48. Trees with prominent lateral thorns..... | HAWTHORN 26 |
| 48. Trees without thorns although stunted branches often thorn-like (49) | |
| 49. Bark of tree white or orange exfoliating in thin papery sheets..... | BIRCH 32 |
| 49. Bark of tree brown or grey..... | CRABAPPLE 26 |
| 49. Bark of tree grey, buds stalked, woody cones persist- ent on tree..... | ALDER 32 |
| 50. Teeth of leaves sharp pointed often incurved, leaves long and pointed..... | CHESTNUT 30 |
| 50. Teeth of leaves not sharp pointed, leaves broadly ovate..... | POPLAR 33 |

KEY TO VINES OF THE CAMPUS

| | PAGE NO. |
|---|-------------------------|
| 1. Leaves opposite, pinnately compound, climbing by roots..... | TRUMPET VINE 45 |
| 1. Leaves alternate (2) | |
| 2. Leaves mostly 5-parted climbing by disk-bearing tendrils..... | VIRGINIA CREEPER 43 |
| 2. Leaves mostly 3-parted, climbing by rootlets..... | POISON IVY 43 |
| 2. Leaves simple (3) | |
| 3. Leaves pinnately veined (4) | |
| 3. Leaves palmately veined (5) | |
| 4. Vines with spines or prickles, climbing by tendrils, leaves entire..... | SMILAX (GREEN BRIER) 39 |
| 4. Vines smooth, twining, leaves finely serrate..... | BITTERSWEET 43 |
| 5. Vines without climbing tendrils or roots, margins of leaves angled..... | MOONSEED VINE 39 |
| 5. Vines climbing by roots or tendrils (6) | |
| 6. Vines climbing by rootlets, leaves glossy evergreen, commonly 3-lobed..... | ENGLISH IVY 44 |
| 6. Vines climbing by roots, stems covered with minute warts, leaves crenately serrate..... | WAHOO 43 |
| 6. Vines climbing by tendrils with disks which attach vine to support, leaves glossy surfaced, 3-lobed..... | BOSTON IVY 43 |
| 6. Vines climbing by tendrils without disks, leaves 3-5 lobed, rather dull green..... | GRAPE 43 |

KEY TO SHRUBS OF THE CAMPUS

| | PAGE NO. |
|---|-------------------|
| 1. Shrubs armed, i. e., with spines, prickles, or thorns (2) | |
| 1. Shrubs unarmed (8) | |
| 2. Leaves simple (3) | |
| 2. Leaves compound (4) | |
| 3. One to three thorns at base of leaves . . . | BARBERRY 39 |
| 3. Thorns woody, solitary in the fork of terminal branches . . . | BUCKTHORN 43 |
| 4. Stems large, coarse, club-like, leaves very large, prickly, one to several times compound. | HERCULES' CLUB 44 |
| 4. Stem not as above (5) | |
| 5. Leaflets 3 to 5 (6) | |
| 5. Leaflets more than 5 (7) | |
| 6. Leaves mostly pinnately compound with 3-leaflets . . . | BLACKBERRY 41 |
| 6. Leaves mostly pinnately compound with 5-leaflets . . . | ROSE 41 |
| 6. Leaves palmately compound . . . | ARALIA 44 |
| 7. Leaflets pointed, aromatic, buds woolly . . . | PRICKLY ASH 42 |
| 7. Leaflets rounded at tip with a terminal bristle, a pair of weak spines at base of each leaf. | SIBERIAN PEA 42 |
| 7. Leaflets five, serrate with stipules . . . | ROSE 41 |
| -8- | |
| 8. Leaves compound (9) | |
| 8. Leaves simple (15) | |
| 9. Leaves palmately compound (5-parted) . . . | CHASTE TREE 46 |
| 9. Leaves pinnately compound (10) | |
| 10. Leaves opposite, with 5-11 leaflets, leaflets serrate . . . | ELDER 46 |
| 10. Leaves alternate (11) | |
| 11. Leaves trifoliate, coarsely toothed, aromatic . . . | FRAGRANT SUMAC 42 |
| 11. Leaves pinnately compound (12) | |
| 12. Leaves with stipules (13) | |
| 12. Leaves without stipules (14) | |
| 13. Leaflets with terminal bristle . . . | SIBERIAN PEA 42 |
| 13. Leaflets indented at tip . . . | BLADDER SENNA 42 |
| 14. Leaflets sharp pointed at tip, serrate . . . | SUMAC 42 |
| 14. Leaflets round at tip, entire . . . | FALSE INDIGO 42 |
| -15- | |
| 15. Leaves alternate (16) | |
| 15. Leaves opposite (28) | |
| 16. Leaves small scales closely appressed on slender branches . . . | TAMARISK 39 |

16. Leaves with petiole and blade (not appressed) (17)
17. Leaves entire, with small spots of white hairs over entire surface, fruit silver or russet in color, mealy when ripe. ELAEAGNUS or OLEASTER 40
17. Margins of leaves toothed with teeth rounded, or wavy margined (18)
17. Margins of leaves dentate (toothed) with teeth acute, or serrate (21)

-18-

18. Leaves obovate or oval, wavy-toothed, straight veined with deciduous stipules, fruit a woody nut-like capsule with 4-divisions at the top. WITCH-HAZEL 40
18. Leaves 3-lobed (19)
19. Leaves palmately veined (20)
19. Leaves pinnately veined, mostly 3-lobed, a clear spot at the main angles of the leaf margins, bark separating in thin layers. (OPULASTER) NINEBARK 42
19. Leaves pinnately veined, mostly 3-lobed, lighter color on under side, wedge-shaped at base; abundant white flowers on long arching stems. . . BRIDAL WREATH 41
20. Leaves 3-lobed, deeply cut, palmately veined, small, leaf blade about one inch long. CURRANT 40
20. Leaves 3-lobed, palmately veined, 2-4 in. long, stipule scars small and round. HIBISCUS 44

-21-

21. Leaves finely serrate (23)
21. Leaves coarsely serrate or toothed (22)
21. Leaves few-toothed and on older parts almost entire, whitish below, obovate; fruit 4-parted. PEARL BUSH 41
22. Leaves coarsely serrate, lanceolate and thin, stipules slender and deciduous, shrubs with slender green stems. KERRIA 41
22. Leaves toothed, somewhat 3-parted. BRIDAL WREATH 41

-23-

23. Leaves with stipules (24)
23. Leaves without stipules (25)
24. Leaves oval with large ear-like stipules; flowers bright red. JAPANESE QUINCE 41
24. Leaves with scale-like stipules, margins of leaves somewhat doubly serrate, pubescent on under side; flowers very small, sessile, 1-3 in. axils of leaves. BLACK ALDER or WINTERBERRY 42
25. Leaves with 3 main veins, ovate or oblong-ovate, finely serrate, downy beneath. . . NEW JERSEY TEA 43

25. Leaves with 1-main vein (26)
26. Leaves doubly serrate, round heart-shaped, downy at first, twigs often bristly hairy.....HAZELNUT 39
26. Leaves serrate (27)
27. Leaves wedge-obovate, sharply serrate, teeth incurved, straight veined, dull green.....WHITE ALDER 44
27. Leaves oblong; snowy white flowers, drooping bell-shaped; fruit prominently 4-winged.SILVER BELL 44
27. Leaves linear to lanceolate, some varieties with small ovate and sharply serrate leaves, smooth above, often minutely downy beneath.....SPIRAEA 41

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28. Margins of leaves entire (29)
28. Margins of leaves serrate (37)
28. Margins of leaves toothed or lobed (45)

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29. Twigs winged or 4-lined.....WAHOO 43
29. Twigs not as above (30)
30. Leaves with stipules.....BUTTONBALL BUSH 46
30. Leaves without stipules (31)
31. Leaves pubescent with hairs at least on lower side (32)
31. Leaves glabrous (smooth) (35)
32. Leaves pubescent mainly on midrib.....PRIVET 45
32. Leaves pubescent on lower side (33)
32. Leaves somewhat pubescent on both sides, oval to oblong; flowers and fruits in pairs..HONEYSUCKLE 47
33. Leaves short petioled (34)
33. Leaves with $\frac{1}{2}$ to $1\frac{1}{2}$ in. petioles, lateral veins curved toward tip of leaf.....DOGWOOD 45
34. Petioles pubescent or hairy, leaves large..ALLSPICE 39
34. Petioles glabrous, leaves small.....CORALBERRY 47
35. Leaves oval to oblong; flowers and fruits in pairs.....HONEYSUCKLE 47
35. Flowers and fruits not in pairs (36)
36. Leaves oval to lanceolate.....PRIVET 45
36. Leaves oval or heart-shaped; buds large, bud scales prominent.....LILAC 45
36. Leaves broadly ovate; fruit drupe-like, red changing to black with three seeds.....THORNLESS BUCKTHORN 43
36. Leaves broadly ovate, stems mostly green, berries white.....AUCUBA 45

