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PLANTS
OF
MICHIGAN

GLEASON

IN MEMORIAM
Richard M. Holman

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THE PLANTS OF MICHIGAN

SIMPLE KEYS FOR THE IDENTIFICATION OF THE NATIVE SEED PLANTS OF THE STATE

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1918

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PUBLISHED BY
GEORGE WAHR
ANN ARBOR

PRINTED BY
THE ANN ARBOR PRESS

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PREFACE

This book is not intended for the expert botanist. He should consult one of the regular Manuals which give full descriptions of each species of plant.

Neither is it intended for the merely curious. Only those who have sufficient interest in a plant to observe it can find its name by this book.

Furthermore, it is not a textbook. It does not attempt to convey botanical information, but offers merely an opportunity to learn the names of plants.

Its mission is fully accomplished if, through its use, students, vacationists, and plant-lovers in general are able to recognize by name the plants about them.

IN MEMORIAM

Richard M. Holman,

HOW TO USE THE BOOK

One recognizes a plant by the presence of structural features peculiar to itself, and not found on any other kind of plant. In such a book as this, these characters are given one or a few at a time, and contrasted with the characters which other sorts of plants possess. Such a presentation is called a Key, and by its proper use the name may be learned of any plant considered in it. This process is called Identification.

Keys are constructed in several different ways, although the principle of all is the same. In this book, the user will begin with lines 1a and 1b on the page headed Key to the Groups. Each of these lines includes some descriptive matter, but only one of them can apply to the plant being identified. For example, if the plant to be identified is an Oak, line 1a will apply perfectly, and the same line will also apply to any other kind of tree or to any shrub. But if the plant is a Violet, a Buttercup, or any other herb, line 1b agrees and line 1a will not apply. At the end of each line is a reference to be consulted next. If the plant is a tree or shrub, one turns accordingly to Group 1, on page ix, and begins again at the first number given. If the plant is an herb, he follows the reference to line 2, just below, and again compares the plants with lines 2a and 2b.

Under every number at least two lines of description are given, designated a and b, and under a few numbers additional lines appear, designated c, d, etc. In every case, the user of the key will select from the different lines under the same number that particular line which agrees with the structure of the plant, and follow up the reference given at the end of that line. Eventually one finds at the end of a line, instead of a number, the name of a family of plants, to which this particular plant belongs, and then turns over to the page where this family is treated. Under each family is a similar key, to be followed in exactly the same way, until finally one finds instead of a number the common name and the scientific name of the plant in hand. The process of identification is now completed, and the student has found the name of the plant.

In some cases, a reference is made in the key to a particular portion of the family key. One then turns directly to this particular number in the family key, and continues his identification in the usual way.

As a definite example of the use of the key, suppose that one has in hand a branch of the White Oak, and that he does not know its name. To determine its name, he will trace it through the following steps in the key. Under the Key to the Groups, it agrees with line 1a, which refers to Group 1, Woody Plants. Under this group it agrees in structure with line 1a, which refers to 2; with line 2b, referring

to 21; with line 21b, referring to 22; with 22b, referring to 29; with 29b, referring to 32; with 32c, referring to 47; with 47b, referring to 48; with 48b, referring to 51; with 51b, referring to number 1b in the Beech Family. Turning to the proper number in this family, the plant is referred to line 3; it agrees with line 3c, referring to 10; with 10a, referring to 11; and with 11b, which gives the name of the plant, White Oak, *Quercus alba*.

As a second example, suppose one has a common yellow-flowered plant blooming on lawns and roadsides in spring. Under the Key to the Groups, it agrees with 1b, referring to 2; with 2b, referring to 3; and its net-veined leaves place it in 3b, referring to Group 4, Dicotyledones. Under this group, its basal leaves place it in 1b, referring to 2; its simple leaves in 2b, referring to 18; the absence of stem-leaves places it in 18b, referring to 23; its solitary flowers on each flower-stalk place it in 23b, referring to 24; its yellow flowers agree with 24a, referring to 25; and its milky juice refers the plant to number 16, in the Composite Family. In the key to this family, its lobed leaves agree with 16b, referring on to 17; its large flowers with 17b, giving one the common name Dandelion, and referring on to 18 to determine which kind of Dandelion the plant may be.

At some point in the key there will be found for each plant a statement in parentheses. This is general information concerning the height of the plant, the color of the flowers, or the season of bloom. It must be remembered that the height of plants is subject to great variation; that most plants have white-flowered varieties; and that the month of bloom depends largely on the latitude and the climate. Therefore this general information should not be used as means of distinguishing species.

The names of plants. Each plant bears a scientific name. This is composed of two parts and is usually of Latin or Greek derivation. In some cases these names are taken directly from the Latin language, as *Quercus*, the Oak, or *Acer*, the Maple. In other cases the name may indicate some characteristic feature of the plant, as *Polygonum*, many joints, for the Knotweed, or *Ammophila*, sand-loving, for the Beach Grass.

An English name is also given for almost every kind of plant. In a few cases there is no accepted English name, and none has been given. In many cases the same English name applies to several kinds of plants and has been repeated for each. When this is so, the common name is given in the key in parentheses before the scientific name is reached. Thus, if one is satisfied to know merely that his plant is a dandelion, he learns it in line 17b of the key to the Composite Family, but to discover which kind of a dandelion he has, he must follow through the key and use the scientific name.

There is in this book, therefore, no necessity of learning or using scientific names. The less critical may be satisfied with an English name, and others may use the scientific names as they see fit.

Possible Errors. In using this book, care must be taken to compare all the lines under each number with the plant, and to use judgment in selecting the right one. While faulty observation or poor judgment may lead to error, a mistake is usually due to carelessness in not following correctly the reference at the end of the line chosen. If one reaches a number in which none of the lines of description agrees with the plant, it is very probable that he has made a mistake at an earlier stage of the identification, and he should then begin anew.

It has been the intention of the author to make the key as nearly as possible proof against errors of judgment. For example, the Indian Turnip may be sought under either Group 3 or Group 4; the Matrimony Vine may be identified either as a shrub or as an herb, and numerous other similar examples may be discovered.

Botanical Information Needed. It is presumed that those using the book will be familiar with the parts of the flower and with the commoner descriptive terms applied to leaves. Unusual terms have been avoided as far as possible, but those which do occur, as well as the simpler ones, are explained in the glossary.

In general, only those characters have been used in the keys which can be observed without a magnifying glass and without dissection of the flower.

In several groups of plants, reference is made to the fuller descriptions to be found in the Manuals. The standard manuals for Michigan are Gray's New Manual of Botany, 7th edition (American Book Company, \$2.50), and Britton and Brown, Illustrated Flora of the Northern States and Canada (Chas. Scribner's Sons, \$13.50). These books may be consulted in most school or public libraries.

All dimensions are expressed in the metric system. For convenience, it may be stated that 25 millimeters (mm.) are about equal to one inch; 1 centimeter (cm.) to two-fifths of an inch; 1 decimeter (dm.) to 4 inches; and 1 meter (m.) is a little more than 3 feet.

GROUP 1, WOODY PLANTS

- 1a. Trees, with erect stem and central trunk, attaining a height of 6 m. (20 ft.) or more —2.
- 1b. Shrubs or woody vines, without true tree habit, or attaining heights of less than 6 m. (20 ft.) —52.
- 2a. Key for use in earliest spring, for trees which have flowers but no leaves —3.
- 2b. Key for use with trees bearing leaves —21.
- 3a. Flowers in catkins, without brightly colored or petal-like parts —4.
- 3b. Flowers not in catkins, either with or without petals —14.
- 4a. Leaf-scars and lateral buds 2-ranked, i. e., in two longitudinal rows with the third leaf above the first —5.
- 4b. Leaf-scars and buds in three or more longitudinal rows —9.
- 5a. From 1 to 3 bud-scales visible on each leaf-bud
2b, in **FAGACEAE**, p. 22.
- 5b. From 4 to 7 bud-scales visible on each leaf-bud —6.
- 5c. From 8 to 20 bud-scales visible on each leaf-bud; buds long and slender; bark of the trunk smooth —8.
- 6a. Bundle-scars 5 or more 2b, in **URTICACEAE**, p. 23.
- 6b. Bundle-scars 3 —7.
- 7a. Twigs bearing numerous dwarf branches thickly covered with crowded leaf-scars (Birch) **BETULACEAE**, p. 21.
- 7b. Twigs without dwarf branches (Ironwood)
9a, in **BETULACEAE**, p. 22.
- 8a. Trunk cylindrical or nearly so 2a, in **FAGACEAE**, p. 22.
- 8b. Trunk prominently fluted with longitudinal ridges
1b, in **BETULACEAE**, p. 21.
- 9a. Bundle-scars 3 in each leaf-scar —10.
- 9b. Bundle scars more than 3 in each leaf-scar —12.
- 10a. Pith divided into separate cavities by transverse partitions
1a, in **JUGLANDACEAE**, p. 21.
- 10b. Pith not partitioned —11.
- 11a. Buds small, with only one external bud-scale
1b, in **SALICACEAE**, p. 19.
- 11b. Buds with more than one outer bud-scale
1a, in **SALICACEAE**, p. 19.
- 12a. Buds clustered near the tips of the twigs
1b, in **FAGACEAE**, p. 22.
- 12b. Buds not clustered at the tips of the twigs —13.

- 13a. Buds with about 3 visible bud-scales
2b, in **FAGACEAE**, p. 22.
- 13b. Terminal bud large, with 4 or more visible bud-scales
1b, in **JUGLANDACEAE**, p. 21.
- 14a. Flowers conspicuous, brightly colored, at least 8 mm. wide,
with both calyx and corolla —15.
- 14b. Flowers inconspicuous, seldom brightly colored, and then
less than 8 mm. wide —17.
- 15a. Flowers irregular, pink or red 3a, in **LEGUMINOSAE**, p. 58.
- 15b. Flowers regular, white —16.
- 16a. Ovary one, superior, in the center of the flower
32b, in **ROSACEAE**, p. 54.
- 16b. Ovary inferior, appearing as a swelling below the calyx at
the summit of the pedicel 42b, in **ROSACEAE**, p. 55.
- 17a. Leaf-scars and buds opposite —18.
- 17b. Leaf-scars and buds alternate —19.
- 18a. Bundle-scar one in each leaf-scar
1b. in **OLEACEAE**, p. 88.
- 18b. Bundle-scars 3 or more in each leaf-scar
ACERACEAE, p. 70.
- 19a. Bundle-scar 1 in each leaf-scar 1b. in **LAURACEAE**, p. 41.
- 19b. Bundle-scars 3 in each leaf-scar —20.
- 19c. Bundle-scars 5 in each leaf-scar
7a, in **LEGUMINOSAE**, p. 58.
- 20a. Branches thorny 5a, in **LEGUMINOSAE**, p. 58.
- 20b. Branches not thorny 3a, in **URTICACEAE**, p. 24.

—21—

- 21a. Leaves narrow, needle-like or scale-like; trees mostly ever-
green **PINACEAE**, p. 1.
- 21b. Leaves broader, flat, never needle-like or scale-like, falling in
winter —22.
- 22a. Leaves compound —23.
- 22b. Leaves simple —29.
- 23a. Leaves opposite —24.
- 23b. Leaves alternate —26.
- 24a. Leaves palmately compound with 5—7 leaflets
SAPINDACEAE, p. 70.
- 24b. Leaves pinnately compound —25.
- 25a. Leaflets 3—5 1a, in **ACERACEAE**, p. 70.
- 25b. Leaflets 7—11 1b, in **OLEACEAE**, p. 88.
- 26a. Stem or branches thorny 4a, in **LEGUMINOSAE**, p. 58.
- 26b. Stem or branches not thorny —27.

- 27a. Leaflets entire 7a, in **LEGUMINOSAE**, p. 58.
- 27b. Leaflets entire except for a few large glandular teeth near their base **SIMARUBACEAE**, p. 65.
- 27c. Leaflets serrate their entire length —28.
 - 28a. Upper leaflets less than 25 mm. wide 4b, in **ROSACEAE**, p. 51.
 - 28b. Upper leaflets more than 25 mm. wide **JUGLANDACEAE**, p. 21.
- 29a. Leaves opposite —30.
- 29b. Leaves alternate —32.
 - 30a. Leaves entire **CORNACEAE**, p. 83.
 - 30b. Leaves toothed or lobed, not entire —31.
- 31a. Leaves lobed 1b, in **ACERACEAE**, p. 70.
- 31b. Leaves merely toothed 27b, in **CAPRIFOLIACEAE**, p. 111.
 - 32a. Leaves entire —33.
 - 32b. Leaves toothed —36.
 - 32c. Leaves lobed —47.
- 33a. Leaves heart-shape 3a, in **LEGUMINOSAE**, p. 58.
- 33b. Leaves not heart-shape —34.
 - 34a. Twigs and foliage spicy-aromatic 1b, in **LAURACEAE**, p. 41.
 - 34b. Twigs and foliage not aromatic —35.
- 35a. Pith 5-angled; fruit an acorn 3a, in **FAGACEAE**, p. 22.
- 35b. Pith not 5-angled; fruit a berry 1a, in **CORNACEAE**, p. 83.
 - 36a. Leaves oblique at base, i. e., one side of the leaf larger than the other —37.
 - 36b. Leaves symmetrical, not oblique at base —38.
- 37a. Leaves heart-shape, about as broad as long **TILIACEAE**, p. 72.
- 37b. Leaves oval or ovate, much longer than wide 1a, in **URTICACEAE**, p. 23.
 - 38a. Stems thorny 41b, in **ROSACEAE**, p. 54.
 - 38b. Stems not thorny —39.
- 39a. Leaves finely toothed, with 3—many teeth per centimeter of margin —40.
- 39b. Leaves coarsely toothed, with 1—2 teeth per centimeter of margin —46.
 - 40a. Petioles laterally compressed 2a, in **SALICACEAE**, p. 19.
 - 40b. Petioles not compressed —41.
- 41a. Leaves, or many of them, crowded on short spur-like branches —42.
- 41b. Leaves scattered, not on short spur-like branches —43.
 - 42a. Bark of the trunks separating in thin papery or leathery sheets **BETULACEAE**, p. 21.
 - 42b. Bark of the trunk not papery or leathery 24b, in **ROSACEAE**, p. 53.

- 43a. Lateral leaf-veins straight and parallel, and terminating in the teeth **BETULACEAE**, p. 21.
 - 43b. Lateral veins more or less curved, and not ending in the teeth —44.
 - 44a. Leaves palmately veined, about as broad as long; juice somewhat milky 2b, in **URTICACEAE**, p. 23.
 - 44b. Leaves pinnately veined; juice not milky —45.
 - 45a. Willows, with slender leaves and brittle twigs 8a, in **SALICACEAE**, p. 19.
 - 45b. Trees with lanceolate, ovate, or oblong leaves and tough twigs 30, in **ROSACEAE**, p. 54.
 - 45c. Cottonwoods, with broad, heart-shape or rounded leaves 1a, in **SALICACEAE**, p. 19.
 - 46a. Petioles laterally compressed 2a, in **SALICACEAE**, p. 19.
 - 46b. Petioles not compressed; lateral veins straight and parallel, running directly to the teeth **FAGACEAE**, p. 22.
 - 47a. Stem thorny 41b, in **ROSACEAE**, p. 54.
 - 47b. Stem not thorny —48.
 - 48a. Leaves palmately veined —49.
 - 48b. Leaves pinnately veined —51.
 - 49a. Lobes of the leaf entire 1b, in **LAURACEAE**, p. 41.
 - 49b. Lobes of the leaf serrate —50.
 - 50a. Juice somewhat milky; lateral buds visible 2b, in **URTICACEAE**, p. 23.
 - 50b. Juice not milky; lateral buds covered by the base of the petiole **PLATANACEAE**, p. 51.
 - 51a. Leaves with 4 large entire lobes; stem marked with a ring at each node **MAGNOLIACEAE**, p. 40.
 - 51b. Leaves with many lobes; stem not ringed 1b, in **FAGACEAE**, p. 22.
- 52—
- 52a. For specimens bearing leaves only —53.
 - 52b. For specimens bearing flowers only —140.
 - 52c. For specimens with both leaves and flowers —155.
 - 53a. Leaves narrow, needle-like or scale-like, mostly evergreen —54.
 - 53b. Leaves broader, flat or rolled, but not needle-like or scale-like —56.
 - 54a. Foliage densely gray-pubescent; low bushy shrubs with yellow flowers 2a, in **CISTACEAE**, p. 74.
 - 54b. Foliage green —55.
 - 55a. Leaves opposite or whorled **PINACEAE**, p. 1.
 - 55b. Leaves scattered on the stem **TAXACEAE**, p. 2.
 - 56a. Twining or climbing vines —57.
 - 56b. Not climbing or twining —66.

- 57a. Thorny vines —58.
- 57b. Not thorny —60.
 - 58a. Climbing by tendrils at the base of the leaves
 - 4b, in **LILIACEAE**, p. 11.
 - 58b. Tendrils none —59.
- 59a. Leaves simple
 - 5a, in **SOLANACEAE**, p. 100.
- 59b. Leaves compound
 - 8a, in **ROSACEAE**, p. 52.
- 60a. Leaves compound —61.
- 60b. Leaves simple —63.
- 61a. Leaves with 5 leaflets
 - 1a, in **VITACEAE**, p. 71.
- 61b. Leaves with 3 leaflets —62.
 - 62a. Plant climbing by tendril-like leaf-stalks
 - 1a, in **RANUNCULACEAE**, p. 35.
 - 62b. Plant climbing by hold-fast roots
 - 5b, in **ANACARDIACEAE**, p. 69.
- 63a. Leaves opposite
 - 5a, in **CAPRIFOLIACEAE**, p. 110.
- 63b. Leaves alternate —64.
 - 64a. Plants climbing by tendrils
 - 1b, in **VITACEAE**, p. 71.
 - 64b. Twining plants —65.
- 65a. Leaves ovate-oblong, attached by the base
 - 1a, in **CELASTRACEAE**, p. 69.
- 65b. Leaves almost round, peltate near the edge
 - MENISPERMACEAE** p. 40.
- 66a. Leaves opposite —67.
- 66b. Leaves alternate —84.
- 67a. Leaves compound —68.
- 67b. Leaves simple —69.
 - 68a. Leaflets 3
 - STAPHYLEACEAE**, p. 69.
 - 68b. Leaflets 7 or more
 - 1a, in **CAPRIFOLIACEAE**, p. 109.
- 69a. Leaves palmately veined, or at least with a pair of prominent lateral veins from the base —70.
- 69b. Leaves pinnately veined —72.
 - 70a. Leaves not lobed
 - 1b, in **RHAMNACEAE**, p. 71.
 - 70b. Leaves more or less lobed —71.
- 71a. Leaves with stipules
 - 22a, in **CAPRIFOLIACEAE**, p. 111.
- 71b. Leaves without stipules
 - 2a, in **ACERACEAE**, p. 70.
- 72a. Leaves serrate —73.
- 72b. Leaves entire —77.
- 73a. Stem thorny
 - 1b, in **RHAMNACEAE**, p. 71.
- 73b. Stem not thorny —74.
 - 74a. Bark of the ripe twigs green
 - 1b, in **CELASTRACEAE**, p. 69.
 - 74b. Bark of the ripe twigs brown, reddish, or gray —75.

- 75a. Twigs with a prominent hairy ridge extending downward from the middle of the line connecting the petiole bases
13a, in **CAPRIFOLIACEAE**, p. 110.
- 75b. Twigs without any pubescent ridge —76.
- 76a. Erect shrubs; leaves obviously toothed
11b, in **CAPRIFOLIACEAE**, p. 110.
- 76b. Spreading shrubs; most of the leaves entire, and only here and there some with serrate margins
18b, in **CAPRIFOLIACEAE**, p. 110.
- 77a. Leaves silvery beneath with a dense coating of scales
ELAEOAGNACEAE, p. 77.
- 77b. Leaves green beneath, or somewhat hairy and light-colored —78.
- 78a. Aquatic plant with lanceolate leaves, and stems bending over and into the water
1a, in **LYTHRACEAE**, p. 77.
- 78b. Not truly aquatic, although frequently in wet places —79.
- 79a. Leaves evergreen, as shown by their presence on the older stems
18a, in **ERICACEAE**, p. 85.
- 79b. Leaves deciduous each year —80.
- 80a. Leaves dotted with translucent dots, easily seen when the leaf is held to the light
1a, in **HYPERICACEAE**, p. 73.
- 80b. Leaves not dotted with translucent dots —81.
- 81a. Lateral veins curved forward and running almost parallel to the leaf-margin
CORNACEAE, p. 83.
- 81b. Lateral veins spreading, and not paralleling the leaf-margin —82.
- 82a. Leaves with stipules
1a, in **RUBIACEAE**, p. 108.
- 82b. Leaves with a prominent ridge connecting them at the base —83.
- 82c. Leaves with neither stipules nor connecting ridges
1a, in **OLEACEAE**, p. 88.
- 83a. Bundle-scar one in each leaf-scar
18b, in **CAPRIFOLIACEAE**, p. 110.
- 83b. Bundle-scars three in each leaf-scar (Honeysuckle)
12, in **CAPRIFOLIACEAE**, p. 110.
- 84a. Leaves compound —85.
- 84b. Leaves simple —95.
- 85a. Stems prickly or thorny —86.
- 85b. Stems without prickles or thorns —88.
- 86a. Leaves twice-pinnate
4a, in **ARALIACEAE**, p. 80.
- 86b. Leaves evenly pinnate
5b, in **LEGUMINOSAE**, p. 58.
- 86c. Leaves odd-pinnate or trifoliate —87.
- 87a. Leaflets entire
1a, in **RUTACEAE**, p. 65.
- 87b. Leaflets serrate
3b, in **ROSACEAE**, p. 51.
- 88a. Leaflets 3 —89.
- 88b. Leaflets 5 to many —91.

- 89a. Tall shrubs; leaflets entire or minutely toothed
1b, in **RUTACEAE**, p. 65.
- 89b. Shrubs 2 m. high or less; leaves conspicuously toothed —90.
 - 90a. Stipules present 17b, in **ROSACEAE**, p. 53.
 - 90b. Stipules none 1b, in **ANACARDIACEAE**, p. 68.
- 91a. Leaflets 6—25 mm. long —92.
- 91b. Leaflets 30 mm. long, or more —93.
 - 92a. Leaflets mostly 5, rarely 3 or 7 7a, in **ROSACEAE**, p. 52.
 - 92b. Leaflets mostly 9—19, 15 mm. long or more
26a, in **LEGUMINOSAE**, p. 60.
 - 92c. Leaflets mostly 25—45, less than 15 mm. long
8a, in **LEGUMINOSAE**, p. 58.
- 93a. Leaflets entire 3a, in **ANACARDIACEAE**, p. 68.
- 93b. Leaflets entire, except for 1—4 large glandular teeth near their base
SIMARUBACEAE, p. 65.
- 93c. Leaflets toothed throughout —94.
 - 94a. Juice milky 1a, in **ANACARDIACEAE**, p. 68.
 - 94b. Juice not milky 3a, in **ROSACEAE**, p. 51.
- 95a. Leaves minute, scale-like, appressed 2a, in **CISTACEAE**, p. 74.
- 95b. Leaves 3—10 mm. long, spreading, completely rolled into a tube
EMPETRACEAE, p. 68.
- 95c. Leaves normal in shape, green in color —96.
 - 96a. Leaves evergreen, as shown by their presence on the older parts of the stem 4b, in **ERICACEAE**, p. 84.
 - 96b. Leaves deciduous —97.
- 97a. Stems or branches thorny —98.
- 97b. Stems or branches without thorns or thorny leaves —103.
- 98a. Leaves conspicuously palmately veined —99.
- 98b. Leaves pinnately veined, or sometimes with smaller lateral veins arising from the end of the petiole —100.
- 99a. Leaves 5 cm. wide or less 1a, in **SAXIFRAGACEAE**, p. 49.
- 99b. Leaves 15 cm. wide or more 1a, in **ARALIACEAE**, p. 80.
 - 100a. Leaves entire 5a, in **SOLANACEAE**, p. 100.
 - 100b. Leaves toothed or somewhat lobed —101.
- 101a. Leaves with bristly margins; some of the thorns three-pointed
2a, in **BERBERIDACEAE**, p. 40.
- 101b. Leaves not bristly on the margin; thorns not branched —102.
 - 102a. Only lateral thorns present 41b, in **ROSACEAE**, p. 54.
 - 102b. Only terminal thorns present 2a, in **RHAMNACEAE**, p. 71.
- 103a. Leaves palmately veined, or with one or more pairs of lateral veins from the base of the leaf —104.
- 103b. Leaves pinnately veined —111.
 - 104a. Leaves entire —105.
 - 104b. Leaves toothed —106.
 - 104c. Leaves palmately lobed —108.

- 105a. Foliage fragrant when crushed; leaves ovate
1b, in **LAURACEAE**, p. 41.
- 105b. Foliage not aromatic; leaves heart-shape
3b, in **LEGUMINOSAE**, p. 58.
- 106a. Lateral veins straight and parallel, running to the teeth
of the leaf 3a, in **BETULACEAE**, p. 22.
- 106b. Lateral veins curved or branched, and not running straight
to the teeth —107.
- 107a. Tall shrubs with somewhat milky juice and broadly ovate
leaves 2b, in **URTICACEAE**, p. 23.
- 107b. Low shrubs less than 1 m. high with watery juice
1b, in **RHAMNACEAE**, p. 71.
- 108a. Leaves with 2 or 3 entire lobes, spicy-fragrant when
crushed 1b, in **LAURACEAE**, p. 41.
- 108b. Leaves with milky juice 2b, in **URTICACEAE**, p. 23.
- 108c. Leaves neither spicy-fragrant nor with milky juice —109.
- 109a. Stem covered with brown bristles 29, in **ROSACEAE**, p. 54.
- 109b. Stem not bristly —110.
- 110a. Sides of the petiole strongly decurrent on the stem;
bundle-scars crowded or nearly in contact in the leaf-scars
28b, in **ROSACEAE**, p. 53.
- 110b. Sides of petiole little decurrent or not at all; bundle-scars
distinctly separate 2b, in **SAXIFRAGACEAE**, p. 49.
- 111a. Leaves aromatically fragrant when crushed —112.
- 111b. Leaves not aromatically fragrant when crushed —113.
- 112a. Leaves broadly obovate, entire; a common woodland shrub
1a, in **LAURACEAE**, p. 41.
- 112b. Leaves linear-lanceolate or oblanceolate, conspicuously
toothed or entire **MYRICACEAE**, p. 20.
- 113a. Leaves entire —114.
- 113b. Leaves toothed or lobed —121.
- 114a. Base of the petiole covering the axillary buds; twigs
marked with rings **THYMELAEACEAE**, p. 77.
- 114b. Base of petiole not covering the bud, and twigs not marked
with rings —115.
- 115a. Pith with prominent partitions; tall shrubs with fetid bark;
leaves obovate, 10 cm. long or larger **ANONACEAE**, p. 40.
- 115b. Pith not partitioned; leaves smaller —116.
- 116a. Leaves waxy or resinous underneath
24b, in **ERICACEAE**, p. 86.
- 116b. Leaves not waxy or resinous —117.

- 117a. Lateral veins curved forward and almost parallel to the margin of the leaf 2a, in **CORNACEAE**, p. 83.
117b. Lateral veins spreading —118.
118a. Leaves lanceolate or linear, much longer than wide —119.
118b. Leaves ovate or elliptical —120.
119a. Stem weak, spreading or trailing 5a, in **SOLANACEAE**, p. 100.
119b. Stems, or some of them, erect 3b, in **LEGUMINOSAE**, p. 58.
120a. Leaves with purple petioles, which are at least one-fourth as long as the leaf-blade 1a, in **AQUIFOLIACEAE**, p. 69.
120b. Leaves with short petioles or sessile 24c, in **ERICACEAE**, p. 86.
121a. Lateral veins straight and parallel, mostly ending in the teeth of the leaf —122.
121b. Lateral veins not straight and parallel —129.
122a. Leaves 2-ranked, i. e., in two longitudinal rows, with the third leaf directly above the first —123.
122b. Leaves not 2-ranked —127.
123a. Leaves unsymmetrical, oblique at the base, i. e., with one side of the leaf larger than the other **HAMAMELIDACEAE**, p. 51.
123b. Leaves symmetrical or nearly so at the base —124.
124a. Lateral leaf-veins ending in the leaf-teeth —125.
124b. Lateral veins not ending in the teeth 42b, in **ROSACEAE**, p. 55.
125a. Bark smooth and fluted on the large stems 1b, in **BETULACEAE**, p. 21.
125b. Bark rough or warty or glandular —126.
126a. Leaves 4 cm. long or less 3a, in **BETULACEAE**, p. 22.
126b. Leaves 5 cm. long or more 9b, in **BETULACEAE**, p. 22.
127a. Pith 3-angled 6a, in **BETULACEAE**, p. 22.
127b. Pith 5-angled 13b, in **FAGACEAE**, p. 23.
127c. Pith cylindrical —128.
128a. Leaves finely serrate 42b, in **ROSACEAE**, p. 55.
128b. Leaves coarsely or doubly serrate 41a, in **ROSACEAE**, p. 54.
129a. Leaves coarsely or doubly serrate —130.
129b. Leaves simply serrate —131.
130a. Leaves 2-ranked, i. e., in two longitudinal rows, with the third leaf directly over the first 9b, in **BETULACEAE**, p. 22.
130b. Leaves not 2-ranked 41a, in **ROSACEAE**, p. 54.

- 131a. Leaves with glands on the petiole or at the base of the leaf-blade —132.
- 131b. Leaves with small dark glands on the upper side of the mid-vein 42a, in **ROSACEAE**, p. 54.
- 131c. Leaves without glands —133.
- 132a. Willows; with usually slender leaves, frequently conspicuous broad stipules, and lateral buds protected by a single external bud-scale 13, in **SALICACEAE**, p. 20.
- 132b. Plums and cherries; with leaves lanceolate or broader, and stipules minute and falling early in the season; lateral buds with more than one bud-scale 30, in **ROSACEAE**, p. 54.
- 133a. With stipules or with stipular scars indicating where stipules have been detached —134.
- 133b. Without stipules or stipular scars —138.
- 134a. With three bundle-scars in each leaf-scar —135.
- 134b. With one bundle-scar in each leaf-scar —136.
- 135a. Willows; usually with slender leaves and twigs and frequently with large conspicuous stipules; lateral buds covered by a single external bud-scale 13, in **SALICACEAE**, p. 20.
- 135b. Juneberries; with oblong or ovate leaves and small stipules which fall early; lateral buds with more than one external scale 42b, in **ROSACEAE**, p. 55.
- 136a. Leaves mostly entire, only a few here and there with low teeth 1a, in **AQUIFOLIACEAE**, p. 69.
- 136b. Leaves sharply toothed —137.
- 137a. Axillary buds superposed, i. e., with a second one just above the first 1b, in **AQUIFOLIACEAE**, p. 69.
- 137b. Axillary buds not superposed 2b, in **RHAMNACEAE**, p. 71.
- 138a. Leaves with purple petioles, which are at least one-fourth as long as the blade 1a, in **AQUIFOLIACEAE**, p. 69.
- 138b. Leaves short-petioled or sessile —139.
- 139a. Stems erect and straight, unbranched or with very few branches 27, in **ROSACEAE**, p. 53.
- 139b. Stems more or less crooked and freely branched, making a spreading shrub 25, in **ERICACEAE**, p. 86.

- 140a. Flowers appearing in autumn, after the leaves have fallen **HAMAMELIDACEAE**, p. 51.
- 140b. Flowers appearing in spring, before the leaves have opened —141.

- 141a. Flowers in catkins, without brightly colored or petal-like parts —142.
- 141b. Flowers not in catkins, either with or without brightly colored or petal-like parts —149.
- 142a. Leaves 2-ranked, as shown by the arrangement of buds and leaf-scars in two longitudinal rows, so that the third bud is directly over the first —143.
- 142b. Leaves and leaf-scars not 2-ranked —146.
- 143a. Bundle-scars three in each leaf-scar —144.
- 143b. Bundle-scars several in each leaf-scar
2b, in **URTICACEAE**, p. 23.
- 144a. Leaf-buds with only 1—3 visible bud-scales
10, in **BETULACEAE**, p. 22.
- 144b. Leaf-buds with more than 3 visible scales —145.
- 145a. Bark of the branches smooth and dark gray, the larger stems fluted with projecting longitudinal ridges
1b, in **BETULACEAE**, p. 21.
- 145b. Branches without projecting ridges 4, in **BETULACEAE**, p. 22.
- 146a. Pith 3-angled 8, in **BETULACEAE**, p. 22.
- 146b. Pith 5-angled 13b, in **FAGACEAE**, p. 23.
- 146c. Pith cylindrical —147.
- 147a. Visible outer bud-scales 2 or more —148.
- 147b. Buds with a single visible outer scale
13, in **SALICACEAE**, p. 20.
- 148a. Bundle-scars 3 in each leaf-scar **MYRICACEAE**, p. 20.
- 148b. Bundle-scars more than 3 in each leaf-scar
2b, in **URTICACEAE**, p. 23.
- 149a. Flowers dark red-purple, about 3 cm. wide
ANONACEAE, p. 40.
- 149b. Flowers bright pink, irregular, about 1 cm. wide
3a, in **LEGUMINOSAE**, p. 58.
- 149c. Flowers white, with 5 conspicuous petals —150.
- 149d. Flowers greenish or yellowish, small, inconspicuous —152.
- 150a. Ovary 1, superior, i. e., in the center of the flower and not attached to surrounding parts 36, in **ROSACEAE**, p. 54.
- 150b. Ovary inferior, appearing as a swelling below the calyx at the apex of the pedicel —151.
- 151a. Flowers in racemes or solitary 42b, in **ROSACEAE**, p. 55.
- 151b. Flowers in flattened or rounded branching clusters
42a, in **ROSACEAE**, p. 55.
- 152a. Stems thorny 1a, in **RUTACEAE**, p. 65.
- 152b. Stems not thorny —153.

- 153a. Bark pleasantly aromatic when crushed; perianth with 6 parts —154.
- 153b. Bark not pleasantly aromatic; perianth with 4 short lobes
THYMELAEACEAE, p. 77.
- 154a. Flowers in sessile lateral clusters
1a, in LAURACEAE, p. 41.
- 154b. Flowers in peduncled terminal clusters
1b, in LAURACEAE, p. 41.
- 155—
- 155a. Leaves narrow, needle-like or scale-like, mostly evergreen —54.
- 155b. Leaves broader, flat or rolled, but not needle-like or scale-like —156.
- 156a. Twining or climbing vines —56.
- 156b. Not twining or climbing —157.
- 157a. Leaves opposite —158.
- 157b. Leaves alternate —165.
- 158a. Leaves compound —68.
- 158b. Leaves simple —159.
- 159a. Leaves broad, palmately lobed —160.
- 159b. Leaves not palmately lobed —161.
- 160a. Flowers greenish-yellow, in racemes or panicles
2a, in ACERACEAE, p. 70.
- 160b. Flowers white, in rounded or flattened clusters
22a, in CAPRIFOLIACEAE, p. 111.
- 161a. Flowers in close clusters, subtended by four large white petal-like bracts
4b, in CORNACEAE, p. 83.
- 161b. Flowers small, white, in dense spherical heads
1a, in RUBIACEAE, p. 108.
- 161c. Flowers not in dense heads, and not subtended by petal-like bracts —162.
- 162a. Petals separate from each other —163.
- 162b. Petals united with each other —164.
- 163a. Flowers dark purple-red
1b, in CELASTRACEAE, p. 69.
- 163b. Flowers bright yellow
1a, in HYPERICACEAE, p. 73.
- 163c. Flowers pink-purple; aquatic shrubs
1a, in LYTHRACEAE, p. 77.
- 163d. Flowers white
5, in CORNACEAE, p. 83.
- 163e. Flowers minute, greenish; twigs usually thorny
1b, in RHAMNACEAE, p. 71.
- 163f. Flowers small, yellowish; leaves silvery beneath
ELAEAGNACEAE, p. 77.
- 164a. Stamens 2
1a, in OLEACEAE, p. 88.
- 164b. Stamens 4 or 5
11, in CAPRIFOLIACEAE, p. 110.
- 164c. Stamens 10
18a, in ERICACEAE, p. 85.

- 165a. Leaves once-compound —166.
165b. Leaves simple —172.
165c. Leaves twice- or thrice-compound 4a, in **ARALIACEAE**, p. 80
166a. Flowers small, greenish or greenish-yellow —167.
166b. Flowers conspicuous, white, or brightly colored —170.
167a. Stems thorny 1a, in **RUTACEAE**, p. 65.
167b. Stems not thorny —168.
168a. Leaflets 3, entire or minutely toothed 1b, in **RUTACEAE**, p. 65.
168b. Leaflets 3, conspicuously toothed 1b, in **ANACARDIACEAE**, p. 68.
168c. Leaflets more than 3 —169.
169a. Leaflets entire except for 1—4 large glandular teeth near their base **SIMARUBACEAE**, p. 65.
169b. Leaflets entire, or toothed for their entire length **ANACARDIACEAE**, p. 68.
170a. Flowers with a single bright-blue petal 8a, in **LEGUMINOSAE**, p. 58.
170b. Flowers with several petals —171.
171a. Flowers regular 3, in **ROSACEAE**, p. 51.
171b. Flowers irregular, the upper petal the largest 4, in **LEGUMINOSAE**, p. 58.
172a. Leaves minute, scale-like, appressed 2a, in **CISTACEAE**, p. 74.
172b. Leaves 3—10 mm. long, spreading, completely rolled into a tube **EMPETRACEAE**, p. 68.
172c. Leaves normal in shape, green in color —173.
173a. Leaves evergreen, as shown by their presence on the older parts of the stem 4b, in **ERICACEAE**, p. 84.
173b. Leaves deciduous —174.
174a. Flowers in catkins, without petal-like parts —142.
174b. Flowers not in catkins, either with or without petal-like parts —175.
175a. Flowers small, inconspicuous, yellowish or greenish in color —176.
175b. Flowers white or colored, with conspicuous petals —180.
176a. Leaves broad and palmately lobed; stem thorny 1a, in **ARALIACEAE**, p. 80.
176b. Leaves entire, toothed, or with 2—3 entire lobes; stem not thorny —177.

- 177a. Flowers in small axillary clusters; foliage not spicy-aromatic
—178.
- 177b. Flowers in clusters terminating last year's twigs; foliage spicy-aromatic
1b, in LAURACEAE, p. 41.
- 178a. Petals none; sepals present 2b, in RHAMNACEAE, p. 71.
- 178b. Petals present but small —179.
- 179a. A stamen in front of each petal
2a, in RHAMNACEAE, p. 71.
- 179b. A stamen between each two petals AQUIFOLIACEAE, p. 69.
- 180a. Petals united with each other; stamens 8—10
24, in ERICACEAE, p. 86.
- 180b. Petals separate from each other —181.
- 181a. Petals 4 —182.
- 181b. Petals 5 —183.
- 181c. Petal-like sepals 6; real petals none; foliage spicy-aromatic
1b, in LAURACEAE, p. 41.
- 181d. Petals 6; sepals also present —187.
- 182a. Flowers in late spring or early summer
2a, in CORNACEAE, p. 83.
- 182b. Flowers in autumn HAMAMELIDACEAE, p. 51.
- 183a. Corolla irregular, the upper petal largest
3b, in LEGUMINOSAE, p. 58.
- 183b. Corolla regular, all petals alike in size and shape —184.
- 184a. Stamens 5 —185.
- 184b. Stamens 10 or more 24, in ROSACEAE, p. 53.
- 185a. Flowers in loose racemes or axillary clusters
2, in SAXIFRAGACEAE, p. 49.
- 185b. Flowers in branching clusters —186.
- 186a. Leaves palmately lobed; stem thorny
1a, in ARALIACEAE, p. 80.
- 186b. Leaves not lobed; stem not thorny
1b, in RHAMNACEAE, p. 71.
- 187a. Flowers dark red-purple ANONACEAE, p. 40.
- 187b. Flowers yellow 2a, in BERBERIDACEAE, p. 40.

GROUP 2, UNUSUAL PLANTS

- 1a. Small brown leafless plants, growing as parasites on the tamarack or black spruce **LORANTHACEAE**, p. 25.
- 1b. Aquatic plants, with all or most of the leaves submerged, or leafless —2.
- 1c. Aquatic plants, with the leaves or the whole plant floating on or near the surface —20.
- 1d. Terrestrial or marsh plants, without floating or submerged leaves —29.
 - 2a. Submerged aquatics, without leaves —3.
 - 2b. Submerged aquatics, with the leaves linear or dissected —4.
- 3a. Flowers showy, yellow or purple **LENTIBULARIACEAE**, p. 105.
- 3b. Flowers small and inconspicuous, sessile, purplish or greenish
 - 3a, in **HALORAGIDACEAE**, p. 79.
- 4a. Leaves linear or lanceolate, not lobed or dissected —5.
- 4b. Leaves more or less lobed or dissected —13.
- 5a. Leaves all basal —6.
- 5b. Stem-leaves present —7.
 - 6a. Flowers blue, 1 cm. long or more; leaves cylindrical, blunt, hollow, partitioned lengthwise 1a, in **LOBELIACEAE**, p. 113.
 - 6b. Flowers yellow; leaves minute **LENTIBULARIACEAE**, p. 105.
 - 6c. Flowers white, in clusters; leaves linear-lanceolate, acute, not hollow 1b, in **ALISMACEAE**, p. 3.
 - 6d. Flowers greenish, solitary at the end of elongated peduncles; leaves very long and ribbon-like, flat or trough-shape
 - 1a, in **HYDROCHARITACEAE**, p. 3.
 - 6e. Flowers minute, whitish or lead-color, in heads **ERIOCAULACEAE**, p. 9.
- 7a. Leaves alternate —8.
- 7b. Leaves opposite —10.
- 7c. Leaves whorled —12.
 - 8a. Leaves with thin sheathing stipules
 - 1b, in **NAJADACEAE**, p. 2.
 - 8b. Leaves without stipules —9.
- 9a. Flowers greenish, in a head **SPARGANIACEAE**, p. 2.
- 9b. Flowers pale yellow 1b, in **PONTEDERIACEAE**, p. 10.
 - 10a. Leaves serrate 2b, in **NAJADACEAE**, p. 2.
 - 10b. Leaves entire —11.

- 11a. Leaves 2 cm. long or less **CALLITRICHACEAE**, p. 68.
- 11b. Leaves thread-like, 2—8 cm. long 2a, in **NAJADACEAE**, p. 2.
- 11c. Leaves linear to elliptical, more than 2 cm. long
1b, in **NAJADACEAE**, p. 2.
- 12a. Leaves in whorls of 3, abruptly widened at the base
2b, in **NAJADACEAE**, p. 2.
- 12b. Leaves in whorls of 3, widest near the middle
1b, in **HYDROCHARITACEAE**, p. 3.
- 12c. Stems straight and erect, at leaves the flowers emerged;
leaves in whorls of 4 or more 2a, in **HALORAGIDACEAE**, p. 79.
- 13a. Leaves with numerous small bladders attached, each bladder
1—3 mm. long **LENTIBULARIACEAE**, p. 105.
- 13b. Leaves without bladders —14.
- 14a. Leaves alternate —15.
- 14b. Leaves opposite or whorled —18.
- 15a. Delicate and rare plants growing attached to stones in running
water **PODOSTEMACEAE**, p. 48.
- 15b. Plants 2 dm. high or more, with roots in mud or sand —16.
- 16a. Leaves once-pinnate —17.
- 16b. Leaves 2—3 times pinnate 15b, in **UMBELLIFERAE**, p. 81.
- 16c. Leaves palmately dissected
1b, in **RANUNCULACEAE**, p. 35.
- 17a. Taste peppery or mustardy 34, in **CRUCIFERAE**, p. 45.
- 17b. Taste not peppery or mustardy
1a, in **HALORAGIDACEAE**, p. 79.
- 18a. Leaves pinnately compound
3b, in **HALORAGIDACEAE**, p. 79.
- 18b. Leaves palmately compound —19.
- 19a. Leaves opposite or in whorls of four
119a, in **COMPOSITAE**, p. 123.
- 19b. Leaves in whorls of 5—12 **CERATOPHYLLACEAE**, p. 34.
- 20a. Plants small, flattened, rounded or ovate, without distinction
of stem and leaf; the whole plant floating on or near the surface
LEMNACEAE, p. 9.
- 20b. Plant attached to the soil, with differentiated stem and
leaves —21.
- 21a. Leaves on long slender stalks, which bear also a cluster of
slender tubers near the leaf-base; leaves heart-shape
1b, in **GENTIANACEAE**, p. 88.
- 21b. Leaf-stalks without a cluster of tubers —22.
- 22a. Leaves all basal —23.
- 22b. Stem-leaves present —24.

- 23a. Leaves parallel-veined 1b, in **ALISMACEAE**, p. 3.
- 23b. Leaves net-veined . 1b, in **NYMPHAEACEAE**, p. 35.
- 24a. Leaves opposite or whorled —25.
- 24b. Leaves alternate —26.
- 25a. Leaves less than 2 cm. long **CALLITRICHACEAE**, p. 68.
- 25b. Leaves more than 2 cm. long 1b, in **NAJADACEAE**, p. 2.
- 26a. Leaves attached by the center to the stalk
- 2b, in **NYMPHAEACEAE**, p. 35.
- 26b. Leaves attached by the margin —27.
- 27a. Leaves parallel-veined —28.
- 27b. Leaves net-veined, with a single midvein; lanceolate or elliptical
in outline 29b, in **POLYGONACEAE**, p. 28.
- 28a. Leaves not over 2 dm. long 1b, in **NAJADACEAE**, p. 2.
- 28b. Leaves very long and grass-like 14a, in **GRAMINEAE**, p. 5.
- 29a. Brown, yellow, or white plants, without green color —30.
- 29b. Plants with normal green color, at least in some parts —33.
- 30a. Stemless and leafless plants, consisting of flowers only and
partly underground 4a, in **ARACEAE**, p. 8.
- 30b. Stems climbing on other plants
1b, in **CONVOLVULACEAE**, p. 91.
- 30c. Stem and flower-stalks erect, not climbing —31.
- 31a. Corolla regular; stamens 6—12 1a, in **ERICACEAE**, p. 84.
- 31b. Corolla irregular —32.
- 32a. Sepals and petals each 3; flowers in simple racemes
5a, in **ORCHIDACEAE**, p. 16.
- 32b. Sepals 5; corolla of united petals
OROBANCHACEAE, p. 106.
- 33a. Stem thick and fleshy, leafless, thorny **CACTACEAE**, p. 77.
- 33b. Stem not thorny —34.
- 34a. Leaves none —35.
- 34b. Leaves reduced to small scales —40.
- 34c. Leaves thick and fleshy —44.
- 34d. Leaves hollow —45.
- 34e. Leaves small, all basal, bearing large glandular hairs on the
upper surface **DROSERACEAE**, p. 48.
- 35a. Stem none, the flowers appearing at or partially beneath the
surface of the soil 4a, in **ARACEAE**, p. 8.
- 35b. Stem present —36.
- 36a. Stem freely branched 2a, in **LILIACEAE**, p. 10.
- 36b. Stem unbranched, except possibly in the flower-clusters
—37.

- 37a. Flowers greenish or brownish, without obvious colored petals
—38.
- 37b. Flowers with conspicuous white or colored petals —39.
- 38a. Each flower with 6 small chaffy petals
4, in **JUNCACEAE**, p. 10.
- 38b. Petals none; each flower in the axil of a single chaffy bract
2a, in **CYPERACEAE**, p. 7.
- 39a. Flowers regular 34a, in **LILIACEAE**, p. 11.
- 39b. Flowers irregular 10a, in **ORCHIDACEAE**, p. 16.
- 40a. Stem erect, unbranched or with one or two branches only
—41.
- 40b. Stem freely branched —42.
- 41a. Plants of moist soil, with opposite scales; corolla regular, with
4 petal-like lobes 1a, in **GENTIANACEAE**, p. 88.
- 41b. Swamp plants, with a few alternate scales; corolla irregular
LENTIBULARIACEAE, p. 105.
- 42a. Leaves numerous and close, concealing the stem
2a, in **CISTACEAE**, p. 74
- 42b. Leaves spreading, not concealing the stem —43.
- 43a. Leaf-scales in small clusters; flowers greenish, with 6 petals
2a, in **LILIACEAE**, p. 10.
- 43b. Leaf-scales distinctly opposite; petals 5, yellow
7a, in **HYPERICACEAE**, p. 74.
- 44a. Sepals 2 3, in **PORTULACACEAE**, p. 34.
- 44b. Sepals 4 or 5 **CRASSULACEAE**, p. 48.
- 45a. Leaves pitcher-shape, open at the top
SARRACENIACEAE, p. 48.
- 45b. Leaves tubular, closed at the end 37b, in **LILIACEAE**, p. 13.

GROUP 3, MONOCOTYLEDONES

- 1a. Twining plants, with flowers in panicles or racemes
DIOSCOREACEAE, p. 14.
- 1b. Plants with milky juice
13a, in **COMPOSITAE**, p. 115.
- 1c. Plants not twining (some climb by tendrils) and not with milky juice —2.
- 2a. Flowers in close spikes or heads, surrounded or subtended by a green or colored bract, the whole resembling a single flower; petals minute or wanting; leaves broad, not grass-like, linear, or sword-shape
ARACEAE, p. 8.
- 2b. Plants with narrow, linear, grass-like, or sword-shape leaves (a few species of *Carex* have broader, lanceolate to ovate leaves); flowers greenish, yellowish, or brownish, never brightly colored, and frequently dry or chaffy in texture; perianth small or wanting; individual flowers inconspicuous in size, but sometimes grouped into conspicuous clusters —3.
- 2c. Plants with leaves of various widths, but the flowers petaloid, i. e., with a white or colored, more or less conspicuous perianth, and never chaffy in texture. In a few cases the flowers are greenish, but the size and conspicuousness of the perianth identifies them in this class —9.
- 3a. Flowers in the axils of dry, membranous or chaffy scales, which are regularly arranged into spikes or spikelets of uniform size and structure, which are variously grouped or clustered; fruit an achene; grasses and sedges, with joined stems and sheathing leaves, or leafless and the stems not jointed —4.
- 3b. Flowers not subtended individually by dry, membranous, or chaffy scales, and otherwise not agreeing with 3a —5.
- 4a. Leaf-sheaths split on the side opposite the leaf; leaves usually 2-ranked, i. e., in 2 longitudinal rows with the third leaf above the first; stems rounded or flat, never triangular, usually hollow
GRAMINEAE, p. 4.
- 4b. Leaf-sheaths closed into a continuous tube; leaves usually 3-ranked; stems frequently triangular, usually solid
CYPERACEAE, p. 7.
- 5a. Flowers in dense spikes —6.
- 5b. Flowers in heads, racemes, or panicles —7.
- 6a. Spike terminal, with pistillate flowers at the base and staminate ones at the apex
TYPHACEAE, p. 2.
- 6b. Spike short, apparently lateral, near the apex of the stem
3a, in **ARACEAE**, p. 8.

- 7a. Flowers in globose heads which are arranged in spikes, the lowest heads pistillate, the upper staminate; ovary 1-celled
SPARGANIACEAE, p. 2.
- 7b. Flowers in globose woolly heads terminating leafless unbranched stalks
ERIOCAULACEAE, p. 9.
- 7c. Flowers in a spike-like raceme; ovaries 3—6, separate or nearly so
JUNCAGINACEAE, p. 3.
- 7d. Flowers in heads or panicles, all perfect, not woolly, with one ovary —8.
- 8a. Leaves less than 1 cm. wide, or none; divisions of the perianth 6
JUNCACEAE, p. 10.
- 8b. Leaves 2 cm. wide or more; petals 5
2a, in **UMBELLIFERAE**, p. 80.
- 9a. Flowers regular, with all the petals of approximately the same size and shape —10.
- 9b. Flowers irregular, with the petals of each flower not of the same size or shape —22.
- 10a. Ovaries 3 or more, separate or barely united with each other at the base —11.
- 10b. Ovary one in each flower —12.
- 11a. Ovaries 3—6 in number; flowers in spikes or racemes; leaves linear
JUNCAGINACEAE, p. 3.
- 11b. Ovaries more than 6
ALISMACEAE, p. 3.
- 12a. Flowers or flower-clusters lateral, axillary or apparently so —13.
- 12b. Flowers or flower-clusters terminal or on leafless stalks —14.
- 13a. Leaves minute and scale-like; flowers greenish-yellow
2a, in **LILIACEAE**, p. 10.
- 13b. Leaves linear, grass-like
3b, in **IRIDACEAE**, p. 13.
- 13c. Leaves lanceolate or broader, not grass-like or scale-like
2b, in **LILIACEAE**, p. 10.
- 14a. Divisions of the perianth 5—12 cm. long —15.
- 14b. Divisions of the perianth less than 5 cm. long —16.
- 15a. Flowers blue, or blue marked with yellow
1a, in **IRIDACEAE**, p. 15.
- 15b. Flowers not blue
12a, in **LILIACEAE**, p. 11.
- 16a. Flowers solitary —17.
- 16b. Flowers 2 or more, in some kind of a cluster —18.
- 17a. Leaves 2, broadly heart-shape, basal, on long stalks
1b, in **ARISTOLOCHIACEAE**, p. 25.
- 17b. Leaves not heart-shape
20, in **LILIACEAE**, p. 12.
- 18a. Divisions of the perianth (4 to 6) all essentially alike —19.
- 18b. Perianth differentiated into sepals and 2 or 3 colored petals —21.

- 19a. Flowers in umbels —20.
19b. Flowers in dense round heads; petals 5
2a, in **UMBELLIFERAE**, p. 80.
19c. Flowers in spikes, racemes, or panicles
38, in **LILIACEAE**, p. 13.
20a. Ovary inferior, appearing below the perianth as a swelling
at the apex of the stalk; flowers bright yellow; leaves linear
AMARYLLIDACEAE, p. 14.
20b. Ovary inferior; flowers blue or white, terminating a flat-
tened winged leafless flower-stalk 3a, in **IRIDACEAE**, p. 15.
20c. Ovary superior, i. e., in the center of the flower and sep-
arate from the perianth 31, in **LILIACEAE**, p. 13.
21a. Flowers in dense heads, yellow, 1 cm. wide or smaller
XYRIDACEAE, p. 9.
21b. Flowers in umbels, blue or white, 2 cm. wide or larger
COMMELINACEAE, p. 9.
22a. Flowers blue; ovary superior (defined under 20c); stamens
distinct from the other parts of the flower —23.
22b. Ovary inferior (defined under 20a); floral structure com-
plex; stamens attached to other parts of the flower and not
resembling ordinary stamens in form or structure
ORCHIDACEAE, p. 15.
23a. Leaves triangular-heart-shape at base; marsh plants
1a, in **PONTEDERIACEAE**, p. 10.
23b. Leaves not heart-shape at base **COMMELINACEAE**, p. 9.

GROUP 4, DICOTYLEDONES

- 1a. Foliage leaves all or principally basal; flower-stalk either completely leafless, or bearing a single pair of opposite leaves only. Bracts and scale-leaves are not considered foliage leaves —2.
 - 1b. Stem-leaves present on the stem, either one or more in number, and not limited to a single opposite pair —3.
 - 2a. Leaves compound —7.
 - 2b. Leaves simple —18.
 - 3a. Stem-leaves all or chiefly opposite or whorled (the bracts of the flower clusters may be alternate) —4.
 - 3b. Stem-leaves all or chiefly alternate —5.
 - 4a. Flowers small and inconspicuous, the perianth none or greenish or chaffy, and never petal-like in appearance —50.
 - 4b. Flowers with a white or colored petal-like perianth —66.
 - 5a. Flowers small and inconspicuous, without any white or colored petal-like perianth —118.
 - 5b. Flowers large or small, but with a white or colored petal-like perianth —6.
 - 6a. Flowers small, not exceeding 3 mm. in length or breadth —144.
 - 6b. Flowers larger, more than 3 mm. in length or breadth —166.
- 7—
- 7a. Leaves twice to three times compound or dissected —8.
 - 7b. Leaves once-compound —11.
 - 8a. Flowers in racemes
 - 8b. Flowers in umbels —9.
 - 2b, in **FUMARIACEAE**, p. 41.
 - 9a. Flowers about 3 mm. wide, white or greenish-white —10.
 - 9b. Flowers 10—20 mm. wide, conspicuous
 - 45b, in **RANUNCULACEAE**, p. 39.
 - 10a. Leaflets 5—15 cm. long
 - 10b. Leaflets not over 2 cm. long
 - 5b, in **ARALIACEAE**, p. 80.
 - 16a, in **UMBELLIFERAE**, p. 81.
 - 11a. Leaflets 2
 - 11b. Leaflets three or more —12.
 - 3a, in **BERBERIDACEAE**, p. 40.
 - 12a. Leaflets entire or very finely toothed —13.
 - 12b. Leaflets coarsely toothed or lobed —15.

- 13a. Flowers irregular, in dense head-like umbels
37a, in **LEGUMINOSAE**, p. 61.
- 13b. Flowers consisting of a greenish or purplish bract wholly or partly enclosing a fleshy spike 2, in **ARACEAE**, p. 8.
- 13c. Flowers regular, solitary or in loose clusters —14.
- 14a. Leaflets reverse heart-shape, not over 2 cm. long
OXALIDACEAE, p. 64.
- 14b. Leaflets 4—10 cm. long 1c, in **GENTIANACEAE**, p. 88.
- 15a. Flowers with colored or white petals and green or colored sepals —16.
- 15b. Flowers with one kind of perianth only (calyx), with broad and petal-like parts 32, in **RANUNCULACEAE**, p. 38.
- 15c. Flowers with white petal-like sepals and small inconspicuous petals 38b, in **RANUNCULACEAE**, p. 39.
- 16a. Petals and sepals each 4 31, in **CRUCIFERAE**, p. 44.
- 16b. Petals and sepals each 5 or more —17.
- 17a. Leaves with stipules **ROSACEAE**, p. 51.
- 17b. Leaves without stipules 23b, in **RANUNCULACEAE**, p. 37.

—18—

- 18a. Stem-leaves a single opposite pair (basal leaves may also be present) —19.
- 18b. Stem-leaves none —23.
- 19a. Leaves entire —20.
- 19b. Leaves toothed or lobed —21.
- 20a. Flowers solitary; leaves broadly kidney-shape
ARISTOLOCHIACEAE, p. 25.
- 20b. Flowers in racemes; leaves linear or lanceolate
PORTULACACEAE, p. 34.
- 21a. Flowers in racemes; petals deeply toothed
23b, in **SAXIFRAGACEAE**, p. 51.
- 21b. Flowers solitary or few in a cluster; petals entire or nearly so —22.
- 22a. Petals 5 **GERANIACEAE**, p. 64.
- 22b. Petals 6 or more 2b, in **BERBERIDACEAE**, p. 40.
- 23a. Flowers or flower-clusters sessile, at or partly beneath the surface of the ground 4a, in **ARACEAE**, p. 8.
- 23b. Flowers or flower-heads solitary at the ends of the flower-stalks —24.
- 23b. Flowers or flower-heads numerous or several on each flower-stalk —38.
- 24a. Flowers yellow —25.
- 24b. Flowers not yellow —29.

- 25a. Juice milky 16, in **COMPOSITAE**, p. 115.
 25b. Juice not milky —26.
- 26a. Aquatic or mud plants, with large entire leaves 1—4 dm. wide **NYMPHAEACEAE**, p. 35.
 26b. Land plants, with smaller or lobed leaves —27.
- 27a. Flower-stalk scaly 110, in **COMPOSITAE**, p. 122.
 27b. Flower-stalk bare or with 1 to 2 minute bracts —28.
- 28a. Flowers regular 10, in **RANUNCULACEAE**, p. 36.
 28b. Flowers irregular, with a spur 3a, in **VIOLACEAE**, p. 75.
- 29a. Flowers obviously irregular, with a spur —30.
 29b. Flowers regular or nearly so, without a spur —31.
- 30a. Leaves sessile or nearly so; stamens 2 **LENTIBULARIACEAE**, p. 105.
 30b. Leaves petioled; stamens 5 **VIOLACEAE**, p. 75.
- 31a. Flowers 3 mm. wide or smaller; leaves thread-like 16a, in **SCROPHULARIACEAE**, p. 103.
 31b. Flowers 6 mm. wide or larger —32.
- 32a. Ovary 1 —33.
 32b. Ovaries numerous —37.
- 33a. Leaves lobed or cleft —34.
 33b. Leaves entire or toothed —35.
- 34a. Leaves deeply 2-cleft; stamens 8 3a, in **BERBERIDACEAE**, p. 40.
 34b. Leaf 1, palmately lobed; stamens numerous 1a, in **PAPAVERACEAE**, p. 41.
- 35a. Flowers dull red **ARISTOLOCHIACEAE**, p. 25.
 35b. Flowers white or pinkish —36.
- 36a. Leaves entire; stamens with good anthers 5 13, in **SAXIFRAGACEAE**, p. 50.
 36b. Leaves minutely toothed; stamens 8—10 14a, in **ERICACEAE**, p. 85.
- 37a. Leaves lobed or divided **RANUNCULACEAE**, p. 35.
 37b. Leaves crenate or toothed 64a, in **ROSACEAE**, p. 56.

- 38a. Flowers of the composite type, with several or many small flowerets closely aggregated into a dense head surrounded by a calyx-like involucre of small bracts 10, in **COMPOSITAE**, p. 114.
 38a. Flowers separate; variously clustered, but never crowded into involucre heads —39.

- 53a. Leaves deeply pinnatifid; swamp plants with flowers in spikes or solitary **HALORAGIDACEAE**, p. 79.
- 53b. Leaves lobed, or irregularly pinnately cut or dissected; weedy plants with flowers in racemes 2, in **COMPOSITAE**, p. 114.
- 54a. Juice milky 3, in **EUPHORBIACEAE**, p. 67.
- 54b. Juice not milky or colored —55.
- 55a. Leaves whorled —56.
- 55b. Leaves all opposite —58.
- 56a. Aquatic or mud plants with erect stems
2a, in **HALORAGIDACEAE**, p. 79.
- 56b. Prostrate weedy terrestrial plants **AIZOACEAE**, p. 31.
- 56c. Erect or ascending terrestrial plants —57.
- 57a. Leaves more than 2.5 cm. long 4a, in **CORNACEAE**, p. 83.
- 57b. Leaves 2 cm. long or less 3a, in **PRIMULACEAE**, p. 87.
- 58a. Flowers in terminal or axillary spikes, racemes, or other clusters —59.
- 58b. Flowers solitary or few in the axils of the leaves —61.
- 59a. Leaves less than 5 mm. long 1a, in **GENTIANACEAE**, p. 88.
- 59b. Leaves more than 2 cm. long —60.
- 60a. Inflorescence chiefly terminal, paniced
2, in **COMPOSITAE**, p. 114.
- 60b. Inflorescence chiefly axillary **URTICACEAE**, p. 23.
- 61a. Flowers on long pedicels 2, in **CARYOPHYLLACEAE**, p. 31.
- 61b. Flowers on short pedicels or sessile —62.
- 62a. Stem erect, repeatedly branched; leaves linear to oblong
ILLECEBRACEAE, p. 31.
- 62b.* Stem decumbent or prostrate —63.
- 63a. Leaves round, ovate, or kidney-shape, rounded at the base, crenate or lobed 12a, in **SAXIFRAGACEAE**, p. 50.
- 63b. Leaves of a narrower shape, entire, tapering toward the base —64.
- 64a. Principal leaves 2—3 cm. long 1a, in **ONAGRACEAE**, p. 78.
- 64b. Principal leaves 1 cm. long or less —65.
- 65a. Petals present **ELATINACEAE**, p. 74.
- 65b. Petals none **CALLITRICHACEAE**, p. 68.
- 66—
- 66a. Plants of the composite type, with several or many small flowerets closely aggregated into a dense head surrounded or subtended by a calyx-like involucre of small bracts —67.
- 66b. Flowers solitary or variously clustered, but not in involucre heads —70.

- 67a. Involucre of 4 conspicuous white bracts, much larger than the small flower-cluster 4a, in **CORNACEAE**, p. 83.
- 67b. Involucral bracts green or somewhat colored —68.
- 68a. Stem more or less prickly **DIPSACACEAE**, p. 112.
- 68b. Stem and leaves not prickly —69.
- 69a. Stem square; foliage aromatic when crushed **LABIATAE**, p. 95.
- 69b. Stem not square; foliage not with the odor of mint **COMPOSITAE**, p. 113.
- 70a. The conspicuous portion of the perianth* composed of separate parts —71.
- 70b. The conspicuous portion of the perianth* composed of united parts —97.
- 71a. Stem-leaves compound, or cleft to the very base —72.
- 71b. Stem-leaves simple —78.
- 72a. Stamens more than 10 in each flower —73.
- 72b. Stamens 5—10 in each flower —75.
- 73a. Ovary 1 in each flower 2a, in **PAPAVERACEAE**, p. 41.
- 73b. Ovaries several in each flower —74.
- 74a. Leaves pinnately compound 68a, in **ROSACEAE**, p. 57.
- 74b. Leaves palmately compound **RANUNCULACEAE**, p. 35.
- 75a. Stamens 6 31, in **CRUCIFERAE**, p. 44.
- 75b. Stamens 5 or 10 —76.
- 76a. Leaflets reverse heart-shape; flowers yellow **OXALIDACEAE**, p. 64.
- 76b. Leaflets not reverse heart-shape; flowers white, greenish, or pink —77.
- 77a. Flowers greenish or white, about 2 mm. broad **ARALIACEAE**, p. 80.
- 77b. Flowers 5 mm. broad or larger **GERANIACEAE**, p. 64.
- 78a. Juice milky —79.
- 78b. Juice not milky —80.
- 79a. A 3-lobed ovary with 3 short styles visible in some of the flowers **EUPHORBIACEAE**, p. 66.
- 79b. Ovaries 2 in the center of each flower (sometimes concealed by other organs); sepals and petals each 5 —104.
- 80a. Perianth with one circle of parts only —81.
- 80b. Each flower with both calyx and corolla —82.

* In most flowers the corolla is the conspicuous portion of the perianth, and is composed of united or separate petals, as the case may be. In some flowers the corolla is absent, and the calyx is the conspicuous portion.

- 81a. Stem prostrate; flowers only 2 mm. broad **AIZOACEAE**, p. 31.
 81b. Stem erect; flowers at least 20 mm. wide
 4a, in **CORNACEAE**, p. 83.
 82a. Petals 2 or 4 —83.
 82b. Petals 3 22, in **LILIACEAE**, p. 12.
 82c. Petals 5 or 6 —84.
 83a. Leaves with 3—5 principal veins **MELASTOMACEAE**, p. 77.
 83b. Leaves with 1 principal midvein **ONAGRACEAE**, p. 78.
 84a. Leaves palmately lobed —85.
 84b. Leaves entire or toothed, or with 1—2 small lobes near the
 base only —86.
 85a. Petals entire or notched at the end **GERANIACEAE**, p. 64.
 85b. Petals conspicuously fringed 23b, in **SAXIFRAGACEAE**, p. 51.
 86a. Ovary 1 —87.
 86b. Ovaries 2, surrounded and concealed by other organs
 ASCLEPIADACEAE, p. 90.
 86c. Ovaries 4—5 2b, in **CRASSULACEAE**, p. 48.
 87a. Leaves dotted with translucent dots (easily seen when the leaf
 is held to the light) **HYPERICACEAE**, p. 73.
 87b. Leaves not dotted with translucent dots —88.
 88a. Leaves only 1—3 mm. long, closely appressed and con-
 cealing the stem 2a, in **CISTACEAE**, p. 74.
 88b. Leaves larger, not concealing the stem —89.
 89a. Style 1 or none —90.
 89b. Styles 2 to 7 —94.
 90a. Stamens 5 —91.
 90b. Stamens 10 —92.
 90c. Stamens neither 5 nor 10 —93.
 91a. Flowers blue, sessile in terminal spikes with leaf-like bracts
 LYTHRACEAE, p. 77.
 91b. Flowers not in terminal bracted spikes **PRIMULACEAE**, p. 87.
 92a. Leaves entire **LYTHRACEAE**, p. 77.
 92b. Leaves toothed or crenate **ERICACEAE**, p. 84.
 93a. Flowers irregular; petals 3 **POLYGALACEAE**, p. 65.
 93b. Flowers regular; petals 5 or more **LYTHRACEAE**, p. 77.
 94a. Sepals 2, partly attached to the ovary
 PORTULACACEAE, p. 34.
 94b. Sepals 5, free from the ovary —95.
 95a. Stamens 5 —96.
 95b. Stamens not 5 **CARYOPHYLLACEAE**, p. 31.
 96a. Flowers blue or yellow **LINACEAE**, p. 63.
 96b. Flowers white or pinkish **CARYOPHYLLACEAE**, p. 31.

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- 97a. Perianth with but one circle of floral leaves —98.
97b. Perianth consisting of both calyx and corolla —101.
- 98a. Flowers small, in dense heads subtended by conspicuous bracts —99.
98b. Flowers 2—5, in a colored spreading 5-lobed involucre
NYCTAGINACEAE, p. 31.
98c. Flowers in various sorts of clusters or solitary, but never in heads with a conspicuous involucre —100.
- 99a. Bracts 4, white and conspicuous; stem not thorny
4a, in CORNACEAE, p. 83.
99b. Bracts green; stem thorny
DIPSACACEAE, p. 112.
- 100a. Stamens 3
VALERIANACEAE, p. 111.
100b. Stamens 4 or 5
RUBIACEAE, p. 108.
- 101a. Anthers more numerous than the lobes of the corolla —102.
101b. Anthers just as many as the lobes of the corolla —103.
101c. Anthers fewer than the lobes of the corolla —110.
- 102a. Leaves simple
POLYGALACEAE, p. 65.
102b. Leaves compound with 3 leaflets
OXALIDACEAE, p. 64.
102c. Leaves finely dissected; stems climbing
2a, in FUMARIACEAE, p. 41.
- 103a. Ovaries 2 —104.
103b. Ovary 1, but very deeply 4-lobed, with a single style
LABIATAE, p. 95.
103c. Ovary 1, not deeply lobed —105.
- 104a. Stamens united, surrounding and more or less concealing the ovaries, and not resembling ordinary stamens
ASCLEPIADACEAE, p. 90.
104b. Stamens separate, of ordinary structure
APOCYNACEAE, p. 90.
- 105a. Ovary inferior, appearing as a swelling below the calyx at the apex of the pedicel —106.
105b. Ovary superior, located in the center of the flower —107.
- 106a. Corolla 3—4-lobed
RUBIACEAE, p. 108.
106b. Corolla 5-lobed
3b, in CAPRIFOLIACEAE, p. 109.
- 107a. Leaves toothed or deeply cut
VERBENACEAE, p. 99.
107b. Leaves entire —108.
- 108a. A stamen in front of the middle of each petal
PRIMULACEAE, p. 87.
108b. Stamens located between the petals or lobes of the corolla, or else so far down in the tubular corolla that their position is not easily ascertained —109.

- 109a. Corolla salver-form, with a very slender tube, and abruptly spreading lobes **POLEMONIACEAE**, p. 92.
- 109b. Corolla salver-form, with a wide tube and fringed blue petals **GENTIANACEAE**, p. 88.
- 109c. Corolla rotate, funnel-form, or bell-shape **GENTIANACEAE**, p. 88.
- 110a. Ovary deeply 4-lobed, appearing like 4 separate ovaries; style 1 **LABIATAE**, p. 95.
- 110b. Ovary not 4-lobed —111.
- 111a. Stamens 2 —112.
- 111b. Stamens 3 **VALERIANACEAE**, p. 111.
- 111c. Stamens 4 —113.
- 112a. Flowers in dense heads 1a, in **ACANTHACEAE**, p. 107.
- 112b. Flowers solitary or in loose clusters **SCROPHULARIACEAE**, p. 101.
- 113a. Corolla distinctly 2-lipped and irregular —114.
- 113b. Corolla not distinctly 2-lipped, its 5 lobes all alike or nearly so —115.
- 114a. Calyx 2-lipped; the upper lip with 3 awl-shape teeth, the lower with 2 short teeth; flowers in slender terminal spikes **PHRYMACEAE**, p. 107.
- 114b. Calyx not obviously 2-lipped, its teeth equal or nearly so **SCROPHULARIACEAE**, p. 101.
- 115a. Flowers sessile or nearly so, in spikes —116.
- 115b. Flowers in nodding pairs at the top of a slender stalk 3a, in **CAPRIFOLIACEAE**, p. 109.
- 115c. Flowers solitary or in clusters; not in spikes or nodding pairs —117.
- 116a. Corolla not over 1 cm. long **VERBENACEAE**, p. 99.
- 116b. Corolla 1.5 cm. long or more **SCROPHULARIACEAE**, p. 101.
- 117a. Calyx-lobes 15—25 mm. long; flowers blue, 3—5 cm. long; calyx without an obvious tube 2, in **ACANTHACEAE**, p. 107.
- 117b. Calyx-lobes united below into an obvious calyx-tube **SCROPHULARIACEAE**, p. 101.
- 118—
- 118a. Leaves deeply lobed, compound, or dissected —119.
- 118b. Leaves simple and not deeply lobed —129.
- 119a. Leaves once-pinnately compound or lobed —120.
- 119b. Leaves once-palmately compound or lobed —124.
- 119c. Leaves dissected or 2—3 times compound —125.
- 120a. Leaves merely lobed —121.
- 120b. Leaves actually compound —123.

- 121a. Flowers axillary; marsh or swamp plants

HALORAGIDACEAE, p. 79.
- 121b. Flowers in terminal clusters —122.
 - 122a. Stamens 2—6; taste mustard-like

52b, in **CRUCIFERAE**, p. 46.
 - 122b. Stamens 10 or more

RESEDACEAE, p. 48.
 - 123a. Leaflets entire

LIMNANTHACEAE, p. 68.
 - 123b. Leaflets serrate

70a, in **ROSACEAE**, p. 57.
 - 124a. Flowers solitary

31a, in **RANUNCULACEAE**, p. 38.
 - 124b. Flowers in dense terminal umbels or heads

UMBELLIFERAE, p. 80.
 - 124c. Flowers in terminal racemes

2a, in **COMPOSITAE**, p. 114.
 - 124d. Flowers in axillary spikes or panicles

9b, in **URTICACEAE**, p. 24.
- 125a. Leaves merely dissected, not truly compound with distinct leaflets —126.
- 125b. Leaves truly compound, with distinct petiolate leaflets —127.
 - 126a. Flowers in axillary clusters

CHENOPODIACEAE, p. 28.
 - 126b. Flowers in terminal clusters

COMPOSITAE, p. 113.
- 127a. Stamens 5; flowers in umbels —128.
- 127b. Stamens 6; flowers in small clusters

3b, in **BERBERIDACEAE**, p. 40.
- 127c. Stamens many; flowers in racemes or panicles

RANUNCULACEAE, p. 35.
- 128a. Styles 5

ARALIACEAE, p. 80.
- 128b. Styles 2

UMBELLIFERAE, p. 80.
- 129a. Flowers in dense cottony heads; plants more or less white-woolly

79, in **COMPOSITAE**, p. 120.
- 129b. Pistillate flowers in an ovoid spiny involucre, ripening into a bur

3a, in **COMPOSITAE**, p. 114.
- 129c. Flowers minute, subtended by palmately cleft axillary bracts

1a, in **EUPHORBIACEAE**, p. 66.
- 129d. Plants without any of the preceding characters —130.
 - 130a. Plants with milky or colored juice

10, in **EUPHORBIACEAE**, p. 67.
 - 130b. Plants with tendrils, at least on the upper leaves

4a, in **LILIACEAE**, p. 11.
 - 130c. Plants of nettè-like character, with stinging hairs

8b, in **URTICACEAE**, p. 24.
 - 130d. Plants with sheathing stipules, surrounding the stem above the base of each leaf

POLYGONACEAE, p. 25.
 - 130e. Plants with smooth, pale, juicy, almost translucent stems

12a, in **URTICACEAE**, p. 24.
 - 130f. Plants without any of the preceding structures or habits —131.

- 131a. Flowers axillary, solitary or in few-flowered clusters —132.
131b. Flowers in terminal, or terminal and axillary clusters —138.
132a. Leaves linear **CHENOPODIACEAE**, p. 28.
132b. Leaves of a broader shape than linear —133.
133a. Flower-clusters with bracts as long as or longer than the flowers —134.
133b. Flowers without conspicuous bracts —135.
134a. Leaves broadest below the middle
8a, in **URTICACEAE**, p. 24.
134b. Leaves broadest above the middle
2, in **AMARANTHACEAE**, p. 30.
135a. Principal leaves 3 cm. long or more —136.
135b. Principal leaves 2.5 cm. long or less—137.
136a. Flowers nodding in the axils of the leaves
1a, in **VIOLACEAE**, p. 75.
136b. Flowers erect in the axils 2a, in **ONAGRACEAE**, p. 78.
137a. Leaves narrowly oblong 1a, in **HALORAGIDACEAE**, p. 79.
137b. Leaves roundish and somewhat heart-shape
12a, in **SAXIFRAGACEAE**, p. 50.
138a. Flowers in racemes or simple spikes —139.
138b. Flowers in panicles or other branched clusters —141.
139a. Leaves toothed or lobed 52b, in **CRUCIFERAE**, p. 46.
139b. Leaves entire —140.
140a. Flowers sessile; leaves heart-shape **PIPERACEAE**, p. 19.
140b. Flowers pedicelled; leaves obovate
8b, in **PRIMULACEAE**, p. 87.
141a. Individual flowers distinct from each other, on pedicels —142.
141b. Individual flowers crowded in close clusters, or separate and sessile —143.
142a. Leaves finely serrate 3b, in **CRASSULACEAE**, p. 49.
142b. Leaves entire 1b, in **CISTACEAE**, p. 74.
143a. Flower-clusters mingled with sharp-pointed bracts
AMARANTHACEAE, p. 30.
143b. Flower-clusters without bracts, or (rarely) with bracts which are not sharp-pointed
CHENOPODIACEAE, p. 28.
—144—
144a. Juice not milky —145.
144b. Juice milky; apparent flowers consisting of a few white or colored petal-like bracts, inclosing a few inconspicuous flowers without petals. In some of them a 3-lobed ovary with 3 styles may be plainly seen
EUPHORBIACEAE, p. 66.

- 145a. Plants of the composite type, with several or many small flowerets closely aggregated into a dense head subtended by a calyx-like involucre of small bracts —146.
145b. Flowers solitary or in clusters, but not in involucre heads —147.
- 146a. Leaves compound with 3 leaflets; stipules present **LEGUMINOSAE**, p. 58.
146b. Stipules none **COMPOSITAE**, p. 113.
- 147a. Leaves compound or deeply lobed —148.
147b. Leaves simple and not deeply lobed —154.
- 148a. Flowers irregular **LEGUMINOSAE**, p. 58.
148b. Flowers regular —149.
- 149a. Petals 3 **LIMNANTHACEAE**, p. 68.
149b. Petals 4 —150.
149c. Petals 5 or more —151.
- 150a. Stamens 4 70a, in **ROSACEAE**, p. 57.
150b. Stamens 6 **CRUCIFERAE**, p. 42.
150c. Stamens numerous 43, in **RANUNCULACEAE**, p. 39.
- 151a. Flowers in heads or umbels —152.
151b. Flowers in slender spikes or racemes —153.
- 152a. Styles 2 **UMBELLIFERAE**, p. 80.
152b. Styles 5 **ARALIACEAE**, p. 80.
- 153a. Leaves ternately compound 43, in **RANUNCULACEAE**, p. 39.
153b. Leaves once-pinnately compound 50b, in **ROSACEAE**, p. 55.
- 154a. Flowers irregular —155.
154b. Flowers regular —156.
- 155a. Stamens 2 40b, in **SCROPHULARIACEAE**, p. 104.
155b. Stamens 5 or 10 **SAXIFRAGACEAE**, p. 49.
155c. Stamens 6 or 8 **POLYGALACEAE**, p. 65.
- 156a. With sheathing stipules surrounding the stem at the base of each leaf **POLYGONACEAE**, p. 24.
156b. Stipules not encircling the stem, or none —157.
- 157a. Petals 3 **CISTACEAE**, p. 74.
157b. Petals 4 —158.
157c. Petals 5 —161.
- 158a. Stamens 2 —159.
158b. Stamens 6 **CRUCIFERAE**, p. 42.
158c. Stamens 8 —160.