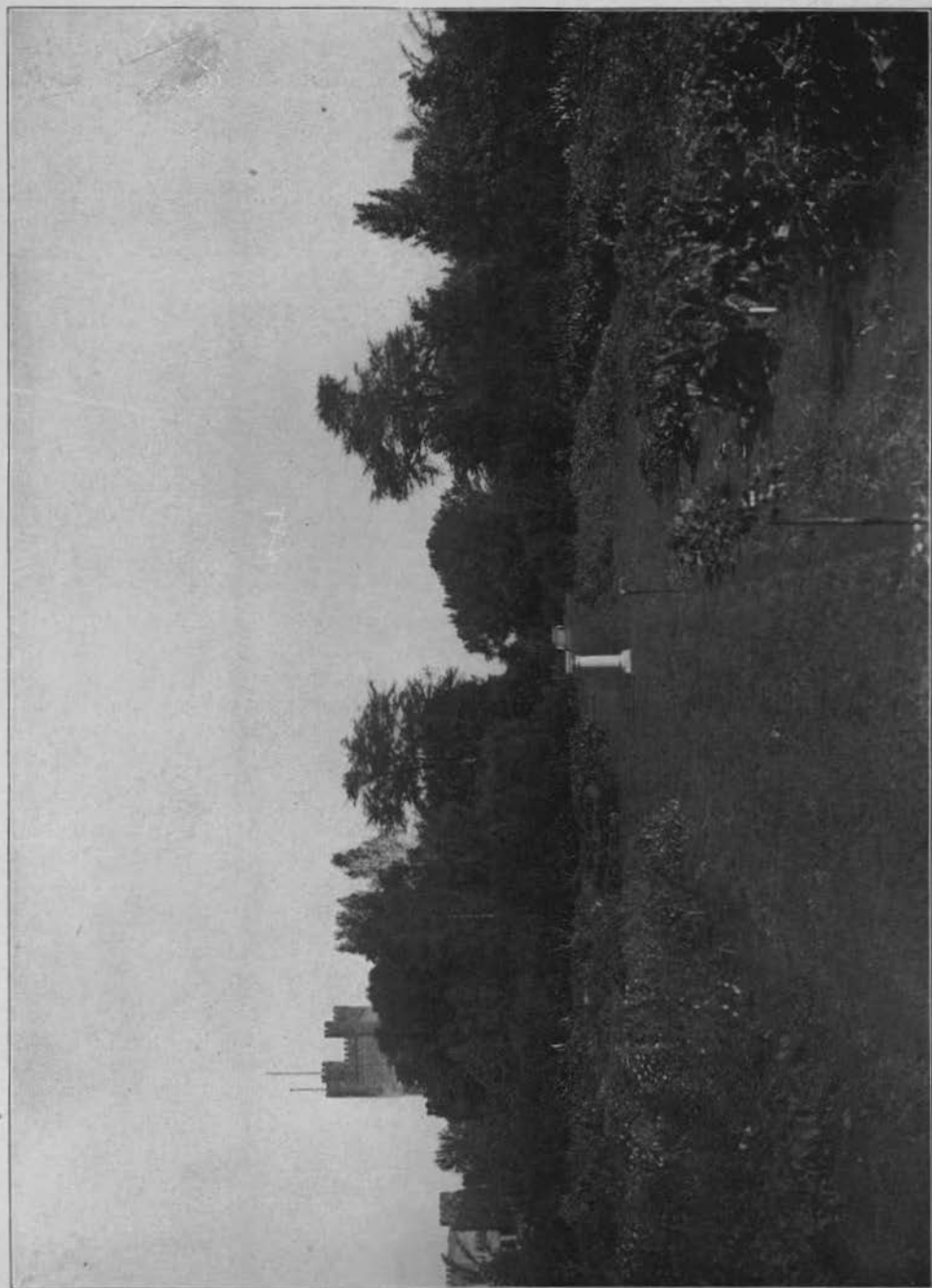
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37. Branches with thin corky wings or 4-lined twigs.....WAHOO 43

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| 37. | Branches not as above (38) | |
| 38. | Branches with terminal buds becoming thorns..... | |
| |BUCKTHORN | 43 |
| 38. | Branches without thorns (39) | |
| 39. | Leaves double serrate (40) | |
| 39. | Leaves serrate (41) | |
| 40. | Leaves coarsely doubly serrate, with stipules..... | |
| |RHODOTYPHUS | 41 |
| 40. | Leaves finely doubly serrate, without stipules and with star-shaped hairs..... | DEUTZIA 40 |
| 41. | Small branches with two lines of hairs..... | WEIGELA 47 |
| 41. | Small branches smooth or pubescent or scurfy (42) | |
| 42. | Leaves with stellate hairs..... | VIBURNUM 46 |
| 42. | Leaves hairy without stellate hairs (43) | |
| 42. | Leaves glabrous (44) | |
| 43. | Leaves and stems with scurfy pubescence..... | |
| |FRENCH MULBERRY | 46 |
| 43. | Leaves pubescent to hairy, heart-shaped at base or obovate and abruptly pointed..... | VIBURNUM 46 |
| 44. | Petioles somewhat winged..... | VIBURNUM 46 |
| 44. | Petioles not winged, base of leaf entire, upper part serrate..... | FORSYTHIA 44 |

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| 45. | Leaves toothed with small pointed teeth far apart, fruit 4-parted, flowers white..... | MOCK ORANGE 40 |
| 45. | Leaves coarsely toothed on tip half and base of leaf entire, fruit not 4-parted, flowers yellow..... | FORSYTHIA 44 |
| 45. | Leaves lobed (maple-like); fruit with 1-flat seed..... | VIBURNUM 46 |
| 45. | Leaves heart-shaped at base and abruptly pointed.... | HYDRANGEA 40 |



THE SCHOOL GARDEN.

TREES

GINKGO FAMILY (*Ginkgoaceae*)

Maiden-hair Tree (*Ginkgo biloba*, L.) This tree is at present found in the mountains of western China. In earlier geologic times it flourished and had a much wider distribution over the world. Fossils and actual remnants of its leaves have been found in the underlying strata of the Columbia Plateau of the western United States. It has been extensively planted and grows well in this country. Its nearest relatives on the campus are the conifers and in the greenhouse the cycads (fern-like seed plants).

BALD CYPRESS FAMILY (*Taxodiaceae*)

Bald Cypress (*Taxodium distichum*, L. (Rich.)). This tree is a native of the southern United States and is found mostly in the swamp forests. It is one of the two deciduous conifers on the campus. It is a good lumber tree. The wood is noted because it does not rot for a long time even when used where it is constantly wet.

PINE FAMILY (*Pinaceae*)

This family has nine representatives on the campus.

Norway Spruce (*Picea abies*, (L.) Karst.). A large tree, conical in shape when young, with numerous spreading and drooping branches, needles in a crowded spiral and pointing toward tip of branch. This tree is a native of Europe. Leaves dark green, usually shining, 15 to 25 mm. long; cones 4-7 inches long.

Canadian Spruce (*Picea canadensis*, (Mill.) B. S. P.). This spruce is a native of the St. Lawrence River Valley and the Great Lakes area. It is an important lumber tree having light, soft, straight-grained wood. The young trees are extensively used for Christmas trees. Leaves 10-25 mm. long, toothed, blunt or sharp pointed, with strong rank odor when crushed; cones 1½ to 2½ inches long.

Colorado Blue Spruce (*Picea pungens*, Englm.). This spruce is a native of the Rocky Mountains. It is extensively planted now as an ornamental tree, especially those specimens with the blue-tipped branches. Leaves 25 to 30 mm. long, stout, stiff, sharp-pointed and incurved, with pungent somewhat disagreeable odor; cones 2¼ to 4 inches long.

Hemlock (*Tsuga canadensis*, (L.) Carr.). This hemlock is a native of northeastern North America and is an important forest tree. Its bark has been an important source of tannins for the tanning of leathers. It is a useful tree in ornamental plantings.

Larch (*Larix larix*, (L.) Karst.). This tree is a native of Europe and planted in this country for ornament. This kind of tree in eastern North America is called the tamarack, an important tree of the bogs of the Northeastern Conifer Forest. It is one of the two deciduous conifers of the campus.

Austrian Pine (*Pinus laricio*, Poir.). This pine is a native of Europe and is planted in a great many places in this country for ornament. It has its needles in groups of two. The needles are long and stiff. The bark is black.

Scotch Pine (*Pinus sylvestris*, L.). This pine is a native of northern Europe much cultivated in this country. Its needles are short, borne in bundles of two, and are twisted. The inner bark, which is evident along the trunk, is yellowish or orange in color.