- 159a. Corolla perfectly regular; flowers in terminal clusters without bracts, becoming racemes; taste peppery
52a, in **CRUCIFERAE**, p. 46.
- 159b. Corolla slightly irregular; flowers in bracted clusters, or axillary; taste not peppery 40b, in **SCROPHULARIACEAE**, p. 104.
- 160a. Delicate trailing evergreen, with flowers solitary in the axils and nearly or quite hidden beneath the leaves
22b, in **ERICACEAE**, p. 85.
- 160b. Erect or nearly so; flowers in terminal clusters
12b, in **ONAGRACEAE**, p. 78.
- 161a. Leaves sword-shape, finely parallel-veined, with bristly margins
2a, in **UMBELLIFERAE**, p. 80.
- 161b. Leaves not sword-shape —162.
- 162a. Leaves toothed or lobed —163.
- 162b. Leaves entire —164.
- 163a. Stems creeping 2b, in **UMBELLIFERAE**, p. 80.
- 163b. Stems erect or nearly so **SAXIFRAGACEAE**, p. 49.
- 164a. Flowers in open panicles; leaves principally basal
SAXIFRAGACEAE, p. 49.
- 164b. Flowers in rounded or flattened clusters; leaves principally on the stem
SANTALACEAE, p. 24.
- 164c. Flowers in racemes, which become elongated at maturity —165.
- 165a. Foliage glabrous 8b, in **PRIMULACEAE**, p. 87:
- 165b. Foliage pubescent **BORAGINACEAE**, p. 93.
- 166—
- 166a. Juice milky or colored —167.
- 166b. Juice watery, not colored —172.
- 167a. Apparent flowers consisting of a few petal-like bracts, inclosing a few inconspicuous flowers without petals. In some of them a 3-lobed ovary with 3 styles may be seen
EUPHORBIACEAE, p. 66.
- 167b. Plants of the composite type, with several or many small flowerets closely aggregated in dense heads subtended by a calyx-like involucre of small bracts 11, in **COMPOSITAE**, p. 115.
- 167c. Flowers never aggregated in involucred clusters resembling a single flower —168.
- 168a. Corolla very irregular; stamens protruding
LOBELIACEAE, p. 113.
- 168b. Corolla regular —169.

- 169a. Stamens with ordinary visible anthers; ovary 1 —170.
169b. Stamens so grown together and to the stigma as to be almost
unrecognizable; ovaries 2 **ASCLEPIADACEAE**, p. 90.
- 170a. Petals separate **PAPAVERACEAE**, p. 41.
170b. Petals united —171.
- 171a. Stamens attached to the tube of the corolla
CONVOLVULACEAE, p. 91.
171b. Stamens attached at the very base of the corolla
CAMPANULACEAE, p. 112.
- 172a. Plants of the composite type, with several or many small
flowerets closely aggregated into dense heads subtended by a
calyx-like involucre of small bracts —173.
172b. Flowers solitary or clustered, but not in involucre heads
—174.
- 173a. True composites, without a normal calyx
COMPOSITAE, p. 113.
173b. A normal calyx with each floweret; leaves compound with 3
leaflets **LEGUMINOSAE**, p. 58.
- 174a. Flowers irregular, i. e., the conspicuous lobes of the
perianth unlike in size or shape —175.
174b. Flowers regular —185.
- 175a. Stamens 2 or 4 **SCROPHULARIACEAE**, p. 101.
175b. Stamens 5 —176.
175c. Stamens 6 —181.
175d. Stamens 8; leaves simple **POLYGALACEAE**, p. 65.
175e. Stamens 10; leaves usually compound **LEGUMINOSAE**, p. 58.
175f. Stamens more than 10 —183.
- 176a. Petals separate —177.
176b. Petals united —179.
- 177a. Flowers greenish or purplish, in a panicle
SAXIFRAGACEAE, p. 49.
177b. Flowers white or purplish, in compound umbels
UMBELLIFERAE, p. 80.
177c. Flowers solitary, or in few-flowered clusters —178.
- 178a. Flowers blue, yellow, or white, in spring
VIOLACEAE, p. 75.
178b. Flowers red-orange or yellow, in summer
BALSAMINACEAE, p. 71.
178c. Flowers small and greenish, in spring
1a, in **VIOLACEAE**, p. 75.

- 179a. Anthers united; stamens protruding from the very irregular corolla **LOBELIACEAE**, p. 113.
- 179b. Anthers separate; corolla almost regular —180.
- 180a. Corolla rotate; some or all filaments hairy
2, in **SCROPHULARIACEAE**, p. 101.
- 180b. Corolla funnel-form, dull yellow and purple; filaments not hairy
12a, in **SOLANACEAE**, p. 101.
- 180c. Corolla funnel-form, blue or violet; filaments not hairy
7b, in **BORAGINACEAE**, p. 94.
- 181a. Leaves compound or dissected **FUMARIACEAE**, p. 41.
- 181b. Leaves simple —182.
- 182a. Flowers solitary **ARISTOLOCHIACEAE**, p. 25.
- 182b. Flowers in spikes, heads, or racemes
POLYGALACEAE, p. 65.
- 183a. Leaves truly compound —184.
- 183b. Leaves palmately cleft; flowers 15 mm. wide or larger
6a, in **RANUNCULACEAE**, p. 36.
- 183c. Leaves irregularly cleft; flowers about 5 mm. wide
RESEDACEAE, p. 48.
- 184a. Petals prolonged backward into hollow spurs
6b, in **RANUNCULACEAE**, p. 36.
- 184b. Petals not prolonged into spurs
CAPPARIDACEAE, p. 47.
- 185—
- 185a. Perianth consisting of one circle of parts only (usually considered to be the calyx) —186.
- 185b. Perianth consisting of both calyx and corolla —192.
- 186a. Leaves with sheathing stipules encircling the stem above the base of every leaf **POLYGONACEAE**, p. 25.
- 186b. Leaves without sheathing stipules —187.
- 187a. Leaves entire —188.
- 187b. Leaves toothed, lobed, or compound —190.
- 188a. Stamens 5 **SANTALACEAE**, p. 24.
- 188b. Stamens 6 —189.
- 188c. Stamens 10 **PHYTOLACCACEAE**, p. 30.
- 189a. Perianth-lobes 3; perianth-tube curved
ARISTOLOCHIACEAE, p. 25.
- 189b. Perianth-lobes 6, spreading
4a, in **LILIACEAE**, p. 11.
- 190a. Stamens 5 **UMBELLIFERAE**, p. 80.
- 190b. Stamens 6 —191.
- 190c. Stamens more than 6 **RANUNCULACEAE**, p. 35.

- 191a. Climbing plant with heart-shape perianth
2a, in **FUMARIACEAE**, p. 41.
- 191b. Erect plant, with spreading perianth
3b, in **BERBERIDACEAE**, p. 40.
- 192a. Corolla composed of united petals —193.
- 192b. Corolla composed of separate petals —208.
- 193a. Stamens 2 or 4 **SCROPHULARIACEAE**, p. 101.
- 193b. Stamens 3; climbing vines **CUCURBITACEAE**, p. 112.
- 193c. Stamens 5 —194.
- 193d. Stamens 6 2a, in **FUMARIACEAE**, p. 41.
- 193e. Stamens 8 22b, in **ERICACEAE**, p. 85.
- 193f. Stamens 10 —207.
- 193g. Stamens very numerous **MALVACEAE**, p. 72.
- 194a. Ovaries 2; flowers orange-red, in umbels
7a, in **ASCLEPIADACEAE**, p. 91.
- 194b. Ovary 1, deeply 4-lobed; flowers in racemes
BORAGINACEAE, p. 93.
- 194c. Ovary 1, not deeply lobed —195.
- 195a. Climbing or scrambling vines —196.
- 195b. Not climbing or scrambling —198.
- 196a. Flowers about 1 cm. wide —197.
- 196b. Flowers 2—8 cm. wide **CONVOLVULACEAE**, p. 91.
- 197a. Leaves 1 cm. wide or less 2b, in **CAMPANULACEAE**, p. 112.
- 197b. Leaves 2 cm. wide or more 4a, in **SOLANACEAE**, p. 100.
- 198a. Flowers solitary, either terminal or axillary —199.
- 198b. Flowers in terminal clusters —201.
- 199a. Calyx concealed by 2 bracts **CONVOLVULACEAE**, p. 91.
- 199b. Calyx not completely concealed by bracts —200.
- 200a. Ovary inferior, appearing as a swelling below the calyx at the base of the flower, 3-celled; stigma 3-lobed
CAMPANULACEAE, p. 112.
- 200b. Ovary superior, located in the center of the flower
SOLANACEAE, p. 100.
- 201a. Some or all filaments hairy —202.
- 201b. Filaments not hairy —203.
- 202a. Leaves lobed or divided **HYDROPHYLLACEAE**, p. 93.
- 202b. Leaves not lobel 2, in **SCROPHULARIACEAE**, p. 101.
- 203a. Anthers close together, longer than the filaments
2, in **SOLANACEAE**, p. 100.
- 203b. Anthers separate from each other —204.
- 204a. Leaves compound or very deeply lobed —205.
- 204b. Leaves simple or with shallow lobes only —206.

- 205a. Leaf-segments linear or oblong, irregular
HYDROPHYLLACEAE, p. 93.
- 205b. Leaves truly compound with separate leaflets
1a, in POLEMONIACEAE, p. 92.
- 206a. Flowers greenish-yellow SOLANACEAE, p. 100.
- 206b. Flowers blue, violet, white, or intermediate tints
CAMPANULACEAE, p. 112.
- 207a. Leaves simple ERICACEAE, p. 84.
- 207b. Leaves compound OXALIDACEAE, p. 64.
- 208—
- 208a. Petals 4 —209.
- 208b. Petals 5 —212.
- 208c. Petals 6 or more —227.
- 209a. Stamens 4 or 8 —210.
- 209b. Stamens 6, 4 long and 2 short CRUCIFERAE, p. 42.
- 209c. Stamens 9 or more CAPPARIDACEAE, p. 47.
- 210a. Leaves compound ROSACEAE, p. 51.
- 210b. Leaves simple —211.
- 211a. Ovary 1, inferior, appearing as a swelling below the calyx ONAGRACEAE, p. 78.
- 211b. Ovaries 4 or 5, in the center of the flower
CRASSULACEAE, p. 48.
- 212a. Stamens with good anthers 5 —213.
- 212b. Stamens 6 to 10 —217.
- 212c. Stamens more than 10 —222.
- 213a. Flowers solitary, terminating the stem
12b, in SAXIFRAGACEAE, p. 50.
- 213b. Flowers axillary, solitary or in small clusters —214.
- 213c. Flowers several, in loose irregular terminal clusters; leaves simple LINACEAE, p. 63.
- 213d. Flowers in slender spike-like racemes; leaves compound
50b, in ROSACEAE, p. 55.
- 213e. Flowers in panicles 20a, in SAXIFRAGACEAE, p. 50.
- 213f. Flowers in umbels —216.
- 214a. Leaves compound 25b, in LEGUMINOSAE, p. 60.
- 214b. Leaves simple —215.
- 215a. Flowers blue or yellow, erect or spreading LINACEAE, p. 63.
- 215b. Flowers greenish, nodding 1a, in VIOLACEAE, p. 75.
- 216a. Flowers pink or purple GERANIACEAE, p. 64.
- 216b. Flowers yellow or white UMBELLIFERAE, p. 80.

- 217a. Leaves compound with 3 leaflets —218.
217b. Leaves pinnately compound —219.
217c. Leaves deeply palmately lobed **GERANIACEAE**, p. 64.
217d. Leaves simple and not deeply lobed —220.
- 218a. Leaflets reverse heart-shape; flowers yellow
OXALIDACEAE, p. 64.
218b. Leaflets taper-pointed; flowers white or pink
73, in **ROSACEAE**, p. 57.
- 219a. Leaflets entire 24, in **LEGUMINOSAE**, p. 60.
219b. Leaflets toothed 50b, in **ROSACEAE**, p. 55.
- 220a. Prostrate plants, with thick, fleshy, entire leaves
3, in **PORTULACACEAE**, p. 34.
220b. Bushy branched plants, with small gray leaves concealing
the stem 2a, in **CISTACEAE**, p. 74.
220c. Erect or spreading plants —221.
- 221a. Ovary 1, style 1 . 4a, in **ERICACEAE**, p. 84.
221b. Ovary with 2 distinct styles **SAXIFRAGACEAE**, p. 49.
221c. Ovaries 5; styles 5 **CRASSULACEAE**, p. 48.
- 222a. Stamens united by their filaments into a tube
MALVACEAE, p. 72.
222b. Stamens separate from each other —223.
- 223a. Leaves with stipules; ovaries more than 1 **ROSACEAE**, p. 51.
223b. Leaves without stipules —224.
- 224a. Leaves toothed, deeply lobed, or compound
RANUNCULACEAE, p. 35.
224b. Leaves entire —225.
- 225a. Ovaries numerous **RANUNCULACEAE**, p. 35.
225b. Ovary 1 —226.
- 226a. Sepals 2 **PORTULACACEAE**, p. 34.
226b. Sepals 3 or 5 **CISTACEAE**, p. 74.
- 227—
- 227a. Leaves entire **LYTHRACEAE**, p. 77.
227b. Leaves lobed, divided, dissected, or compound —228.
- 228a. Flowers in slender racemes **RESEDACEAE**, p. 48.
228b. Flowers solitary or clustered, but not in slender racemes
—229.
- 229a. Stamens 6 3b, in **BERBERIDACEAE**, p. 40.
229b. Stamens numerous **RANUNCULACEAE**, p. 35.

THE PLANTS OF MICHIGAN

PINACEAE, the Pine Family

Trees or shrubs, usually evergreen, with needle-like or scale-like leaves; fruit a cone or berry.

- 1a. Leaves in clusters of 2—5 —2.
- 1b. Leaves mostly in clusters of 10 or more, on short lateral wart-like branches, deciduous each autumn
Tamarack, Larix laricina.
- 1c. Leaves not in clusters —4.
 - 2a. Leaves in clusters of 5 **White Pine, Pinus strobus.**
 - 2b. Leaves in clusters of 2 or 3 —3.
- 3a. Leaves 8—15 cm. long **Norway Pine, Pinus resinosa.**
- 3b. Leaves 2—4 cm. long **Jack Pine, Pinus banksiana.**
- 4a. Leaves alternate or scattered —5.
- 4b. Leaves opposite or whorled —8.
- 5a. Leaves four-sided —6.
- 5b. Leaves flattened —7.
 - 6a. Leaves 6—12 mm. long **Black Spruce, Picea mariana.**
 - 6b. Leaves 15—25 mm. long **White Spruce, Picea canadensis.**
- 7a. Leaves short-stalked, 15 mm. long or less
Hemlock, Tsuga canadensis.
- 7b. Leaves sessile, 15—30 mm. long **Balsam, Abies balsamea.**
- 8a. Leafy twigs soft and flattened
White Cedar, Thuja occidentalis.
- 8b. Leafy twigs not distinctly flattened —9.
- 9a. Leaves opposite —10.
- 9b. Leaves in whorls of three —11.
 - 10a. Erect shrub or tree **Red Cedar, Juniperus virginiana.**
 - 10b. Prostrate or spreading shrub
Creeping Cedar, Juniperus horizontalis.
- 11a. Erect shrub or small tree **Juniper, Juniperus communis.**
- 11b. Spreading or ascending shrub, growing in dense mats
Low Juniper, Juniperus communis var. depressa.

TAXACEAE, the Yew Family

Shrubs, with needle-like evergreen leaves; fruit red and berry-like.

One species in Michigan; straggling shrub 1—3 m. high

Ground Hemlock, *Taxus canadensis*.

TYPHACEAE, the Cat-tail Family

Erect plants 1—2 m. high, with linear leaves and terminal spikes of brown flowers, appearing in summer.

1a. Staminate and pistillate portions of the flower-spike contiguous, the latter 2.5 cm. in diameter **Common Cat-tail, *Typha latifolia*.**

1b. Staminate and pistillate portions of the spike separated, the latter 2 cm. or less in diameter

Narrow-leaved Cat-tail, *Typha angustifolia*.

SPARGANIACEAE, the Bur-reed Family

Marsh plants with linear leaves and spherical heads of inconspicuous greenish flowers, appearing in summer.

About 5 species occur in Michigan, of which the commonest is

Bur-reed, *Sparganium eurycarpum*.

NAJADACEAE, the Pondweed Family

Aquatic plants with submerged or floating leaves and inconspicuous flowers in summer.

1a. Leaves opposite or whorled —2.

1b. Leaves alternate —2c.

2a. Leaves thread-like, 3—8 cm. long

Horned Pondweed, *Zannichellia palustris*.

2b. Leaves linear, toothed, abruptly dilated at the base, 3cm. long or less (Naiad) —3.

2c. Leaves entire, not abruptly dilated at base

***Pondweed, *Potamogeton* spp.**

3a. Leaves about 2 mm. wide, sharply and coarsely toothed

Naiad, *Najas marina*.

3b. Leaves very narrowly linear, with numerous minute teeth

Naiad, *Najas flexilis*.

* About 30 species of *Potamogeton* occur in Michigan, among which the most conspicuous is *Potamogeton natans*, with elliptical floating leaves. For the identification of the species the Manual must be used.

JUNCAGINACEAE, the Arrow Grass Family

Marsh plants, with linear cylindrical leaves and inconspicuous flowers in spikes or racemes, appearing in early summer.

- 1a. Leaves all basal; flowers numerous in a spike-like raceme (Arrow Grass) —2.
- 1b. Stem-leaves present; flowers in a loose bracted raceme (1—3 dm. high). **Scheuchzeria, Scheuchzeria palustris.**
- 2a. Fruit (usually to be seen at the base of the raceme) ovoid or oblong, rounded at the base **Arrow Grass, Triglochin maritima.**
- 2b. Fruit linear, narrowed at the base (1—5 dm. high) **Arrow Grass, Triglochin palustris.**

ALISMACEAE, the Water Plantain Family

Marsh plants, with scape-like stems; flowers with 3 green sepals, 3 white petals, 6 or more stamens, and several separate pistils.

- 1a. Ovaries in a ring; flowers in panicles (2—8 dm. high, summer) **Water Plantain, Alisma Plantago-aquatica.**
- 1b. Ovaries in a head; flowers in racemes or umbels —2.
 - 2a. Flowers all perfect, in a single umbel of 2—8 flowers; stamens 9 (leaves lanceolate; 15 cm. high or less; summer) **Dwarf Water Plantain, Echinodorus tenellus.**
 - 2b. Flowers in a raceme of 3-flowered whorls, the lower pistillate, the upper staminate; stamens usually more than nine (1—10 dm. high, summer) (Arrow-head) —3.
- 3a. Leaves ovate to linear, not sagittate at base —4.
- 3b. Leaves broad or narrow, sagittate at base —5.
 - 4a. Pistillate (basal) flowers sessile or nearly so (2—8 dm. high, summer) **Arrow-head, Sagittaria heterophylla.**
 - 4b. Pistillate flowers with obvious pedicels **Arrow-head, Sagittaria graminea.**
- 5a. Basal lobes of the leaf conspicuous, triangular, almost or quite as long as the terminal portion —6.
- 5b. Basal lobes small, short, linear —4b.
 - 6a. Beak of the achene very short and erect; rare species **Arrow-head, Sagittaria arifolia.**
 - 6b. Beak of the achene sharp, incurved at right angles to the body; common species **Arrow-head, Sagittaria latifolia.**

HYDROCHARITACEAE, the Frog's Bit Family

Submerged aquatics, with inconspicuous flowers in summer.

- 1a. Leaves all from the base, 2 dm. long or more **Eel Grass, Vallisneria spiralis.**
- 1b. Leaves on the stem, 2 cm. long or less **Water-weed, Elodea canadensis.**

GRAMINEAE, the Grass Family

Grasses, with linear or narrow sheathing leaves, and very small flowers without perianth in the axils of chaffy bracts, appearing in late spring and summer.

Of the large number (over 150) of grasses in Michigan, only the commonest are included here, and the student is referred to the Manuals for a full treatment of them.

Their classification depends chiefly upon the structure and arrangement of the spikelets. These consist typically of a short axis, the rachilla, almost or quite concealed by several chaffy bracts. The two lower bracts are termed glumes, and have no flowers in their axils. Above the glumes are two or more other bracts, the lemmas. In the axil of each lemma, and usually concealed by it, is a smaller bract, the palea, and between the lemma and the palea is a single flower. The number of flowers in a spikelet is therefore normally equal to the number of lemmas. The spikelets are grouped in racemes, spikes, or panicles of various size.

1a. Spikelets one-flowered —2.

1b. Spikelets with 2 or more flowers —24.

2a. Spikelets grouped into dense solitary cylindrical spikes —3.

2b. Spikelets arranged in panicles or in paniced spikes —8.

3a. Spikelets without awns or bristles, or with short awns not more than 3 mm. long —4.

3b. Spikelets with awns 2—5 cm. long, terminating the bracts

Squirrel-tail, *Hordeum jubatum*.

3c. Bracts of the spikelet without terminal awns, but the spikelets with one or more long bristles arising from their base —6.

4a. Spike-like panicle thickened in the middle, more than 1 cm. thick

Beach Grass, *Ammophila arenaria*.

4b. Spike little or not at all thickened in the middle, less than 1 cm. thick —5.

5a. Lower bracts awned; stem erect, unbranched

Timothy, *Phleum pratense*.

5b. Lower scales unawned; stem branched at the base

Floating Foxtail, *Alopecurus geniculatus*.

6a. Bristles 5 or more at the base of each spikelet

Yellow Foxtail, *Setaria glauca*.

6b. Bristles 1—3 at the base of each spikelet —7.

7a. Spikelets about 2 mm. long; bristles not much longer, green

Green Foxtail, *Setaria viridis*.

7b. Spikelets about 3 mm. long; bristles much longer, usually purple

Millet, *Setaria italica*.

8a. Spikelets numerous, in long slender symmetrical spikes —9.

8b. Spikelets in panicles, racemes, or loose spikes —13.

- 9a. Spikelets without awns; plants 8 dm. high or less (Crab Grass)
—10.
- 9b. Spikelets with awns; plants 12 dm. high or more —12.
- 10a. Leaf-sheaths all glabrous. **Crab Grass, *Digitaria humifusa*.**
- 10b. Lower leaf-sheaths hairy —11.
- 11a. Axis of the spike flat, with wing-like margins
Crab Grass, *Digitaria sanguinalis*.
- 11b. Axis of the spike slender, without winged margins
Crab Grass, *Digitaria filiformis*.
- 12a. Spikes numerous, appressed to the axis of the panicle; tall
marsh grass **Slough Grass, *Spartina michauxiana*.**
- 12b. Spikes 2—6, widely divergent; plant of dry ground
Blue-joint, *Andropogon furcatus*.
- 13a. Spikelets subtended by an ovoid thorny involucre 3—8 mm. wide
Sand Bur, *Cenchrus carolinianus*.
- 13b. Spikelets without a thorny involucre —14.
- 14a. Lower branches of the panicle spreading, bearing staminate
flowers, the upper branches erect, with pistillate flowers;
aquatic or marsh grass 2—4 m. high
Wild Rice, *Zizania aquatica*.
- 14b. Panicle uniform throughout —15.
- 15a. Spikelets with awns 2 mm. or more long —16.
- 15b. Spikelets not awned, or with short inconspicuous awns —18.
- 16a. Spikelets in solitary raceme-like spikes; awn about 1 cm.
long or more **Beard Grass, *Andropogon scoparius*.**
- 16b. Spikelets in branching clusters; awn less than 1 cm.
long —17.
- 17a. Leaf-blade 4 mm. wide or narrower; panicle slender
Drop-seed, *Muhlenbergia schreberi*.
- 17b. Leaf-blade 6 mm. wide or more; panicle stout and coarse
Barnyard Grass, *Echinochloa crus-galli*.
- 18a. Spikelet plump and compact, its bracts closely folded about
each other —19.
- 18b. Spikelet very flat, its two bracts closely folded together
Cut-grass, *Leersia oryzoides*.
- 18c. Spikelet loose and open, somewhat flattened, its 3 bracts
ascending or spreading and not closely folded about each
other —20.
- 19a. Panicle about half as long as the entire plant; leaves copiously
hairy **Witch Grass, *Panicum capillare*.**
- 19b. Panicle of smaller size
Panic-grasses, various species of *Panicum*.
- 20a. Panicle strongly contracted or spike-like; plants of sand-
dunes —4a.
- 20b. Panicle spreading or slightly contracted; axis of the spike-
let beset with bristles; leaves 2 dm. long or more; marsh
grass **Reed Grass, *Calamagrostis canadensis*.**
- 20c. Panicle spreading or somewhat contracted, but not spike-
like; axis of the spikelet without bristles —21.

- 21a. Panicle-branches erect or ascending —22.
- 21b. Panicle-branches strongly spreading —23.
- 22a. The two outer scales of the spikelet one-fourth as long as the third scale, or sometimes one of them absent —17a.
- 22b. The glumes at least half as long as the lemma
Wood-grass, Muhlenbergia mexicana.
- 23a. The chief lateral branches of the panicle dividing and bearing flowers below their middle **Red-top, Agrostis alba.**
- 23b. The chief branches of the panicle dividing only beyond the middle **Hair Grass, Agrostis hyemalis.**
- 24a. Spikelets arranged in two rows to form a definite spike —25.
- 24b. Spikelets in panicles, never in definite rows —29.
- 25a. Spikelets in a single row on one side of the axis, forming a one-sided spike **Yard Grass, Eleusine indica.**
- 25b. Spikelets alternating on opposite sides of the axis, forming a two-rowed spike —26.
- 26a. Spikelets in pairs at each joint, forming a dense spike (Wild Rye) —27.
- 26b. Spikelets single at each joint, forming a loose, open or interrupted spike —28.
- 27a. Glumes lanceolate **Wild Rye, Elymus canadensis.**
- 27b. Glumes narrowly subulate **Wild Rye, Elymus virginicus.**
- 28a. Spikelets with their edges toward the axis of the spike **Rye Grass, Lolium perenne.**
- 28b. Spikelets with their sides toward the axis of the spike **Quack Grass, Agropyron repens.**
- 29a. Glumes longer than the lemmas **Oats, Avena sativa.**
- 29b. Glumes shorter than the lemmas —30.
- 30a. Axis of the spikelet beset with conspicuous long hairs about equaling the lemmas; tall marsh grass 1—4 m. high **Reed, Phragmites communis.**
- 30b. Spikelets without conspicuous long hairs —31.
- 31a. Spikelets sessile or nearly so, forming crowded or spike-like panicles —32.
- 31b. Spikelets distinctly panicked —33.
- 32a. Spikelets in dense one-sided clusters at the ends of the panicle branches **Orchard Grass, Dactylis glomerata.**
- 32b. Spikelets in an erect spike-like cluster **Prairie June-grass, Koeleria cristata.**
- 33a. Lemmas, exclusive of the awn when present, 8 mm. long or more —34.
- 33b. Lemmas, exclusive of the awn when present, 6 mm. long or less —35.

- 34a. Awns on the lemmas 12 mm. long or more
Brome-grass, *Bromus tectorum*.
- 34b. Awns on the lemmas 8 mm. long or less, or none
Cheat, *Bromus secalinus*.
- 35a. Lemmas with 7 sharp conspicuous veins from base to apex
Manna Grass, *Glyceria nervata*.
- 35b. Lemmas with 3—5 inconspicuous veins —36.
- 36a. Spikelets with 5 flowers or more —37.
- 36b. Spikelets with 2—4 (rarely 5) flowers —40.
- 37a. Stems tufted and decumbent at base (Love Grass) —38.
- 37b. Stems erect (Fescue Grass) —39.
- 38a. Spikelets 1.5 mm. wide **Love Grass, *Eragrostis pilosa*.**
- 38b. Spikelets 3 mm. wide **Love Grass, *Eragrostis megastachya*.**
- 39a. Lemmas with conspicuous awns **Fescue Grass, *Festuca octoflora*.**
- 39b. Lemmas without awns **Fescue Grass, *Festuca elatior*.**
- 40a. Tufted annual grass **Spear Grass, *Poa annua*.**
- 40b. Perennials, with erect flowering stems —41.
- 41a. Stems round **Blue Grass, *Poa pratensis*.**
- 41b. Stems strongly flattened **Canadian Blue Grass, *Poa compressa*.**

CYPERACEAE, the Sedge Family

Grass-like or rush-like plants, with linear leaves or leafless, and inconspicuous flowers in small chaffy spikes.

Over 200 species occur in Michigan, of which only the commonest are included here. For the remaining species the Manuals should be consulted.

- 1a. Spikes all alike —2.
- 1b. The uppermost spike or spikes wholly staminate, the lower one or more pistillate; ovary and achene surrounded by a sac, the perigynium. Mature fruit is necessary for satisfactory identification (Sedge) —12.
- 2a. Stems leafless, bearing one or more spikes at or near the top —3.
- 2b. Stems leafy —6.
- 3a. Spike one, terminal and erect (Spike Rush) —4.
- 3b. Spikes usually more than one, lateral and spreading —5.
- 4a. Annual, with fibrous roots **Spike Rush, *Eleocharis obtusa*.**
- 4b. Perennial, with a running rootstock
Spike Rush, *Eleocharis palustris*.
- 5a. Stem round **Bulrush, *Scirpus validus*.**
- 5b. Stem 3-cornered **Three-square, *Scirpus americanus*.**
- 6a. Spikes axillary along the side of the stem
Dulichium, *Dulichium, arundinaceum*.
- 6b. Spikes terminal —7.

- 7a. Spikes subtended by long conspicuous leaves which greatly exceed the flower clusters —8.
- 7b. Spikes not conspicuously exceeded by the bract-like leaves —10.
 - 8a. Spikes in a dense head-like cluster, white-woolly at maturity
Cotton Grass, Eriophorum virginicum.
 - 8b. Spikes not in dense heads, nor white-woolly at maturity —9.
- 9a. Perennial by a creeping rootstock. **Nut Grass, Cyperus esculentus.**
- 9b. Perennial by hard basal corms **Cyperus, Cyperus strigosus.**
- 10a. Bracts of the spike chestnut-brown
Twig Rush, Cladium mariscoides.
- 10b. Bracts of the spike green or straw-color (Sedge) —11.
- 11a. Spikes 3—8, separate **Sedge, Carex straminea.**
- 11b. Spikes very numerous and densely crowded
Sedge, Carex vulpinoidea.
- 12a. Achenes flattened **Sedge, Carex crinita.**
- 12b. Achenes 3-angled —13.
- 13a. Perigynium tipped with a sharp straight 2-toothed beak —14.
- 13b. Perigynium with a short soft beak —17.
 - 14a. Perigynium thin and papery, loosely enclosing the achene —15.
 - 14b. Perigynium firm, closely enclosing the achene —16.
- 15a. Perigynium less than 1 cm. long **Sedge, Carex hystericina.**
- 15b. Perigynium more than 1 cm. long **Sedge, Carex lupulina.**
 - 16a. Perigynium smooth **Sedge, Carex riparia.**
 - 16b. Perigynium hairy **Sedge, Carex filiformis.**
- 17a. Beak of the perigynium bent abruptly to one side
Sedge, Carex laxiflora.
- 17b. Beak of the perigynium straight **Sedge, Carex pennsylvanica.**

ARACEAE, the Arum Family

Individual flowers small, but crowded on a fleshy spadix to form a conspicuous spike, usually surrounded by a green or colored spathe.

- 1a. Leaves compound —2.
- 1b. Leaves simple —3.
 - 2a. Leaflets 3, spathe pale green or purple (3—6 dm. high; spring)
Indian Turnip, Arisaema triphyllum.
 - 2b. Leaflets 7—11; spathe green; spadix long and slender (3—8 dm. high; late spring) **Dragon Root, Arisaema dracontium.**
- 3a. Leaves linear, sword-shape; spathe none (5—15 dm. high; early summer) **Sweet Flag, Acorus calamus.**
- 3b. Leaves broader than linear; spathe present —4.
 - 4a. Flower clusters partly underground, appearing in earliest spring **Skunk Cabbage, Symplocarpus foetidus.**
 - 4b. Flower clusters peduncled, in early summer —5.

- 5a. Leaves broadly ovate-cordate; spathe white
Water Arum, *Calla palustris*.
5b. Leaves more or less sagittate; spathe green
Arrow Arum, *Peltandra virginica*.

LEMNACEAE, the Duckweed Family

Minute leafless plants floating on quiet water; flowers exceedingly small and seldom seen.

- 1a. Plant thick, ovoid, less than 2 mm. long; roots none. Two species are reported from Michigan *Wolffia* spp.
1b. Plant flattened, with short roots —2.
2a. Roots several from each rounded plant
Duckweed, *Spirodela polyrhiza*.
2b. Root single from each rounded plant Duckweed, *Lemna* spp.

Three species are reported from Michigan, of which the commonest is *Lemna minor*.

ERIOCAULACEAE, the Pipewort Family

Bog or marsh herbs, with small flowers in heads terminating long slender scapes.

One species in Michigan; leaves linear and basal; flower-stalk 5—15 cm. high; flower-heads whitish or lead-color

Pipewort, *Eriocaulon articulatum*.

XYRIDACEAE, the Yellow-eyed Grass Family

Small herbs with basal leaves and erect flower-stalks bearing a head of perfect yellow flowers, in summer.

- 1a. Base of plant bulbous-thickened (3—6 dm. high)
Yellow-eyed Grass, *Xyris flexuosa*.
1b. Base of plant not bulbous-thickened (1—3 dm. high)
Yellow-eyed Grass, *Xyris montana*.

COMMELINACEAE, the Spiderwort Family

Leafy-stemmed herbs; flowers with 3 sepals, 3 petals, and 6 stamens, lasting but a single day; petals blue.

- 1a. Stamens 6; petals all equal (Spiderwort) —2.
1b. Perfect stamens 3, sterile stamens 3; two of the petals larger than the third (3—6 dm. high; summer)
Day-flower, *Commelina virginica*.
2a. Sepals villous (3—10 dm. high; late spring)
Spiderwort, *Tradescantia virginiana*.
2b. Sepals glabrous, or with a tuft of hairs at the apex (4—10 dm. high; late spring)
Spiderwort, *Tradescantia reflexa*.

PONTEDERIACEAE, the Pickerel-weed Family

Aquatic herbs, with 6 rather conspicuous petals; flowers in summer.

- 1a. Flowers blue; leaves cordate-sagittate (3—10 dm. high)
Pickerel-weed, *Pontederia cordata*.
- 1b. Flowers yellow; leaves linear (submerged)
Mud Plantain, *Heteranthera dubia*.

JUNCACEAE, the Rush Family

Grass-like or rush-like plants, with inconspicuous greenish or brownish flowers, of 3 chaffy or scale-like sepals and as many similar petals.

- 1a. Leaf-sheaths closed; capsule 1-celled and 3-seeded; stem or leaves usually hairy at or near the base (1—4 dm. high), (*Wood Rush*) —2.
- 1b. Leaf-sheaths open; capsule many-seeded; plants never hairy —4.
 - 2a. Flowers solitary at the ends of the branches of the umbel-like cluster (spring) **Wood Rush, *Luzula saltuensis*.**
 - 2b. Flowers in spikes or dense clusters —3.
- 3a. Flower-cluster spike-like, nodding at the tip (summer)
Wood Rush, *Luzula spicata*.
- 3b. Flower-cluster umbel-like (spring)
Wood Rush, *Luzula campestris* var. *multiflora*.
- 4. The genus *Juncus*, or *Rush*, contains about 25 species in Michigan, blooming in summer or autumn. For their identification the Manuals should be consulted. One of the commonest species is *Juncus effusus*, growing in marshes, with erect leafless cylindrical stems, bearing a lateral cluster of flowers near the summit. Another common species is *Juncus tenuis*, with slender stems and linear leaves, growing in hard ground, especially in woodland paths.

LILIACEAE, the Lily Family

Herbs or twining shrubs, with generally conspicuous flowers; sepals and petals each 3, and usually colored alike, stamens 6, ovary 3-celled, superior. In one species the perianth is 4-parted and the stamens are 4.

- 1a. Flowers or flower-clusters lateral, axillary or apparently so —2.
- 1b. Flowers or flower-clusters scapose or terminal —12.
 - 2a. Leaves minute and scale-like (7—15 dm. high; flowers greenish-yellow, June) **Asparagus, *Asparagus officinalis*.**
 - 2b. Leaves broad and flat, not scale-like —3.

- 3a. Flowers numerous in rounded umbels; perianth-segments nearly separate; leaves long-petioled —4.
- 3b. Flowers in clusters of 1—8; leaves short-petioled, sessile, or clasping —8.
- 4a. Stems herbaceous (flowers greenish-yellow, ill-scented) (Carrion-flower) —5.
- 4b. Stems woody, thorny, climbing (flowers greenish-yellow, early summer) (Green Brier) —7.
- 5a. Stems climbing by tendrils —6.
- 5b. Stem not climbing; only the upper leaves, or none, with tendrils

Carrion-flower, *Smilax ecirrhata*.
- 6a. Leaves smooth beneath.

Carrion-flower, *Smilax herbacea*.
- 6b. Leaves minutely pubescent beneath when mature

Carrion-flower, *Smilax herbacea* var. *pulverulenta*.
- 7a. Leaves with 5 principal veins.

Green Brier, *Smilax rotundifolia*.
- 7b. Leaves with 7 principal veins.

Green Brier, *Smilax hispida*.
- 8a. Perianth-segments united into a tube (flowers axillary, late spring) (Solomon's Seal) —9.
- 8b. Perianth-segments separate (2—8 dm. high; spring) (Twisted-stalk) —10.
- 9a. Leaves minutely pubescent beneath; filaments rough, inserted at three-fourths the length of the perianth (3—8 dm. high)

Small Solomon's Seal, *Polygonatum biflorum*.
- 9b. Leaves smooth beneath; filaments smooth, inserted at the middle of the perianth tube (5—15 dm. high)

Great Solomon's Seal, *Polygonatum commutatum*.
- 10a. Leaves distinctly clasping the stem; flowers greenish-white

Twisted-stalk, *Streptopus amplexifolius*.
- 10b. Leaves closely sessile; flowers reddish to purple —11.
- 11a. Rootstock short and thick; berries spherical

Twisted-stalk, *Streptopus roseus*.
- 11b. Rootstock long and slender; berries 3-angled

Twisted-stalk, *Streptopus longipes*.
- 12a. Perianth-segments 5—12 cm. long —13.
- 12b. Perianth-segments shorter than 5 cm. —19.
- 13a. Leaves all or chiefly basal, stem-leaves bract-like or none —14.
- 13b. Leaves chiefly or entirely on the stem —15.
- 14a. Leaves numerous, linear or sword-shape (flowers orange, summer)

Day Lily, *Hemerocallis fulva*.
- 14b. Leaves a single pair, oblong or lanceolate —21.
- 15a. Leaves a single whorl of 3 (Wake Robin, *Trillium*) —22.
- 15b. Leaves numerous (6—12 dm. high; flowers yellow, orange, or red, in summer) (*Lily*) —16.
- 16a. Flowers erect —17.
- 16b. Flowers nodding —18.

- 17a. Leaves narrowly lanceolate, 6—15 mm. wide, mostly whorled
Wood Lily, *Lilium philadelphicum*.
- 17b. Leaves linear, 5 mm. wide or less, almost all alternate
Wood Lily, *Lilium philadelphicum* var. *andinum*.
- 18a. Perianth-segments strongly revolute
Turk's-cap Lily, *Lilium superbum*.
- 18b. Perianth-segments half-recurved
Yellow Lily, *Lilium canadense*.
- 19a. Flower solitary —20.
- 19b. Flowers in clusters, not solitary —31.
- 20a. Stem with a single pair of basal leaves (Dog's-tooth Violet) —21.
- 20b. Stem with a single whorl of 3 leaves (1—3 dm. high; spring)
 (Wake Robin, *Trillium*) —22.
- 20c. Stem leafy (Bellwort) —29.
- 21a. Perianth yellow **Dog's-tooth Violet, *Erythronium americanum*.**
- 21b. Perianth white, bluish, or pinkish
Dog's-tooth Violet, *Erythronium albidum*.
- 22a. Flower sessile, red or brown —23.
- 22b. Flower peduncled, white or pink, rarely red —24.
- 23a. Leaves sessile, sepals spreading **Wake Robin, *Trillium sessile*.**
- 23b. Leaves short-petioled, sepals reflexed
Wake Robin, *Trillium recurvatum*.
- 24a. Ovary with 6 distinct wing-like angles —25.
- 24b. Ovary obtusely 3-angled or lobed —28.
- 25a. Stamens distinctly longer than the pistil —26.
- 25b. Stamens equaling or shorter than the pistil —27.
- 26a. Stigmas erect or nearly so, slender
Wake Robin, *Trillium grandiflorum*.
- 26b. Stigmas strongly recurved or spreading
Wake Robin, *Trillium erectum*.
- 27a. Filaments about as long as the anthers
Wake Robin, *Trillium cernuum*.
- 27b. Filaments half as long as the anthers or shorter
Wake Robin, *Trillium declinatum*.
- 28a. Leaves obtuse; petals obtuse, white
Dwarf White Trillium, *Trillium nivale*.
- 28b. Leaves acuminate; petals acute, purple-striped at base
Painted Trillium, *Trillium undulatum*.
- 29a. Leaves sessile (3—6 dm. high; flowers yellow, spring)
Bellwort, *Oakesia sessilifolia*.
- 29b. Leaves perfoliate (4—6 dm. high; flowers yellow, in spring) —30.
- 30a. Leaves minutely pubescent beneath
Bellwort, *Uvularia grandiflora*.
- 30b. Leaves glabrous and all glaucous
Bellwort, *Uvularia perfoliata*.

- 31a. Stem bearing 2 whorls of 3—9 leaves (3—6 dm. high; flowers pale yellow, early summer)

Indian Cucumber-root, *Medeola virginiana*.

- 31b. Stem-leaves not whorled, or all leaves basal —32.

32a. Flowers in umbels —33.

32b. Flowers in racemes or panicles —38.

- 33a. Plant with the odor of onions or garlic (leaves all or chiefly basal; flower-stalks 2—8 dm. high, late spring or summer) —34.

- 33b. Plant not with the odor of onions (leaves basal; flower-stalks 2—3 dm. high, with an umbel of 3—6 greenish-yellow flowers in late spring)
Clintonia, *Clintonia borealis*.

- 34a. Leaves oblong, 2—5 cm. wide, not present when the plants are in bloom (greenish-white flowers)

Wild Leek, *Allium tricoccum*.

- 34b. Leaves linear, present with the flowers —35.

- 35a. Umbel nodding or horizontal (petals rose-color)

Wild Onion, *Allium cernuum*.

- 35b. Umbel erect —36.

36a. Pedicels longer than the flowers —37.

36b. Pedicels equaling or shorter than the flowers (petals rose-purple) **Wild Chives, *Allium schoenoprasum* var. *sibiricum*.**

- 37a. Leaves flattened; flowers pink to white

Wild Onion, *Allium canadense*.

- 37b. Leaves cylindrical; flowers greenish to purple

Field Garlic, *Allium vineale*.

- 38a. Leaves lanceolate to ovate, not more than 8 times as long as broad —39.

- 38b. Leaves linear or grass-like, at least 12 times as long as broad —45.

- 39a. Principal leaves all basal, stem-leaves none or bract-like —40.

- 39b. Principal leaves on the stem —41.

40a. Flowers in a spike-like raceme (4—10 dm. high; small white flowers in summer) **Colic-root, *Aletris farinosa*.**

- 40b. Flowers in an umbel-like cluster —34b.

- 41a. Perianth-segments 4 (1—2 dm. high; flowers white, early summer) **Wild Lily of the Valley, *Maianthemum canadense*.**

- 41b. Perianth-segments 6 —42.

42a. Styles 3; flowers dioecious (3—10 dm. high; flowers white, early summer) **Blazing Star, *Chamaelirium luteum*.**

- 42b. Style 1; flowers perfect, white, in spring (False Solomon's Seal) —43.

- 43a. Flowers panicled (3—6 dm. high)
False Solomon's Seal, *Smilacina racemosa*.
- 43b. Flowers racemed —44.
- 44a. Leaves 2—4, usually 3 (1—2 dm. high)
False Solomon's Seal, *Smilacina trifolia*.
- 44b. Leaves 5—12 (2—5 dm. high)
False Solomon's Seal, *Smilacina stellata*.
- 45a. Flowers bright blue; perianth-segments united (2—3 dm. high, spring)
Grape Hyacinth, *Muscari botryoides*.
- 45b. Flowers blue, greenish, yellowish, or white; perianth-segments separate —46.
- 46a. Flowers 1 cm. wide, or smaller (white or greenish, in racemes, late spring or summer) (False Asphodel) —47.
- 46b. Flowers 1.5 cm. wide, or larger —48.
- 47a. Stem glabrous (2 dm. high or less)
False Asphodel, *Tofieldia palustris*.
False Asphodel, *Tofieldia glutinosa*.
- 47b. Stem viscid-pubescent (1—5 dm. high)
- 48a. Perianth-segments with 2 glands near the base (3—8 dm. high; greenish-white panicled flowers in summer)
Zygadenus, *Zygadenus chloranthus*.
- 48b. Perianth-segments without glands—49.
- 49a. Plant 3—5 dm. tall; flowers blue or nearly white, in long racemes (early summer)
Wild Hyacinth, *Camassia esculenta*.
- 49b. Plant 1—3 dm. tall; flowers greenish-white, in short corymb-like racemes (spring)
Star of Bethlehem, *Ornithogalum umbellatum*.

DIOSCOREACEAE, the Yam Family

Twining herbs with net-veined leaves and greenish or white flowers in panicles or racemes.

One species in Michigan; leaves ovate-cordate; flowers in summer
Wild Yam, *Dioscorea villosa*.

AMARYLLIDACEAE, the Amaryllis Family

Plants with linear basal leaves, and perfect flowers, with 6-parted perianth, inferior ovary, and 6 stamens.

One species in Michigan; 1—2 dm. high; flowers yellow, 1 cm. wide, in spring
Star Grass, *Hypoxis hirsuta*.

IRIDACEAE, the Iris Family

Herbs, with 6-parted perianth, inferior ovary, and 3 stamens.

- 1a. Flowers blue, 5 cm. wide or larger —2.
- 1b. Flowers about 1 cm. wide (blue or white, from a spathe terminating a 2-edged stem 2—5 dm. high, spring and early summer) (Blue-eyed Grass) —3.
 - 2a. Flowering stems 4—8 dm. high (early summer)
Blue Flag, Iris versicolor.
 - 2b. Flowering stems 2 dm. or less high (spring)
Dwarf Iris, Iris lacustris.
- 3a. Spathes terminal, sessile —4.
- 3b. Spathes long-peduncled, axillary —8.
 - 4a. Spathe single —5.
 - 4b. Spathes 2 on each flowering stem —7.
- 5a. Pedicels much longer than the inner (shorter) bract
Blue-eyed Grass, Sisyrinchium mucronatum.
- 5b. Pedicels equaling or barely exceeding the inner bract —6.
 - 6a. Capsule brown; common species
Blue-eyed Grass, Sisyrinchium angustifolium.
 - 6b. Capsule green or yellowish; rare species
Blue-eyed Grass, Sisyrinchium montanum.
- 7a. Leaves folded lengthwise; stems narrowly winged
Blue-eyed Grass, Sisyrinchium hastile.
- 7b. Leaves flat; stem broadly winged, 2—3 mm. wide
Blue-eyed Grass, Sisyrinchium albidum.
 - 8a. Capsules pale straw-color or whitish —9.
 - 8b. Capsules brown, or tinged with purple —10.
- 9a. Plant with straight fibrous bristles at base; pedicels long-exserted
Blue-eyed Grass, Sisyrinchium farwellii.
- 9b. Plants not bristly at base; pedicels barely exserted
Blue-eyed Grass, Sisyrinchium strictum.
 - 10a. Pedicels scarcely exceeding the inner bract —6a.
 - 10b. Pedicels much exceeding the inner bract —11.
- 11a. Stem 2—6 mm. wide; bracts 1.5—2 cm. long
Blue-eyed Grass, Sisyrinchium gramineum.
- 11b. Stem 1—2 mm. wide; bracts 1—1.5 cm. long
Blue-eyed Grass, Sisyrinchium apiculatum.

ORCHIDACEAE, the Orchis Family

Herbs, with irregular flowers, one petal, the lip, differing from the others in size and shape, inferior ovary, and one or two stamens adherent to the style.

- 1a. Flowers in a spike-like obviously twisted raceme; small, yellowish or greenish-white, in late summer and autumn (except 4a) (*Ladies' Tresses*) —2.
- 1b. Flowers solitary or in clusters, but never in a twisted raceme —5.
 - 2a. Flowers in 1 row *Ladies' Tresses, Spiranthes gracilis.*
 - 2b. Flowers in several rows —3.
- 3a. Lip constricted near the apex
Ladies' Tresses, Spiranthes romanzoffiana.
- 3b. Lip not constricted —4.
 - 4a. Lip yellow; flowers in spring and early summer
Ladies' Tresses, Spiranthes lucida.
 - 4b. Lip white
Ladies' Tresses, Spiranthes cernua.
- 5a. Brown, purple, or yellow plants, without green color, with scale-like leaves (1—4 dm. high; summer) (*Coral Root*) —6.
- 5b. Plants with normal green color —9.
 - 6a. Lip white, not spotted *Coral Root, Corallorrhiza trifida.*
 - 6b. Lip white, spotted with red —7.
- 7a. Lip distinctly 3-lobed *Coral Root, Corallorrhiza maculata.*
- 7b. Lip entire, or barely toothed —8.
 - 8a. Flower, exclusive of ovary, 4 mm. long
Coral Root, Corallorrhiza odontorrhiza.
 - 8b. Flower about 10 mm. long. *Coral Root, Corallorrhiza striata.*
- 9a. Leaf 1 or none at flowering time —10.
- 9b. Leaves a single pair, basal, or opposite on the stem; never alternate on the stem —19.
- 9c. Leaves several, all basal, prominently net-veined, and frequently blotched with white (scape 1—4 dm. high; flowers whitish, pubescent, in summer) (*Rattlesnake Plantain*) —26.
- 9d. Leaves 2 or more, on the stem —28.
 - 10a. Foliage leaf absent or undeveloped at flowering time, or merely persisting through the winter from the previous year —11.
 - 10b. Foliage leaf present at flowering time —12.
- 11a. Flower rose-purple, 3—5 cm. long, solitary or two (1—3 dm. high, early summer) *Arethusa, Arethusa bulbosa.*
- 11b. Flowers purplish-green, in racemes, with a spur 2 cm. long
Crane-fly Orchis, Tipularia discolor.
- 11c. Flowers yellowish, purple tinged, in racemes; spur none (3—4 dm. high, early summer). *Putty Root, Aplectrum hyemale.*
 - 12a. Leaf linear or linear-lanceolate —13.
 - 12b. Leaf of a broader shape —14.
- 13a. Flower solitary or two; leaf just below the flower —11a.
- 13b. Flowers in a loose raceme, sometimes only 2; leaf basal
Calopogon, Calopogon pulchellus.
 - 14a. Flowers greenish, yellowish, or white —15.
 - 14b. Flowers pink to purple, often variegated —17.

- 15a. Flowers 6—10 mm. wide, with a spur about the same length (1—4 dm. high, summer) (Rein Orchis) —35.
- 15b. Flowers 5 mm. wide or less; spur none (1—2 dm. high; summer) (Adder's Mouth) —16.
- 16a. Pedicels less than 5 mm. long; lip broadest below the middle
Adder's Mouth, Microstylis monophyllos.
- 16b. Pedicels more than 5 mm. long; lip broadest near the apex
Adder's Mouth, Microstylis unifolia.
- 17a. Flowers spicate; lip distinctly 3-lobed (1—2 dm. high; early summer) —24.
- 17b. Flowers solitary or two —18.
- 18a. Leaf on the stem, lanceolate to ovate —34a.
- 18b. Leaf basal, round-ovate (2 dm. high or less; early summer)
Calypso, Calypso bulbosa.
- 19a. Leaves opposite and sessile near the middle of the stem (1—3 dm. high; flowers in summer) (Tway-blade) —20.
- 19b. Leaves basal —21.
- 20a. Lip deeply 2-cleft (flowers purplish)
Tway-blade, Listera cordata.
- 20b. Lip wedge-shape, with 2 round shallow lobes (flowers greenish-yellow)
Tway-blade, Listera convallarioides.
- 21a. Lip an inflated sac about 4 cm. long —29d.
- 21b. Lip not sac-like —22.
- 22a. Flower with a spur 15—50 mm. long —23.
- 22b. Flower not spurred (1—2 dm. high; early summer) (Tway-blade) —25.
- 23a. Flowers purple or magenta, or with white markings —24.
- 23b. Flowers greenish, yellowish, or white (1—4 dm. high; summer) (Rein Orchis) —36.
- 24a. Leaf 1 (1—2 dm. high; early summer)
Round-leaved Orchis, Orchis rotundifolia.
- 24b. Leaves 2 (—20 cm. high; late spring)
Showy Orchis, Orchis spectabilis.
- 25a. Lip about 10 mm. long, purple **Tway-blade, Liparis liliifolia.**
- 25b. Lip about 5 mm. long, yellowish-green
Tway-blade, Liparis loeselii.
- 26a. Perianth 8—10 mm. long; lip with elongated point
Rattlesnake Plantain, Epipactis decipiens.
- 26b. Perianth 4—6 mm. long; lip sack-like —27.
- 27a. Raceme loosely flowered, one-sided
Rattlesnake Plantain, Epipactis repens var. ophioides.
- 27b. Raceme closely flowered, not one-sided
Rattlesnake Plantain, Epipactis pubescens.
- 28a. Lip conspicuously sack-like, inflated (late spring and early summer) (Lady's Slipper) —29.
- 28b. Lip not sack-like nor inflated —32.

29a. Lip white (1—3 dm. high)

White Lady's Slipper, *Cypripedium candidum*.

29b. Lip yellow (2—7 dm. high) —30.

29c. Lip white, with crimson or purple markings —31.

29d. Lip pink (1—4 dm. high, late spring)

Stemless Lady's Slipper, *Cypripedium acaule*.

30a. Lip 2—3 cm. long.

Small Yellow Lady's Slipper, *Cypripedium parviflorum*.

30b. Lip 3.5—5 cm. long

Large Yellow Lady's Slipper, *Cypripedium parviflorum* var. *pubescens*.

31a. Lip 2 cm. long or less; sepals separate (1.5—3 dm. high)

Ram's Head Lady's Slipper, *Cypripedium arietinum*.

31b. Lip 3 cm. long or more; the 2 lower sepals united

Showy Lady's Slipper, *Cypripedium hirsutum*.

32a. Flowers solitary in the axils, or solitary and terminal; not spurred —33.

32b. Flowers in terminal racemes, spurred —38.

33a. Leaves a whorl of 5 (2—3 dm. high; petals greenish; late summer)

Whorled Pogonia, *Pogonia verticillata*.

33b. Leaves alternate —34.

34a. Leaves lanceolate or narrowly ovate, 2—8 cm. long, narrowed at base; flower terminal (1—4 dm. high; flowers pink purple, early summer)

Snake Mouth, *Pogonia ophioglossoides*.

34b. Leaves ovate, 1—2 cm. long, clasping; flowers axillary (5—20 cm. high; flowers purple, summer)

Nodding Pogonia, *Pogonia trianthophora*.

35a. Leaf basal; spur nearly straight

Rein Orchis, *Habenaria obtusata*.

35b. Leaf on the stem; spur strongly curved

Rein Orchis, *Habenaria clavellata*.

36a. Flower-stalk without bracts below the raceme; flowers yellowish-green

Rein Orchis, *Habenaria hookeri*.

36b. Flower-stalk bearing bracts below the raceme; flowers greenish-white —37.

37a. Spur 15—25 mm. long

Rein Orchis, *Habenaria orbiculata*.

37b. Spur 30—50 mm. long

Rein Orchis, *Habenaria macrophylla*.

38a. Lip fringed (Fringed Orchis) —43.

38b. Lip not fringed (Rein Orchis) —39.

39a. Lip with 2—3 evident teeth at apex —40.

39b. Lip without apical teeth —41.

40a. Stem-leaves 3 or more

Rein Orchis, *Habenaria bracteata*.

40b. Stem-leaves 2 —35b.

41a. Flowers white

Rein Orchis, *Habenaria dilatata*.

41b. Flowers greenish-yellow —42.

42a. Lip lanceolate, tapering toward the apex

Rein Orchis, *Habenaria hyperborea*.

42b. Lip oblong, truncate at the apex

Rein Orchis, *Habenaria flava*.

- 43a. Lip deeply 3-lobed, toothed or fringed —44.
- 43b. Lip not 3-lobed, but deeply fringed —46.
 - 44a. Flowers purple **Purple Fringed Orchis, Habenaria psycodes.**
 - 44b. Flowers white or nearly so —45.
- 45a. Spur 3 cm. long or more
Prairie Fringed Orchis, Habenaria leucophaea.
- 45b. Spur 1—1.5 cm. long **Ragged Fringed Orchis, Habenaria lacera.**
- 46a. Flowers yellow **Yellow Fringed Orchis, Habenaria ciliaris.**
- 46b. Flowers white
White Fringed Orenis, Habenaria blephariglottis.

PIPERACEAE, the Pepper Family

Herbaceous plants with alternate leaves, and flowers without either calyx or corolla.

One species in Michigan, a marsh plant with heart-shape leaves and slender racemes of white flowers

Lizard's Tail, Saururus cernuus.

SALICACEAE, the Willow Family

Trees or shrubs, with dioecious flowers in catkins.

- 1a. Leaves less than twice as long as broad, on petioles 3 cm. long or more —2.
- 1b. Leaves more than twice as long as broad, on petioles 2.5 cm. long or less. (The genus *Salix*, or Willow, contains about 30 species in Michigan, of which only the commoner are mentioned here. For the others the Manuals should be consulted.) —8.
 - 2a. Petioles strongly flattened laterally —3.
 - 2b. Petioles not flattened laterally —6.
- 3a. Leaves broadly ovate or nearly circular —4.
- 3b. Leaves broadly triangular or deltoid in shape —5.
 - 4a. Leaves coarsely toothed
Large-toothed Aspen, Populus grandidentata.
 - 4b. Leaves finely crenulate or serrate
Quaking Aspen, Populus tremuloides.
- 5a. Tree with narrow spire-shape crown
Lombardy Poplar, Populus nigra var. italica.
- 5b. Tree with spreading crown **Cottonwood, Populus deltoides.**
 - 6a. Lower side of leaf densely tomentose
White Poplar, Populus alba.
 - 6b. Lower side of leaf glabrous or nearly so —7.
- 7a. Petioles glabrous **Balsam Poplar, Populus balsamifera.**
- 7b. Petioles ciliate **Balm of Gilead, Populus candicans.**
- 8a. Trees —9.
- 8b. Shrubs —13.

- 9a. Petioles without glands —10.
- 9b. Petioles with glands —11.
 - 10a. Petiole short (about 5 mm.), broad and flat
Black Willow, *Salix nigra*.
 - 10b. Petiole slender, about 10—20 mm. long
Peach-leaved Willow, *Salix amygdaloides*.
- 11a. Leaves green beneath
Crack Willow, *Salix fragilis*.
- 11b. Leaves pale beneath —12.
 - 12a. Branches and twigs conspicuously drooping
Weeping Willow, *Salix babylonica*.
 - 12b. Branches and twigs not conspicuously drooping, yellow
Yellow Willow, *Salix alba* var. *vitellina*.
- 13a. Shrubs of bogs —14.
- 13b. Plants of sand-dunes along the Great Lakes —15.
- 13c. Plants of dry upland hills —16.
- 13d. Plants of wet ground, river-banks, and swamps —17.
 - 14a. Leaves densely white-tomentose beneath
Willow, *Salix candida*.
 - 14b. Leaves pale beneath but not tomentose
Willow, *Salix serissima*.
 - 14c. Leaves glabrous and green beneath
Willow, *Salix pedicellaris*.
- 15a. Leaves linear
Willow, *Salix longifolia*.
- 15b. Leaves ovate-lanceolate, tomentose beneath
Willow, *Salix syrticola*.
- 15c. Leaves ovate-lanceolate, glabrous
Willow, *Salix glaucophylla*.
- 16a. Leaves about 3 times as long as broad
Willow, *Salix rostrata*.
- 16b. Leaves narrower, nearly sessile
Willow, *Salix tristis*.
- 16c. Leaves narrower, distinctly petioled
Willow, *Salix humilis*.
- 17a. Leaves linear or nearly so
Willow, *Salix longifolia*.
- 17b. Leaves shining
Willow, *Salix lucida*.
- 17c. Leaves silky
Willow, *Salix sericea*.
- 17d. Leaves not as in the preceding 3 species —18.
 - 18a. Leaves rounded at base
Willow, *Salix cordata*.
 - 18b. Leaves acute at base —19.
- 19a. Leaves finely serrulate
Willow, *Salix petiolaris*.
- 19b. Leaves remotely serrate or nearly entire
Willow, *Salix discolor*.

MYRICACEAE, the Sweet Gale Family

Shrubs, with monoecious or dioecious flowers in catkins, and aromatic foliage.

- 1a. Leaves pinnately lobed
Sweet Fern, *Myrica asplenifolia*.
- 1b. Leaves merely serrate —2.

- 2a. Shrub of sandy soil, shore of Lake Erie

Bayberry, *Myrica carolinensis*.

- 2b. Shrub of bogs and shores, northern half of state

Sweet Gale, *Myrica gale*.

JUGLANDACEAE, the Walnut Family

Trees with alternate pinnately compound leaves and flowers in catkins.

- 1a. Leaflets 11—23; pith divided by partitions into chambers —2.

- 1b. Leaflets 5—11; pith not partitioned (Hickory) —3.

- 2a. Pith brown; bark with flat longitudinal ridges

Butternut, *Juglans cinerea*.

- 2b. Pith cream-color; bark of trunk without flat ridges

Black Walnut, *Juglans nigra*.

- 3a. Bark of the trunk essentially smooth, not deeply furrowed or shaggy —4.

- 3b. Bark of the trunk deeply furrowed or shaggy —6.

- 4a. Leaflets glabrous beneath; buds greenish —5.

- 4b. Leaflets somewhat pubescent beneath; buds bright yellow

Bitter Nut, *Carya cordiformis*.

- 5a. Twigs hairy

Small-fruited Hickory, *Carya microcarpa*.

- 5b. Twigs smooth

Pignut Hickory, *Carya glabra*.

- 6a. Twigs and leaves both pubescent —7.

- 6b. Twigs nearly smooth; leaves smooth beneath

Shag-bark Hickory, *Carya ovata*.

- 7a. Twigs brownish; buds densely hairy

Mocker-nut Hickory, *Carya alba*.

- 7b. Twigs orange; buds very slightly hairy

King-nut Hickory, *Carya laciniosa*.

BETULACEAE, the Birch Family

Trees or shrubs with alternate simple leaves and inconspicuous monoecious flowers, the staminate flowers in catkins, and the pistillate in catkins or small clusters.

- 1a. Trees, with white or yellowish bark exfoliating in thin papery plates or scales —2.

- 1b. Tree or shrub, with smooth, dark gray bark; trunk fluted with prominent longitudinal ridges. **Hornbeam, *Carpinus caroliniana*.**

- 1c. Trees or shrubs; the bark more or less roughened, but not exfoliating; trunk not fluted —3.

- 2a. Bark white or chalky

Paper Birch, *Betula alba* var, *papyrifera*.

- 2b. Bark yellowish

Yellow Birch, *Betula lutea*.

- 3a. Shrubs, with leaves 4 cm. long or less —4.
- 3b. Shrubs or trees, with leaves 5 cm. long or more —5.
 - 4a. Twigs glandular-warty **Dwarf Birch, *Betula glandulosa*.**
 - 4b. Twigs not glandular **Swamp Birch, *Betula pumila*.**
- 5a. Twigs and bark with the odor of wintergreen **Sweet Birch, *Betula lenta*.**
- 5b. Twigs and bark without odor of wintergreen —6.
 - 6a. Fruit clusters woody, persistent on the plant for a long time —7.
 - 6b. Fruit clusters herbaceous, dropping in late autumn —9.
- 7a. Leaves rusty or whitish beneath, and pubescent at least on the veins **Speckled Alder, *Alnus incana*.**
- 7b. Leaves green beneath, and either pubescent or smooth —8.
 - 8a. Leaves broadest at or below the middle **Mountain Alder, *Alnus crispa*.**
 - 8b. Leaves broadest above the middle **Smooth Alder, *Alnus rugosa*.**
- 9a. Tree; fruit a cluster of bladder-like sacs each containing a small achene **Ironwood, *Ostrya virginiana*.**
- 9b. Shrubs; fruit a nut within a close-fitting involucre —10.
 - 10a. Involucre of 2 broad bracts, almost separate and not much longer than the fruit **Hazel, *Corylus americana*.**
 - 10b. Involucre of united bracts, prolonged into a bristly beak beyond the fruit **Beaked Hazel, *Corylus rostrata*.**

FAGACEAE, the Beech Family

Trees (or 1 species shrubby), with alternate simple leaves and monoecious flowers, the staminate flowers in catkins, and the pistillate solitary or in small clusters. Fruit a nut (or acorn) enclosed in a cup or bur.

- 1a. Leaves serrate with numerous sharp-pointed teeth —2.
- 1b. Leaves serrate, lobed, or entire, but never serrate with sharp-pointed teeth; fruit an acorn; pith 5-angled in the young twigs (Oak) —3.
 - 2a. Bark gray, smooth; buds 3—4 times longer than wide; nut triangular **Beech, *Fagus grandifolia*.**
 - 2b. Bark rough; buds relatively thicker; nut rounded **Chestnut, *Castanea dentata*.**
- 3a. Leaves entire, except for a bristle at the tip **Shingle Oak, *Quercus imbricaria*.**
- 3b. Leaves toothed or lobed, the points bristle-tipped —4.
- 3c. Leaves toothed or lobed, the points without bristles —10.
 - 4a. Leaves entire below the middle, with a few shallow lobes beyond **Black Jack Oak, *Quercus marilandica*.**
 - 4b. Leaves deeply lobed throughout —5.

- 5a. Cup of the acorn saucer-shape, covering less than one-third of the acorn —6.
- 5b. Cup of the acorn hemispherical or top-shape, covering one-third or more of the acorn —8.
- 6a. Length of the lateral leaf-lobes less than one-third the width of the leaf; acorn cup 2—2.5 cm. wide
Red Oak, *Quercus rubra*.
- 6b. Length of the lateral leaf-lobes more than one-third the width of the leaf —7.
- 7a. Acorn depressed-globose, about 1 cm. in diameter
Pin Oak, *Quercus palustris*.
- 7b. Acorn ovoid, 1.5—2 cm. thick **Schneck's Oak, *Quercus schneckii*.**
- 8a. Leaves pubescent beneath **Black Oak, *Quercus velutina*.**
- 8b. Leaves glabrous beneath —9.
- 9a. Buds glabrous; inner bark of the trunk yellow
Hill's Oak, *Quercus ellipsoidalis*.
- 9b. Buds pubescent beyond the middle; inner bark of trunk red
Scarlet Oak, *Quercus coccinea*.
- 10a. Leaves deeply pinnately lobed —11.
- 10b. Leaves crenate, dentate, or sinuate, not lobed —12.
- 11a. Leaf divided nearly to the middle by a pair of deep lateral lobes near the middle of the leaf; acorn more than half covered by the cup
Bur Oak, *Quercus macrocarpa*.
- 11b. Leaf without a median pair of deeper lobes; acorn about one-fourth covered by the cup
White Oak, *Quercus alba*.
- 12a. Leaves broadest at or near the middle, with numerous (8—13) sharp coarse teeth on each side
Yellow Oak, *Quercus muhlenbergii*.
- 12b. Leaves broadest above the middle, with a few shallow, rounded or subacute teeth (7 or less on each side) —13.
- 13a. Large tree; leaves densely white-tomentose beneath; acorn on a stalk 3—10 cm. long **Swamp White Oak, *Quercus bicolor*.**
- 13b. Shrub; leaves thinly white-tomentose beneath; acorn sessile or nearly so
Scrub Oak, *Quercus prinoides*.

URTICACEAE, the Nettle Family

Herbs or trees, with small inconspicuous apetalous flowers.

- 1a. Trees or tall shrubs —2.
- 1b. Herbs —7.
- 2a. Leaves oblong-ovate to lanceolate, serrate —3.
- 2b. Leaves broadly ovate to rotund, some of them lobed (Mulberry) —6.

- 3a. Leaves thick, coarsely and doubly serrate, broadest near the middle (Elm) —4.
- 3b. Leaves thin, simply serrate, broadest distinctly below the middle
Hackberry, *Celtis occidentalis*.
- 4a. Some of the branches with flat corky wings; leaves smooth above
Cork Elm, *Ulmus racemosa*.
- 4b. Branches without corky wings; leaves more or less rough above —5.
- 5a. Petioles and axillary buds glabrous. **White Elm, *Ulmus americana*.**
- 5b. Petioles and axillary buds pubescent with rusty hairs
Slippery Elm, *Ulmus fulva*.
- 6a. Leaves rough above **Red Mulberry, *Morus rubra*.**
- 6b. Leaves smooth above **White Mulberry, *Morus alba*.**
- 7a. Leaves alternate —8.
- 7b. Leaves opposite —9.
- 8a. Leaves 2—5 cm. long, stems pubescent
Pellitory, *Parietaria pennsylvanica*.
- 8b. Leaves 8—20 cm. long; stem armed with stinging hairs
Wood Nettle, *Laportea canadensis*.
- 9a. Twining plant; leaves serrate or cleft **Hop, *Humulus lupulus*.**
- 9b. Erect plant; leaves palmately compound **Hemp, *Cannabis sativa*.**
- 9c. Erect plants; leaves not lobed or compound —10.
- 10a. Stems armed with stinging hairs —11.
- 10b. Stems glabrous or rough, but not with stinging hairs —12.
- 11a. Leaves ovate, with a heart-shape base
Stinging Nettle, *Urtica dioica*.
- 11b. Leaves lanceolate or ovate-lanceolate, not heart-shape at base
Slender Nettle, *Urtica gracilis*.
- 12a. Stems glabrous, pellucid **Clearweed, *Pilea pumila*.**
- 12b. Stems rough, opaque **False Nettle, *Boehmeria cylindrica*.**

SANTALACEAE, the Sandalwood Family

Low herbs with alternate entire leaves and terminal clusters of small greenish-white bell-shape flowers without petals in spring and early summer.

- 1a. Inflorescence of several-flowered clusters terminating the stem and in the upper axils **Toad-flax, *Comandra umbellata*.**
- 1b. Inflorescence of axillary clusters of 1—5 flowers
Toad-flax, *Comandra livida*.

LORANTHACEAE, the Mistletoe Family

Parasitic plants, attached to the branches of trees.

One species in Michigan, a dwarf brown plant 5—20 mm. long, with minute scale-like leaves, growing on the branches of Black Spruce

Dwarf Mistletoe, *Arceuthobium pusillum*.

ARISTOLOCHACEAE, the Birthwort Family

Flowers greenish-brown or reddish-brown, at or near the ground, with inferior 6-celled ovary.

- 1a. Leaves alternate, on the stem; flowers on a basal scaly branch (1—4 dm. high; summer)

Virginia Snakeroot, *Aristolochia serpentaria*.

- 1b. Leaves a single basal pair, bearing 1 short-stalked flower between them (spring) (Wild Ginger) —2.

- 2a. Lobes of the perianth ending in a tubular portion 5—8 mm. long

Wild Ginger, *Asarum canadense*.

- 2b. Lobes of the perianth ending in a tubular portion over 1 cm. long

Wild Ginger, *Asarum canadense* var. *acuminatum*.

- 2c. Lobes of the perianth triangular, not tubular at the end

Wild Ginger, *Asarum canadense* var. *reflexum*.

POLYGONACEAE, the Buckwheat Family

Herbs with alternate entire leaves, stipules surrounding the stem above the base of each leaf, and small green, white or pink flowers without petals.

- 1a. Erect or ascending or prostrate or floating plants —2.

- 1b. Scrambling or climbing plants, clinging by sharp recurved prickles on the 4-angled stems (flowers greenish or pink, summer) (Tear-thumb) —32.

- 1c. Twining vines (flowers white or greenish, summer) —33.

- 2a. Sepals 6, the 3 inner ones enlarging in fruit and surrounding the achenes; flowers in panicles —3.

- 2b. Sepals 4 or 5 (occasional flowers may be found with 6 sepals, but the flowers are not in panicles) (summer) —13.

- 3a. Leaves arrow-shape or halberd-shape, with 2 basal lobes (Sorrel) —4.

- 3b. Leaves without basal lobes (Dock) —5.

- 4a. Leaves halberd-shape, the basal lobes directed sidewise

Red Sorrel, *Rumex acetosella*.

- 4b. Leaves arrow-shape, the basal lobes directed backward

Green Sorrel, *Rumex acetosa*.

- 5a. The projecting wings of the fruiting calyx (known as valves)
with sharp slender teeth **Bitter Dock, Rumex obtusifolius.**
- 5b. Valves entire or finely dentate, but without sharp slender teeth
—6.
- 6a. Pedicels straight, thickened toward the end, all regularly
deflexed, 3—4 times longer than the fruiting calyx
Swamp Dock, Rumex verticillatus.
- 6b. Pedicels slender, flexuous, spreading —7.
- 7a. Leaves flat or nearly so —8.
- 7b. Leaves with strongly crisped or wavy-curved margins; plants
usually of cultivated grounds or waste places (5—10 dm., sum-
mer) —12.
- 8a. With grain-like tubercles on all 3 valves of the fruit —9.
- 8b. With grain-like tubercles on only one valve, or entirely lack-
ing —10.
- 9a. Valves broadly cordate, finely toothed
Water Dock, Rumex brittanica.
- 9b. Valves triangular-ovate, entire or nearly so
Dock, Rumex mexicanus.
- 10a. Valves oblong **Bloody Dock, Rumex sanguineus.**
- 10b. Valves broadly heart-shape —11.
- 11a. Grain-like tubercle less than half as long as the valve
Patience Dock, Rumex patientia.
- 11b. Grain-like tubercle more than half as long as the valve
Tall Dock, Rumex altissimus.
- 12a. The grain-like tubercle on the valves of the fruit broadly
ellipsoid, with rounded apex **Sour Dock, Rumex crispus.**
- 12b. Tubercle ovoid with tapering apex
Sour Dock, Rumex elongatus.
- 13a. Flowers inconspicuous, in small axillary clusters; leaves jointed
at the base (Knotweed) —14.
- 13b. Flowers more or less conspicuous, in obvious spikes or racemes
which terminate the stems or branches, or arise from the
axils of the upper leaves —18.
- 14a. Leaves sharply folded lengthwise (1—4 dm. tall)
Knotweed, Polygonum tenue.
- 14b. Leaves flat or nearly so —15.
- 15a. The small sepals pink or white at the margin (stems prostrate
or ascending) —16.
- 15b. Sepals greenish or yellowish throughout (stems erect or ascend-
ing) —17.
- 16a. Leaves thin; common weed of dooryards and gardens
Knotweed, Polygonum aviculare.
- 16b. Leaves thick and fleshy; a plant of sandy shores
Knotweed, Polygonum aviculare var. littorale.

- 17a. Leaves narrowly lanceolate or linear-oblong; rare species
Knotweed, Polygonum ramosissimum.
- 17b. Leaves broadly oblong, oval, or elliptical; common weed of yards and gardens
Knotweed, Polygonum erectum.
- 18a. Leaves broadly triangular (3—7 dm. high; flowers white)
Buckwheat, Fagopyrum esculentum.
- 18b. Leaves from linear to ovate or oblong —19.
- 19a. Sepals 4; flowers in very long and slender spike-like racemes (4—10 dm. high)
Knotweed, Polygonum virginianum.
- 19b. Sepals 5; flowers in spikes or racemes —20.
- 20a. Flowers on slender pedicels, forming a loose raceme; leaves linear, jointed at the base (1—3 dm. high; flowers pink or white; chiefly near the Great Lakes)
Jointweed, Polygonella articulata.
- 20b. Flowers sessile or nearly so, forming a spike or spike-like raceme —21.
- 21a. Stipular sheaths at the base of the leaves ciliate at their upper margin —22.
- 21b. Stipular sheaths not ciliate at the upper margin —28.
- 22a. Sheaths with spreading borders —23.
- 22b. Sheaths without a spreading border, appressed to the stem (Smartweed) —24.
- 23a. Leaves ovate, acuminate; stem erect (1—2 m. high; flowers pink)
Prince's Feather, Polygonum orientale.
- 23b. Leaves oblong, obtuse or subacute; spreading or ascending plant of wet soil
Water Smartweed, Polygonum amphibium var. hirtwrightii.
- 24a. Peduncles with glandular hairs (5—15 dm. high)
Smartweed, Polygonum careyi.
- 24b. Peduncles not glandular (1—8 dm. high) (Smartweed) —25.
- 25a. Sepals beset with minute black dots —26.
- 25b. Sepals white, pink, or red, not black-dotted —27.
- 26a. Racemes drooping or nodding at the tip; achene dull-colored
Smartweed, Polygonum hydropiper.
- 26b. Racemes erect; achene smooth and shining
Smartweed, Polygonum acre.
- 27a. Sheaths smooth; leaves usually with a dark spot near the base
Smartweed, Polygonum persicaria.
- 27b. Sheaths hairy; leaves not dark-spotted
Smartweed, Polygonum hydropiperoides.
- 28a. Leaves obtuse or somewhat acute at the apex —29.
- 28b. Leaves acuminate at the apex (5—15 dm. high; flowers white to pink) (Smartweed) —30.

- 29a. Stem unbranched, erect, bearing a single terminal raceme (5—30 cm. high; flowers pink). **Bistort, Polygonum viviparum.**
- 29b. Stem branched, submerged in water or creeping on muddy shores (flowers pink)

Water Smartweed, Polygonum amphibium.

- 30a. Raceme single or two; leaves broadly ovate-lanceolate, about 3 times as long as wide

Smartweed, Polygonum mühlenbergii.

- 30b. Racemes numerous; leaves lanceolate, 4—6 times as long as wide —31.

- 31a. Racemes drooping or nodding at the tip

Smartweed, Polygonum lapathifolium.

- 31b. Racemes erect

Smartweed, Polygonum pennsylvanicum.

- 32a. Leaves arrow-shape, the basal lobes pointing backward

Tear-thumb, Polygonum sagittatum.

- 32b. Leaves halberd-shape, the basal lobes pointing sidewise

Tear-thumb, Polygonum arifolium.