White Pine (*Pinus Strobus*, L.). This pine is a native of northeastern North America and was before its destruction one of the most important trees of that forest and is also one of our valuable lumber trees. It is one of our most beautiful ornamental trees but it does not grow well in cities where there is a great deal of smoke in the air. Millions of these trees have been destroyed in recent years by a fungus causing a disease known as the White Pine Blister Rust. The needles of this pine are borne in bundles of five.

Mugo Pine (*P. montana*, var. *Mughus*, Willd.). A low prostrate form, shrubby, leaves (needles 2 in a bundle, stiff and twisted). This is a plant from the mountains of central and southern Europe.

JUNIPER FAMILY (*Juniperaceae*)

Arborvitae (*Thuja occidentalis*, L.). This tree is often called White Cedar and is a native of eastern North America from the Appalachian Mountains northward and west to Minnesota, usually in wet soils and along the banks of streams. It becomes a fair-sized tree where it grows best and is quite valuable in ornamental plantings. The leaves and stems are very much flattened.

Juniper (*Juniperus virginiana*, L.). This tree is commonly called Red Cedar and is a native of eastern North America. The wood is valuable commercially being durable, light in weight, and fragrant. It is used for cedar chests and extensively used in the manufacture of lead pencils. The fruit is small, blue, and berry-like. There are two kinds of needles: appressed ones making square branches, and divergent, sharp-pointed scale leaves.

Common Juniper (*J. communis*, L.). An evergreen shrub or small tree with linear to lanceolate leaves $\frac{1}{2}$ to $\frac{3}{4}$ inches long, tapering from the base to a sharp point with a broad white band on upper side and bluntly keeled below.

Irish Juniper (*J. communis*, var. *hibernica* Gord.). A narrow columnar form with upright branches.

Sabine Juniper (*J. sabina*, L.). A spreading or procumbent evergreen shrub with acute spreading leaves having a disagreeable odor when bruised. This plant is a native of the mountains of southern Europe and western Asia.

Retinospora (*Chamaecyparis* sp.). There are numerous varieties of these dwarf evergreens. They are distinguished from the Junipers by having the leaves opposite in pairs. The leaves are scale-like and are usually slightly spreading. These forms are natives of Japan.

MAGNOLIA FAMILY (*Magnoliaceae*)

There are four representatives of this family on the campus, three of them are Flowering Magnolias used as ornamental trees; *M. soulangeana* with its petals tinged with purple; *M. obovata* with showy flowers pink-purple outside and white within; *M. lennei* with its flowers purple outside and pearl colored within.

Tulip Tree (*Liriodendron tulipifera*, L.). This tree is an important lumber tree of the deciduous or broad-leaf forest of the eastern United States known to the lumberman as "yellow poplar." It is a magnificent forest tree with large tulip-like flowers; it reaches a height of from eighty to one hundred feet with a diameter of eight to ten feet. The wood is light, straight grained, easily worked and used for a great many purposes in cabinet work of all kinds. This is also a beautiful tree for landscape plantings because of its symmetry and flowers. The leaves are large with three main veins and the main or central lobe of the leaf is broadly truncate.

CUSTARD APPLE FAMILY (*Anonaceae*)

Papaw (*Asimina triloba*, Dunal). This is a small tree common throughout the Mississippi Valley often forming thickets of many acres in extent. It is our only representative of a rather large tropical family. The flowers are a deep wine red. The fruit is a rather large "custard apple" with large seeds and is edible. The tree is easily recognized in winter by the naked buds covered with dark brown silky hairs.

LAUREL FAMILY (*Lauraceae*)

Sassafras (*Sassafras sassafras*, (L.) Karst.). A tree having leaves of many different shapes, with a prominent aromatic odor and branches which remain green for several years. The flowers are small and yellow or greenish. The largest grove of large trees in the United States is near Paris, Illinois.

LINDEN FAMILY (*Tiliaceae*)

The **American Linden** or **Basswood** (*Tilia americana*, L.) and the European Linden (*T. europea*, L.) are two of our most beautiful trees. They are valuable in ornamental plantings although very seldom used. The wood is light in weight, soft, white, and easily worked. The flowers are sweet smelling and secrete nectar which attracts bees so that it is often called "bee tree."

ROSE FAMILY (*Rosaceae*)

This is a very large family of plants having a number of trees as well as shrubs and herbaceous plants in it. On our campus we have:

Mountain Ash (*Sorbus aucuparia*, (L.) Ehrh.). This is a small tree used in ornamental planting because of its large clusters of small white flowers and its brilliant red fruit.

Pear (*Pyrus communis*, L.). Belongs to this family and from this most of the varieties of our commercial fruits have been developed.

Flowering Crab (*P. floribundus*, Lindl.). A bush or small tree perhaps an offshoot of the common crab with flesh-colored or rose-colored flowers.

Double Flowering Crab (*P. ioensis bechtel*). This is often called Bechtel Crab and has been developed from the western crab-apple.

Apple (*P. malus*, L.).

Hawthorns (*Crataegus spp.*). There are a number of varieties of this group on the campus. These trees are the "haws" and many of them have thorns. The species are difficult to identify.

Wild Black Cherry (*Prunus serotina*, Ehrh.). The leaves of this cherry are shiny above with the teeth of the margin of the leaves incurved, the cherries becoming purplish black when ripe. The flowering clusters are much elongated.

Choke Cherry (*P. virginiana*, L.). The teeth on the margins of the leaves of this cherry are somewhat spreading, the flowers in short dense clusters, and the fruit red turning to a dark crimson.

Dwarf or Sand Cherry (*P. pumila*, L.)². This is really a shrub with black cherries; cultivated for its flowers and fruit.

Plum (*P. domestica*, L.). This tree is probably of Asiatic origin from which have been developed many varieties.

Peach (*P. persica*, (L.) Stokes). This tree was also introduced from Asia, the many varieties being developed from this species.

PULSE FAMILY (*Leguminosae*)

This is a large family of plants to which belong the beans, peas, locusts, clovers, beggar's lice, and many others.

Redbud (*Cercis canadensis*, L.). A small shrub-like tree with heart-shaped leaves and rose-purple flowers blooming in early spring before its leaves grow out of the buds. It is a native of the deciduous forest and cultivated for its flowers.

Honey Locust (*Gleditsia triacanthos*, L.). This becomes a large tree and is distinguished from the black locust by the absence of thorns on the small branches but it has very large branched thorns on the large branches and main trunk of the tree; very small leaflets; leaves 2-3 times compound.

Black or Clammy Locust (*Robinia pseudo-acacia*, L.). This tree also becomes a large tree and is distinguished from the honey locust by having two thorns at the base of each leaf and no thorns on the main trunk and large branches; leaves only once compound.

Rose Acacia or Pink Flowering Locust (*Robinia hispida*, L.). A small tree cultivated for its rose-colored flowers.

Kentucky Coffee-Tree (*Gymnocladus dioica*, (L.) Koch.). A medium sized tree with very rough fluted bark and very large seed pods. This tree either has flowers producing only pollen or flowers producing only seeds but never both so that it is necessary to have two trees for seeds to be produced. Leaves 2-3 times compound; a single leaf may be two feet or more long; large leaflets.

Yellow Wood (*Cladrastis lutea*, Koch.). This tree becomes a medium sized tree with clear yellow wood changing to light brown on exposure and yielding a clear yellow dye. It is not a lumber tree, rather rare and local in its distribution, cultivated for ornament. Compound leaves; leaflets rather oval; petiole covers bud.

RUE FAMILY (*Rutaceae*)

Wafer-Ash or Hoptree (*Ptelea trifoliata*, L.). A small tree with ovate to elliptic-oblong leaflets, 2-5 in. long, nearly or quite sessile, tapering to a point, entire or finely crenulate, smooth, flowers greenish-white, fruit flat with a thin broad wing that is very veiny.

QUASSIA FAMILY (*Simarubaceae*)

Ailanthus or Tree of Heaven (*Ailanthus glandulosa*, Desf.). A rapid growing tree with compound pinnate leaves 1-3 ft. long, leaflets stalked and with 2-4 coarse teeth near the base of the leaf with a large gland on the under side. This tree is a native of China and has become naturalized in eastern North America.

BLADDER-NUT FAMILY (*Staphlyaceae*)

Bladder-Nut (*Staphylea trifolia*, L.). This is a small tree with trifoliolate leaves, slightly pubescent beneath, the end leaflet slender stalked. The fruits are large inflated (bladder-like) pods.

SOAPBERRY FAMILY (*Sapindaceae*)

Buckeye (*Aesculus glabra*, Willd.). This tree becomes quite large and has clusters of pale yellow flowers with four petals. It is a native of this country. Leaves mostly 5-parted.

Horse-Chestnut (*Aesculus hippocastanum*, L.). This tree was introduced from Asia. It has large upright clusters of white

flowers spotted with purple and yellow, each flower having 5 petals. This is a beautiful ornamental tree with very large compound leaves giving a dense shade. Leaves mostly 7-parted.