- 33a. The three outer sepals becoming conspicuously winged in fruit (False Buckwheat) —34.

- 33b. The sepals all unchanged in fruit, except in size (Black Bindweed) —35.

- 34a. Wings of the fruit with wavy-curved margins

False Buckwheat, Polygonum scandens.

- 34b. Wings of the fruit flat

False Buckwheat, Polygonum dumetorum.

- 35a. Leaf-sheaths with a ring of bristles at the base

Black Bindweed, Polygonum cilinode.

- 35b. Leaf-sheaths without a ring of bristles

Black Bindweed, Polygonum convolvulus.

CHENOPODIACEAE, the Goosefoot Family

Herbs, with inconspicuous greenish or reddish flowers without petals, in summer.

- 1a. Leaves linear or nearly so, entire —2.

- 1b. Leaves of a broader shape, usually toothed or lobed —5.

- 2a. Leaves rather stiff, narrowly linear or thread-like, with spine-like tips **Russian Thistle, Salsola kali var. tenuifolia.**

- 2b. Leaves soft, not spine-like —3.

- 3a. Widely branched, rather diffuse, 1—5 dm. tall; plant of the shore of the Great Lakes **Bug-seed, Corispermum hyssopifolium.**

- 3b. Erect plants with ascending branches —4.

- 4a. Leaves glabrous (3—6 dm. tall)

Goosefoot, Chenopodium leptophyllum.

- 4b. Leaves minutely ciliate on the margin (bushy branched, 5—10 dm. tall)

Kochia, Kochia scoparia.

- 5a. Principal leaves with a broad truncate, rounded, or hastate base —6.
- 5b. Principal leaves narrowed to the base —12.
 - 6a. Leaves broadly ovate, with 1—4 large sharp projecting teeth on each side **Goosefoot, *Chenopodium hybridum*.**
 - 6b. Leaves hastate or triangular-ovate, entire or with many teeth —7.
- 7a. Leaves entire or merely undulate —8.
- 7b. Leaves sharply or sinuately toothed —9.
 - 8a. Stem erect, simple or sparingly branched **Good King Henry, *Chenopodium bonus-henricus*.**
 - 8b. Stem diffuse or ascending, freely branched **Orache, *Atriplex patula*.**
- 9a. Flowers in small heads, in the axils or in terminal spikes; leaves sinuately toothed or nearly entire **Strawberry Blite, *Chenopodium capitatum*.**
- 9b. Flowers in terminal panicles; leaves sharply toothed (Goosefoot) —10.
 - 10a. Panicles short, not as long as the subtending leaves **Goosefoot, *Chenopodium murale*.**
 - 10b. Panicles long, exceeding the subtending leaves —11.
- 11a. Calyx green **Goosefoot, *Chenopodium urbicum*.**
- 11b. Calyx red **Goosefoot, *Chenopodium rubrum*.**
- 12a. Foliage glandular and strongly aromatic —13.
- 12b. Foliage not glandular nor aromatic; sometimes ill-scented —15.
- 13a. Flowers in large loose open spreading panicles; leaves deeply pinnatifid **Jerusalem Oak, *Chenopodium botrys*.**
- 13b. Flowers clustered in slender axillary or terminal spikes —14.
 - 14a. Spikes dense, leafy **Mexican Tea, *Chenopodium ambrosioides*.**
 - 14b. Spikes open, nearly leafless **Wormseed, *Chenopodium ambrosioides* var. *anthelminticum*.**
- 15a. Stem erect, 5—20 dm. tall; leaves frequently white-mealy **Lamb's Quarters, *Chenopodium album*.**
- 15b. Stem prostrate or ascending, succulent; leaves glaucous-white beneath **Goosefoot, *Chenopodium glaucum*.**
- 15c. Stem widely and diffusely branched; leaves green, soon deciduous **Cycloloma, *Cycloloma atriplicifolium*.**

AMARANTHACEAE, the Amaranth Family

Herbs, with alternate leaves, and inconspicuous greenish or reddish flowers without petals, which are axillary or in dense clusters, blooming in summer.

- 1a. Flower-clusters axillary —2.
- 1b. Flower-clusters in terminal spikes or panicles, sometimes also axillary —3.

2a. Plant prostrate or decumbent; seed about 1.5 mm. broad

Pigweed, *Amaranthus blitoides*.

2b. Plant erect or ascending, widely branched; seeds about 1 mm. broad (3—10 dm. high)

Tumble Weed, *Amaranthus graecizans*.

- 3a. Principal leaves with a pair of spines at their base

Thorny Amaranth, *Amaranthus spinosus*.

- 3b. Spines none at the base of the leaves —4.

4a. Weedy plants of cultivated or waste ground; flowers monoecious or polygamous; pistillate flowers with a calyx (Pigweed) —5.

4b. Plants of swamps or stream-banks; flowers dioecious; pistillate flowers without calyx (Water Hemp) —7.

- 5a. Spikes short, 1—8 cm. long, crowded in dense ovoid panicles; the terminal spike not conspicuously elongated beyond the appressed or ascending lower ones

Pigweed, *Amaranthus retroflexus*.

- 5b. Spikes slender, 1—12 cm. long; the terminal spike greatly exceeding the short inconspicuous divergent lower ones —6.

6a. Bracts subulate, sharply awned

Pigweed, *Amaranthus hybridus*.

6b. Bracts merely acuminate. **Pigweed, *Amaranthus paniculatus*.**

- 7a. Flowers in leafy spikes, or the lower in separate clusters

Water Hemp, *Acnida tuberculata*.

- 7b. Flowers in separate distinct clusters

Water Hemp, *Acnida tuberculata* var. *subnuda*.

PHYTOLACCACEAE, the Pokeweed Family

Herbs with alternate entire leaves, small flowers without petals, and a many-celled ovary.

One species in Michigan, 1—2 m. high, with numerous racemes of whitish flowers, in late summer, followed by dark-purple berries

Pokeweed, *Phytolacca decandra*.

NYCTAGINACEAE, the Four-o'Clock Family

Herbs, with opposite entire leaves and flowers in small clusters surrounded by a broad open calyx-like involucre; the true calyx colored like a corolla; petals none (4—8 dm. high; flowers purple, in summer).

1a. Leaves lanceolate or narrower, sessile

Umbrella-wort, *Oxybaphus hirsutus*.

1b. Leaves ovate, petioled **Umbrella-wort, *Oxybaphus nyctagineus*.**

ILLECEBRACEAE, the Knotwort Family

Herbs, with opposite entire leaves, and minute flowers without petals. (Prostrate spreading or freely branched plants, 3 dm. high or less; flowers in summer.)

1a. Stipules none; leaves slightly connate at base, subulate

Knawel, *Scleranthus annuus*.

1b. Stipules present, but small; leaves elliptical or oval (Forked Chickweed) —2.

2a. Stems pubescent; internodes seldom more than 1 cm. long

Forked Chickweed, *Anychia polygonoides*.

2b. Stems smooth; internodes about 2 cm. long

Forked Chickweed, *Anychia canadensis*.

AIZOACEAE, the Carpet-weed Family

Prostrate herbs, with whorled leaves and small whitish axillary flowers without petals, in summer.

One species in Michigan

Carpet-weed, *Mollugo verticillata*.

CARYOPHYLLACEAE, the Pink Family

Herbs, with opposite or whorled entire leaves, and stems frequently swollen at the nodes. Sepals 4 or 5; petals separate, as many as the sepals, or rarely none; stamens twice as many as the petals in plants with conspicuous flowers, sometimes fewer in those with small flowers; ovary 1-celled, with the ovules on a central axis, and with 2—5 styles.

1a. Calyx spreading, of separate sepals; flowers 15 mm. wide or less; petals sometimes none —2.

1b. Calyx tubular, of united sepals; flowers in many species more than 15 mm. wide; petals always present —22.

2a. Stipules present —3.

2b. Stipules none —4.

- 3a. Leaves opposite; flowers pink (about 1 dm. high; summer)
Sand Spurrey, *Spergularia rubra*.
- 3b. Leaves whorled; flowers white (1—5 dm. high; leaves linear; summer)
Spurrey, *Spergula arvensis*.
- 4a. Leaves subulate or thread-like —5.
- 4b. Leaves linear to ovate —7.
- 5a. Leaves opposite (1 dm. high or less; flowers white, summer)
Pearlwort, *Sagina procumbens*.
- 5b. Leaves fascicled in the axils —6.
- 6a. Styles 4 or 5 (1 dm. high; terminal white flowers 5 mm. wide, in summer)
Pearlwort, *Sagina nodosa*.
- 6b. Styles 3 (1—4 dm. high; flowers white, nearly 1 cm. wide, summer)
Stitchwort, *Arenaria stricta*.
- 7a. Petals entire (3 dm. high or less; flowers white, in summer) (Stitchwort) —8.
- 7b. Petals notched or 2-cleft at the end, or none —11.
- 8a. Principal leaves 1 cm. long or less —9.
- 8b. Principal leaves 1.5 cm. long or more —10.
- 9a. Petals half as long as the sepals
Stitchwort, *Arenaria leptoclados*.
- 9b. Petals almost as long as the sepals
Stitchwort, *Arenaria serpyllifolia*.
- 10a. Leaves oblong-oval, obtuse. **Stitchwort, *Arenaria lateriflora*.**
- 10b. Leaves lanceolate, acute. **Stitchwort, *Arenaria macrophylla*.**
- 11a. Capsule splitting by valves at maturity; styles usually 3 (Chickweed) —12.
- 11b. Capsule opening by terminal teeth at maturity; styles usually 5 (tufted or matted plants, 1—5 dm. high; flowers white, in spring and summer) (Mouse-ear Chickweed) —18.
- 12a. Petals distinctly shorter than the sepals, or none —13.
- 12b. Petals as long as the sepals, or longer —15.
- 13a. Leaves ovate (1—3 dm. high; flowers white, all summer)
Chickweed, *Stellaria media*.
- 13b. Leaves lanceolate to oblong (in water or wet places, 1—4 dm. high; flowers white, in summer) —14.
- 14a. Flowers in a leafy terminal branching cluster
Chickweed, *Stellaria borealis*.
- 14b. Flowers in a lateral cluster with minute bracts
Chickweed, *Stellaria uliginosa*.
- 15a. Flowers in clusters with leaf-like bracts, or axillary and solitary (in water or wet places; 1—3 dm. high; flowers white, summer)
Chickweed, *Stellaria crassifolia*.
- 15b. Flowers in clusters with scale-like bracts —16.

- 16a. Leaves distinctly linear; cymes lateral; a common species in marshes (2—5 dm. high; flowers white, early summer)
Chickweed, *Stellaria longifolia*.
- 16b. Leaves distinctly broadest near the base; flower-cluster terminal —17.
- 17a. Pedicels erect; clusters usually few-flowered; in extreme northern part of the state only (1—3 dm. high; flowers white, summer)
Chickweed, *Stellaria longipes*.
- 17b. Pedicels spreading; clusters open, many-flowered (2—6 dm. high; flowers white, in summer) **Chickweed, *Stellaria graminea*.**
- 18a. Petals distinctly longer than the sepals —19.
- 18b. Petals as long as the sepals, or shorter than them —21.
- 19a. Flowers much less than 1 cm. wide
Mouse-ear Chickweed, *Cerastium nutans*.
- 19b. Flowers more than 1 cm. wide —20.
- 20a. Stem-leaves linear or narrowly lanceolate
Mouse-ear Chickweed, *Cerastium arvense*.
- 20b. Stem-leaves oblong
Mouse-ear Chickweed, *Cerastium arvense* var. *oblongifolium*.
- 21a. Bracts green; pedicels short and inflorescence crowded
Mouse-ear Chickweed, *Cerastium viscosum*.
- 21b. Bracts with transparent white margins; pedicels longer than the calyx and inflorescence open
Mouse-ear Chickweed, *Cerastium vulgatum*.
- 22a. Styles 5 —23.
- 22b. Styles 3 (3—10 dm. high; flowers in summer) —25.
- 22c. Styles 2 —29.
- 23a. Calyx-teeth much longer than the calyx-tube (erect, 4—10 dm. high; flowers large, red, late summer)
Corn Cockle, *Agrostemma githago*.
- 23b. Calyx-teeth shorter than the calyx-tube (4—10 dm. high; flowers in summer) —24.
- 24a. Flowers crimson **Mullein Pink, *Lychnis coronaria*.**
- 24b. Flowers white or pink **White Campion, *Lychnis alba*.**
- 25a. Flowers night-blooming, always wilted during the day
Catchfly, *Silene noctiflora*.
- 25b. Flowers open during the day —26.
- 26a. Flowers 6 mm. wide or less, white or pink
Catchfly, *Silene antirrhina*.
- 26b. Flowers 1—2 cm. wide, white to pink or purple —27.
- 26c. Flowers 2 cm. wide or more, crimson
Fire Pink, *Silene virginica*.
- 27a. Principal leaves in whorls of 4 **Starry Campion, *Silene stellata*.**
- 27b. Leaves opposite —28.

- 28a. Calyx globular, much inflated or bladder-like
Bladder Campion, *Silene latifolia*.
- 28b. Calyx club-shape, not inflated
Sweet William Catchfly, *Silene armeria*.
- 29a. Leaves linear or narrowly lanceolate, 5 mm. wide or less (flowers pink or white, in summer) —30.
- 29b. Leaves lanceolate or ovate (flowers pink, white, or red, in summer) —32.
- 30a. Flowers in terminal clusters; leaves hairy (2—4 dm. high)
Deptford Pink, *Dianthus armeria*.
- 30b. Flowers solitary at the ends of long pedicels —31.
- 31a. Flowers 3—4 mm. wide (1—2 dm. high)
Gypsophyll, *Gypsophila muralis*.
- 31b. Flowers 1 cm. wide or more (1—5 dm. high)
Meadow Pink, *Dianthus deltoides*.
- 32a. Flowers less than 1 cm. broad —33.
- 32b. Flowers more than 1 cm. broad —34.
- 33a. Flowers white, in large panicles (4—7 dm. high)
Baby's Breath, *Gypsophila paniculata*.
- 33b. Flowers pale red, in loose clusters (4—10 dm. high)
Cow-herb, *Saponaria vaccaria*.
- 34a. Leaves with 3—5 prominent veins (4—7 dm. high)
Soapwort, *Saponaria officinalis*.
- 34b. Leaves with one mid-vein (3—6 dm. high)
Sweet William, *Dianthus barbatus*.

PORTULACACEAE, the Purslane Family

Herbs with opposite or alternate leaves and regular flowers with 2 sepals, 5 petals, and a 1-celled ovary with 2 or 3 styles.

- 1a. Leaves a single pair on each stem (1—2 dm. high; flowers pink, in racemes in early spring) (Spring Beauty) —2.
- 1b. Leaves numerous (prostrate or spreading; flowers in summer) —3.
- 2a. Leaves lance-ovate to oblong, not more than six times as long as wide
Spring Beauty, *Claytonia caroliniana*.
- 2b. Leaves linear or linear-lanceolate, more than six times as long as wide
Spring Beauty, *Claytonia virginica*.
- 3a. Flowers yellow, about 5 mm. wide Purslane, *Portulaca oleracea*.
- 3b. Flowers 2—5 cm. wide *Portulaca*, *Portulaca grandiflora*.

CERATOPHYLLACEAE, the Hornwort Family

Submerged aquatics, with whorled, finely dissected leaves and inconspicuous flowers with neither calyx nor corolla.

One species in Michigan

Hornwort, *Ceratophyllum demersum*.

NYMPHAEACEAE, the Water Lily Family

Aquatic plants, with usually large and floating leaves which are round or elliptical and palmately veined.

- 1a. Floating and emersed leaves centrally peltate —2.
- 1b. Leaves rounded but not peltate, with a deep sinus —3.
 - 2a. Leaves round, 3 dm. in diameter or more; flowers very large, pale yellow **Lotus, Nelumbo lutea.**
 - 2b. Leaves oval, 5—15 cm. long; flowers small, purple **Water Shield, Braseniaschreberi.**
- 3a. Flowers yellow (Pond Lily) —4.
- 3b. Flowers white or tinged with pink (Water Lily) —5.
 - 4a. Leaves more than 1 dm. long **Pond Lily, Nymphaea advena.**
 - 4b. Leaves less than 1 dm. long **Pond Lily, Nymphaea microphylla.**
- 5a. Flowers very fragrant; leaves purplish beneath **Water Lily, Castalia odorata.**
- 5b. Flowers not fragrant; leaves green beneath **Water Lily, Castalia tuberosa.**

RANUNCULACEAE, the Crowfoot Family

Herbs with alternate (rarely opposite) leaves, acrid watery juice, separate sepals and petals, numerous stamens, and several or many (rarely only 1) simple pistils. Petals present or absent, in the latter case the sepals are usually petal-like in appearance.

- 1a. Climbing plants with opposite leaves (flowers in late summer) (Virgin's Bower) —2.
- 1b. Aquatic plants with dissected submerged leaves (flowers in late spring and summer) (Water Crowfoot) —3.
- 1c. Terrestrial or mud plants, not agreeing with 1a or 1b —6.
 - 2a. Flowers white, 2—3 cm. wide **Virgin's Bower, Clematis virginiana.**
 - 2b. Flowers pink-purple, 5—8 cm. wide **Virgin's Bower, Clematis verticillaris.**
- 3a. Flowers white —4.
- 3b. Flowers yellow —5.
 - 4a. Leaves rigid, not collapsing when removed from the water **Water Crowfoot, Ranunculus circinatus.**
 - 4b. Leaves soft, collapsing when removed from the water **Water Crowfoot, Ranunculus aquatilis var. capillaceus.**
- 5a. Submerged leaves divided into hair-like segments **Water Crowfoot, Ranunculus delphinifolius.**
- 5b. Submerged leaves palmately divided into linear lobes **Water Crowfoot, Ranunculus purshii.**

- 6a. Flowers blue, irregular, with one spur (4—8 dm. high, summer) **Larkspur, *Delphinium ajacis*.**
- 6b. The five petals each prolonged into a spur; flowers showy (4—8 dm. tall) (Columbine) —7.
- 6c. Flowers regular, without spurs —8.
- 7a. Spurs nearly straight; flowers scarlet and yellow (spring) **Wild Columbine, *Aquilegia canadensis*.**
- 7b. Spurs strongly incurved; flowers blue or white (spring, early summer) **Columbine, *Aquilegia vulgaris*.**
- 8a. Flowers yellow —9.
- 8b. Flowers of various colors, but never yellow —28.
- 9a. Petals none; sepals petal-like; leaves crenate or dentate (2—4 dm. high, flowers in early spring) **Cowslip, *Caltha palustris*.**
- 9b. Petals small; sepals petal-like; leaves deeply palmately lobed (4—6 dm. tall; flowers in late spring) **Globe-flower, *Trollius laxus*.**
- 9c. Petals yellow; sepals green or yellowish —10.
- 10a. Leaves linear to narrowly oblong, entire or with minute teeth (flowers 10—15 mm. wide, in summer) —11.
- 10b. Leaves broader, some or all of them lobed or divided, or cordate-ovate and not lobed —12.
- 11a. Stems ascending (4—8 dm. high), rooting at the lower joints; fruits pointed with a long slender beak **Spearwort, *Ranunculus laxicaulis*.**
- 11b. Stems prostrate and trailing, rooting at the joints; fruits tipped with a minute short beak **Spearwort, *Ranunculus flammula* var. *reptans*.**
- 12a. Basal leaves, or most of them, merely serrate or crenate, and not obviously lobed —13.
- 12b. All the leaves lobed or divided —16.
- 13a. Stem-leaves resembling the basal ones, and not lobed (1—2 dm. high; summer) **Sea-side Crowfoot, *Ranunculus cymbalaria*.**
- 13b. Stem-leaves deeply divided into oblong or linear segments —14.
- 14a. Flowers 1.5 cm. wide or more (1—3 dm. high; spring) **Buttercup, *Ranunculus rhomboidens*.**
- 14b. Flowers 1 cm. wide or less (2—5 dm. high; spring) —15.
- 15a. Foliage glabrous or minutely pubescent; basal leaves cordate **Small-flowered Crowfoot, *Ranunculus abortivus*.**
- 15b. Foliage villous; basal leaves barely cordate or not at all **Small-flowered Crowfoot, *Ranunculus micranthus*.**
- 16a. Stem erect or essentially so —17.
- 16b. Stem prostrate, creeping, or ascending. Early in spring stems may be found which appear almost erect. Common spring-flowering buttercups are all classified here —22.

- 17a. Flowers 2 cm. broad or larger (Buttercup) —18.
17b. Flowers 1 cm. broad or smaller —19.
- 18a. Terminal lobe of leaf stalked (2—5 dm. high, early summer) **Buttercup, Ranunculus bulbosus.**
18b. Terminal lobe of leaf sessile (5—10 dm. high; all summer) **Buttercup, Ranunculus acris.**
- 19a. Plant glabrous, succulent; stem hollow (1—5 dm. high; spring and summer) **Cursed Crowfoot, Ranunculus sceleratus.**
19b. Plant pubescent (Buttercup) —20.
- 20a. Fruits tipped with a prominent recurved beak; plant of shady woods (2—6 dm. high; flowers in late spring) **Buttercup, Ranunculus recurvatus.**
20b. Fruits tipped with a straight or slightly curved beak; plants of marshes or wet soil (3—6 dm. high; flowers in summer) —21.
- 21a. Fruits in a short-cylindric head on a conical receptacle **Buttercup, Ranunculus pennsylvanicus.**
21b. Fruits in a globose or short-ovoid head, on an obovoid receptacle **Buttercup, Ranunculus macounii.**
- 22a. Leaves dissected into numerous linear or narrowly wedge-shape divisions; plants growing in water or very wet places (late spring and summer) **Water Crowfoot, Ranunculus delphinifolius.**
22b. Leaves palmately lobed, the terminal division not definitely stalked —23.
22c. Leaves compound, some or all of the divisions on definite stalks (Buttercup) —24.
- 23a. Stem-leaves numerous (1—2 dm. tall; late spring and summer) **Crowfoot, Ranunculus purshii.**
23b. Stem-leaves one or none, the principal leaves all basal (about 1 dm. high; flowers in summer) **Buttercup, Ranunculus lapponicus.**
- 24a. Style short, obviously curved —25.
24b. Style long and slender, straight or nearly so (common spring-flowering buttercups, 2—5 dm. high) —26.
- 25a. Stems creeping; flowers 2 cm. wide or more (spring) **Buttercup, Ranunculus repens.**
25b. Stems ascending; flowers 1.5 cm. wide or less (3—6 dm. high; summer) **Buttercup, Ranunculus macounii.**
- 26a. The two lateral divisions of the leaf sessile or nearly so **Buttercup, Ranunculus fascicularis.**
26b. The two lateral divisions of the leaf on long stalks —27.

27a. Roots fibrous; plants of wet soil

Buttercup, *Ranunculus septentrionalis*.

27b. Roots thickened; plants of dry woods or thickets

Buttercup, *Ranunculus hispidus*.

28a. Leaves dissected into numerous narrowly linear acute divisions (4—7 dm. high; flowers large, bluish, in summer)

Love-in-a-mist, *Nigella damascena*.

28b. Leaves lobed or divided, but the divisions not separated by definite stalks —29.

28c. Leaves truly compound, all their divisions separated by distinct stalks —39.

29a. Leaves all basal, their lobes (usually 3) entire (1—2 dm. high; flowers pink-purple, in earliest spring) (*Hepatica*) —30.

29b. Lobes of the leaf serrate or incised —31.

30a. Lobes of the leaf obtuse or rounded

***Hepatica*, *Hepatica triloba*.**

30b. Lobes of the leaf acute

***Hepatica*, *Hepatica acutifolia*.**

31a. Petals none; sepals 3, usually falling away as soon as the flower opens (2—4 dm. high; flowers greenish-white, in spring)

Golden Seal, *Hydrastis canadensis*.

31b. Petals none; sepals petal-like, 4 or more (*Anemone*) —32.

31c. Petals present, but much smaller than the 5 petal-like sepals —38.

32a. Stem-leaves sessile or nearly so —33.

32b. Stem-leaves on definite petioles —35.

33a. Ovary tipped with a long slender hairy style; flowers bluish-purple (1—4 dm. high; early spring)

Pasque Flower, *Anemone patens* var. *wolfgangiana*.

33b. Ovary with a short style, densely woolly; flowers red, greenish, or white (1—4 dm. high; late spring and summer) —34.

33c. Ovary tipped with a short style, glabrous or nearly so; flowers white (4—7 dm. high; late spring and early summer)

***Anemone*, *Anemone canadensis*.**

34a. Stem 1-flowered, sepals white

***Anemone*, *Anemone parviflora*.**

34b. Stem 3-flowered; sepals usually red

***Anemone*, *Anemone multifida*.**

35a. Achenes densely woolly; flowers appearing in summer —36.

35b. Achenes merely pubescent; stems 1-flowered; woodland species blooming in early spring (1—2 dm. high; flowers white)

Wood Anemone, *Anemone quinquefolia*.

MAGNOLIACEAE, the Magnolia Family

Trees or shrubs, with alternate leaves, and large, frequently showy flowers.

One species in Michigan, with broad 4-lobed leaves and greenish-yellow flowers in late spring **Tulip Tree, *Liriodendron tulipifera*.**

ANONACEAE, the Custard Apple Family

Trees or shrubs, with alternate simple entire leaves, 3 sepals, and 6 petals.

One species in Michigan; tall shrub or small tree, with obovate leaves and large dull-purple flowers in spring

Papaw, *Asimina triloba*.

MENISPERMACEAE, the Moonseed Family

Woody climbers, with alternate leaves, 6—8 petals, and numerous stamens.

One species in Michigan, with 5—7-angled leaves which are peltate near the edge, and small white flowers in early summer

Moonseed, *Menispermum canadense*.

BERBERIDACEAE, the Barberry Family

Shrubs or herbs; petals 6 or more; stamens 6—18, frequently opening by two terminal lids; pistil 1.

1a. Leaves simple —2.

1b. Leaves compound —3.

2a. Stem shrubby (flowers yellow, in racemes, in spring)

Barberry, *Berberis vulgaris*.

2b. Stem herbaceous, with a single pair of palmately lobed leaves (4—6 dm. tall; flower white, solitary, terminal, in spring)

May Apple, *Podophyllum peltatum*.

3a. Leaves all basal; leaflets 2 (2—4 dm. high; the flower-stalks bearing solitary white flowers in spring)

Twin-leaf, *Jeffersonia diphylla*.

3b. The stem-leaf ternately compound, with numerous leaflets (4—8 dm. high; with yellowish-green clustered flowers in spring)

Blue Cohosh, *Caulophyllum thalictroides*.

LAURACEAE, the Laurel Family

Trees or shrubs, with aromatic taste or odor, and alternate simple leaves; flowers small, imperfect, the anthers opening by lids.

- 1a. Freely branched shrub; leaves obovate-oblong, entire (flowers yellow, in early spring, before the leaves)

Spice Bush, Benzoin aestivale.

- 1b. Tree or tall shrub; some or all of the leaves 2—3-lobed (flowers greenish-yellow, appearing with the leaves)

Sassafras, Sassafras variifolium.

PAPAVERACEAE, the Poppy Family

Herbs with milky or colored juice, regular flowers, 2 sepals, 4, 6, or 8 petals, numerous stamens, and a 1-celled ovary.

- 1a. Leaves palmately lobed; flower 2.5—5 cm. wide, with 8 petals or more (leaf basal; flower white, in early spring)

Bloodroot, Sanguinaria canadensis.

- 1b. Leaves pinnately toothed or lobed; flower 7—10 cm. wide, with 4—6 petals (4—8 dm. high; leaves clasping; summer)

Poppy, Papaver somniferum.

- 1c. Leaves divided pinnately to the midrib into several toothed or lobed segments; flower 2.5 cm. broad or less (3—5 dm. high; flowers yellow) —2.

- 2a. Flowers in clusters of 2—4, about 3 cm. wide (spring)

Celandine Poppy, Stylophorum diphyllum.

- 2b. Flowers in umbels of 3—8, about 1.5 cm. wide

Celandine, Chelidonium majus.

FUMARIACEAE, the Fumitory Family

Herbs with watery juice, compound or dissected leaves, and irregular flowers; sepals 2, small; petals 4, in two pairs, and one or both of the outer pair spurred at the base; stamens 6.

- 1a. Both outer petals spurred or sack-like at the base —2.

- 1b. One outer petal spurred or sack-like at the base —4.

- 2a. A climbing vine with flowers in panicles (white or pinkish flowers in summer) **Climbing Fumitory, Adlumia fungosa.**

- 2b. Low herbs (2—4 dm.) with basal leaves and white or pinkish flowers in racemes (early spring) —3.

- 3a. Spurs of the corolla triangular, divergent

Dutchman's Breeches, Dicentra cucullaria.

- 3b. Spurs of the corolla short and rounded

Squirrel Corn, Dicentra canadensis.

- 4a. Flowers about 5 mm. long, pink-purple tipped with red (3—8 dm. high; summer) **Fumitory, *Fumaria officinalis*.**
4b. Flowers 10 mm. long or more, yellow, at least at the tip (2—6 dm. high) (*Corydalis*) —5.
5a. Flowers yellow throughout (spring) ***Corydalis, Corydalis aurea*.**
5b. Flowers pink, tipped with yellow (summer).
***Corydalis, Corydalis sempervirens*.**

CRUCIFERAE, the Mustard Family

Herbs, with alternate, frequently lobed or dissected leaves, and regular flowers, usually in racemes; sepals and petals each 4, stamens 6, 4 long and 2 short (or rarely 2 only), ovary 1.

- 1a. Petals yellow or yellowish —2.
1b. Petals white, pink, or purple, never yellow —29.
2a. Leaves simple, entire or dentate, never lobed —3.
2b. Leaves deeply lobed or compound (the bracteal leaves, at or near the flower-clusters, may be simple and unlobed) —10.
3a. Leaves clasping the stem —4.
3b. Leaves not clasping at base —6.
4a. Clasping base and apex of leaf obtuse or rounded; pod very long and slender (3—8 dm. high; summer)
Hare's Ear, *Conringia orientalis*.
4b. Clasping base and apex of leaf acute; pod obovoid (3—7 dm. high; early summer) (False Flax) —5.
5a. Stem and leaves glabrous **False Flax, *Camelina sativa*.**
5b. Leaves and usually the stem pubescent
False Flax, *Camelina microcarpa*.
6a. Flowers about 2 mm. wide (1—3 dm. high; flowers in summer) —7.
6b. Flowers 5 mm. wide or more (2—6 dm. high; flowers in summer) —8.
7a. Leaves about twice as long as broad, widest near or below the middle **Whitlow Grass, *Draba nemorosa*.**
7b. Leaves 3—5 times as long as broad, widest above the middle
Yellow Alyssum, *Alyssum alyssoides*.
8a. Leaves lanceolate, gradually tapering to the base; flowers about 15 mm. wide **Sand Rocket, *Diploxis muralis*.**
8b. Leaves ovate, acute at base; flowers about 15 mm. wide —22a.
8c. Leaves entire or minutely toothed; flowers 5—10 mm. wide —9.

- 9a. Pods 25 mm. long or less, on slender pedicels about 8 mm. long
Worm-seed Mustard, *Erysimum cheiranthoides*.
- 9b. Pods 20 mm. long or more, on stout pedicels about 4 mm. long
Worm-seed Mustard, *Erysimum parviflorum*.
- 10a. Leaves bipinnate or dissected into very numerous divisions
(3—8 dm. high; flowers in summer) —11.
- 10b. Leaves simply pinnate —13.
- 11a. Flowers about 5 mm. broad; pods about 20 mm. long by 1 mm.
broad **Herb Sophia, *Sisymbrium sophia*.**
- 11b. Flowers about 3 mm. broad; pods about 8 mm. long by 2 mm.
wide (Tansy Mustard) —12.
- 12a. Stems gray with a close fine pubescence
Tansy Mustard, *Sisymbrium canescens*.
- 12b. Stems green
Tansy Mustard, *Sisymbrium canescens* var. *brachycarpon*.
- 13a. Pod short, not more than 3 times as long as wide (coarse plants,
preferring wet or sandy ground; flowers in summer) (Yellow
Cress) —14.
- 13b. Pod elongated, more than 4 times as long as wide —17.
- 14a. Stems creeping, with erect or ascending branches; flowers
about 8 mm. wide **Yellow Cress, *Radicula sylvestris*.**
- 14b. Stems erect or ascending (3—10 dm. high); flowers about
4 mm. wide —15.
- 15a. Pods about twice as long as the pedicels
Yellow Cress, *Radicula obtusa*.
- 15b. Pods about as long as the pedicels, or shorter than them —16.
- 16a. Plant glabrous or minutely pubescent
Yellow Cress, *Radicula palustris*.
- 16b. Plant hirsute **Yellow Cress, *Radicula palustris* var. *hispida*.**
- 17a. Petals 7 mm. long or more; pod terminating in a conspicuous
beak (coarse, weedy plants, 3—12 dm. high, blooming in sum-
mer) —18.
- 17b. Petals of smaller size; pod not terminating in a conspicuous
beak —24.
- 18a. Upper stem-leaves clasping at the base
Rutabaga, *Brassica campestris*.
- 18b. Upper stem-leaves not clasping —19.
- 19a. Pod tipped with a slender cylindrical beak whose base is much
narrower than the pod —20.
- 19b. Pod gradually narrowed at its tip into a stout, flattened or
angled beak —22.
- 20a. Leaves oblanceolate, rather regularly pinnatifid, the
terminal segment about the same size as the lateral ones
Sand Rocket, *Diplotaxis muralis*.
- 20b. Leaves broad, irregularly pinnatifid especially below the
middle, with a large terminal segment —21.

- 21a. Beak of pod 3—4 mm. long **Black Mustard, *Brassica nigra*.**
 21b. Beak of pod 5 mm. long or more
 Indian Mustard, *Brassica juncea*.
 22a. Leaves dentate or lobed **Charlock, *Brassica arvensis*.**
 22b. Leaves deeply pinnatifid —23.
 23a. Pod dehiscent when ripe by two valves, tipped with a flat or
 angled beak **White Mustard, *Brassica alba*.**
 23b. Pod indehiscent, with spongy cross-partitions between the seeds,
 tipped with a conical beak
 Wild Radish, *Raphanus raphanistrum*.
 24a. Terminal segment of the principal leaves much larger than
 the lateral segments; flowers in spring and summer —25.
 24b. Terminal segment of the principal leaves equaling or
 smaller than the lateral ones (5—10 dm. high; pods very long
 and slender; flowers in summer)
 ***Sisymbrium, Sisymbrium altissimum*.**
 25a. Flowers about 3 mm. wide; pods erect and closely appressed to
 the stem (3—9 dm. high; weed blooming in summer) (**Hedge
 Mustard**) —26.
 25b. Flowers about 7 mm. wide; pods spreading or ascending (3—6
 dm. high; flowers in spring) (**Winter Cress**) —27.
 26a. Pods pubescent **Hedge Mustard, *Sisymbrium officinale*.**
 26b. Pods glabrous
 Hedge Mustard, *Sisymbrium officinale* var. *leiocarpum*.
 27a. Lateral leaf-segments 5—8 pairs on the principal leaves
 Winter Cress, *Barbarea verna*.
 27b. Lateral leaf-segments 1—4 pairs on the principal leaves —28.
 28a. Flowers bright yellow, in racemes; pods spreading or
 ascending **Winter Cress, *Barbarea vulgaris*.**
 28b. Flowers pale yellow, in corymb-like clusters; pods erect and
 somewhat appressed **Winter Cress, *Barbarea stricta*.**
 29a. Principal stem-leaves compound or deeply lobed (the upper-
 most or bracteal leaves may be simple) —30.
 29b. Principal stem-leaves entire, dentate, serrate, or sometimes
 shallowly lobed or none (the basal leaves, at the surface of
 the ground, may be deeply lobed or compound) —42.
 30a. Leaves ternately divided or compound (2—5 dm. high;
 flowers in spring) (**Toothwort**) —31.
 30b. Leaves pinnately divided or compound —33.
 31a. Leaf-segments lanceolate or narrowly oblong
 Toothwort, *Dentaria laciniata*.
 31b. Leaf-segments ovate or ovate-oblong —32.
 32a. Stem-leaves 2, opposite or nearly opposite
 Toothwort, *Dentaria diphylla*.
 32b. Stem-leaves 2—5, alternate **Toothwort, *Dentaria maxima*.**

- 33a. Plants growing in water, or in mud near water (spring and summer) —34.
- 33b. Plants of dry or moist soil —35.
- 34a. Aerial leaves distinctly compound, with 3—11 leaflets
Water Cress, *Radicula nasturtium-aquaticum*.
- 34b. Aerial leaves merely serrate to pinnatifid; the submerged leaves, if present, dissected **Lake Cress, *Radicula aquatica*.**
- 35a. Flowers 5 mm. broad, or less —36.
- 35b. Flowers 6 mm. broad, or more —39.
- 36a. Stem-leaves irregularly pinnatifid or lobed; pod about as broad as long (2—4 dm. high; flowers in summer)
Garden Cress, *Lepidium sativum*.
- 36b. Stem-leaves distinctly pinnatifid, with 3—6 pairs of lateral segments (spring) (Bitter Cress) —37.
- 37a. Leaves chiefly basal, pubescent on the upper side (1—3 dm. tall)
Bitter Cress, *Cardamine hirsuta*.
- 37b. Stem-leaves conspicuous, glabrous on the upper side —38.
- 38a. Plant of dry soil; flowers about 3 mm. wide (1—4 dm. high)
Bitter Cress, *Cardamine parviflora*.
- 38b. Plant of moist or wet soil; flowers about 5 mm. wide (2—8 dm. high) **Bitter Cress, *Cardamine pennsylvanica*.**
- 39a. Leaves irregularly pinnatifid or lobed, not segmented into definitely paired divisions (coarse plants 4—8 dm. high; flowers in summer) —40.
- 39b. Leaves deeply segmented into 3—10 pairs of divisions —41.
- 40a. Flowers pink or white from the first
Radish, *Raphanus sativus*.
- 40b. Flowers yellow at first, turning white with age
Wild Radish, *Raphanus raphanistrum*.
- 41a. Flowers pink or white, appearing in spring (2—5 dm. high)
Cuckoo Flower, *Cardamine pratensis*.
- 41b. Flowers yellowish or cream-color; a weed blooming in summer (5—10 dm. high) ***Sisymbrium, Sisymbrium altissimum*.**
- 42a. A fleshy, much-branched plant of the shores of the Great Lakes, with a pod transversely divided into two joints (2—3 dm. high; summer) **Sea Rocket, *Cakile edentula*.**
- 42b. Pod not transversely divided into two joints —43.
- 43a. Pod short, its length not more than 3 times its diameter —44.
- 43b. Pod long and slender, its length more than 3 times its diameter —55.
- 44a. Pods not conspicuously flattened, thick and plump, about circular in cross-section (flowers in summer) —45.
- 44b. Pods distinctly flat —46.

- 45a. A plant escaped from cultivation in dry or moist soil, with very large basal leaves (5—10 dm. high)

Horse Radish, *Radicula armoracia*.

- 45b. A plant of water or very wet soil, the largest leaves seldom more than 15 cm. long (1—5 dm. tall)

Lake Cress, *Radicula aquatica*.

- 46a. Stem-leaves clasping the stem by an auricled base —47.

- 46b. Stem-leaves sessile or petioled, not clasping, or none —49.

- 47a. Stem and leaves glabrous or pubescent; pod very flat and circular, about 10 mm. wide (1—5 dm. tall; early summer)

Penny Cress, *Thlaspi arvense*.

- 47b. Stem and leaves glabrous or pubescent; pod not more than 5 mm. wide (1—6 dm. high; spring and early summer) —48.

- 48a. Pods broadly ovate **Field Cress, *Lepidium campestre*.**

- 48b. Pods triangular, or slightly indented at the apex

Shepherd's Purse, *Capsella bursa-pastoris*.

- 49a. Pods about circular, or a very little longer than broad —50.

- 49b. Pods ovoid or oblong, broadest near the middle, and distinctly longer than wide (Whitlow Grass) —53.

- 50a. Leaves entire (1—3 dm. high; flowers in summer)

Yellow Alyssum, *Alyssum alyssoides*.

- 50b. Leaves serrate (2—6 dm. high; flowers in summer) —51.

- 51a. Stamens 6

Garden Cress, *Lepidium sativum*.

- 51b. Stamens 2 (Pepper Grass) —52.

- 52a. Petals present

Pepper Grass, *Lepidium virginicum*.

- 52b. Petals none

Pepper Grass, *Lepidium apetalum*.

- 53a. Petals deeply 2-cleft (about 1 dm. high; early spring)

Whitlow Grass, *Draba verna*.

- 53b. Petals entire or barely notched at the tip —54.

- 54a. Leaves all or chiefly at or near the base (about 1 dm. high; spring)

Whitlow Grass, *Draba caroliniana*.

- 54b. Stems leafy up to the flowers (1—5 dm. high; summer)

Whitlow Grass, *Draba arabisans*.

- 55a. Stem-leaves cordate or sagittate at the base and sessile, forming a more or less clasping leaf (3—10 dm. high) (Rock Cress) —56.

- 55b. Stem-leaves sessile or somewhat petioled, but not clasping —63.

- 56a. Seeds in 2 rows in each cavity of the pod (early summer) —57.

- 56b. Seeds in 1 row in each cavity of the pod —59.

- 57a. Calyx pubescent; the pods reflexed

Rock Cress, *Arabis holboellii*.

- 57b. Calyx glabrous; the pods spreading or ascending —58.

- 58a. Basal leaves densely pubescent

Rock Cress, *Arabis brachycarpa*.

- 58b. Basal leaves smooth or nearly so

Rock Cress, *Arabis drummondii*.

- 59a. Petals conspicuous, about twice as long as the calyx, or longer; straight, erect, mostly unbranched plants —60.
- 59b. Petals inconspicuous, equaling or but little longer than the calyx —61.
- 60a. Pods 3—4 cm. long, ascending (summer)
Rock Cress, *Arabis patens*.
- 60b. Pods 8—10 cm. long, recurved (late spring)
Rock Cress, *Arabis laevigata*.
- 61a. Pods widely spreading; stem usually sparingly branched near the base (spring)
Rock Cress, *Arabis dentata*.
- 61b. Pods erect or appressed; stem usually unbranched (summer) —62.
- 62a. Stem-leaves and stem smooth and glaucous
Rock Cress, *Arabis glabra*.
- 62b. Stem-leaves and stem almost always pubescent, and never glaucous
Rock Cress, *Arabis hirsuta*.
- 63a. Principal stem-leaves 7—10 cm. long, or more —64.
- 63b. Principal stem-leaves 2—5 cm. long —65.
- 64a. Leaves lanceolate or oblong; flowers 10 mm. wide or less (3—7 dm. high; summer)
Rock Cress, *Arabis canadensis*.
- 64b. Leaves ovate or ovate-lanceolate; flowers 15—20 mm. wide (5—8 dm. high; late spring and summer)
Dame's Rocket, *Hesperis matronalis*.
- 65a. Basal leaves ovate to orbicular or cordate, not more than twice as long as broad (1—3 dm. high; spring) (Bitter Cress) —66.
- 65b. Basal leaves oblong, lanceolate, or oblanceolate, at least 3 times as long as broad (1—3 dm. high) —67.
- 66a. Flowers purple or rose color
Bitter Cress, *Cardamine douglassii*.
- 66b. Flowers white
Bitter Cress, *Cardamine bulbosa*.
- 67a. Basal leaves pinnatifid (spring and summer)
Rock Cress, *Arabis lyrata*.
- 67b. Basal leaves entire or toothed —68.
- 68a. Leaves narrowly oblanceolate; rare plant occurring from Mackinac northward (summer)
Rock Cress, *Braya humilis*.
- 68b. Leaves obovate or oblong; an introduced weed (spring)
Mouse-ear Cress, *Sisymbrium thalianum*.

CAPPARIDACEAE, the Caper Family

Herbs, with alternate compound leaves, 4 petals, and 6 or more stamens, which are about equal in length; fruit a 1-celled pod.

One species in Michigan, stamens about 11; leaflets 3 (2—4 dm. high; flowers yellowish, in summer)

Clammy-weed, *Polanisia graveolens*.

RESEDACEAE, the Mignonette Family

Herbs, with alternate leaves and terminal racemes of small yellowish flowers; sepals 6, petals 6, stamens numerous.

One species in Michigan, with divided leaves and irregularly cleft petals, blooming in summer **Yellow Mignonette, Reseda lutea.**

SARRACENIACEAE, the Pitcher Plant Family

Insectivorous plants, with hollow, pitcher-shaped leaves, and large purple flowers at the ends of naked stems.

One species in Michigan, growing in bogs and blooming in late spring
Pitcher Plant, *Sarracenia purpurea*.

DROSERACEAE, the Sundew Family

Insectivorous herbs, with a rosette of basal leaves bearing gland-tipped bristles on their upper surface, and with slender racemes of small white flowers in summer; inhabitants of bogs and swamps (2 dm. high, or less).

- 1a. Leaf-blade about as long as wide Sundew, *Drosera rotundifolia*.
1b. Leaf-blade about 2—3 times as long as wide
Sundew, *Drosera longifolia*.
1c. Leaf-blade about 5—8 times as long as wide
Sundew, *Drosera anglica*.
1d. Leaf-blade narrowly linear, about 10 times as long as wide
Sundew, *Drosera linearis*.

PODOSTEMACEAE, the River Weed Family

Small submerged aquatics, growing attached to stones in running water, with dissected leaves and minute flowers.

One species in Michigan **River Weed**, *Podostemum ceratophyllum*.

CRASSULACEAE, the Orpine Family

Herbs, with usually alternate leaves; the sepals, petals, and pistils each 4 or 5, or in one species the petals none, and the stamens as many or twice as many as the sepals.

- 1a. Leaves entire (Stonecrop) —2.
1b. Leaves toothed —3.
2a. Leaves 3—5 mm. long, very thick and fleshy (tufted plants
about 1 dm. high, with yellow flowers in summer)
Stonecrop, *Sedum acre*.
2b. Leaves 10—30 mm. long, flat (tufted plants 1—2 dm. high;
flowers white, in spring) **Stonecrop, *Sedum ternatum*.**

3a. Petals present, purple (2—5 dm. high; summer)

Live-for-ever, *Sedum purpureum*.

3b. Petals none (3—6 dm. high; summer)

Ditch Stonecrop, *Penthorum sedoides*.

SAXIFRAGACEAE, the Saxifrage Family

Herbs or shrubs, with alternate or opposite leaves; petals and sepals each 5, or the petals none; stamens 5 or 10; styles or stigmas 2—4.

1a. Shrubs with lobed leaves (3—15 dm. high; flowers in late spring) —2.

1b. Herbs —12.

2a. Stems thorny —3.

2b. Stems not thorny (Currant) —8.

3a. Flowers and fruits in racemes **Swamp Currant, *Ribes lacustre*.**

3b. Flowers and fruit in short clusters (Gooseberry) —4.

4a. Ovary and fruit prickly and bristly

Gooseberry, *Ribes cynosbati*.

4b. Ovary and fruit smooth, or sometimes a little glandular —5.

5a. Stamens equaling the ovate calyx-lobes in length, or a very little longer —6.

5b. Stamens distinctly longer than the linear calyx-lobes —7.

6a. Leaves glabrous beneath, or nearly so

Gooseberry, *Ribes oxycanthoides*.

6b. Leaves softly pubescent beneath

Gooseberry, *Ribes oxycanthoides* var. *calcicola*.

7a. Flowers, including the stamens, about 15 mm. long

Gooseberry, *Ribes gracile*.

7b. Flowers, including the stamens, about 8 mm. long

Gooseberry, *Ribes rotundifolium*.

8a. Calyx prolonged above the ovary into a tube which is longer than the sepals —9.

8b. Calyx-tube shorter than the ovary or none —10.

9a. Flowers greenish-yellow, inconspicuous; calyx-tube narrowly bell-shape **Black Currant, *Ribes floridum*.**

9b. Flowers bright yellow, conspicuous; calyx-tube narrow, with spreading lobes **Golden Currant, *Ribes aureum*.**

10a. Ovary and berry bristly with glandular hairs

Skunk Currant, *Ribes prostratum*.

10b. Ovary and fruit smooth, or with sessile glands —11.

- 11a. Leaves dotted beneath with resinous glands

Black Currant, *Ribes hudsonianum*.

- 11b. Leaves glabrous or pubescent beneath, without resinous glands
Red Currant, *Ribes triste*.

- 12a. Flowers minute, yellowish, without petals, in the axils of the leaves (1—2 dm. high; flowers in spring)

Golden Saxifrage, *Chrysosplenium americanum*.

- 12b. Flowers large, solitary, terminating erect stalks (leaves mostly basal; flowers white, in late summer; flower-stalks 1—5 dm. high) (*Grass-of-Parnassus*) —13.

- 12c. Flowers in terminal racemes, panicles, or clusters —15.

- 13a. Flowers less than 2 cm. wide; leaves narrowed to the base

***Grass-of-Parnassus, Parnassia parviflora*.**

- 13b. Flowers 2—3.5 cm. wide; leaves rounded or cordate at the base —14.

- 14a. A 3-cleft scale at the base of each petal

***Grass-of-Parnassus, Parnassia caroliniana*.**

- 14b. A many-cleft (9—15) scale at the base of each petal

***Grass-of-Parnassus, Parnassia palustris*.**

- 15a. Leaves linear to oblanceolate, 3 times as long as broad, or more, and pinnately veined (*Saxifrage*) —16.

- 15b. Leaves broadly ovate to nearly circular, frequently cordate at the base, and always palmately veined or lobed —20.

- 16a. Leaves basal; the flower-stalk bearing no leaves except small ones at the base of its branches —17.

- 16b. Flower-stalk leafy below (1—3 dm. high; flowers yellow, summer) —18.

- 17a. Petals white; sepals erect; leaves conspicuously toothed, 3—10 cm. long (1—3 dm. high; spring)

***Saxifrage, Saxifraga virginensis*.**

- 17b. Petals greenish; sepals reflexed; leaves minutely toothed or entire, 10—30 cm. long (5—10 dm. high; spring)

***Saxifrage, Saxifraga pennsylvanica*.**

- 18a. Leaves with 3 sharp teeth at the apex

***Saxifrage, Saxifraga tricuspidata*.**

- 18b. Leaves with numerous teeth or entire —19.

- 19a. Leaves linear, chiefly on the stem ***Saxifrage, Saxifraga aizoides*.**

- 19b. Leaves spatulate, chiefly in a basal rosette

***Saxifrage, Saxifraga aizoon*.**

- 20a. Stamens 5 (leaves mostly basal; flowers greenish or purplish in late spring, on stalks 5—10 dm. high) (*Alum Root*) —21.

- 20b. Stamens 10 (flowers white, in spring) —23.

- 21a. Flowers regular

***Alum Root, Heuchera americana*.**

- 21b. Flowers irregular, the calyx oblique, longer on the upper side than on the lower —22.

22a. Stamens projecting beyond the calyx

Alum Root, *Heuchera hirsuticaulis*.

22b. Stamens not projecting beyond the calyx

Alum Root, *Heuchera hispida*.

23a. Stem-leaves alternate or none —24.

23b. Stem with a pair of opposite leaves (2—4 dm. high)

Bishop's Cap, *Mitella diphylla*.

24a. Petals deeply fringed (1—2 dm. high)

Bishop's Cap, *Mitella nuda*.

24b. Petals entire (1—3 dm. high)

False Mitrewort, *Tiarella cordifolia*.

HAMAMELIDACEAE, the Witch Hazel Family

Shrubs, with alternate simple leaves; sepals, petals, and stamens each 4; ovary 2-lobed.

One species in Michigan; tall shrub with obovate leaves and yellow flowers appearing late in autumn

Witch Hazel, *Hamamelis virginiana*.

PLATANACEAE, the Plane Tree Family

Trees, with broad, palmately veined and lobed leaves, and minute flowers in dense spherical heads.

One species in Michigan

Sycamore, *Platanus occidentalis*.

ROSACEAE, the Rose Family

Trees, herbs, or shrubs, with alternate, frequently compound leaves; petals and sepals usually 5, stamens numerous, pistils 1 to many; receptacle expanded into a saucer-shape or cup-shape organ, bearing the sepals, petals, and stamens at its margin, the pistils at its center, and resembling a calyx-tube or flattened calyx.

1a. Shrubs or trees —2.

1b. Herbaceous plants —48.

2a. Leaves compound —3.

2b. Leaves simple —24.

3a. Flowers in large panicles or corymbs, each flower 5—10 mm. across; leaflets 7 or more —4.

3b. Flowers solitary or in small clusters, each flower usually 20—80 mm. wide; leaflets frequently only 3 or 5 —7.

4a. Flowers in a pyramidal or oblong panicle, the ovaries superior (1—2 m. high; flowers white, in summer) —70b.

4b. Flowers in rounded or hemispheric clusters, the ovary inferior —5.

- 5a. Leaves pubescent on the lower surface
Rowan Tree, *Pyrus aucuparia*.
- 5b. Leaves glabrous beneath when mature (small trees; flowers white, in early summer or late spring) (Mountain Ash) —6.
- 6a. Leaves acuminate at the apex
Mountain Ash, *Pyrus americana*.
- 6b. Leaves obtuse or acute at the apex
Mountain Ash, *Pyrus sitchensis*.
- 7a. Flowers yellow (5—10 dm. high; summer)
Cinquefoil, *Potentilla fruticosa*.
- 7b. Flowers pink or red, rarely white, 4—10 cm. across (shrubs, 5—15 dm. high, or climbing; stems usually thorny; flowers in early summer) (Rose) —8.
- 7c. Flowers white, 1—3 cm. across (4—20 dm. high; flowers in late spring) —16.
- 8a. Leaflets on most of the leaves 3; styles cohering in a column which protrudes from among the stamens
Climbing Rose, *Rosa setigera*.
- 8b. Leaflets 5—11; styles not cohering in a protruding column—9.
- 9a. Sepals persistent on the fruit after flowering —10.
- 9b. Sepals soon deciduous from the young fruit after flowering —14.
- 10a. A pair of spines below each leaf larger than the other spines —11.
- 10b. Spines all alike in size or nearly so, or absent completely —12.
- 11a. Sepals entire
Wild Rose, *Rosa woodsii*.
- 11b. Sepals pinnatifid
Dog Rose, *Rosa canina*.
- 12a. Stems with few thorns or none at all
Wild Rose, *Rosa blanda*.
- 12b. Stems prickly —13.
- 13a. Fruit somewhat pear-shape, narrowed toward the base.
Wild Rose, *Rosa acicularis*.
- 13b. Fruit globose, rounded at the base
Wild Rose, *Rosa acicularis* var. *bourgeauiana*.
- 14a. The pair of spines at the base of each leaf straight or nearly so
Wild Rose, *Rosa humilis*.
- 14b. The pair of spines at the base of each leaf distinctly recurved or hooked —15.
- 15a. Leaves densely glandular-pubescent beneath
Sweetbrier, *Rosa rubiginosa*.
- 15b. Leaves glabrous or minutely pubescent
Swamp Rose, *Rosa carolina*.
- 16a. Stems trailing or creeping —17.
- 16b. Stems erect, ascending, or arched —19.

17a. Stems distinctly shrubby and thorny (Dewberry) —18.

17b. Stems almost herbaceous, without thorns

Dwarf Raspberry, *Rubus triflorus*.

18a. Leaves thin, dull above; fruit black, large and juicy

Dewberry, *Rubus villosus*.

18b. Leaves firm or thick, shining above; fruit reddish, small, consisting of a few sour drupelets

Swamp Dewberry, *Rubus hispidus*.

19a. Ripe fruit dropping away from the white receptacle or core; terminal leaflet of each leaf with a long stalk, while the lateral leaflets are sessile or nearly so (Raspberry) —20.

19b. Ripe fruit and receptacle or core dropping together; all the leaflets on stalks which are approximately equal in length (Blackberry) —22.

20a. Stem very glaucous with a whitish or bluish waxy deposit; fruit black

Black Raspberry, *Rubus occidentalis*.

20b. Stem not glaucous; fruit red —21.

21a. Calyx velvety-pubescent

Red Raspberry, *Rubus idaeus*.

21b. Calyx bristly-hispid

Red Raspberry, *Rubus idaeus* var. *aculeatissimus*.

22a. Pedicels with gland-tipped hairs, but no prickles

Blackberry, *Rubus allegheniensis*.

22b. Pedicels with prickles

Blackberry, *Rubus nigricans*.

22c. Pedicels with neither prickles nor gland-tipped hairs —23.

23a. Leaves downy beneath

Blackberry, *Rubus frondosus*.

23b. Leaves smooth beneath

Blackberry, *Rubus canadensis*.

24a. Ovaries 1 or more, superior (attached to the surface of the receptacle, but not concealed within it or united to it) —25.

24b. Ovary 1, inferior (permanently enclosed within the receptacle, with only the styles protruding) —38.

25a. Ovaries more than 1 —26.

25b. Ovary 1 —30.

26a. Leaves serrate —27.

26b. Leaves lobed —28.

27a. Leaves glabrous or very nearly so (8—20 dm. high; flowers white or pinkish, summer)

Meadow-sweet, *Spiraea salicifolia*.

27b. Leaves closely pubescent beneath (5—15 dm. high; flowers pink, summer)

Hardhack, *Spiraea tomentosa*.

28a. Flowers showy, purple or white, 3—4 cm. broad —29.

28b. Flowers white, about 1 cm. wide (1—3 m. high; flowers in early summer)

Ninebark, *Physocarpus opulifolius*.

- 29a. Flowers purple **Flowering Raspberry, *Rubus odoratus*.**
29b. Flowers white **Salmonberry, *Rubus parviflorus*.**
- 30a. Flowers in racemes (trees or tall shrubs; flowers white, in late spring) —31.
30b. Flowers in small umbels or corymbs (flowers white, in spring) —32.
- 31a. Leaves oblong, the points of their teeth incurved **Black Cherry, *Prunus serotina*.**
31b. Leaves obovate, the points of their teeth spreading **Choke Cherry, *Prunus virginiana*.**
- 32a. Flowers about 1 cm. wide —33.
32b. Flowers about 1.5—2.5 cm. wide —36.
- 33a. Low shrubs, with the spatulate or oblong leaves widest above the middle —34.
33b. Erect tall shrubs or small trees, with the leaves widest below the middle —35.
- 34a. An erect shrub (5—10 dm. high) **Appalachian Cherry, *Prunus cuneata*.**
34b. A prostrate or ascending shrub (3—15 dm. high) **Sand Cherry, *Prunus pumila*.**
- 35a. Leaves very broadly ovate, almost as wide as long (small tree) **Perfumed Cherry, *Prunus mahaleb*.**
35b. Leaves oblong-lanceolate, about 3 times as long as broad (shrub or small tree, 2—10 m. high) **Pin Cherry, *Prunus pennsylvanica*.**
- 36a. Sepals glandular-serrate (tall shrub or small tree) **Wild Plum, *Prunus nigra*.**
36b. Sepals entire —37.
- 37a. Leaves with sharp teeth, frequently bristle-tipped; a native species (tall shrub or small tree, frequently growing in thickets) **Wild Plum, *Prunus americana*.**
37b. Leaves with obtuse teeth; a species escaped from cultivation (widely branched tree) **Cherry, *Prunus cerasus*.**
- 38a. Trees, in cultivation or escaped from cultivation near roads or dwellings, with showy flowers 2.5—5 cm. across, edible fruits, and no thorns (spring) —39.
38b. Native species, trees or shrubs, growing in woods, fields, or thickets; frequently with thorns (spring) —40.
- 39a. Leaves finely serrulate or entire **Pear, *Pyrus communis*.**
39b. Leaves coarsely serrate or somewhat lobed **Apple, *Pyrus malus*.**
- 40a. Shrubs or small trees, without thorns —42.
40b. Bushy trees or shrubs, with thorns or stiff thorn-like branches, and with flowers generally 1.5—2.5 cm. across —41.
- 41a. Flowers pink, very fragrant **Wild Crab, *Pyrus coronaria*.**
41b. Flowers white (Hawthorn, the genus *Crataegus*). Several species of this genus occur in the state, for the identification of which the Manual must be used.

- 42a. Mid-vein glandular above (shrubs 1—3 m. tall; flowers white or pink) (Chokeberry) —43.
- 42b. Mid-vein not glandular (shrubs or trees, 1—10 m. tall; flowers white) (Juneberry) —44.
- 43a. Leaves glabrous beneath **Chokeberry, *Pyrus melanocarpa*.**
- 43b. Leaves tomentose beneath **Chokeberry, *Pyrus arbutifolia* var. *atropurpurea*.**
- 44a. Petals 15—25 mm. long —45.
- 44b. Petals 5—12 mm. long —46.
- 45a. Mature leaves glabrous **Juneberry, *Amelanchier canadensis*.**
- 45b. Mature leaves pubescent beneath **Juneberry, *Amelanchier canadensis* var. *botryapium*.**
- 46a. Flowers in racemes —47.
- 46b. Flowers solitary, or in small clusters of 2—4 **Juneberry, *Amelanchier oligocarpa*.**
- 47a. Leaves coarsely dentate, with about 1 tooth for each lateral vein **Juneberry, *Amelanchier spicata*.**
- 47b. Leaves finely serrate, with about 2—3 teeth for each lateral vein **Juneberry, *Amelanchier oblongifolia*.**
- 48a. Flowers yellow —49.
- 48b. Flowers white, pink, purple, or rose, never yellow —63.
- 49a. Plant with basal trifoliate leaves, resembling strawberry (1—3 dm. high; late spring) **Barren Strawberry, *Waldsteinia fragarioides*.**
- 49b. Plants with leafy stems —50.
- 50a. Flowers solitary in the axils of foliage leaves, on long peduncles (trailing or creeping plants; flowers in late spring and summer) —51.
- 50b. Flowers in narrow terminal spike-like racemes (3—8 dm. high; summer) (Agrimony) —52.
- 50c. Flowers in irregular or spreading clusters —55.
- 51a. Leaflets 5 **Five-finger, *Potentilla canadensis*.**
- 51b. Leaflets 7—25 **Silver Weed, *Potentilla anserina*.**
- 52a. Principal leaflets more than 3 times (about $3\frac{1}{2}$) as long as wide **Agrimony, *Agrimonia parviflora*.**
- 52b. Principal leaflets less than 3 times (about $2\frac{1}{2}$) as long as wide —53.
- 53a. Leaves nearly glabrous beneath, or with scattered spreading hairs **Agrimony, *Agrimonia gryposepala*.**
- 53b. Leaves softly pubescent beneath —54.
- 54a. Leaves distinctly glandular beneath **Agrimony, *Agrimonia striata*.**
- 54b. Leaves not glandular beneath **Agrimony, *Agrimonia mollis*.**

- 55a. Principal leaves palmately compound with 5—7 leaflets (Cinquefoil) —56.
- 55b. Principal stem-leaves with 3 leaflets, or pinnately compound with several leaflets —58.
- 56a. Leaves silvery-white beneath, laciniately toothed (1—4 dm. high; late spring and summer)
Silvery Cinquefoil, *Potentilla argentea*.
- 56b. Leaves not silvery-white beneath (3—10 dm. high; summer) —57.
- 57a. Terminal leaflet more than 3 times as long as wide
Cinquefoil, *Potentilla recta*.
- 57b. Terminal leaflet less than 3 times as long as wide
Cinquefoil, *Potentilla intermedia*.
- 58a. Flowers about 4 mm. wide (2—6 dm. high; spring)
Spring Avens, *Geum vernum*.
- 58b. Flowers 6 mm. wide, or wider —59.
- 59a. Principal leaves with lobed leaflets, of which the terminal is the largest; leaf-axis bearing also some small leaflets between those of usual size (4—12 dm. high; late spring and summer) (Avens) —60.
- 59b. Principal leaves with toothed or pinnately cleft leaflets, the lateral ones about equaling the terminal one in size, and without any small scattered leaflets (3—8 dm. tall; summer) (Cinquefoil) —61.
- 60a. Terminal leaflet cordate at base **Avens, *Geum macrophyllum*.**
- 60b. Terminal leaflet wedge-shape or acute at base
Avens, *Geum strictum*.
- 61a. Leaflets 3 **Cinquefoil, *Potentilla monspeliensis*.**
- 61b. Leaflets 5—15 —62.
- 62a. Leaflets crenate **Cinquefoil, *Potentilla paradoxa*.**
- 62b. Leaflets deeply incised
Cinquefoil, *Potentilla pennsylvanica*.
- 63a. Leaves all basal, the flowers on leafless stalks —64.
- 63b. Stem-leaves present —66.
- 64a. Leaves simple (1—2 dm. high; summer)
Dalibarda, *Dalibarda repens*.
- 64b. Leaves trifoliate (1—2 dm. high; spring) (Strawberry) —65.
- 65a. Leaflets thick and firm, the petioles and pedicels pubescent with spreading or ascending hairs; fruit subglobose, the achenes embedded in pits on its surface
Strawberry, *Fragaria virginiana*.
- 65b. Leaflets thin, the petioles and pedicels nearly glabrous or with appressed hairs; fruit conic, the achenes on its surface
Wood Strawberry, *Fragaria americana*.
- 66a. Leaves pinnate with numerous leaflets —67.
- 66b. Stem-leaves with 3—5 leaflets —72.

LEGUMINOSAE, the Pulse Family

Trees, shrubs, or herbs, with alternate compound (except 3 species with simple) leaves and stipules; flowers usually irregular (except in a few species), with a large upper petal and 4 smaller ones, the 2 lower enclosing the stamens and pistil; stamens almost always 10, and generally united by their filaments; pistil 1, simple, ripening into a pod.

- 1a. Shrubs or trees —2.
- 1b. Herbs, twining, but without tendrils —9.
- 1c. Herbs; the leaves, or some of them, tipped with tendrils —12.
- 1d. Herbs, not climbing or twining; tendrils none —21.
 - 2a. Leaves simple —3.
 - 2b. Leaves compound —4.
- 3a. Leaves broadly cordate (tall shrub or small tree; flowers pink, early spring) **Redbud, *Cercis canadensis*.**
- 5b. Leaves lanceolate or elliptical (3—6 dm. high; flowers yellow, summer) **Dyer's Greenweed, *Genista tinctoria*.**
- 4a. Twigs or branches thorny —5.
- 4b. Thorns none —7.
- 5a. Thorns branched, scattered on the stem (tall tree; flowers greenish, early summer) **Honey Locust, *Gleditsia triacanthos*.**
- 5b. Thorns unbranched, a pair of them at the base of each leaf (late spring) —6.
 - 6a. Branches glabrous or nearly so (tree; flowers white) **Black Locust, *Robinia pseudo-acacia*.**
 - 6b. Branches glandular-pubescent (tall shrub; flowers pinkish) **Clammy Locust, *Robinia viscosa*.**
 - 6c. Branches bristly (shrub, 1—3 m. high; flowers pink) **Bristly Locust, *Robinia hispida*.**
- 7a. Trees; leaves 2—3-pinnate (flowers greenish-white, spring) **Kentucky Coffee-tree, *Gymnocladus dioica*.**
- 7b. Low shrubs; leaves once-pinnate (3—6 dm. high; summer) —8.
 - 8a. Flowers bright-blue, each with a single petal **Lead Plant, *Amorpha canescens*.**
 - 8b. Flowers yellowish and pink-purple, petals 5 —26a.
- 9a. Leaflets 5—7; flowers in racemes (purplish, late summer) **Wild Bean, *Apios tuberosa*.**
- 9b. Leaflets 3 (flowers greenish, purple, or white, late summer) —10.
 - 10a. Flowers in small capitate clusters; lower 2 petals strongly incurved **Wild Bean, *Strophostyles helvola*.**
 - 10b. Flowers in racemes (Hog Peanut) —11.

- 11a. Stem pubescent or glabrate; leaflets seldom more than 5 cm. long
Hog Peanut, *Amphicarpa monoica*.
- 11b. Stem villous with retrorse hairs; leaflets usually longer than 5 cm.
Hog Peanut, *Amphicarpa pitcheri*.
- 12a. Style with a tuft of hairs at the apex; lateral petals of the corolla adherent to the lower ones as far as the middle; stipules less than 10 mm. long, and usually less than one-fourth the length of the lower leaflets (spring and summer) (Vetch) —13.
- 12b. Style hairy along the inner side; lateral petals of the corolla free from the lower ones or adherent only at the very base; stipules more than 8 mm. long and usually one-third or more the length of the lower leaflets (late spring and summer) —17.
- 13a. Flowers axillary, sessile or nearly so (flowers purple) —14.
- 13b. Flowers in peduncled racemes —15.
 - 14a. Upper leaves oblong-obovate, truncate or notched, and mucronate at the apex
Spring Vetch, *Vicia sativa*.
 - 14b. Upper leaves lance-linear, sharply acute
Common Vetch, *Vicia angustifolia*.
- 15a. Flowers 15—20 mm. long, 4—8 in a cluster (flowers purple)
Vetch, *Vicia americana*.
- 15b. Flowers 8—12 mm. long —16.
 - 16a. Racemes one-sided; flowers blue
Vetch, *Vicia cracca*.
 - 16b. Racemes loosely flowered, not one-sided; flowers whitish, the lower petals tipped with blue
Vetch, *Vicia caroliniana*.
- 17a. Flowers yellowish-white
Vetchling, *Lathyrus ochroleucus*.
- 17b. Flowers purple —18.
 - 18a. Stipules nearly regularly halberd-shape, almost as large as the leaflets
Beach Pea, *Lathyrus maritimus*.
 - 18b. Stipules half-sagittate, apparently attached laterally near the middle —19.
- 19a. Leaflets 4—8 pairs, ovate; racemes with 10 or more flowers
Wild Pea, *Lathyrus venosus*.
- 19b. Leaflets 2—4 pairs, linear to oblong or elliptical; racemes with 2—9 flowers (Marsh Pea) —20.
 - 20a. Stems with a membranous wing on the margins
Marsh Pea, *Lathyrus palustris*.
 - 20b. Stems angled, but not winged
Marsh Pea, *Lathyrus palustris* var. *myrtifolius*.
- 21a. Leaves simple (2—3 dm. high; flowers yellow, summer)
Rattlebox, *Crotalaria sagittalis*.
- 21b. Leaves palmately compound; leaflets 7—11 (3—6 dm. high; flowers blue, late spring)
Lupine, *Lupinus perennis*.
- 21c. Leaves pinnately compound; leaflets 5 to many —22.
- 21d. Leaves compound; leaflets 3 —28.

- 22a. Leaflets 5; flowers rose-purple in a spike-like head (5—8 dm. high, late summer)

Prairie Clover, *Petalostemum purpureum*.

- 22b. Leaflets more than 5 —23.

- 23a. Flowers bright-blue, in a dense spike (3—6 dm. high; summer) —8a.

- 23b. Flowers bright-yellow; stamens not united (summer) —24.

- 23c. Flowers white, cream-color, or yellowish, or marked with purple —26.

- 24a. Leaflets linear-oblong, 2 cm. long or less; stamens 5 or 10 (3—6 dm. high) (Partridge Pea) —25.

- 24b. Leaflets lanceolate-oblong, 2—5 cm. long; 7 stamens with normal anthers and 3 with imperfect anthers (8—15 dm. high)

Wild Senna, *Cassia marilandica*.

- 25a. Anthers 10; flowers 2—4 cm. wide

Partridge Pea, *Cassia chamaecrista*.

- 25b. Anthers 5; flowers 5—10 mm. wide

Partridge Pea, *Cassia nictitans*.

- 26a. Silky-hairy with whitish hairs; flowers marked with purple (3—5 dm. high; summer) **Goat's Rue, *Tephrosia virginiana*.**

- 26b. Glabrous or nearly so (summer) (Milk Vetch) —27.

- 27a. Flowers greenish cream-color (4—10 dm. high)

Milk Vetch, *Astragalus canadensis*.

- 27b. Flowers white (3—5 dm. high)

Milk Vetch, *Astragalus neglectus*.

- 28a. Flowers in heads, umbels, or short dense spikes —29.

- 28b. Flowers in loose racemes or panicles —42.

- 29a. Flowers bright-yellow; decumbent or ascending plants (spring and summer) —30.

- 29b. Flowers white, cream, purple, or red; never yellow —34.

- 30a. Whole flower only about 2 mm. long; pod coiled —31.

- 30b. Flowers larger, each one 3—6 mm. long; pod straight (1—4 dm. high) (Hop Clover) —32.

- 31a. Flowers numerous in each head

Black Medick, *Medicago lupulina*.

- 31b. Flowers in clusters of 2—20

Bur Clover, *Medicago hispida*.

- 32a. Stipules linear

Hop Clover, *Trifolium agrarium*.

- 32b. Stipules ovate —33.

- 33a. Heads densely flowered; flowers 20 or more; upper petal striate when dry

Hop Clover, *Trifolium procumbens*.

- 33b. Heads loosely flowered; flowers usually 10 or fewer; upper petal scarcely striate or not at all

Hop Clover, *Trifolium dubium*.

- 34a. Leaves palmately compound, the 3 leaflets all from the same point (late spring and summer) (Clover) —35.

- 34b. Leaves pinnately compound, the terminal leaflet on a distinct stalk —39.

- 35a. Individual flowers sessile, or on very short pedicels —36.
 35b. Individual flowers distinctly pedicelled —37.
- 36a. Heads oblong, on distinct peduncles; calyx longer than the corolla (flowers nearly white; 1—4 dm. tall)
Stone Clover, *Trifolium arvense*.
- 36b. Heads nearly globose, almost sessile, closely subtended by the leaves; corolla longer than the calyx (2—8 dm. high; flowers red-purple)
Red Clover, *Trifolium pratense*.
- 37a. Stems prostrate or creeping; heads long-peduncled, arising from the creeping branches (flower-stalks 1—2 dm. high; flowers white)
White Clover, *Trifolium repens*.
- 37b. Some or all of the stems erect; heads arising from the leafy stems (flowers white or pink) —38.
- 38a. Plants with long basal runners; flowers 10—13 mm. long (2—3 dm. high)
Buffalo Clover, *Trifolium stoloniferum*.
- 38b. Basal runners none; flowers 6—8 mm. long (3—8 dm. high)
Alsike Clover, *Trifolium hybridum*.
- 39a. Prostrate; leaflets broadly ovate; flowers 3—10 in a cluster —10a.
- 39b. Erect; leaflets broadest near the middle; flowers numerous (5—12 dm. high; flowers yellowish-white, late summer) (Bush Clover) —40.
- 40a. Leaflets less than twice as long as broad
Bush Clover, *Lespedeza hirta*.
- 40b. Leaflets more than twice as long as broad —41.
- 41a. Leaflets linear, 5 mm. wide or less; heads with obvious peduncles
Bush Clover, *Lespedeza angustifolia*.
- 41b. Leaflets narrowly elliptical, the principal ones more than 5 mm. wide; heads sessile or nearly so
Bush Clover, *Lespedeza capitata*.
- 42a. Leaflets finely toothed —43.
- 42b. Leaflets entire —44.
- 43a. Flowers violet or blue (3—6 dm. high; summer)
Alfalfa, *Medicago sativa*.
- 43b. Flowers yellow (1—2 m. high; summer)
Yellow Sweet Clover, *Melilotus officinalis*.
- 43c. Flowers white (1—3 m. high; summer)
White Sweet Clover, *Melilotus alba*.
- 44a. Flowers yellow (5—10 dm. high; summer)
Wild Indigo, *Baptisia tinctoria*.
- 44b. Flowers white, the leaflets all from the same point (5—10 dm. high; summer)
Wild Indigo, *Baptisia leucantha*.
- 44c. Flowers blue, purple, or pink (rarely white, and then the terminal leaflet stalked) —45.

- 45a. Racemes arising from the base of the plant, leafless (4—8 dm. high; summer) **Tick Trefoil, Desmodium nudiflorum.**
- 45b. Racemes terminal or a few of them axillary; leaflets generally more than 3 cm. long; pod (usually to be seen at the base of the raceme) transversely segmented into 2 or more joints (summer) (Tick Trefoil; the genus Desmodium. Pods are usually necessary for satisfactory identification) —46.
- 45c. Racemes short, loose, chiefly axillary; leaflets generally less than 3 cm. long; the short ovate or ovoid pod not transversely jointed (5—10 dm. high; flowers in summer) (Bush Clover; the genus Lespedeza. Reference to the Manual is recommended) —58.
- 46a. Leaves clustered near the summit of the stem (4—12 dm. high) **Tick Trefoil, Desmodium grandiflorum.**
- 46b. Leaves scattered on the stem —47.
- 47a. Plants prostrate; racemes paniced; leaflets nearly circular **Tick Trefoil, Desmodium rotundifolium.**
- 47b. Plants decumbent or ascending; racemes short, simple, few-flowered; stipules ovate (stems 4—8 dm. long) **Tick Trefoil, Desmodium paniculatum.**
- 47c. Plants erect or ascending; racemes paniced —48.
- 48a. Leaflets of an oblong type, broadest at or near the middle, and about 4 times as long as broad (5—10 dm. tall) —49.
- 48b. Leaflets of an ovate or lanceolate type, broadest below the middle, and not more than 3 times as long as wide —50.
- 49a. Stem pubescent; leaves sessile or nearly so **Tick Trefoil, Desmodium sessilifolium.**
- 49b. Stem glabrous or nearly so; leaves obviously petioled **Tick Trefoil, Desmodium paniculatum.**
- 50a. Stipules lanceolate to ovate, 1 cm. long or more (6—15 dm. high) —51.
- 50b. Stipules narrowly lanceolate or subulate, less than 1 cm. long —54.
- 51a. Stems glabrous or minutely pubescent; leaves acuminate —52.
- 51b. Stems hispid or densely pubescent; leaves ovate or ovate-lanceolate, obtuse or barely acute —53.
- 52a. Leaves glabrous on both sides **Tick Trefoil, Desmodium bracteosum.**
- 52b. Leaves rough above, hairy beneath **Tick Trefoil, Desmodium bracteosum var. longifolium.**
- 53a. Leaflets broadly ovate **Tick Trefoil, Desmodium canescens.**
- 53b. Leaflets ovate-lanceolate **Tick Trefoil, Desmodium illinoense.**
- 54a. Flowers 10—12 mm. long (1—2 m. high) **Tick Trefoil, Desmodium canadense.**
- 54b. Flowers 5—8 mm. long (5—8 dm. tall) —55.
- 54c. Flowers 3—4 mm. long (4—8 dm. tall) —56.

- 55a. Leaflets broadly ovate **Tick Trefoil, *Desmodium viridiflorum*.**
- 55b. Leaflets oblong-ovate **Tick Trefoil, *Desmodium dillenii*.**
- 56a. Leaflets 3—5 cm. long, oblong-ovate, scabrous above **Tick Trefoil, *Desmodium rigidum*.**
- 56b. Leaflets 1—2.5 cm. long, broadly ovate or oval, not scabrous above —57.
- 57a. Stem and leaves glabrous or very nearly so **Tick Trefoil, *Desmodium marilandicum*.**
- 57b. Stem and leaves conspicuously pubescent **Tick Trefoil, *Desmodium obtusum*.**
- 58a. Flower-clusters sessile, or on peduncles shorter than the subtending leaves —59.
- 58b. Flower-clusters, or many of them, on peduncles longer than the leaves —61.
- 59a. Leaves linear-oblong **Bush Clover, *Lespedeza virginica*.**
- 59b. Leaves ovate or oval —60.
- 60a. Leaves and stem velvety or downy **Bush Clover, *Lespedeza stuevei*.**
- 60b. Leaves and stem glabrous, or with close appressed pubescence **Bush Clover, *Lespedeza frutescens*.**
- 61a. Leaves ovate or broadly elliptical; corolla conspicuously exceeding the calyx —62.
- 61b. Leaves linear-oblong; calyx about as long as the corolla **Bush Clover, *Lespedeza manniana*.**
- 62a. Stem erect or ascending —63.
- 62b. Stem trailing; peduncles much exceeding the leaves **Bush Clover, *Lespedeza procumbens*.**
- 63a. Villous-pubescent; inflorescence dense; some peduncles shorter than the leaves **Bush Clover, *Lespedeza nuttallii*.**
- 63b. Slightly pubescent or glabrous; inflorescence loose, on peduncles much longer than the leaves **Bush Clover, *Lespedeza violacea*.**

LINACEAE, the Flax Family

Herbs with simple leaves, and regular flowers, having 5 sepals, 5 yellow or blue petals, 5 stamens, and 5 styles.