MAPLE FAMILY (*Aceraceae*)

There are seven different species of maples on our campus. They may be identified by the shapes of their leaves.

KEY TO MAPLES

1. Leaves pinnately compound (3-7) leaflets, small branches green.....BOX ELDER
1. Leaves simple, palmately veined (2)
2. Leaves with 3-7 long slender and pointed lobes, irregularly notched or toothed, leaves often white on under side, bark of trees scaly.....SILVER MAPLE
2. Leaves with 3-5 broad lobes, bark of trees not scaly (3)
3. Leaves with stipules (absent in some individuals), drooping, with pubescence at least on the under side.....BLACK MAPLE
3. Leaves without stipules, not drooping, sometimes slightly pubescent on the lower side (4)
4. Lobes of leaf rather regularly toothed, teeth broad, sinus angled.....SYCAMORE MAPLE
4. Lobes of leaf entire or nearly so (5)
5. Leaves with 5-prominent veins, with watery or frothy sap.....SUGAR MAPLE
5. Leaves with 7-prominent veins, with milky sap.....NORWAY MAPLE

Silver Maple (*Acer saccharinum*, L.). Leaves white beneath, 5 deeply cut lobes. There are numerous cutleaf varieties, some of them with drooping branches.

Japanese Maple (*Acer palmatum*, Thunb.). Leaves seven to eleven parted, the segments narrow, many forms with variously cut and colored leaves, cultivated under many names.

The maple trees with large rather broad lobes with rounded sinus between them (except Sycamore Maple), the so-called "hard maples," are:

Norway Maple (*Acer platanoides*, L.). Leaves having a milky juice, 7 prominent veins, many colored-leaved varieties cultivated.

Sycamore Maple (*Acer pseudo-platanus*, L.). Ample five-lobed leaves, three of the lobes quite large, whitish on the under side, usually with long reddish petioles, sinus angled.

Sugar Maple (*Acer saccharum*, Marsh.). Leaves having three main lobes with the sinus between the lobes rounded, and long slender petioles.

Black Maple (*Acer nigrum*, Michx.). Leaves very similar to the sugar maple but having stipules or leaf-like processes on many of the leaves at the base of the petioles.

The **Box Elder** or **Ash-leaved Maple** (*Acer negundo*, L.) is the only maple having compound leaves with three to five leaflets. It is easily distinguished by the winged fruits as a maple and as the box elder by the three-parted leaves and green branches.

The maples are among our more important forest and lumber trees and very desirable for ornamental planting. If a dense shade is not desirable the "soft maples" should be used and if a dense shade is desired the "hard maples" should be used. The Norway Maple is probably the best shade tree for it grows rapidly and has a well rounded top.

WITCH-HAZEL FAMILY (*Hamamelidaceae*)

Sweet Gum (*Liquidambar styraciflua*, L.). This is a beautiful tree with star-shaped leaves and silver gray branches often with prominent cork wings or ridges. The fruit is a spiny ball on a rather long stem. The autumn coloration of the leaves is the most beautiful of any of our trees.

PLANE TREE FAMILY (*Platanaceae*)

Sycamore, Buttonball Tree or **Plane Tree** (*Platanus occidentalis*, L.). A tree of the river bottoms reaching a very large size having close white bark separating into thin brittle plates which show green between them. The leaves become quite large and are covered with scurfy down. The fruit is a round ball hanging on a rather long stem. The wood is used for meat chopping blocks and is a beautiful wood for furniture and interior finish of houses.

Oriental Plane Tree (*Platanus orientalis*, L.). This tree is planted occasionally in this country. Its leaves are more segmented than the native species and the fruit is larger.

NETTLE FAMILY (*Urticaceae*)

American or **White Elm** (*Ulmus americana*, L.). A well-known large tree with doubly serrate leaves and with one main vein. The surface of the leaves is smooth. This distinguishes it from the red or slippery elm whose leaves are very rough.

Slippery or **Red Elm** (*Ulmus fulva*, Michx.). This does not become as large a tree as the American elm. Its small twigs are hairy and the leaves are very rough.

English Elm (*Ulmus campestris*, L.). This elm is similar to the slippery elm but has smaller leaves of about half the size of the other elms on the campus. It is used as an ornamental tree and occurs in several forms, some of which have thick corky ridges on the branches.

Scotch Elm (*Ulmus montana*, With.) has also been introduced from Europe and is cultivated for ornament.

Hackberry (*Celtis occidentalis*, L.). This tree is easily recognized in the winter by the "witches' brooms," clusters of small branches caused by parasites. The leaves are quite similar to the elm leaves except there are three main veins instead of the one main vein in the elm leaf.

Red Mulberry (*Morus rubra*, L.). This mulberry has red fruit almost black when ripe and has larger leaves than the white mulberry.

White Mulberry (*Morus alba*, L.). This tree has white to purple fruit, and has smaller leaves than the red. It was introduced from China. The Russian mulberry is a form of it.

Tea's Weeping Mulberry. Used in ornamental plantings because of its drooping branches and dwarfed height.

Osage Orange (*Toxylon pomiferum*, Sarg.). This tree has been used widely as a hedge about fields and along roadsides. It is the common "hedge" whose fruit is the large "hedge apple." It is rapidly being destroyed in most localities. The wood is very valuable as fence posts.

BEECH FAMILY (*Fagaceae*)

Beech (*Fagus grandifolia*, Ehrh.). One of our finest ornamental forest trees with tight gray bark with taper-pointed, thin, distinctly toothed leaves and long pointed brown buds. The nuts are triangular in shape, the bur covered with hooked prickles.

Copper Beech. This tree is a variety of the European Beech (*Fagus sylvatica*, L.). It is cultivated for its beautiful form and copper-colored foliage.

Chestnut (*Castanea dentata*, Borkh.). This is an important forest tree in the eastern United States with rather long broadly toothed leaves with the large teeth sharp pointed. The fruit is a very prickly bur and the seeds or "nuts" are gathered in great quantities. The Chestnut forests are rapidly being destroyed by the "chestnut blight," a fungus disease introduced from the Orient. The bark is dark; later scaly.

Oaks. There are on our campus nine different kinds of oak trees. The economic importance of these trees is so well known that nothing need be said in this bulletin about it. All can be identified by buds clustered at ends of branches.

KEY TO OAKS

1. Leaves entire.....SHINGLE OAK
1. Leaves toothed or slightly lobed (2)
 1. Leaves lobed (3)
 2. Leaves regularly toothed.....CHESTNUT OAK
 2. Leaves with large rounded teeth and somewhat lobed at base, often white on under side, acorns prominently stalked.....SWAMP WHITE OAK
 3. Lobes round tipped (without a terminal bristle) (4)
 3. Lobes bristle tipped (5)
 4. Leaves with terminal lobes large and broad, acorn very large.....BUR OAK
 4. Leaves with lobes approximately same size.....WHITE OAK
 5. Lobes of leaves broad not deeply cut, pubescent on under side, bark of young trees smooth.....BLACK OAK
 5. Lobes narrow, leaves deeply lobed (6)
 6. Lobes of leaf pointing forward, inner bark pale reddish...RED OAK
6. Lobes of leaves at right angles to main vein (7)
 7. Buds oval, wooly at tip.....SCARLET OAK
 7. Buds, small, ovate, pointed and smooth.....PIN OAK

The Chestnut Oaks

Chestnut Oak (*Quercus Muhlenbergii*, Engelm.) has leaves rather similar to the chestnut leaves but the teeth are more rounded than pointed. The bark of the tree is dark.

Swamp White Oak (*Quercus bicolor*, Willd.) has rather large leaves with rounded teeth and is much broader at tip. The bark is very gray in color and flaky. This is the only oak with stalked acorns. The lower side of the leaf is covered with fine white hairs.

The White Oaks

White Oak (*Quercus alba*, L.). The leaves of this oak are rather deeply cut with the lobes or segments rounded at the tips. These leaves are lobed to the tip of the leaf.

Bur Oak (*Quercus macrocarpa*, Michx.). The leaves of this tree become quite large and the lobes are rounded. It differs from the white oak in that the tip of the leaf is the broadest part of the leaf and the tip is not deeply lobed. The acorns are quite large and the cup of the acorn is quite shaggy. Because of this the name "mossy-cup" oak is often used for this tree.

The Pin Oaks

This group of oaks is characterized by the lobes of the leaf being terminated by a spine or bristle.

Black Oak (*Quercus velutina*, Lam.). This oak has large broad leaves rather thick with rusty colored hairs in the angles of the veins on the under side of the leaf. Leaf becomes very leathery.

Scarlet Oak (*Quercus coccinea*, Muench.). The leaves are shiny on the upper surface and the leaf is deeply divided with wide rounded angles between the lobes. All parts of the leaf are more slender than either the black or the red oak leaf. The cup of the acorn is top-shaped.