- 1a. Flowers blue (3—6 dm. high; summer) **Flax, *Linum usitatissimum*.**
- 1b. Flowers yellow (3—8 dm. high; summer) (Wild Flax) —2.
- 2a. Middle stem-leaves below the branches opposite **Wild Flax, *Linum striatum*.**
- 2b. Middle stem-leaves below the branches alternate —3.
- 3a. Leaves narrowly lanceolate to linear, 1—4 mm. wide —4.
- 3b. Leaves oblanceolate to oblong, 4—6 mm. wide **Wild Flax, *Linum virginianum*.**
- 4a. Leaves entire **Wild Flax, *Linum medium*.**
- 4b. Upper leaves glandular-ciliate **Wild Flax, *Linum sulcatum*.**

OXALIDACEAE, the Wood Sorrel Family

Herbs, with alternate or basal compound leaves with 3 reverse heart-shape leaflets; sepals, petals, and styles each 5; stamens 10. (Wood Sorrel)

1a. Leaves all basal; flowers white to pink-purple (1—2 dm. high; late spring) —2.

1b. Stem-leaves present; flowers yellow (1—5 dm. high; spring and summer) —3.

2a. Flower-stalks bearing a single flower

Wood Sorrel, *Oxalis acetosella*.

2b. Flower-stalks bearing an umbel of several flowers

Wood Sorrel, *Oxalis violacea*.

3a. Stem prostrate and creeping

Wood Sorrel, *Oxalis repens*.

3b. Stem erect or ascending —4.

4a. Pedicels with spreading pubescence

Wood Sorrel, *Oxalis corniculata*.

4b. Pedicels with appressed pubescence

Wood Sorrel, *Oxalis stricta*.

GERANIACEAE, the Geranium Family

Herbs, with deeply lobed or divided leaves; flowers regular, with 5 sepals, 5 petals, 5 or 10 stamens, and a 5-celled ovary.

1a. Anthers 5 (spreading or ascending plants, 2—4 dm. high; flowers pink or purple, spring and summer) —2.

1b. Anthers 10 —3.

2a. Leaves pinnately dissected

Stork's-bill, *Erodium cicutarium*.

2b. Leaves palmately divided into cuneate lobes

Crane's-bill, *Geranium pusillum*.

3a. Leaves ternately divided, the lobes pinnatifid (2—4 dm. high; flowers purple, late spring and summer)

Herb Robert, *Geranium robertianum*.

3b. Leaves palmately 3—11-lobed —4.

4a. Petals 12 mm. long or more (3—6 dm. high; flowers pale purple, spring)

Wild Geranium, *Geranium maculatum*.

4b. Petals less than 10 mm. long (Crane's-bill) —5.

- 5a. Seed-bearing portion of the pistil smooth, glabrous or nearly so (low spreading plant; flowers purple, late spring and summer) **Crane's-bill, *Geranium columbinum*.**
- 5b. Seed-bearing portion of the pistil transversely wrinkled (widely branching, 1—3 dm. tall; flowers purple, summer) **Crane's-bill, *Geranium molle*.**
- 5c. Seed-bearing portion of the pistil pubescent (widely branching, 1—5 dm. tall) —6.
- 6a. Leaves divided almost to the base (flowers pinkish or white, spring and summer) —7.
- 6b. Leaves divided one-half to two-thirds the way to the base (flowers purple, summer) **Crane's-bill, *Geranium rotundifolium*.**
- 7a. Petals white or pale pink; flowers in compact clusters **Crane's-bill, *Geranium carolinianum*.**
- 7b. Petals pink-purple; flowers in loose clusters **Crane's-bill, *Geranium bicknellii*.**

RUTACEAE, the Rue Family

Shrubs or low trees, with compound leaves frequently dotted with translucent glands; flowers small, greenish-white, with 3—5 sepals, petals, and stamens.

- 1a. Leaflets 5—9; stems thorny **Prickly Ash, *Zanthoxylum americanum*.**
- 1b. Leaflets 3; stems not thorny **Hop Tree, *Ptelea trifoliata*.**

SIMARUBACEAE, the Quassia Family

Trees, with pinnately compound leaves and small greenish-yellow flowers in large panicles in early summer, ripening into winged fruits.

- One species in Michigan, escaped from cultivation chiefly in towns **Tree of Heaven, *Ailanthus glandulosa*.**

POLYGALACEAE, the Milkwort Family

Small herbs, with alternate or whorled simple leaves, and small irregular flowers; sepals 5, petals 3, stamens 6 or 8, more or less united with each other and with the petals.

- 1a. All of the leaves alternate —2.
- 1b. Some or all of the leaves in whorls (1—4 dm. high; flowers greenish, purple, or white; summer) (Milkwort) —6.
- 2a. Flowers few, loosely clustered, 15—20 mm. long (1—3 dm. high; flowers purple; early summer) **Flowering Wintergreen, *Polygala paucifolia*.**
- 2b. Flowers numerous, in a spike or raceme —3.

- 3a. Stem-leaves minute, linear-subulate; stem slender, erect, 3—7 dm. high (flowers pink; summer)

Milkwort, *Polygala incarnata*.

- 3b. Stem-leaves narrowly oblong or broader; stem generally 1—4 dm. high —4.

- 4a. Flowers in a short thick obtuse very dense spike (flowers greenish or purple; summer) **Milkwort, *Polygala sanguinea*.**

- 4b. Flowers in a slender tapering spike —5.

- 4c. Flowers in a raceme; plants with subterranean flowers also (flowers purple; early summer) **Milkwort, *Polygala polygama*.**

- 5a. Leaves linear or nearly so (flowers purple; summer) —7b.

- 5b. Leaves lanceolate or oblong-lanceolate, 2—6 cm. long (flowers white; late spring) **Seneca Snakeroot, *Polygala senega*.**

- 5c. Leaves ovate to ovate-lanceolate (flowers white; late spring) **Seneca Snakeroot, *Polygala senega* var. *latifolia*.**

- 6a. Spike oval, thick, obtuse **Milkwort, *Polygala cruciata*.**

- 6b. Spike acute —7.

- 7a. Spike densely flowered, 1—2 cm. long

Milkwort, *Polygala verticillata*.

- 7b. Spike loosely flowered, 2—5 cm. long

Milkwort, *Polygala verticillata* var. *ambigua*.

EUPHORBIACEAE, the Spurge Family

Herbs, with alternate, opposite, or whorled leaves and usually milky juice. Flowers small or minute and inconspicuous, without petals and frequently without calyx. In our commoner species, several staminate flowers, each consisting of a single stamen only, and one pistillate flower, consisting of a single pedicelled 3-lobed ovary only, are included within a 4—5-lobed involucre, which is sometimes colored and resembles a calyx or corolla.

- 1a. Stem-leaves alternate; inflorescence axillary; flowers with calyx and several stamens (3—8 dm. tall; flowers greenish or purplish; summer) (Three-seeded Mercury) —2.

- 1b. Stem-leaves opposite, usually inequilateral at base; flowers as described for the family; apparent flowers in axillary clusters (summer and autumn) (Spurge) —3.

- 1c. Stem-leaves alternate; inflorescence a terminal umbel-like cluster, with its branches subtended by opposite or whorled leaves; flowers as described for the family (Spurge) —9.

- 2a. Leaves ovate or ovate-lanceolate; flower-clusters shorter than the subtending bract

Three-seeded Mercury, *Acalypha virginica*.

- 2b. Leaves lanceolate to oblong; flower-clusters equaling or exceeding the subtending bract

Three-seeded Mercury, *Acalypha gracilens*.

- 3a. Stem and foliage glabrous —4.
- 3b. Stem and foliage more or less pubescent (stems prostrate or ascending, 1—4 dm. long) —7.
 - 4a. Erect or ascending, usually without basal branches (2—4 dm. tall) **Spurge, Euphorbia preslii.**
 - 4b. Prostrate or spreading, branched from the base (stems 1—4 dm. long) —5.
- 5a. Leaves entire; plants of the shores of the Great Lakes **Spurge, Euphorbia polygonifolia.**
- 5b. Leaves serrulate —6.
 - 6a. Leaves broadly oblong or obovate; seeds obscurely wrinkled **Spurge, Euphorbia serpyllifolia.**
 - 6b. Leaves narrowly oblong; seeds with prominent transverse ridges **Spurge, Euphorbia glyptosperma.**
- 7a. Seeds black **Spurge, Euphorbia hirsuta.**
- 7b. Seeds red —8.
 - 8a. Leaves oblong **Spurge, Euphorbia maculata.**
 - 8b. Leaves elliptical to obovate; involucre split down one side **Spurge, Euphorbia humistrata.**
- 9a. Flowers subtended by conspicuous petal-like white appendages (part of the involucre) (4—10 dm. tall; summer) **Spurge, Euphorbia corollata.**
- 9b. Flowers not subtended by petal-like appendages —10.
 - 10a. Stem-leaves below the inflorescence serrulate (2—5 dm. high; summer) —11.
 - 10b. Stem-leaves below the inflorescence entire —13.
- 11a. Upper leaves acute **Spurge, Euphorbia platyphylla.**
- 11b. Upper leaves obtuse, rounded, or notched at the apex —12.
 - 12a. Leaves of the involucre broadly triangular-ovate, widest near the base **Spurge, Euphorbia obtusata.**
 - 12b. Leaves of the involucre broadly obovate to nearly circular, widest near or above the middle **Spurge, Euphorbia helioscopia.**
- 13a. Stem-leaves narrowly linear, less than 3 mm. wide (2—4 dm. high; late spring and summer) **Cypress Spurge, Euphorbia cyparissias.**
- 13b. Stem-leaves narrowly oblong-spatulate, more than 5 mm. wide, and more than 3 times as long as wide (2—6 dm. high; summer) —14.
- 13c. Stem-leaves obovate to nearly circular, not more than twice as long as wide (1—4 dm. high) —15.
 - 14a. Leaves at base of umbel narrow, resembling those on the stem **Spurge, Euphorbia esula.**
 - 14b. Leaves at base of umbel broad, resembling those of the inflorescence **Spurge, Euphorbia lucida.**

- 15a. Upper stem-leaves distinctly narrowed at the base; introduced species of waste places (summer) **Spurge, *Euphorbia peplus*.**
15b. Upper stem-leaves rounded at the sessile base; native species of woodlands (spring and early summer)
Spurge, *Euphorbia commutata*.

CALLITRICHACEAE, the Water Starwort Family

Small herbs growing in water or in mud, with opposite entire leaves and small inconspicuous axillary flowers, with neither calyx nor corolla. (Flowers in summer).

- 1a. Completely submerged; leaves all linear
Water Starwort, *Callitriche autumnalis*.
1b. Submerged leaves linear, emerged and floating leaves obovate
Water Starwort, *Callitriche palustris*.

EMPETRACEAE, the Crowberry Family

Low evergreen shrubs, with the linear leaves completely rolled into a tube, and inconspicuous flowers without petals, in the axils of the leaves.

- One species in Michigan, 1—3 dm. high; leaves less than 1 cm. long; flowers in summer
Crowberry, *Empetrum nigrum*.

LIMNANTHACEAE, the False Mermaid Family

Low herbs with alternate compound leaves and minute axillary flowers; sepals 3, petals 3, stamens 6.

- One species in Michigan, with stems 1—3 dm. long, and flowers in late spring
False Mermaid, *Floerkea proserpinacoides*.

ANACARDIACEAE, the Cashew Family

Shrubs or small trees, with milky or resinous juice, alternate compound leaves sometimes poisonous to the touch, and small clustered greenish or yellowish flowers.

- 1a. Leaflets 7 to many (1—5 m. high) (Sumach) —2.
1b. Leaflets 3 —5.
2a. Axis of the leaves wing-margined between the leaflets
Sumach, *Rhus copallina*.
2b. Axis of the leaves not margined —3.
3a. Leaflets entire
Poison Sumach, *Rhus vernix*.
3b. Leaflets serrate —4.
4a. Bark of the older stems glabrous
Sumach, *Rhus glabra*.
4b. Bark of the older stems densely velvety-hairy
Sumach, *Rhus typhina*.

- 5a. Terminal leaflet narrowed to a sessile base (5—20 dm. high)
Sumach, *Rhus canadensis*.
- 5b. Terminal leaflet on a definite stalk, round or acute at base (3—8 dm. high, or climbing by hold-fast roots)
Poison Ivy, *Rhus toxicodendron*.

AQUIFOLIACEAE, the Holly Family

Shrubs, with alternate simple leaves and small white or greenish axillary flowers in late spring and early summer; sepals, petals, and stamens each 4—6; fruit a berry.

- 1a. Leaves entire or nearly so, 1—3 cm. long (1—2 m. tall)
Mountain Holly, *Nemopanthus mucronata*.
- 1b. Leaves sharply serrate, 5—8 cm. long (2—5 m. high) (Black Alder) —2.
- 2a. Leaves downy on the veins beneath; fruit red
Black Alder, *Ilex verticillata*.
- 2b. Leaves nearly or quite glabrous; fruit orange
Black Alder, *Ilex verticillata* var. *tenuifolia*.

CELASTRACEAE, the Staff Tree Family

Shrubs with simple leaves and inconspicuous flowers; sepals and petals each 4 or 5, the stamens of the same number and attached to a disk which fills the center of the flower; fruit showy, orange and red.

- 1a. Leaves alternate (climbing vine; flowers in racemes; late spring)
Bitter-sweet, *Celastrus scandens*.
- 1b. Leaves opposite (flowers in axillary clusters) —2.
- 2a. Prostrate, with short erect branches; leaves broadest above the middle (spring) **Creeping Wahoo, *Evonymus obovatus*.**
- 2b. Tall shrub, with leaves broadest below or near the middle (early summer) **Wahoo, *Evonymus atropurpureus*.**

STAPHYLEACEAE, the Bladder Nut Family

Shrubs with opposite trifoliate leaves and small axillary clusters of white flowers in spring; sepals, petals, and stamens each 5; ovary 3-celled, ripening into a large inflated 3-celled pod.

One species in Michigan (2—5 m. high)

Bladder Nut, *Staphylea trifolia*.

ACERACEAE, the Maple Family

Trees or shrubs, with opposite, lobed or compound leaves and inconspicuous flowers; sepals about 5; petals the same number, or none; stamens 4—12; ovary 2-lobed, ripening into a pair of winged fruits.

- 1a. Leaves compound (tree; flowers appearing before the leaves)
Box Elder, *Acer negundo*.
- 1b. Leaves simple (Maple) —2.
 - 2a. Shrubs or small trees; leaves 3—5-lobed; the lobes with regularly serrate margins (flowers greenish-yellow, appearing later than the leaves) —3.
 - 2b. Trees; leaves 3—7-lobed; margins of the lobes entire or incised, but never regularly serrate —4.
- 3a. Leaves finely and sharply serrate; twigs smooth; bark conspicuously striped with white lines
Striped Maple, *Acer pennsylvanicum*.
- 3b. Leaves coarsely and bluntly serrate; young twigs pubescent; bark not striped
Mountain Maple, *Acer spicatum*.
- 4a. Angles between the leaf-lobes rounded (flowers greenish-yellow, appearing with the leaves) —5.
- 4b. Angles between the leaf-lobes acute or obtuse, but not rounded (flowers purple, red, or yellowish, appearing before the leaves) —6.
- 5a. Leaves glabrous beneath, or minutely pubescent on the veins
Sugar Maple, *Acer saccharum*.
- 5b. Leaves downy beneath **Black Maple, *Acer saccharum* var. *nigrum*.**
 - 6a. Middle leaf-lobe usually more than half the length of the leaf, narrowed at its base; broken twigs with a strong odor
Silver Maple, *Acer saccharinum*.
 - 6b. Middle leaf-lobe usually less than half the length of the leaf, its sides parallel or broadened at the base; broken twigs without strong odor
Red Maple, *Acer rubrum*.

SAPINDACEAE, the Soapberry Family

Trees, with opposite palmately compound leaves, and showy white or yellowish flowers in panicles in spring; sepals 5; petals 4 or 5; stamens about 7; fruit a smooth brown nut.

- 1a. Leaflets 7; buds viscid; corolla of 5 petals
Horse Chestnut, *Aesculus hippocastanum*.
- 1b. Leaflets 5; buds smooth; corolla of 4 petals
Buckeye, *Aesculus glabra*.

BALSAMINACEAE, the Touch-me-not Family

Smooth herbs, with alternate simple leaves and showy flowers; one petal-like sepal prolonged into a spur; fruit explosive when ripe (5—10 dm. high; summer).

- 1a. Flowers pale-yellow, with a few red-brown spots
Touch-me-not, *Impatiens pallida*.
- 1b. Flowers orange, thickly spotted with red-brown
Touch-me-not, *Impatiens biflora*.

RHAMNACEAE, the Buckthorn Family

Shrubs, with simple leaves and small flowers in axillary or terminal clusters in early summer; sepals, petals, and stamens each 4 to 5, or petals none.

- 1a. Leaves with a single mid-vein; flowers in axillary clusters, greenish (Buckthorn) —2.
- 1b. Leaves with 3—5 principal veins; flowers in dense terminal clusters, white (Red-root) —3.
 - 2a. Lateral veins 3—4 pairs (stout shrub, frequently thorny, escaped from cultivation) **Buckthorn, *Rhamnus cathartica*.**
 - 2b. Lateral veins 6—9 pairs (1 m. high or less; in swamps and bogs) **Buckthorn, *Rhamnus alnifolia*.**
- 3a. Leaves ovate, rounded or cordate at the base, 2—5 cm. wide or more (4—8 dm. high) **Red-root, *Ceanothus americanus*.**
- 3b. Leaves elliptical-lanceolate, 2 cm. wide or less (3—8 dm. high) **Red-root, *Ceanothus ovatus*.**

VITACEAE, the Grape Family

Shrubs, climbing by tendrils or hold-fast roots, with palmately lobed or palmately compound leaves and small greenish flowers in panicles or flattened clusters; petals and sepals each 4 or 5; fruit a berry.

- 1a. Leaves compound (summer) (Virginia Creeper) —2.
- 1b. Leaves simple (late spring) (Grape) —4.
 - 2a. Branches of the tendrils chiefly ending in adhesive disks —3.
 - 2b. Branches of the tendrils twining, or rarely with a few disks
Virginia Creeper, *Psedera vitacea*.
- 3a. Stem and foliage glabrous
Virginia Creeper, *Psedera quinquefolia*.
- 3b. Stem and foliage pubescent, at least when young
Virginia Creeper, *Psedera quinquefolia* var. *hirsuta*.
 - 4a: Leaves conspicuously pubescent beneath —5.
 - 4b. Leaves glabrous beneath when mature, or pubescent on the veins only —6.

- 5a. A tendril or flower-cluster opposite each leaf
Fox Grape, *Vitis labrusca*.
- 5b. No tendril opposite each third leaf
Summer Grape, *Vitis aestivalis*.
- 6a. Pith continuous through the joints of the stem
Fox Grape, *Vitis rotundifolia*.
- 6b. Pith interrupted by the solid joints —7.
- 7a. Leaf-lobes with rounded angles between them
Summer Grape, *Vitis bicolor*.
- 7b. Leaf-lobes with sharp angles between them —8.
- 8a. Leaves coarsely toothed, unlobed or slightly 3-lobed
Frost Grape, *Vitis cordifolia*.
- 8b. Leaves sharply toothed, prominently lobed
Frost Grape, *Vitis vulpina*.

TILIACEAE, the Linden Family

Trees, with alternate, simple, palmately veined leaves, and clusters of fragrant white flowers in late spring arising from the middle of a leaf-like bract; sepals and petals each 5; stamens numerous, but united into 5 sets.

One species in Michigan

Basswood, *Tilia americana*.

MALVACEAE, the Mallow Family

Herbs with alternate leaves; sepals and petals each 5; stamens numerous, united by their filaments to form a tube surrounding the styles; ovary many-celled.

- 1a. Flowers yellow (summer and autumn) —2.
- 1b. Flowers pale-yellow, with a dark center (2—4 dm. high; late summer)
Flower-of-an-hour, *Hibiscus trionum*.
- 1c. Flowers white to red or blue, never yellow —3.
- 2a. Leaves broadly heart-shape (10—15 dm. tall)
Velvet Leaf, *Abutilon theophrasti*.
- 2b. Leaves ovate-lanceolate (2—5 dm. tall) *Sida*, *Sida spinosa*.
- 3a. Calyx subtended by 6 to many bractlets which are sometimes united at base (summer) —4.
- 3b. Calyx subtended by 3 bractlets, or by none —6.
- 4a. Flowers 2—4 cm. wide (5—10 dm. high; flowers pink)
Marsh Mallow, *Althaea officinalis*.
- 4b. Flowers 7—15 cm. wide (8—15 dm. high; flowers pink to nearly white) (Rose Mallow) —5.
- 5a. Leaves densely pubescent below
Rose Mallow, *Hibiscus moscheutos*.
- 5b. Leaves glabrous
Rose Mallow, *Hibiscus militaris*.

- 6a. Petals prominently notched at the end or reverse heart-shape (Mallow) —7.
- 6b. Petals obtuse or truncate (summer) —11.
- 7a. Flowers 1—1.5 cm. wide —8.
- 7b. Flowers 2—5 cm. wide (3—8 dm. high; flowers in summer) —9.
- 8a. Stems procumbent, prostrate, or spreading (spring, summer, and autumn) **Mallow, *Malva rotundifolia*.**
- 8b. Stems erect (10—15 dm. high; summer) **Mallow, *Malva verticillata*.**
- 9a. Leaves with prominent but shallow lobes; flowers axillary **Mallow, *Malva sylvestris*.**
- 9b. Leaves deeply lobed or cleft; flowers in the upper axils, producing a raceme-like cluster —10.
- 10a. Lobes of the leaf dentate or incised **Mallow, *Malva alcea*.**
- 10b. Lobes of the leaf pinnately cleft into linear or narrowly oblong divisions **Mallow, *Malva moschata*.**
- 11a. Flowers white (1—2 m. high) **Virginia Mallow, *Sida hermaphrodita*.**
- 11b. Flowers purple or pink (3—5 dm. high, spreading) **Poppy Mallow, *Callirhoe triangulata*.**

HYPERICACEAE, the St. John's-wort Family

Herbs or shrubs, with opposite entire leaves dotted with translucent glands; flowers usually yellow (or pink); sepals and petals each 5; stamens 5 to many; ovary with 3—5 styles. (St. John's-wort.)

- 1a. Shrubs (4—8 dm. high; flowers yellow, summer) —2.
- 1b. Herbs (flowers in summer) —3.
- 2a. Styles 5 **St. John's-wort, *Hypericum kalmianum*.**
- 2b. Styles 3 **St. John's-wort, *Hypericum prolificum*.**
- 3a. Flowers pinkish, 15 mm. broad (3—5 dm. high, in swamps) **Marsh St. John's-wort, *Hypericum virginicum*.**
- 3b. Flowers yellow —4.
- 4a. Flowers about 4 cm. wide; principal leaves 5—10 cm. long (7—15 dm. tall) **St. John's-wort, *Hypericum ascyron*.**
- 4b. Flowers 8—25 mm. wide; stamens 15 or more —5.
- 4c. Flowers 1—10 mm. wide; stamens 12 or fewer (1—6 dm. high) —7.
- 5a. Petals dotted with black (4—8 dm. high) —6.
- 5b. Petals without black dots (2—5 dm. high) **St. John's-wort, *Hypericum ellipticum*.**
- 6a. Flowers 20—25 mm. wide; leaves of an oblong type, broadest near the middle **St. John's-wort, *Hypericum perforatum*.**
- 6b. Flowers 10—15 mm. wide; leaves of an ovate type, broadest below the middle **St. John's-wort, *Hypericum punctatum*.**

- 7a. Leaves minute, subulate, 1—3 mm. long
Pineweed, *Hypericum gentianoides*.
- 7b. Leaves linear, with 1—3 principal veins, broadest near or above the middle
St. John's-wort, *Hypericum canadense*.
- 7c. Leaves lanceolate, 4—6 times as long as broad, with 5—7 principal veins
St. John's-wort, *Hypericum majus*.
- 7d. Leaves oblong, elliptic, or ovate, 1.5—3 times as long as broad —8.
- 8a. Uppermost bracts linear **St. John's-wort, *Hypericum mutilum*.**
- 8b. Uppermost bracts resembling the leaves in shape, but smaller
St. John's-wort, *Hypericum boreale*.

ELATINACEAE, the Waterwort Family

Small marsh herbs, with opposite leaves without translucent dots, and inconspicuous axillary flowers. (Stems 2—5 cm. long; flowers in summer.)

One species in Michigan

Waterwort, *Elatine americana*.

CISTACEAE, the Rock-rose Family

Small herbs or shrubs, with opposite or alternate entire leaves; flowers regular, with 5 sepals, 3 or 5 petals, and 3 to many stamens.

- 1a. Flowers yellow (early summer) —2.
- 1b. Flowers greenish or purplish, minute, in panicles (late summer)
(Pinweed) —4.
- 2a. Leaves crowded, closely appressed to the branches; flowers 7 mm. wide (2—4 dm. high) **False Heather, *Hudsonia tomentosa*.**
- 2b. Leaves spreading; flowers 15—30 mm. wide (3—6 dm. high)
(Frostweed) —3.
- 3a. Petal-bearing flowers solitary
Frostweed, *Helianthemum canadense*.
- 3b. Petal-bearing flowers few, racemose
Frostweed, *Helianthemum majus*.
- 4a. Stem-leaves linear, 4 or more times as long as wide —5.
- 4b. Stem-leaves oblong or elliptical, about 3 times as long as wide (2—6 dm. tall) —8.
- 5a. Plant pale with dense appressed pubescence (2—4 dm. high)
Pinweed, *Lechea stricta*.
- 5b. Plant green, pubescence sparse or none —6.
- 6a. Leaves thread-like, seldom exceeding 1 mm. in width (1—3 dm. tall)
Pinweed, *Lechea tenuifolia*.
- 6b. Leaves 1—5 mm. wide (2—6 dm. high) —7.

- 7a. Leaves on the basal shoots narrowly lanceolate
Pinweed, *Lechea intermedia*.
- 7b. Leaves on the basal shoots oblong-elliptic, about twice as long
as wide
Pinweed, *Lechea racemulosa*.
- 8a. Pubescence of spreading hairs
Pinweed, *Lechea villosa*.
- 8b. Pubescence of appressed hairs
Pinweed, *Lechea minor*.

VIOLACEAE, the Violet Family

Herbs with simple, alternate or basal leaves, and conspicuous irregular flowers with a spur (except in the first species); sepals, petals, and stamens each 5; ovary 1-celled.

- 1a. Flowers regular or nearly so, greenish-white, axillary; erect plant with leafy stem (3—5 dm. high; spring)
Green Violet, *Hybanthus concolor*.
- 1b. Flowers irregular, blue, yellow, or white, conspicuous (Violet) —2.
- 2a. Plant stemless, the flowers all on leafless stalks and the leaves all basal (spring or early summer) —3.
- 2b. Stems leafy (spring and summer) —17.
- 3a. Petals yellow
Round-leaved Violet, *Viola rotundifolia*.
- 3b. Petals blue, violet, or white —4.
- 4a. Principal leaves at time of flowering deeply lobed —5.
- 4b. Leaves oblong, ovate, or triangular, not narrowed to the petiole, and frequently sharply toothed or incised near the base —7.
- 4c. Leaves narrowly lanceolate, tapering to the base
Violet, *Viola lanceolata*.
- 4d. Leaves heart-shape or kidney-shape, not lobed —8.
- 5a. Lateral petals bearded —6.
- 5b. Lateral petals not bearded
Bird-foot Violet, *Viola pedata*.
- 6a. Leaves divided to the base into linear segments
Bird-foot Violet, *Viola pedatifida*.
- 6b. Leaves irregularly divided into broader segments
Hand-leaf Violet, *Viola palmata*.
- 7a. Leaves ovate-oblong, pubescent
Violet, *Viola fimbriatula*.
- 7b. Leaves triangular-lanceolate, usually somewhat dilated at base, nearly or quite glabrous
Violet, *Viola sagittata*.
- 8a. Flowers violet or blue (rarely white-flowered plants are found with the typical blue-flowered ones) (Blue Violets) —9.
- 8b. Flowers white, the 3 lower petals marked with purple (White Violets) —14.
- 9a. Lateral petals bearded —10.
- 9b. Lateral petals beardless
Great-spurred Violet, *Viola selkirkii*.
- 10a. Foliage glabrous —11.
- 10b. Petioles and lower surface of leaves pubescent —13.

- 11a. Beard of the lateral petals with a knob at the tip of each hair
Blue Violet, *Viola cucullata*.
- 11b. Beard of the lateral petals not knobbed —12.
 - 12a. Spurred petal hairy Wood Violet, *Viola affinis*.
 - 12b. Spurred petal glabrous Blue Violet, *Viola papilionacea*.
- 13a. Spurred petal villous Blue Violet, *Viola septentrionalis*.
- 13b. Spurred petal glabrous, or with a few scattered hairs
Common Blue Violet, *Viola sororia*.
- 14a. Leaf-blade obviously pubescent —15.
- 14b. Leaf-blade glabrous or very nearly so —16.
- 15a. Lateral petals bearded Sweet White Violet, *Viola incognita*.
- 15b. Lateral petals not bearded White Violet, *Viola renifolia*.
- 16a. Leaf-blades strictly glabrous
Sweet White Violet, *Viola pallens*.
- 16b. Leaf-blades with some minute white hairs on the upper surface near the base
Sweet White Violet, *Viola blanda*.
- 17a. Stipules large and leaf-like, deeply pinnatifid and nearly or quite as long as the petioles —18.
- 17b. Stipules small, inconspicuous, entire or toothed, and much shorter than the petiole —19.
 - 18a. Leaves serrate; flowers 1.5—2.5 cm. wide (1—3 dm. high; flowers of various colors) Pansy, *Viola tricolor*.
 - 18b. Upper leaves entire or nearly so; flowers about 1 cm. wide (1—2 dm. high; flowers bluish-white)
Wild Pansy, *Viola rafinesquii*.
- 19a. Petals yellow (1—4 dm. high) (Yellow Violet) —20.
- 19b. Petals violet, blue, or white —21.
 - 20a. Foliage villous-pubescent Yellow Violet, *Viola pubescens*.
 - 20b. Foliage nearly or quite glabrous
Yellow Violet, *Viola scabriuscula*.
- 21a. Stipules entire (2—4 dm. high) Canada Violet, *Viola canadensis*.
- 21b. Stipules toothed —22.
 - 22a. Lateral petals not bearded (1—2 dm. high)
Long-spurred Violet, *Viola rostrata*.
 - 22b. Lateral petals bearded —23.
- 23a. Flowers white or nearly white (1—3 dm. high)
Pale Violet, *Viola striata*.
- 23b. Flowers blue (about 1 dm. high) —24.
 - 24a. Leaves smooth Dog Violet, *Viola conspersa*.
 - 24b. Leaves pubescent Sand Violet, *Viola arenaria*.

CACTACEAE, the Cactus Family

Fleshy, jointed, leafless plants, armed with numerous thorns; flowers large (5—10 cm. wide), yellow, with about 10 petals and numerous stamens.

One species in Michigan, on the shores of Lake Michigan; flowers in summer
Prickly Pear, *Opuntia rafinesquii*.

THYMELAEACEAE, the Mezereum Family

Shrubs, with simple alternate entire leaves, and small yellowish flowers in clusters, opening before the leaves; petals none, the sepals somewhat petal-like.

One species in Michigan, 5—15 dm. tall, with very tough bark
Leatherwood, *Dirca palustris*.

ELAEAGNACEAE, the Oleaster Family

Shrubs, with opposite, silvery-pubescent, simple, entire leaves, and small clusters of inconspicuous yellow flowers in spring.

One species in Michigan, 1—2 m. high
Buffalo Berry, *Shepherdia canadensis*.

LYTHRACEAE, the Loosestrife Family

Herbs or shrubs, with opposite or alternate entire leaves; receptacle cup-shape or tubular, bearing the 5—7 petals and sepals at its margin, and the 6—12 stamens on its inner surface; ovary superior.

1a. Stem shrubby (aquatic, stems 1—3 m. long; flowers pink, summer)
Water Loosestrife, *Decodon verticillatus*.

1b. Stem herbaceous (4—10 dm. high; flowers purple, summer) —2.

2a. Flowers solitary in the axils; leaves mostly alternate
Loosestrife, *Lythrum alatum*.

2b. Flowers in terminal panicles; leaves opposite or whorled
Loosestrife, *Lythrum salicaria*.

MELASTOMACEAE, the Melastoma Family

Herbs, with opposite leaves with 3—5 principal veins; receptacle urn-shape, bearing 4 sepals and 4 petals at its edge; stamens 8; ovary 4-celled, superior.

One species in Michigan, 3—4 dm. high, with purple flowers in late summer
Meadow Beauty, *Rhexia virginica*.

ONAGRACEAE, the Evening Primrose Family

Herbs with opposite or alternate simple leaves and regular flowers; sepals and petals each 4 (or 2 in one genus), stamens 8 (or 2 in one genus), attached to the summit or inside of a tubular receptacle; ovary 2—4-celled, inferior.

- 1a. Aquatic plant of shallow water or muddy ground, with prostrate stem (flowers minute, axillary; petals small or none, summer)
Water Purslane, *Ludvigia palustris*.
- 1b. Land plants with erect or ascending stems —2.
 - 2a. Petals minute, greenish (3—8 dm. high; late summer)
False Loosestrife, *Ludvigia polycarpa*.
 - 2b. Petals yellow —3.
 - 2c. Petals white, pink, purple, or red —9.
- 3a. Sepals borne at the summit of the ovary (5—10 dm. high; summer)
False Loosestrife, *Ludvigia alternifolia*.
- 3b. Sepals borne at the summit of the slender tubular receptacle, which is prolonged beyond the ovary —4.
 - 4a. Stamens all equal in length (Evening Primrose) —5.
 - 4b. The alternate stamens longer (3—8 dm. high; summer) (Sundrops) —8.
- 5a. Leaves deeply dentate or pinnatifid (2—5 dm. high; early summer)
Evening Primrose, *Oenothera laciniata*.
- 5b. Leaves entire or undulate or finely toothed (5—12 dm. high; summer) —6.
 - 6a. Hairs on the stem with broad reddish bases
Evening Primrose, *Oenothera muricata*.
 - 6b. Hairs on the stem none, or without swollen bases —7.
- 7a. Stem and foliage glabrous, or with sparse spreading hairs
Evening Primrose, *Oenothera biennis*.
- 7b. Stem and foliage densely but closely appressed-pubescent
Evening Primrose, *Oenothera rhombipetala*.
 - 8a. Petals 5—10 mm. long
Sundrops, *Oenothera pumila*.
 - 8b. Petals 14 mm. long or more
Sundrops, *Oenothera fruticosa*.
- 9a. Petals 2, reverse heart-shape, stamens 2 (flowers small, white, summer) (Enchanter's Nightshade) —10.
- 9b. Petals 4; stamens 4 or 8 —12.
 - 10a. Leaves rounded at the base, denticulate (3—8 dm. high; fruit prickly)
Enchanter's Nightshade, *Circaea lutetiana*.
 - 10b. Leaves cordate at the base —11.
- 11a. Fruit 2-celled, bristly (2—4 dm. high)
Enchanter's Nightshade, *Circaea intermedia*.
- 11b. Fruit 1-celled, with soft hairs (delicate plant 2 dm. high, or less)
Enchanter's Nightshade, *Circaea alpina*.
 - 12a. Petals entire (summer) —13.
 - 12b. Petals notched at the end (flowers white or pinkish, less than 1 cm. broad, in summer) (Willow Herb) —15.

- 13a. Flowers 2—3 cm. wide, purple (7—20 dm. high)
Fireweed, *Epilobium angustifolium*.
- 13b. Flowers about 1 cm. wide —14.
- 14a. Flowers red (2—5 dm. high) ***Gaura, Gaura coccinea*.**
- 14b. Flowers white, turning pink when old
***Gaura, Gaura biennis*.**
- 15a. Leaves entire, the margins usually somewhat revolute —16.
- 15b. Leaves toothed, flat (4—9 dm. high) —18.
- 16a. Plant densely pubescent with spreading hairs (3—8 dm. high)
Willow Herb, *Epilobium molle*.
- 16b. Plant pubescent with appressed or incurved hairs —17.
- 17a. Leaves linear, the margin revolute (3—5 dm. high)
Willow Herb, *Epilobium densum*.
- 17b. Leaves narrowly lanceolate, not revolute (2—4 dm. high)
Willow Herb, *Epilobium palustre*.
- 18a. Seeds tipped with a tuft of reddish-brown hairs
Willow Herb, *Epilobium coloratum*.
- 18b. Seeds tipped with a tuft of white hairs
Willow Herb, *Epilobium adenocaulon*.

HALORAGIDACEAE, the Water Milfoil Family

Aquatic or marsh herbs, with alternate, opposite, or whorled leaves, and small, inconspicuous terminal or axillary flowers, frequently without petals (summer).

- 1a. Leaves none, or else very small and inconspicuous
Water Milfoil, *Myriophyllum tenellum*.
- 1b. Leaves alternate (1—4 dm. high)
Mermaid Weed, *Proserpinaca palustris*.
- 1c. Leaves opposite or whorled —2.
- 2a. Leaves entire (2—4 dm. high)
Mare's-tail, *Hippuris vulgaris*.
- 2b. Leaves toothed or dissected (Water Milfoil) —3.
- 3a. Flowers in the axils of foliage leaves —4.
- 3b. Flowers in terminal spikes, subtended by bracts —5.
- 4a. Flowers above water, subtended by toothed or entire leaves
Water Milfoil, *Myriophyllum heterophyllum*.
- 4b. Flowers submerged, subtended by dissected leaves
Water Milfoil, *Myriophyllum farwellii*.
- 5a. Flowers solitary or in pairs at each joint of the spike
Water Milfoil, *Myriophyllum alternifolium*.
- 5b. Flowers several at each joint of the spike —6.
- 6a. Bracts deeply pinnatifid
Water Milfoil, *Myriophyllum verticillatum* var. *pectinatum*.
- 6b. Bracts entire or toothed
Water Milfoil, *Myriophyllum spicatum*.

ARALIACEAE, the Sarsaparilla Family

Herbs or thorny shrubs, with alternate or whorled leaves, and small flowers in umbels; sepals 5, minute; petals and stamens each 5; ovary inferior, with 2—5 styles, ripening into a berry.