Red Oak (*Quercus rubra*, L.). The leaves of this oak are somewhat larger than those of the scarlet oak, dark dull green above and pale yellow green and smooth below except for tufts of hairs in the angles of the veins. The cup of the acorn is saucer-shaped.

Pin Oak (*Quercus palustris*, Muench.). The leaves of this oak are quite similar to the red and scarlet oak but the acorns are small and roundish being barely $\frac{1}{2}$ inch long. Leaves are shiny.

Shingle or Laurel Oak (*Quercus imbricaria*, Michx.). The leaves of this tree are without lobes or divisions of any kind, quite firm and smooth on the upper side.

BIRCH FAMILY (*Betulaceae*)

Blue Beech or Muscle Wood (*Carpinus caroliniana*, Walt.). A small tree with leaves that are shaped somewhat like medium-sized elm leaves. The bark is tight and smooth with raised places standing out like the muscles of an arm.

Ironwood or Hop Hornbeam (*Ostrya virginiana*, K. Koch.). A small tree with doubly notched leaves and fruit resembling hops. The bark exfoliates in thick, narrow, closely appressed strips.

American White Birch (*Betula populifolia*, Ait.). A small slender tree with chalky white bark, the leaves not deeply cut.

European White Birch (*Betula alba*, L.). This tree is similar to the one above except that the leaves are deeply cut and from this form the weeping varieties have been developed.

River Birch (*Betula nigra*, L.). The leaves are rather similar to the American White Birch but the inner bark is yellow separating in thin layers.

Hoary Alder (*Alnus incana*, Muench.). This tree has toothed leaves and may be recognized by the small open woody cones which remain on the tree throughout the year.

WALNUT FAMILY (*Juglandaceae*)

Black Walnut (*Juglans nigra*, L.). This tree has large leaves of 11-17 leaflets (occasionally 23), the pith of the young stems is brown and partitioned. The fruit is round.

White Walnut or Butternut (*Juglans cinerea*, L.). The leaves of this tree are large with 7-17 leaflets very similar to the black walnut. The fruit, however, is oblong while the black walnut is round. The bark of the old butternut tree appears as though the outside surfaces of the ridges have been planed off.

Hickories. The hickories are quite difficult to name in the woods but we have only three kinds on the campus.

Bitternut (*Hicoria cordiformis*, K. Koch.). The winter buds of this tree are yellow, the leaves have from 7-11 leaflets.

Pignut (*Hicoria glabra*, Spach.). The leaves of this hickory have 5-7 leaflets, the bark does not exfoliate in long strips, buds small oval and smooth.

Shell-bark (*Hicoria laciniosa*, Loud.). The leaves of this tree have 7-9 leaflets downy beneath. The nut is pointed at both ends. The bark is loose and scaly.

WILLOW FAMILY (*Salicaceae*)

Cottonwood (*Populus deltoides*, Marsh.). The leaves are rather triangular in outline with a long point at the tip, the margin is coarsely scallop-toothed. The leaf stalk is long and flattened. This is the tree so much planted along streets where quick growth is desired. The staminate (male) tree is the one to plant because the pistillate (female) tree is the one producing seeds with long cottony hairs, from which the name is taken, that cover the ground for yards and are blown for long distances. This tree is grown in large plantations for the wood which is used for paper pulp.

Lombardy Poplar (*Populus italica*, Du Roi.). This tree is easily recognized by the vertical growth of the branches which causes the tree to be spire-shaped.

Large-toothed Aspen (*Populus grandidentata*, Michx.). The leaves are roundish heart-shaped, with large irregular sinuate teeth. The bark is rather smooth and somewhat gray.

Willows. There are six species of willows on the campus:

KEY TO WILLOWS

1. Trees with drooping branches...WEeping Willow
1. Trees with upright branches (2)
2. Leaves and young branches silky hairy.....WHITE Willow
2. Leaves not hairy on both sides (3)
3. Leaves with glands on petioles (4)
3. Leaves without glands on petioles (5)
4. Leaves with 2-glands at base of blade, margin of leaf glandular serrate, small branches breaking easily at base in a definite plane.....BRITTLE Willow
4. Leaves with numerous glands at base of blade and top of petiole, upper surface of leaves shiny and dark green.....LAUREL-LEAVED Willow
5. Petioles of leaves hairy, leaves felty-pubescent on under side (a pussy willow).....GOAT Willow
5. Petioles smooth (not hairy) leaves slender long pointed, with fine incurved teeth.....BLACK Willow

Weeping Willow (*Salix babylonica*, L.). This willow becomes a large tree with drooping branches. There are numerous varieties of this tree. The original form is a native of Asia.

White Willow (*S. alba*, L.). This tree has a whitish appearance in the landscape because of the abundant white hairs on leaves and young branches. It is a native of Europe.

Brittle Willow (*S. fragilis*, L.). This is also a European willow much used for basket work.

Laurel-leaved Willow (*S. pentandra*, L.). This is an attractive small tree or shrub because of its clean shiny leaves. This is one of the so-called Pussy Willows, a native of Eurasia.

Goat Willow (*S. caprea*, L.). This is one of the Pussy Willows and also a native of Eurasia from which have been developed several varieties.

Black Willow (*S. nigra*, Marsh.). This is a native willow becoming a medium-sized tree, common along streams and lakes. There are a number of varieties as it hybridizes with other species.

EBONY FAMILY (*Ebenaceae*)

Persimmon (*Diospyros virginiana*, L.). The leaves of this tree are rather thick, ovate, entire leaves longer than broad. The wood is hard and black. This is the only representative of the ebony family in our climate.

OLIVE FAMILY (*Oleaceae*)

KEY TO ASHES

1. Leaves with 5-7 leaflets (2)
1. Leaves with 7-13 leaflets (3)
2. Twigs 4-angled.....BLUE ASH
2. Twigs not 4-angled.....GREEN ASH
3. Leaves shiny dark green on upper side, hairy on veins beneath.....EUROPEAN ASH
3. Not as above (4)
4. Leaflets sessile and serrate.....BLACK ASH
4. Leaflets stalked, usually almost entire...WHITE ASH

European Ash (*Fraxinus excelsior*, L.). This ash has leaves with 7-13 ovate leaflets dark green and smooth on the upper side and pubescent at least on the veins beneath. Margins of the leaves are serrate; winter buds blue black. Leaf scars straight at top. There are several varieties of this tree.

Blue Ash (*Fraxinus quadrangulata*, Michx.). The branches of this tree are 4-lined, often with narrow wings. The leaves have from 5-9 leaflets and they are serrate.

Black Ash (*Fraxinus nigra*, Marsh.). The leaves of this ash have from 7-11 leaflets that are sessile, i. e., the leaflets do not have stalks or petioles, and are serrate.

American or White Ash (*Fraxinus americana*, L.). The leaves of this tree are rather large with 7-9, or sometimes 5, leaflets ovate or oblong with smooth margins or occasional teeth. Leaf scars are deeply concave at top.

Green Ash (*Fraxinus lanceolata*, Sarg.). This ash has leaves with 5-9 leaflets that are usually serrate ovate to lanceolate and long pointed. This is a flood-plain tree.

Fringe-Tree (*Chionanthus virginica*, L.). A small tree or large shrub with oval to oblong leaves. Leaves 3-8 in. long acuminate, tapering at base. Flowers white in drooping panicles, fruit ovoid, dark blue when ripe.

BIGNONIA FAMILY (*Bignoniaceae*)

Catalpa (*Catalpa speciosa*, Warder.) This tree has large heart-shaped leaves and long slender seed pods. The catalpa has been planted extensively in small plantings on farms for fence posts and is often used for small telephone poles.

Dwarfed Catalpa (*Catalpa bungei*). This is a dwarfed form with drooping branches produced by grafting buds. This form is used entirely for ornamental planting and can only be obtained from nurseries.

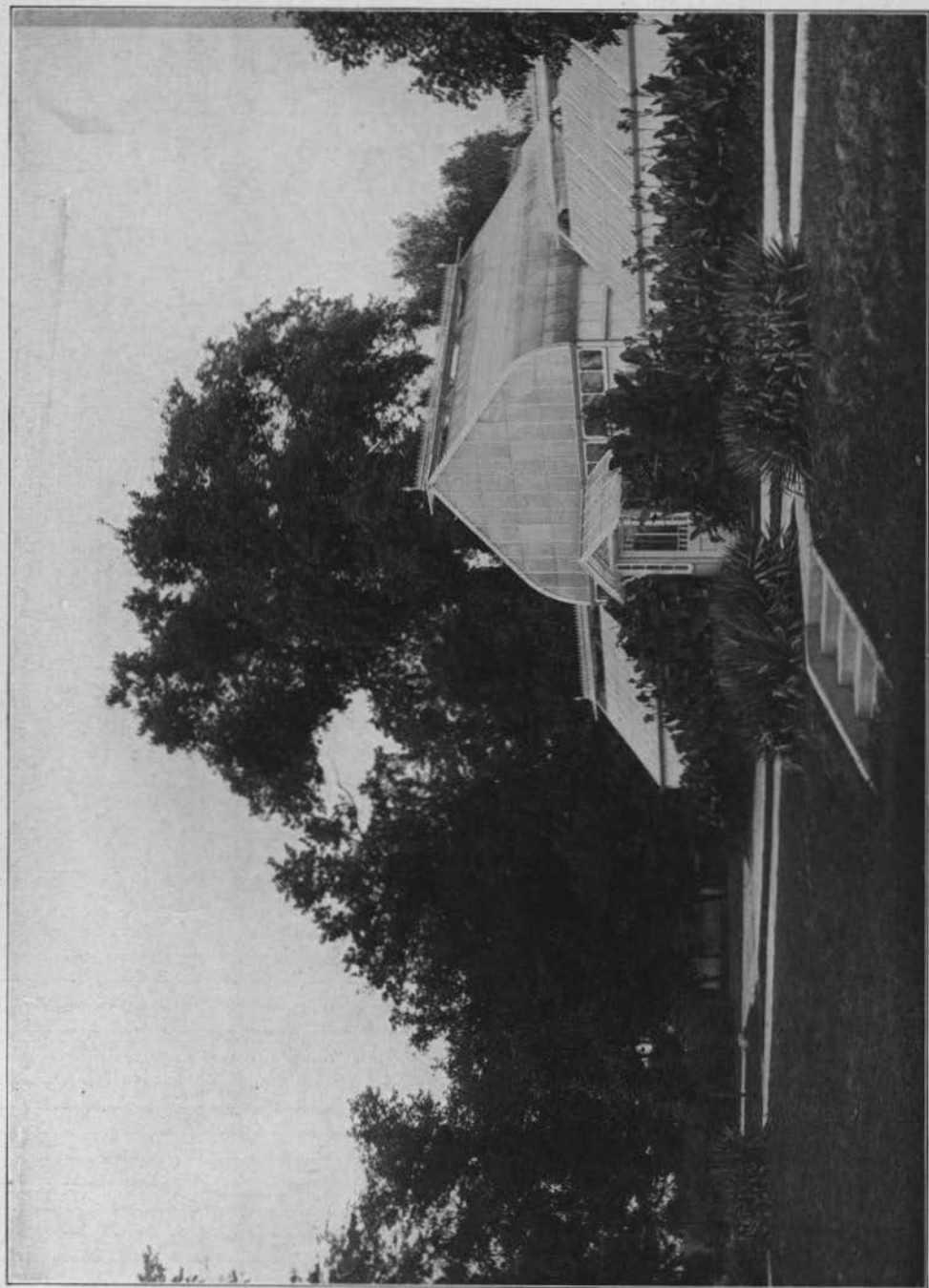
DOGWOOD FAMILY (*Cornaceae*)

Flowering Dogwood (*Cornus florida*, L.). This is a small tree with "alligator bark," i. e., bark exfoliating in small irregular squares, and clusters of flowers surrounded by large white leafy bracts; the whole cluster is often called a single flower. The fruit is bright red.

Panicled Dogwood (*Cornus paniculata*, L'Her.). The leaves of this dogwood are whitish beneath, the bark ash-colored, the flowers in loose clusters, and the fruit white.

Rough-leaved Dogwood (*Cornus asperifolia*, Michx.). The leaves of this form are rough, the flower clusters small, and the fruit of a blue color.

Alternate-leaved Dogwood (*Cornus alternifolia*, L.). The leaves of this tree are alternate, the flower clusters flat-topped, and the fruit is bright blue on red stalks.



THE GREENHOUSE.

SHRUBS AND VINES

LILY FAMILY (*Liliaceae*)

Green Brier (*Smilax hispida*, Muhl.). A vine having long, dark or black bristly prickles, small greenish flowers and black berries.

Green Brier (*S. rotundifolia*, L.). A vine having scattered prickles that do not become dark, branchlets somewhat four-sided, otherwise as above.

TAMARISK FAMILY (*Tamariscineae*)

Tamarisk (*Tamarix hispida*, Willd.). This shrub has small leaves that cause the plant to resemble the cypress trees. It has small pink flowers in close spikes at the ends of the branches. It is named from the Tamaris (now called Tambre), a small river in Spain.

BIRCH FAMILY (*Betulaceae*)

Hazelnut (*Corylus americana*, Walt.). This plant usually grows in thickets. It has hairy branches and leaves, and small leaves subtending the fruit. The staminate flowers are in finger-like catkins. The hazelnuts are often called filberts.

CALYCANTHUS FAMILY (*Calycanthaceae*)

Carolina Allspice or **Sweet Scented Shrub** (*Calycanthus floridus*, L.). This shrub has dark red, sweet-scented flowers and large rough-surfaced dry fruits that are also sweet when crushed, and contain numerous seeds.

MOONSEED FAMILY (*Menispermaceae*)

Moonseed Vine (*Menispermum canadense*, L.) Has white flowers late in the season and black fruits, looking like small grapes.

BARBERRY FAMILY (*Berberidaceae*)

Japanese Barberry (*Berberis thunbergii*, DC.) Has small yellow to reddish flowers and red berries, leaves becoming red in the fall.

LAUREL FAMILY (*Lauraceae*)

Spice Bush or **Fever Bush** (*Benzoin aestivale*, L.). Has yellow flowers and red fruit similar to small cherries. The leaves and bark are spicy aromatic.

OLEASTER FAMILY (*Elaeagnaceae*)

Oleaster (*Elaeagnus longipes*, Gray). This shrub has its branchlets covered with reddish brown scales and its leaves are ovate and oblong, with stellate hairs on the upper surface giving it a dotted appearance, and the lower surface is silvery with scattered brown scales. The flowers are solitary or two together. The fruit is oblong becoming red when ripe and quite acid.

Oleaster (*Elaeagnus angustifolia*, L.). This is a tree-like shrub which is sometimes spiny with its branchlets silvery white and its leaves lanceolate or oblong, and otherwise similar to the above form. The fruit is yellow and covered with silvery scales.

SAXIFRAGE FAMILY (*Saxifragaceae*)

Hydrangea (*Hydrangea arborescens*, L.). Has ovate, slightly heart-shaped, serrate leaves, and has flat-topped flower clusters with a row of white sterile flowers around the margin.

Cultivated Hydrangea (*Hydrangea arborescens* var. *grandiflora*, Rehd.). Differs from the wild form in that nearly all of the flowers are sterile and the individual flowers are larger than the wild form. The leaves are large, coarse-toothed, and a glossy green.

Mock Orange (*Philadelphus grandiflorus*, Willd.). The leaves of this shrub are rather large, sparingly toothed, and slightly hairy, and the flowers are large, scentless, white, with four petals. The fruit is a four-parted dry capsule attached to plant in all seasons.

Dwarf Mock Orange (*Philadelphus lemoinei*, Lemoine). This plant never gets over 6 feet high and is similar to the above with all parts smaller.

Deutzia (*Deutzia scabra*, Thunb.). This plant has white or slightly pink flowers in clusters. Each flower has five petals. The leaves when young are covered with fine white star-shaped hairs.

Deutzia (*Deutzia gracilis*, Thunb.) and (*D. lemoinei*, Lemoine) are smaller forms of this shrub having snow-white flowers.

Gooseberry (*Ribes cynosbati*, L.). This plant has blunt three-lobed leaves and the stem and berries are covered with prickles. The flower is greenish; the berry when ripe is a dull purple.

Red Flowered Currant (*Ribes sanguineum*, Pursh.). This plant has 3-5 lobed leaves, white downy on the lower surface. The flower is red; the fruit, blue black.

Golden Currant (*Ribes aureum*, Pursh.). Has yellow flowers and black berries. The leaves are rounded, three-lobed, and cut-toothed.

WITCH-HAZEL FAMILY (*Hamamelidaceae*)

Witch-hazel (*Hamamelis virginiana*, L.). This shrub has oval, wavy marginal leaves and blooms very late in the summer, the flowers having four crumpled yellow petals.

ROSE FAMILY (*Rosaceae*)

There are six forms of *Spiraea* on the campus:

(*Spiraea Van Houttei*, Zabel). Bridal wreath, with abundant clusters of small white flowers and wedge-shaped leaves.

(*Spiraea callosa*, L.) with narrow, sharply serrate leaves and the branches terminated by clusters of deep pink flowers.

(*Spiraea bumalda*, Burv.). A dwarf plant with broader ovate-lanceolate leaves, and flowers in large flat clusters colored a bright carmine. Some individuals have almost white flowers. This is known under the name of Anthony Waterer.

(*Spiraea prunifolia*, Sieb.) with double flowers of a clear white. The plant otherwise resembles the bridal wreath and is often called bridal wreath, as is the single flowered *S. Van Houttei*.

(*Spiraea belliardii* Herincq.). A spiraea having long, narrow, doubly serrate leaves, gray tomentose under surface when young. The flowers are bright pink with prominent stems in dense panicles.

(*Spiraea salicifolia*, L.). A dense shrub with oval to lanceolate leaves and hairy clusters of light pink flowers in a panicle.

Blackberry (*Rubus nigrobaccus*, Bailey). This common shrub has 3-5 parted leaves, hooked prickles on the stems and oblong or thimble-shaped "black berries." From this form many varieties have been developed.

(*Rosa rugosa*, Thunb.). This is a hardy shrub densely covered with prickles and bristles of different sizes. The flowers are purple or white, large, and last for a long time. There are single, semi-double, and double varieties of this rose.

Hugo Rose (*Rosa hugonis*, Hemsl.). This is also a hardy shrub with stout straight flattened prickles and bristles on the red stems. The leaves are small with five to eleven leaflets. The flowers are single and a clear yellow.

There are on the campus in addition to the above a variety of cultivated roses too numerous to list in this bulletin.

Japanese Quince (*Cydonia japonica*, Hort.) This is a stiff thorny shrub, oblong-ovate leaves with large stipules and scarlet red flowers. There are many varieties in cultivation.

(*Rhodotyphus kerrioides*, Sieb.). This shrub is from Japan. It has opposite leaves, ovate to oblong, and doubly serrate. The young stems become reddish later in the season. The flowers are white with four petals. The fruit consists of four black fleshy drupes in clusters that remain over winter. This plant is often called White Kerria.

Kerria (*Kerria japonica*, DC.). This plant is also from Japan. It has green stems with alternate leaves, ovate to lanceolate with serrate margins. The flowers are yellow, with five petals.

Pearl Bush (*Exochorda grandiflora*, Lindl.). A beautiful shrub from China cultivated for its large white flowers of five petals around a green center. The fruit is a rather curious five-angled capsule with one or two flattened seeds in each division. The leaves are often toothed on upper half and entire on lower half.

Ninebark (*Physocarpus opulifolius*, (L.) Maxim.). A shrub with smooth leaves 1-3 inches long, usually more or less distinctly 3-lobed, margins dentate or serrate. Flowers in clusters whitish, pods 3-5 from each flower. There is a form with yellow leaves.

LEGUME FAMILY (*Leguminosae*)

False Indigo (*Amorpha fruticosa*, L.). This is a tall shrub with leaves of eleven to twenty-one leaflets and dark purple flowers. The pods are hard and covered with small glands. The colors of the flowers vary and in some individuals may be white or pale blue.

Siberian Pea (*Caragana arborescens*, Lam.). A tall shrub of erect habit with yellow pea-like flowers and leaves with from four to six pairs of oval leaflets. Each leaflet has a small bristle at the tip.

Bladder Senna (*Colutea arborescens*, L.). This is a rather large shrub with alternate odd-pinnately compound leaves with small stipules. The leaflets are indented at the tip. The flowers are yellow and the fruit is bladder-like and many-seeded.

RUE FAMILY (*Rutaceae*)

Prickly Ash or **Toothache Tree** (*Xanthoxylum americanum*, Mill.). The stems and often leaves are prickly and have an aromatic odor. The leaves have from 5-9 leaflets. The flowers are yellowish-green, and the pods thick and fleshy.

HOLLY FAMILY (*Aquifoliaceae*)

Black-Alder or **Winterberry** (*Ilex verticillata*, (L.) Gray). A deciduous shrub with oval or lanceolate leaves, acuminate or acute, somewhat doubly serrate usually pubescent on the lower side, 1½ to 3 in. long. The flowers are very small and the fruit a bright red berry about ¼ in. in diameter.

CASHEW FAMILY (*Anacardiaceae*)

Staghorn Sumac (*Rhus typhina*, L.). A shrub or tree-like plant whose branches are densely hairy and leaves have eleven to thirty-one leaflets which are oblong lanceolate, serrate, and sharp pointed. *Rhus typhina* var. *laciniata* is on the campus and differs from the above in having deeply cut leaflets.

Smooth Sumac (*Rhus glabra*, L.). This plant is similar to *R. typhina* except that the stems are smooth.

Fragrant Sumac (*Rhus canadensis*, Marsh.). This shrub is named because of the aromatic leaves and bark. This is a small shrub having three-parted leaves, the leaflets ovate and cut-lobed. The flowers are a light yellow.

Poison Ivy (*Rhus toxicodendron*, L.). This is a shrub or vine climbing by rootlets secreting an oil that is poisonous to the touch of most people, causing watery blisters called "ivy poison." The

leaves are always three-parted, never five-parted; they may be distinguished from box-elder, which they most closely resemble, by being alternate in arrangement. The fruit is white or cream-colored berries.

Smoke Tree (*Rhus cotinus*, L.). This is a large shrub or small tree whose leaves have an aromatic milky juice. The margin of the leaves is smooth and the apex prominently rounded. Most of the flowers fail to develop and their stems develop long plumy hairs which cause the fruiting cluster to resemble puffs of smoke. It is from this that it gets its name "Smoke Tree."

STAFF TREE FAMILY (*Celastraceae*)

Bittersweet (*Celastrus scandens*, L.). This is a twining shrub with oblong, finely serrate, pointed leaves and small greenish flowers. The fruit is colored orange and scarlet.

Wahoo or **Spindle Tree** (*Evonymus atropurpureus*, Jaeg.). This is a shrub or small tree with green stems and sharply serrate leaves. The flowers are dull red to purple and small. The fruit is four-lobed and red.

European Spindle Tree (*Evonymus europaeus*, L.). This form has flowers in groups of three with four greenish, oblong petals, and red fruit.

Winged Wahoo (*Evonymus alatus*). This shrub is similar to the above but has four prominent cork wings on the branches.

Climbing Wahoo (*E. radicans*, Sieb.). An evergreen shrub or vine climbing by short roots with elliptic-oval leaflets, crenately-serrate, dark green with whitish veins. The stems have corky warts. This plant is a native of Japan.

Canby's Mountain Lover (*Pachistima Canbyi*, Gray). This is a small leaved evergreen shrub with oblong obtuse leaves. This plant resembles the Climbing Wahoo but has much smaller leaves and does not climb. It is a native of the mountains of Virginia and West Virginia.

BUCKTHORN FAMILY (*Rhamnaceae*)

Buckthorn (*Rhamnus cathartica*, L.). A shrub with ovate, minutely serrate leaves and a three or four seeded black berry. The branchlets are rigid, often spine-like and usually have a small spine in the angle between the terminal branches.

(*Rhamnus frangula*, L.) is a small tree similar to the above but without thorns. Berries 3-seeded.

New Jersey Tea (*Ceanothus americanus*, L.). A shrub with ovate leaves with three prominent veins and serrate margins. The flowers are small and white in terminal clusters. The receptacles of flowers remain on the plant through the winter as round, woody disks.

VINE FAMILY (*Vitaceae*)

Grape (*Vitis spp.*). There are several varieties of these vines on the campus climbing by coiled tendrils. The leaves are simple but variously lobed. The fruit is a pulpy berry.

Virginia Creeper or **Five-leaved Ivy** (*Psedera quinquefolia*, L.). This is a vine climbing by tendrils which end in small disks. The leaves are five-parted.

Boston Ivy (*Psedera veitchi*, Hort.). A vine climbing by tendrils with disks and having large three-lobed leaves with a shiny surface.

MALLOW FAMILY (*Malvaceae*)

Rose of Sharon (*Hibiscus syriacus*, L.). This is an erect shrub with rather small leaves that have three prominent veins. The large showy flowers are open bell-shape, of rose to purple color, or they may vary from white, cream-color to bluish, and may be double. This is an Asiatic shrub cultivated under a number of names.

Rose Mallow (*Hibiscus Moscheutos*, L.). This mallow has leaves that are white hairy on the under side, and bright pink or rose colored flowers.

GINSENG FAMILY (*Araliaceae*)

Hercules' Club (*Aralia spinosa*, L.). A shrub with thick club-like branches covered with spines. The flowers are produced in great terminal clusters, three to four feet long in midsummer.

Angelica Bush (*Acanthopanax* or *Aralia pentophylla*, Thunb.) is a spreading shrub with rather small palmately compound leaves and greenish-white flowers. There are sharp, rather weak thorns below the leaves.

ENGLISH IVY (*Hedera helix*, L.)

English Ivy (*Hedera helix*, L.). This is an evergreen vine climbing by roots. The leaves are 3-5 lobed and the veins are often light colored; those of the fruiting branches not lobed. The fruit is commonly black. There are numerous varieties of this vine. It is a native of the Canary Islands and Asia. Some of the varieties have blotched and variegated leaves.

HEATH FAMILY (*Ericaceae*)

Sweet Pepperbush or **White Alder** (*Clethra alnifolia*, L.). This shrub has obovate leaves with at least the tip half of the leaves serrate. The flowers are white or pink, blooming from July to September.

STORAX FAMILY (*Styracaceae*)

Silver-Bell or **Snow-Drop Tree** (*Halesia carolina*, L.). A shrub or tree with ovate to ovate-lanceolate leaves two to six inches long, pointed and finely serrate, smooth on upper surface and hairy on under surface. The flowers are white and drooping and the dry fruit has four prominent wings.

OLIVE FAMILY (*Oleaceae*)

Golden-Bell (*Forsythia intermedia*, Zabel.). This shrub has yellow flowers with four petals blooming before the leaves are out. The leaves have the tip half serrate or are three-parted, tapering at both ends. There are clusters of buds in the axils of many of the leaves.

(*Forsythia viridissima*, Lindl.). A shrub with olive green branchlets and simple leaves, serrate on the upper half. Flowers of a bright greenish-yellow.

Lilac (*Syringa vulgaris*, L.). A shrub with opposite, simple, ovate leaves with entire margins and white or lilac colored flowers that are fragrant.

Persian Lilac (*Syringa persica*, L.). A shrub with lanceolate, long pointed leaves and flower clusters two to three inches long. The flowers are lilac or white.

Japanese Lilac (*Syringa japonica*, Maxim.). A shrub with broadly ovate, pointed leaves, dark green, leathery and rounded at the base, and hairy on the under side. The flowers are creamy white.

California Privet (*Ligustrum ovalifolium*, Hassk.). This shrub used mostly for a hedge has oval leaves acute at the apex, dark, glossy green above, and yellowish-green underneath. The flowers are in clusters about three inches long and the fruit is a shiny black berry.

Regal Privet (*L. ibota* var. *regalianum*, Rehd.). This shrub has pubescent branches and leaves similar to the California privet, but larger and downy on lower surface particularly on the main vein. Flower clusters as long as eight inches.

Japanese Privet (*L. amurense*, Carr.). The branches of this shrub are downy when young, with oval to oblong leaves and obtuse at apex, smooth except on midrib on lower surface. The flower clusters are not more than two and one-half inches long.

Common Privet (*L. vulgare*, L.). This shrub has ovate to lanceolate leaves with either obtuse or acute tips, smooth on both surfaces. The flowers are in dense clusters about four inches long. The fruit, as in all the privets, is black.

DOGWOOD FAMILY (*Cornaceae*)

Red Osier (*Cornus sanguinea*, L.). A shrub with purple or blood-red branches and leaves downy on both sides. The hairs on the lower surfaces are somewhat woolly. The flowers are greenish-

white in dense clusters and the fruit is black or green. This is an oriental shrub.

Panicled Dogwood (*C. paniculata*, L'Her.). Branches gray, smooth, leaves ovate-lanceolate, taper pointed, acute at base, whitish beneath, fruit white on red pedicels.

Aucuba (*Aucuba japonica*, Thunb.) This shrub has large leaves 3 to 7 in. long, ovate or somewhat oblong lanceolate; berries white. This plant is a native of eastern Asia. There are varieties with spotted leaves and with scarlet or yellow berries.

BIGNONIA FAMILY (*Bignoniaceae*)

Trumpet Creeper (*Tecoma radicans*, L.). This is a climbing woody vine with large scarlet, orange-red, or yellow flowers and leaves with nine to eleven leaflets. It is also called trumpet vine or trumpet honeysuckle.

VERVAIN FAMILY (*Verbenaceae*)

French Mulberry (*Callicarpa purpurea*, Juss.). This shrub gets to be about four feet high with elliptical or ovate leaves with margin crenate or serrate at apex and entire toward the base. The flowers are in clusters, pink, and about one-eighth inch long. The fruit is lilac-violet. This is also an oriental shrub.

Chaste Tree (*Vitex angus-castus*, L.). A shrub or small tree, with strongly aromatic odor, leaves long petioled palmately veined, 3-7 leaflets, entire or with a few coarse teeth, dark green above, gray beneath. Flowers white or pale lilac in terminal spikes.

MADDER FAMILY (*Rubiaceae*)

Buttonball Bush (*Cephalanthus occidentalis*, L.). This shrub is common in the edges of swamps in Eastern North America. It grows from three to fifteen feet high. It has ovate to lanceolate leaves three to six inches long, and triangular stipules at the base of the leaves. The flowers are in round heads on long stems, three or more at the ends of the branches.

HONEYSUCKLE FAMILY (*Caprifoliaceae*)

American or Sweet Elder (*Sambucus canadensis*, L.). This shrub grows to a height of twelve feet and has pale yellowish-gray branches with large white pith and leaves bright green with usually seven leaflets that are acute at tip and sharply toothed, the lowest pair frequently lobed. The flowers are white produced in large flat clusters. The berries are purplish-black.

European Elder (*S. nigra*, L.). The bark of this elder is deeply furrowed, the leaves dark green with three to seven, usually five, leaflets. The flowers are yellowish or dull white, borne in

smaller clusters than the American form. The berries are a shiny black and three-celled, thus differing from the four-celled American form.

Red-berried Elder (*S. racemosa*, L.). The stems of this form are light brown and the pith is light brown. The leaves are a bright green with usually five leaflets which are oval or ovate and sharply and regularly toothed. The flowers are white and the berries are scarlet and three-seeded.

High-bush Cranberry (*Viburnum opulus*, L.). This tall shrub has maple-like leaves, three-lobed, coarsely and irregularly toothed, downy on the lower surface. The flat clusters of flowers have a border of white sterile flowers. The red fruit hangs on the branches over the winter.

Snowball (*V. opulus sterilis*, DC.). This viburnum differs from the above in that practically the whole flower cluster is of white sterile flowers that give it the name of Snowball Bush.

Maple-leaved Viburnum (*V. acerifolium*, L.). This is rather a small shrub seldom over five feet high. The leaves are three to five lobed, and turn a dark purple in autumn. The flat clusters of flowers are white, two to three inches across, and the fruit is red changing to purple-black.

Wayfaring Tree (*V. lantana*, L.). This shrub is often tree-like, reaching a height of twenty feet. The leaves are ovate, two to four inches long, minutely toothed, downy above and somewhat woolly beneath. The flowers are white, and the fruit a bright red oval, changing to almost black.

Sheepberry (*V. lentago*, L.). This shrub also becomes tree-like. It has ovate, pointed leaves two to four inches long, finely and sharply serrate, and with very little down. The petioles are somewhat winged. The white flower clusters are sessile and many flowered. The fruit is oval and bluish-black.

Japanese Snowball (*V. plicatum*, Mig.). This is a bushy shrub becoming about ten feet high with its branches tomentose when young. The leaves are broadly ovate to oblong, acute at apex, dark green and nearly smooth above, and downy on lower surface, at least on the veins. The flowers are white and sterile, produced in small clusters about three inches in diameter. The fruit is red changing to a bluish-black.

Weigela (*Diervilla florida*, Sieb. and Zucc.). The branchlets of this shrub have two hairy stripes. The leaves are ovate, two to four inches long, long pointed, short petioled and serrate except at base, and downy on the veins on the lower side. The flowers are funnel-shaped, and deep rose outside and paler within.

There is also a variegated form on our campus with irregular yellow or white margined leaves and much paler flowers.

Bush Honeysuckle (*Lonicera ruprechtiana*, Regel.). This honeysuckle grows to a height of twelve feet. It has ovate to lanceolate leaves, dark green above and gray-downy underneath. The flowers are two-lipped and pure white changing to yellow. The fruit is red or sometimes yellow.

(*L. tartarica*, L.). This shrub has ovate to oblong leaves, downy on the lower surface. The flowers are pink, crimson or sometimes white, with a two-lipped corolla that is hairy on the inside. The berries are red but in rare cases may be yellow.

(*L. fragrantissima*, Lindl.). This honeysuckle reaches a height of about eight feet. The leaves are rather stiff and leathery, broadly oval with hairs on margins and mid-rib. The flowers are creamy-white, very fragrant, and several pairs are produced in same place.

There are several other varieties of honeysuckles on the campus. The above, however, are the most common.

Indian Currant (*Symphoricarpos orbicularis*, Muench.). This shrub is also called Coral Berry and is from three to seven feet high. The branches are densely leafy and downy. The leaves are broadly oval or ovate, short petioled and usually downy beneath. The flowers are produced in dense short clusters from the lower side of the twigs and are a dull white. The berries are a purplish-red.

Snowberry or **Waxberry** (*S. racemosus*, Michx.). The leaves of this shrub are rather similar to the Indian Currant but the flowers are slightly pink and borne in terminal clusters and the berries are snow-white.

Abelia (*Abelia chinensis*, R.Br.). This is a small shrub whose branches are minutely reddish-downy. The leaves are ovate with serrate margins, more or less hairy above and on the midrib beneath. The flowers are in dense terminal clusters, white with long stamens and rosy-tinted calyx lobes.