- 1a. Leaves simple, palmately lobed (thorny shrub; flowers greenish-white, in panicles, in June) **Devil's Club, *Fatsia horrida*.**
- 1b. Leaves once compounded, whorled (umbel one, terminal) —2.
- 1c. Leaves twice or thrice compounded (umbels several) —3.
 - 2a. Leaflets sessile; flowers white, in spring (1—2 dm. high) **Dwarf Ginseng, *Panax trifolium*.**
 - 2b. Leaflets stalked; flowers greenish, in summer (2—5 dm. high) **Ginseng, *Panax quinquefolium*.**
- 3a. Stem and petioles spiny or bristly (flowers white, summer) —4.
- 3b. Stem and petioles smooth or a little pubescent (flowers greenish-white) —5.
- 4a. Shrubby, with stout thorns (1—3 m. high) **Hercules' Club, *Aralia spinosa*.**
- 4b. Herbaceous, with slender bristles (4—10 dm. high) **Bristly Sarsaparilla, *Aralia hispida*.**
- 5a. Stem-leaves present; leaflets cordate at the base (8—15 dm. high; summer) **Spikenard, *Aralia racemosa*.**
- 5b. Leaf and flower-stalk arising from the ground; leaflets acute at the base (2—4 dm. high; spring) **Wild Sarsaparilla, *Aralia nudicaulis*.**

UMBELLIFERAE, the Parsley Family

Herbs, with alternate, usually compound leaves, the petioles dilated at the base; flowers small, in umbels or heads; sepals 5, minute or even wanting; petals and stamens each 5; ovary inferior, with 2 styles, ripening into a dry fruit.

- 1a. Leaves simple (flowers in summer) —2.
- 1b. Leaves compound, or at least deeply cleft —4.
 - 2a. Leaves linear, sword-shape (4—10 dm. tall; flowers greenish-white) **Rattlesnake Master, *Eryngium yuccifolium*.**
 - 2b. Leaves kidney-shape or almost circular (stems creeping, about 1 dm. high; flowers white) (Water Pennywort) —3.
- 3a. Leaves peltate, attached by the center **Water Pennywort, *Hydrocotyle umbellata*.**
- 3b. Leaves not peltate, attached by the margin **Water Pennywort, *Hydrocotyle americana*.**
 - 4a. Flowers yellow or purple —5.
 - 4b. Flowers white or greenish —13.
- 5a. Leaf-segments entire (4—8 dm. high) —6.
- 5b. Leaf-segments toothed or incised —7.

- 6a. Leaf-segments filiform (summer) **Fennel, *Foeniculum vulgare*.**
- 6b. Leaf-segments ovate to lanceolate **Golden Alexander, *Taenidia integerrima*.**
- 7a. Leaves pinnately compound; some of the leaflets incised or pin-
natifid —8.
- 7b. Leaves ternately compound; the segments crenate or serrate —9.
- 7c. Leaves deeply palmately cleft or divided; flowers in head-like
umbels —18a.
- 8a. Leaf-segments obtuse, rounded, or cordate at the base (6—15
dm. high; summer) **Wild Parsnip, *Pastinaca sativa*.**
- 8b. Leaf-segments narrowed to the base (4—8 dm. high; spring)
Prairie Parsley, *Polytaenia nuttallii*.
- 9a. Terminal leaflets conspicuously stalked, their total length, in-
cluding stalk, at least 50% greater than the length of the
lateral leaflets (Meadow Parsnip) —10.
- 9b. Terminal leaflets not conspicuously stalked, their total length,
including stalk, about equaling the lateral leaflets (4—8 dm.
high; late spring) (Golden Alexander) —12.
- 10a. Flowers purple (4—8 dm. high; early summer)
Meadow Parsnip, *Thaspium aureum* var. *atropurpureum*.
- 10b. Flowers yellow —11.
- 11a. Stem-leaves once-ternate; leaflets finely serrate (4—8 dm. high;
early summer) **Meadow Parsnip, *Thaspium aureum*.**
- 11b. Many stem-leaves 2—3-ternate; leaflets coarsely serrate or in-
cised (6—12 dm. high; early summer)
Meadow Parsnip, *Thaspium barbinode*.
- 12a. Basal and lower stem-leaves 2—3-ternate
Golden Alexander, *Zizia aurea*.
- 12b. Basal leaves simple; stem-leaves once-ternate
Golden Alexander, *Zizia cordata*.
- 13a. Leaves once-pinnate (or the submerged leaves decompound, if
present) (summer) —14.
- 13b. Leaves ternately, palmately, or 2—3-pinnately compound —16.
- 14a. Leaflets mostly ovate or ovate-lanceolate, some of them
coarsely incised (3—9 dm. high)
Water Parsnip, *Berula erecta*.
- 14b. Leaflets linear to oblong, serrate to nearly entire, not
incised (6—15 dm. high) —15.
- 15a. Leaflets entire, or with a few low remote teeth
Cowbane, *Oxypolis rigidior*.
- 15b. Leaflets finely but sharply serrate
Water Parsnip, *Sium cicutaefolium*.
- 16a. Leaves principally basal, decompound; flowers in early
spring (1—2 dm. high) **Harbinger of Spring, *Erigenia bulbosa*.**
- 16b. Leaves principally on the stem —17.

- 17a. Leaves palmately or ternately once-compound —18.
- 17b. Leaves 2—3 times compound or decompound —24.
- 18a. Flowers short-pedicelled, crowded in head-like umbels, greenish; ovary bristly (4—9 dm. high; early summer) (**Black Snakeroot**) —19.
- 18b. Flowers in open umbels, white —22.
- 19a. Styles short, not projecting beyond the bristles of the mature fruit —20.
- 19b. Styles long, projecting beyond the bristles of the fruit, and recurved —21.
- 20a. Staminate flowers on pedicels 3—4 mm. long, equaling or barely exceeding the fruit **Black Snakeroot, Sanicula trifoliata.**
- 20b. Staminate flowers short-pedicelled, concealed among the fruits **Black Snakeroot, Sanicula canadensis.**
- 21a. Fruit short-stalked, 4 mm. long or less **Black Snakeroot, Sanicula gregaria.**
- 21b. Fruit sessile, 6—7 mm. long **Black Snakeroot, Sanicula marilandica.**
- 22a. Umbel unsymmetrical, its branches irregular in length; plant slender (3—8 dm. tall; early summer) **Honewort, Cryptotaenia canadensis.**
- 22b. Umbel symmetrical with regular branches; plants tall and stout —23.
- 23a. Stem and leaves very pubescent (10—25 dm. high; summer) **Cow Parsnip, Heracleum lanatum.**
- 23b. Stem and leaves glabrous or nearly so (5—15 dm. high; early summer) **Masterwort, Imperatoria ostruthium.**
- 24a. Ovary and fruit bristly (4—10 dm. high) —25.
- 24b. Ovary and fruit smooth or winged, never bristly —27.
- 25a. Umbels loose, open, few-flowered; woodland plants blooming in spring (**Sweet Cicely**) —26.
- 25b. Umbels densely flowered; weedy plants blooming from summer to fall **Wild Carrot, Daucus carota.**
- 26a. Stem villous-pubescent **Sweet Cicely, Osmorhiza claytoni.**
- 26b. Stem glabrous except at the joints **Sweet Cicely, Osmorhiza longistylis.**
- 27a. Leaflets merely serrate (flowers in summer) —28.
- 27b. Leaflets coarsely incised, so that the leaf appears dissected —30.
- 28a. Umbel densely pubescent (8—15 dm. high) **Angelica, Angelica villosa.**
- 28b. Umbel smooth —29.
- 29a. Leaf-segments broadly ovate (8—15 dm. high) **Angelica, Angelica atropurpurea.**
- 29b. Leaf-segments lanceolate (8—15 dm. high) **Water Hemlock, Cicuta maculata.**
- 29c. Leaf-segments linear (4—10 dm. high) **Water Hemlock, Cicuta bulbifera.**

- 30a. Principal branches of the umbel 2—5; fruit linear-oblong; woodland plants blooming in spring (2—4 dm. high)

Chervil, *Chaerophyllum procumbens*.

- 30b. Principal branches of the umbel 7 or more; fruit ovate to broadly elliptical (summer) —31.

- 31a. Native plants, growing in swamps (5—15 dm. high)

Hemlock Parsley, *Conioselinum chinense*.

- 31b. Introduced plants, in waste places and along roads —32.

- 32a. Stems conspicuously spotted with purple (5—15 dm. high)

Poison Hemlock, *Conium maculatum*.

- 32b. Stems not spotted with purple (2—5 dm. high)

Caraway, *Carum carvi*.

CORNACEAE, the Dogwood Family

Trees, shrubs, or herbs, with alternate leaves and small flowers in rather crowded rounded or flattened clusters; sepals 4, minute; petals and stamens each 4; ovary inferior, ripening into a berry. In one genus the flowers are minute and greenish, with 5 sepals and petals minute or none.

- 1a. Leaves alternate —2.

- 1b. Leaves opposite —3.

- 2a. Flowers white, conspicuous, in flattened clusters (shrubs 2—4 m. high; flowers in late spring)

Dogwood, *Cornus alternifolia*.

- 2b. Flowers greenish, inconspicuous, in small axillary clusters (tree; flowers in spring)

Sour Gum, *Nyssa sylvatica*.

- 3a. Flower clusters small and dense, surrounded by a showy involucre of 4 bracts, resembling a corolla of 4 petals —4.

- 3b. Flowers in open flattened clusters, without petal-like involucre (shrubs 1—4 m. high; late spring) —5.

- 4a. Herbaceous, 3 dm. high or less (flowers in late spring)

Dwarf Dogwood, *Cornus canadensis*.

- 4b. Tall shrub or tree (flowers in late spring)

Flowering Dogwood, *Cornus florida*.

- 5a. Leaves distinctly pubescent beneath with woolly or spreading hairs —6.

- 5b. Leaves smooth beneath, or pubescent with short appressed hairs —9.

- 6a. Leaves rough above; fruit white

Dogwood, *Cornus asperifolia*.

- 6b. Leaves smooth or finely soft-hairy above —7.

- 7a. Leaves at least twice as long as wide; branches brownish or purplish —8.
- 7b. Leaves less than twice as long as wide; branches greenish; fruit blue Dogwood, *Cornus circinata*.
- 8a. Branches purplish; fruit blue Dogwood, *Cornus amomum*.
- 8b. Branches brownish; fruit white Dogwood, *Cornus baileyi*.
- 9a. Branches bright red or reddish-purple Dogwood, *Cornus stolonifera*.
- 9b. Branches grayish Dogwood, *Cornus paniculata*.

ERICACEAE, the Heath Family

Herbs or shrubs, frequently with evergreen leaves; sepals 4—5; corolla regular, with 4—5 petals; stamens as many or twice as many; ovary 3—10-celled, with 1 style.

- 1a. Plants without green color; leafless or with scale leaves only —2.
- 1b. Plants with green leaves —4.
 - 2a. Flowers solitary (1—2 dm. high; summer) Indian Pipe, *Monotropa uniflora*.
 - 2b. Flowers in clusters —3.
- 3a. Petals united into a bell-shape corolla (3—9 dm. high; summer) Pine Drops, *Pterospora andromedea*.
- 3b. Petals all separate (1—3 dm. high; summer) Beech Drops, *Monotropa hypopitys*.
- 4a. Leaves all basal; herbaceous plants with terminal racemes (1—4 dm. high; summer) (Shin-leaf) —5.
- 4b. Stem-leaves present —12.
- 5a. Style straight —6.
- 5b. Style bent near the apex —8.
 - 6a. Racemes one-sided, the flowers all turned in one direction (flowers white or greenish-white) —7.
 - 6b. Raceme regular, the flowers not all pointing in the same direction (flowers white or pink) Shin-leaf, *Pyrola minor*.
- 7a. Flowers numerous in each raceme Shin-leaf, *Pyrola secunda*.
- 7b. Flowers only 3—7 in each raceme Shin-leaf, *Pyrola secunda* var. *obtusata*.
- 8a. Flowers pink or purple —9.
- 8b. Flowers white or greenish —10.
- 9a. Leaves cordate at base Shin-leaf, *Pyrola asarifolia*.
- 9b. Leaves rounded at base, not cordate Shin-leaf, *Pyrola asarifolia* var. *incarnata*.
- 10a. Leaves shining on the upper side; sepals one-third as long as the petals Shin-leaf, *Pyrola americana*.
- 10b. Leaves dull on the upper side; sepals one-fourth as long as the petals, or a little shorter —11.

- 11a. Leaf-blades mostly shorter than their petioles, thick and firm
Shin-leaf, *Pyrola chlorantha*.
- 11b. Leaf-blades thin, usually longer than their petioles
Shin-leaf, *Pyrola elliptica*.
- 12a. Petals nearly or quite separate from each other —13.
- 12b. Petals united into a gamopetalous corolla, the tube of which is as long as or longer than the lobes —18.
- 13a. Leaves opposite or whorled; stems herbaceous or nearly so (summer) —14.
- 13b. Leaves alternate; stems shrubby (early summer) —16.
- 14a. Flowers solitary; leaves broadly ovate to nearly circular (1 dm. high; flower white)
One-flowered Wintergreen, *Moneses uniflora*.
- 14b. Flowers in clusters; leaves narrow (stems trailing, 1—3 dm. high; flowers white or pinkish) —15.
- 15a. Leaves broadest above the middle, green
Prince's Pine, *Chimaphila umbellata*.
- 15b. Leaves broadest below the middle, spotted with white
Spotted Wintergreen, *Chimaphila maculata*.
- 16a. Leaves 2—5 cm. long, densely woolly beneath (5—10 dm. high; flowers white) **Labrador Tea, *Ledum groenlandicum*.**
- 16b. Leaves 1—2 cm. long, pale beneath but not wholly (creeping; flowers pink) (Cranberry) —17.
- 17a. Leaves acute **Cranberry, *Vaccinium oxycoccos*.**
- 17b. Leaves obtuse **Cranberry, *Vaccinium macrocarpon*.**
- 18a. Leaves opposite or whorled; corolla saucer-shape (shrubs 3—8 dm. high; flowers purple, summer) —19.
- 18b. Leaves alternate; corolla bell-shape or salver-form —20.
- 19a. Branches and twigs cylindrical, not angled
Sheep Laurel, *Kalmia angustifolia*.
- 19b. Branches and twigs with 2 sharp angles
Swamp Laurel, *Kalmia polifolia*.
- 20a. Plants prostrate, or with a few ascending branches only (flowers white or pink) —21.
- 20b. Plants erect or ascending —23.
- 21a. Flowers 10—20 mm. long, very fragrant (early spring)
Trailing Arbutus, *Epigaea repens*.
- 21b. Flowers 4—5 mm. long (late spring) —22.
- 22a. Leaves spatulate, broadest beyond the middle
Bearberry, *Arctostaphylos uva-ursi*.
- 22b. Leaves oval, broadest at the middle
Snowberry, *Chiogenes hispidula*.

- 23a. Leaves linear, white beneath, their margins strongly revolute (shrub 3—8 dm. high; flowers white, late spring)

Bog Rosemary, *Andromeda glaucophylla*.

- 23b. Leaves oblong, scurfy beneath with rusty scales (bog shrub 4—10 dm. high; flowers white, in spring)

Leatherleaf, *Chamaedaphne calyculata*.

- 23c. Leaves smooth, pubescent, or resinous beneath, but not scurfy nor white —24.

- 24a. Low shrubs 10—15 cm. high, erect from a creeping root-stock; leaves with the taste of wintergreen (flowers white or pink, summer)

Wintergreen, *Gaultheria procumbens*.

- 24b. Bushy shrubs 3—8 dm. high; leaves dotted beneath with yellowish resinous dots; ovary 10-celled (flowers greenish-pink, spring)

Huckleberry, *Gaylussacia baccata*.

- 24c. Shrubs 1 dm. to 3 m. high; leaves not resinous-dotted beneath; ovary 5-celled (flowers white or greenish-pink, spring or early summer) —25.

- 25a. Corolla bell-shape, the stamens projecting beyond it (5—15 dm. high)

Deerberry, *Vaccinium stamineum*.

- 25b. Corolla cylindrical or urn-shape, the stamens not projecting —26.

- 26a. Filaments hairy (Blueberry) —27.

- 26b. Filaments glabrous (Bilberry) —32.

- 27a. Low bushy shrubs, usually less than 5 dm. and never more than 1 m. high —28.

- 27b. Tall erect shrubs, 1—4 m. high —31.

- 28a. Foliage pubescent

Blueberry, *Vaccinium canadense*.

- 28b. Foliage glabrous —29.

- 29a. Leaves pale-green and glaucous, entire or nearly so

Blueberry, *Vaccinium vacillans*.

- 29b. Leaves bright-green, distinctly serrulate —30.

- 30a. Fruit blue

Blueberry, *Vaccinium pennsylvanicum*.

- 30b. Fruit black

Blueberry, *Vaccinium pennsylvanicum* var. *nigrum*.

- 31a. Leaves downy beneath; fruit black-

Blueberry, *Vaccinium atrococcum*.

- 31b. Leaves smooth or minutely pubescent beneath; fruit blue

Blueberry, *Vaccinium corymbosum*.

- 32a. Full-grown leaves less than 2.5 cm. long; low much-branched shrubs, mostly less than 5 dm. high —33.

- 32b. Full-grown leaves more than 2.5 cm. long; shrubs usually a meter high or more —34.

- 33a. Leaves entire; petals usually 4.

Bilberry, *Vaccinium uliginosum*.

- 33b. Leaves finely serrulate; petals 5

Bilberry, *Vaccinium caespitosum*.

- 34a. Leaves serrulate, green beneath, acute; corolla globular
Bilberry, *Vaccinium membranaceum*.
34b. Leaves entire, pale beneath, obtuse; corolla ovoid
Bilberry, *Vaccinium ovalifolium*.

PRIMULACEAE, the Primrose Family

Herbs, with alternate or opposite simple leaves and regular flowers; petals more or less united; stamens attached one in front of each petal; ovary 1-celled with 1 style.

- 1a. Leaves all basal; flowers on leafless stalks —2.
1b. Stem-leaves present —5.
2a. Flowers nodding, the petals reflexed (3—6 dm. high; flowers showy, white or pink, in spring)
Shooting Star, *Dodecatheon meadia*.
2b. Flowers erect or spreading; petals not reflexed —3.
3a. Corolla not longer than the calyx; flowers small and inconspicuous (1 dm. high; flowers white or pink, spring)
Androsace, *Androsace occidentalis*.
3b. Corolla conspicuous, much longer than the calyx (flowers pink or purple, summer) (Primrose) —4.
4a. Leaves white-mealy beneath (1—4 dm. high)
Primrose, *Primula farinosa*.
4b. Leaves green beneath (2 dm. high or less)
Primrose, *Primula mistassinica*.
5a. All the stem-leaves in one whorl just below the flower-cluster —6.
5b. Stem-leaves several or many, scattered over the stem —7.
6a. Stem-leaves about 1 cm. long —3a.
6b. Stem-leaves 5—10 cm. long **Star Flower, *Trientalis americana*.**
7a. Flowers red, blue, or white (summer) —8.
7b. Flowers yellow (summer) —9.
8a. Leaves opposite; flowers axillary (stems spreading, 1—4 dm. long; flowers blue or red)
Pimpernel, *Anagallis arvensis*.
8b. Leaves alternate; flowers racemose (1—4 dm. high; flowers minute, white)
Water Pimpernel, *Samolus floribundus*.
9a. Stem creeping **Moneywort, *Lysimachia nummularia*.**
9b. Stem erect (Loosestrife) —10.
10a. Flowers in dense spike-like racemes (3—8 dm. high)
Loosestrife, *Lysimachia thyrsiflora*.
10b. Flowers axillary or racemose (3—9 dm. high) —11.
11a. Corolla dotted or streaked with purple or brown; leaves punctate with dark spots —12.
11b. Corolla plain yellow; leaves not dark-dotted —14.
12a. Flowers in racemes —13.
12b. Flowers all axillary **Loosestrife, *Lysimachia quadrifolia*.**

- 13a. Flowers all in racemes; leaves opposite or some of them alternate
Loosestrife, *Lysimachia terrestris*.
- 13b. The lowest flowers axillary; leaves opposite or whorled
Loosestrife, *Lysimachia producta*.
- 14a. Leaves ovate, on slender ciliate petioles
Loosestrife, *Steironema ciliatum*.
- 14b. Leaves lanceolate, sessile or short-petioled, pinnately veined
Loosestrife, *Steironema lanceolatum*.
- 14c. Leaves linear, with one mid-vein
Loosestrife, *Steironema quadriflorum*.

OLEACEAE, the Olive Family

Trees or shrubs, with opposite leaves and regular flowers; sepals 4, or calyx none; petals 4, united, or none; stamens usually 2; ovary 2-celled, superior.

- 1a. Leaves simple (shrub 2—5 m. high; flowers blue or white, in showy clusters in spring) **Lilac, *Syringa vulgaris*.**
- 1b. Leaves compound (trees; flowers greenish, inconspicuous, in spring) (Ash) —2.
 - 2a. Lateral leaflets sessile **Black Ash, *Fraxinus nigra*.**
 - 2b. Lateral leaflets stalked —3.
- 3a. Twigs sharply 4-angled **Blue Ash, *Fraxinus quadrangulata*.**
- 3b. Twigs not distinctly angled —4.
 - 4a. Leaves pubescent beneath **Red Ash, *Fraxinus pennsylvanica*.**
 - 4b. Leaves glabrous beneath —5.
- 5a. Leaves pale-green beneath, obscurely serrulate
White Ash, *Fraxinus americana*.
- 5b. Leaves bright-green beneath, sharply serrulate
Green Ash, *Fraxinus pennsylvanica* var. *lanceolata*.

GENTIANACEAE, the Gentian Family

Herbs, with opposite or basal, entire, usually simple leaves and regular flowers; sepals, petals, and stamens equal in number, 4—12; ovary superior, 1-celled.

- 1a. Leaves reduced to small scales (1—4 dm. high; flowers small, greenish-yellow, in summer) **Bartonia, *Bartonia virginica*.**
- 1b. Leaves rounded, floating (flowers white, summer)
Floating Heart, *Nymphoides lacunosum*.
- 1c. Leaves compound (2—4 dm. high; flowers white or bluish, early summer)
Buckbean, *Menyanthes trifoliata*.
- 1d. Leaves simple, whorled (1—2 m. high; flowers yellowish-white, summer)
American Columbo, *Frasera caroliniensis*.
- 1e. Leaves simple, opposite —2.

- 2a. Corolla rotate, with spreading lobes, 2—4 cm. broad, pink (5—8 dm. high; summer) **Rose Pink, Sabbatia angularis.**
- 2b. Corolla bell-shape, each petal with a spur at the base, purplish or white, and not over 1 cm. long (1—4 dm. high; summer) **Spurred Gentian, Halenia deflexa.**
- 2c. Corolla bell-shape, tubular, funnel-form, or salver-form, not spurred —3.
- 3a. Corolla-lobes fringed (flowers bright-blue) (Fringed Gentian) —4.
- 3b. Corolla-lobes entire —5.
- 4a. Leaves lanceolate (2—8 dm. high; autumn) **Fringed Gentian, Gentiana crinita.**
- 4a. Leaves linear (1—4 dm. high; late summer) **Fringed Gentian, Gentiana procera.**
- 5a. Corolla 2 cm. long or a little less —6.
- 5b. Corolla 2.5—5 cm. long (late summer and autumn) (Gentian) —7.
- 6a. Upper leaves linear or narrowly lanceolate (2—4 dm. high; flowers pink-purple, late summer) **Centaury, Centaurium umbellatum.**
- 6b. Upper leaves ovate, with several principal veins (1—5 dm. high; flowers blue, late summer and autumn) **Gentian, Gentiana quinquefolia.**
- 7a. Calyx-lobes rough or ciliate at the margin (flowers blue, or rarely white) —8.
- 7b. Calyx-lobes smooth (2—8 dm. high) —10.
- 8a. Corolla-lobes spreading; leaves narrowly lanceolate, indistinctly veined (2—5 dm. high) **Gentian, Gentiana puberula.**
- 8b. Corolla-lobes erect or incurved; leaves ovate to ovate-lanceolate, with 3—7 principal veins (3—6 dm. high) —9.
- 9a. Calyx-lobes equaling or exceeding the calyx-tube **Gentian, Gentiana saponaria.**
- 9b. Calyx-lobes shorter than the calyx-tube **Gentian, Gentiana andrewsii.**
- 10a. Leaves ovate or ovate-lanceolate, somewhat cordate at base (flowers greenish-white or yellowish-white) **Gentian, Gentiana flavida.**
- 10b. Leaves narrowly lanceolate or nearly linear, not cordate (flowers blue) **Gentian, Gentiana linearis.**

APOCYNACEAE, the Dogbane Family

Herbs, with opposite simple entire leaves and regular flowers; sepals, petals, and stamens each 5; petals united; stamens attached to the corolla; ovaries 2, with a single style or stigma.

- 1a. Plant creeping or trailing; flowers blue, axillary, 2—3 cm. broad (spring) **Periwinkle, *Vinca minor*.**
- 1b. Plant erect or essentially so; flowers 1 cm. broad or less (4—12 dm. high) —2.
 - 2a. Corolla pinkish, about 8 mm. long by 6—8 mm. broad (early summer) **Dogbane, *Apocynum androsaemifolium*.**
 - 2b. Corolla white or greenish, about 6 mm. long by 4 mm. broad (summer) —3.
- 3a. Leaves petioled, acute at the base **Indian Hemp, *Apocynum cannabinum*.**
- 3b. Leaves sessile, rounded or truncate at the base **Indian Hemp, *Apocynum cannabinum* var. *hypericifolium*.**

ASCLEPIADACEAE, the Milkweed Family

Herbs, with simple entire leaves and regular flowers; juice usually milky; except in the first species, which is a twining vine. The flowers have an unusual structure: calyx of 5 sepals; petals 5, united with each other, and spreading or reflexed so that they conceal the calyx; stamens 5, united with each other and with the stigma to form a complex organ in the center of the flower; ovaries 2; on the back of each stamen is a colored projecting hood, which is frequently the most conspicuous part of the flower, and may be mistaken for the corolla.

- 1a. Twining vine, with dark purple flowers (summer) **Black Swallow-wort, *Cynanchum nigrum*.**
- 1b. Stems not twining —2.
 - 2a. Leaves whorled (3—6 dm. high; summer) (Milkweed) —3.
 - 2b. Leaves opposite or alternate —4.
- 3a. Leaves in whorls of 4, lanceolate (flowers pink) **Milkweed, *Asclepias quadrifolia*.**
- 3b. Leaves in whorls of 4—7, linear (flowers greenish-white) **Milkweed, *Asclepias verticillata*.**
 - 4a. Umbel sessile (4—8 dm. high; flowers green, summer) **Green Milkweed, *Acerates viridiflora*.**
 - 4b. Umbel peduncled —5.
- 5a. Leaves linear or narrowly linear-lanceolate (4—8 dm. high; flowers greenish-white, summer) **Green Milkweed, *Acerates floridana*.**
- 5b. Leaves lanceolate or broader (flowers in summer) —6.
 - 6a. Leaves pubescent beneath —7.
 - 6b. Leaves glabrous or nearly so —10.

- 7a. Flowers brilliant orange (3—6 dm. high)
Butterfly Weed, *Asclepias tuberosa*.
- 7b. Flowers red or purple —8.
- 8a. Reflexed lobes of corolla merely purple-tinged (1—2 m. high)
Milkweed, *Asclepias syriaca*.
- 8b. Reflexed lobes of corolla bright-red or purple —9.
- 9a. The erect hoods of each flower about 5 mm. long (7—12 dm. high)
Milkweed, *Asclepias purpurascens*.
- 9b. The erect hoods of each flower about 3 mm. long (6—10 dm. high)
Swamp Milkweed, *Asclepias incarnata* var. *pulchra*.
- 10a. Leaves broadly rounded and almost sessile at base (flowers purplish) —11.
- 10b. Leaves narrowed at the base, distinctly petioled (8—15 dm. high) —12.
- 11a. Umbel solitary, terminal and erect on a long peduncle (4—8 dm. high)
Milkweed, *Asclepias amplexicaulis*.
- 11b. Umbels terminal or lateral, bent toward one side (7—12 dm. high)
Milkweed, *Asclepias sullivantii*.
- 12a. Corolla (not hoods) red (1—2 m. high)
Swamp Milkweed, *Asclepias incarnata*.
- 12b. Corolla (not hoods) greenish (8—15 dm. high)
Milkweed, *Asclepias exaltata*.

CONVOLVULACEAE, the Morning Glory Family

Twining or trailing herbs (except one species), with regular flowers; sepals 5; corolla 5-angled or 5-lobed; stamens 5, attached to the corolla; ovary superior, 2—3-celled.

- 1a. Plants with green foliage and conspicuous flowers (summer) —2.
- 1b. Leafless brown or yellow plants, with very small flowers (Dodder) —7.
- 2a. Style divided at the top into linear or oblong stigmas (flowers white or pink) (Bindweed) —3.
- 2b. Style not divided at the top; stigmas sessile, capitate (Morning Glory) —6.
- 3a. Stem erect; leaves rounded or somewhat cordate at base, not hastate or sagittate (1—3 dm. high)
Bindweed, *Convolvulus spithameus*.
- 3b. Stem trailing or twining; leaves sagittate or hastate —4.
- 4a. Calyx almost concealed by two large heart-shape bracts —5.
- 4b. Bracts at base of calyx none
Bindweed, *Convolvulus arvensis*.

- 5a. Leaves triangular-hastate, with sharp basal lobes
Bindweed, Convolvulus sepium.
- 5b. Leaves oblong-ovate, the basal lobes obtuse
Bindweed, Convolvulus sepium var. pubescens.
- 6a. Stem smooth or nearly so; ovary 2-celled (flowers white)
Wild Potato Vine, Ipomoea pandurata.
- 6b. Stem with reflexed hairs; ovary 3-celled (flowers of various colors)
Morning Glory, Ipomoea purpurea.
- 7a. Introduced weed, growing as a parasite on clover
Dodder, Cuscuta epithymum.
- 7b. Native species, on various shrubs and herbs —8.
- 8a. Flowers sessile —9.
- 8b. Flowers distinctly pedicelled —12.
- 9a. Sepals united below into a gamosepalous calyx —10.
- 9b. Sepals separate from each other —11.
- 10a. Calyx-lobes obtuse
Dodder, Cuscuta arvensis.
- 10b. Calyx-lobes acute
Dodder, Cuscuta obtusiflora.
- 11a. Flowers in dense rope-like twists on various species of herbs
Dodder, Cuscuta paradoxa.
- 11b. Flowers in dense clusters on various species of shrubs
Dodder, Cuscuta compacta.
- 12a. Tips of the petals inflexed
Dodder, Cuscuta coryli.
- 12b. Tips of the petals erect or spreading —13.
- 13a. Capsule depressed at the summit
Dodder, Cuscuta cephalanthi.
- 13b. Capsule pointed at the summit
Dodder, Cuscuta gronovii.

POLEMONIACEAE, the Polemonium Family

Herbs with alternate or opposite leaves and conspicuous regular flowers; sepals 5, united; petals 5, united and bearing the 5 stamens in the corolla-tube; ovary superior, 3-celled.

- 1a. Leaves pinnately compound and alternate (2—4 dm. high; flowers blue, in spring)
Greek Valerian, Polemonium reptans.
- 1b. Leaves fascicled, narrowly linear (about 1 dm. high; flowers pink-purple, in spring)
Moss Pink, Phlox subulata.
- 1c. Leaves simple, strictly opposite —2.
- 2a. Corolla-lobes deeply 2-cleft to the middle (1—2 dm. high; flowers pink, in spring)
Cleft Phlox, Phlox bifida.
- 2b. Corolla-lobes entire and rounded, or somewhat notched at the apex —3.
- 3a. Flowers in summer (8—15 dm. high; flowers purple)
Garden Phlox, Phlox paniculata.
- 3b. Flowers in spring (3—6 dm. high) —4.
- 4a. Corolla blue-purple; stems ascending
Sweet William, Phlox divaricata.
- 4b. Corolla pink or red-purple; stems erect
Sweet William, Phlox pilosa.

HYDROPHYLLACEAE, the Water-leaf Family

Herbs with alternate lobed or divided leaves and regular flowers; sepals 5; petals 5, united; stamens 5, attached to the corolla-tube and projecting beyond it; ovary 1-celled.

- 1a. Leaves palmately veined and lobed (4—8 dm. high; flowers purple, early summer) **Water-leaf, *Hydrophyllum canadense*.**
- 1b. Leaves pinnately veined and lobed (2—6 dm. high; flowers blue or purple, varying to white) —2.
- 2a. Corolla-lobes much shorter than the corolla-tube (summer) ***Phacelia*, *Phacelia franklinii*.**
- 2b. Corolla-lobes much longer than the corolla-tube (late spring and summer) (Water-leaf) —3.
- 3a. Calyx with a small reflexed appendage between each pair of sepals **Water-leaf, *Hydrophyllum appendiculatum*.**
- 3b. Calyx without appendages **Water-leaf, *Hydrophyllum virginicum*.**

BORAGINACEAE, the Borage Family

Herbs with alternate entire leaves; sepals 5; petals 5, united, corolla generally regular; stamens 5, attached to the corolla-tube; ovary deeply 4-lobed with a single style.

- 1a. Corolla reddish-purple, about 8 mm. wide (4—10 dm. high; spring) **Hound's Tongue, *Cynoglossum officinale*.**
- 1b. Corolla blue with a yellow center, 4—8 mm. wide (1—5 dm. high; spring and early summer) (Forget-me-not) —13.
- 1c. Corolla deep orange, salver-form (2—6 dm. high; spring) (Puccoon) —15.
- 1d. Corolla white or blue, or lightly tinged with yellow or red —2.
- 2a. Corolla rotate, with a very short tube, bright-blue, about 20 mm. broad (3—8 dm. high; summer) **Borage, *Borago officinalis*.**
- 2b. Corolla tubular, funnel-form, or salver-form —3.
- 3a. Corolla 10 mm. long or more; its tube distinctly longer than the calyx —4.
- 3b. Corolla less than 10 mm. long; its tube equaling or shorter than the calyx —8.
- 4a. Flowers yellowish-white, or somewhat tinged with pink or greenish —5.
- 4b. Flowers blue or purple —6.
- 5a. Corolla-lobes erect; leaves sessile (3—8 dm. high; early summer) **False Gromwell, *Onosmodium occidentale*.**
- 5b. Corolla-lobes spreading; leaves decurrent (6—10 dm. high; summer) **Comfrey, *Symphytum officinale*.**
- 6a. Stem and leaves glabrous (3—6 dm. high; spring) **Bluebell, *Mertensia virginica*.**
- 6b. Stem and leaves pubescent (4—8 dm. high) —7.

- 7a. Corolla regular; leaves ovate or ovate-lanceolate (summer)
Bluebell, Mertensia paniculata.
- 7b. Corolla irregular; leaves linear-oblong (summer)
Blueweed, Echium vulgare.
- 8a. Ovary and fruit covered with hooked prickles —9.
- 8b. Ovary and fruit not prickly —12.
- 9a. Principal leaves 2.5 cm. wide or more —10.
- 9b. Principal leaves 2 cm. wide or less (3—8 dm. high; flowers blue or white, summer) (Stickseed) —11.
- 10a. Leaves chiefly basal, the racemes on long leafless peduncles (4—8 dm. high; flowers pale blue, early summer)
Wild Comfrey, Cynoglossum boreale.
- 10b. Stems leafy (8—12 dm. high; flowers white, summer)
Beggar Lice, Lappula virginiana.
- 11a. A bract at the base of each flower **Stickseed, Lappula echinata.**
- 11b. Racemes without bracts at the base of each flower
Stickseed, Lappula deflexa var. americana.
- 12a. Racemes bractless, or bracted only at the base (1—4 dm. high) —14.
- 12b. Raceme with a bract at the base of each flower (flowers white or yellowish) —17.
- 13a. Corolla 4 mm. wide **Forget-me-not, Myosotis laxa.**
- 13b. Corolla 6—8 mm. wide **Forget-me-not, Myosotis scorpioides.**
- 14a. Calyx-lobes all of equal length (summer)
Scorpion Grass, Myosotis arvensis.
- 14b. Calyx-lobes distinctly unequal in length (spring)
Scorpion Grass, Myosotis virginica.
- 15a. Corolla-lobes denticulate **Puccoon, Lithospermum angustifolium.**
- 15b. Corolla-lobes entire —16.
- 16a. Flowers sessile; stem softly pubescent
Puccoon, Lithospermum canescens.
- 16b. Flowers on pedicels 2—5 mm. long; stem hispid or bristly
Puccoon, Lithospermum gmelini.
- 17a. Corolla white; fruit brown and wrinkled (weed 2—4 dm. high; spring and summer) **Corn Gromwell, Lithospermum arvense.**
- 17b. Corolla yellowish-white; fruit white and smooth (5—10 dm. high) —18.
- 18a. Corolla distinctly surpassing the calyx in length (spring and summer) **Corn Gromwell, Lithospermum officinale.**
- 18b. Corolla equaling or shorter than the calyx (spring)
Wild Gromwell, Lithospermum latifolium.

LABIATAE, the Mint Family

Herbs with opposite leaves, square stems, and usually aromatic odor; flowers irregular, with united petals, or almost regular; stamens 2 or 4, attached to the tube of the corolla; ovary deeply 4-lobed, with a single style.

1a. Stamens 2 —2.

1b. Stamens 4 —15.

2a. Corolla regular or nearly so; flowers white, in dense axillary clusters; plants usually of wet grounds (2—8 dm. high; summer and autumn) —3.

2b. Corolla distinctly irregular and more or less 2-lipped —7.

3a. Calyx-teeth short, triangular, acute or obtuse (Bugle Weed) —4.

3b. Calyx-teeth narrow, acuminate or cuspidate (Water Hoarhound) —5.

4a. Stems and stolons bearing tubers

Bugle Weed, *Lycopus uniflorus*.

4b. Stems and stolons not bearing tubers

Bugle Weed, *Lycopus virginicus*.

5a. Leaves serrate; calyx-teeth sharp-pointed —6.

5b. Leaves coarsely incised; calyx-teeth awn-tipped

Water Hoarhound, *Lycopus americanus*.

6a. Corolla twice as long as the calyx; leaves narrowed at the base **Water Hoarhound, *Lycopus rubellus*.**

6b. Corolla barely longer than the calyx; leaves sessile or nearly so **Water Hoarhound, *Lycopus lucidus* var. *americanus*.**

7a. Corolla blue, 3—4 mm. long; flowers in loose axillary clusters (1—4 dm. high; summer) (Pennyroyal) —8.

7b. Corolla 8—40 mm. long —9.

8a. Leaves serrate

Pennyroyal, *Hedeoma pulegioides*.

8b. Leaves linear, entire

Pennyroyal, *Hedeoma hispida*.

9a. Lower lobe of the corolla fringed, very much longer than the upper (5—15 dm. high; corolla pale-yellow; late summer)

Horse Balm, *Collinsonia canadensis*.

9b. Lower lobe of the corolla nearly or quite as long as the upper and not fringed —10.

10a. Calyx narrowly tubular; its teeth about equal in size (5—10 dm. high; flowers in dense terminal heads, in summer) —11.

10b. Calyx campanulate, 2 of its teeth different in size from the other 3 (4—8 dm. high; flowers pink-purple, in terminal clusters in summer) —14.

- 11a. Corolla scarlet **Oswego Tea, *Monarda didyma*.**
11b. Corolla bright crimson or rose-red
Wild Bergamot, *Monarda fistulosa* var. *rubra*.
11c. Corolla white, pink, pale-purple, or yellowish —12.
12a. Flower-clusters all terminal —13.
12b. Flower-clusters both terminal and axillary
Horse Mint, *Monarda punctata*.
13a. Leaves and stem with soft spreading pubescence
Wild Bergamot, *Monarda fistulosa*.
13b. Leaves and stem grayish with fine appressed pubescence
Wild Bergamot, *Monarda mollis*.
14a. Upper calyx-teeth about 3 times as long as the lower
Blephilia, *Blephilia hirsuta*.
14b. Upper calyx-teeth but little longer than the lower
Blephilia, *Blephilia ciliata*.
15a. Calyx with a distinct protuberance on the back of the upper
side (Skullcap) —16.
15b. Calyx without a distinct protuberance —20.
16a. Corolla 5—8 mm. long; flowers in axillary racemes (3—8
dm. high; flowers blue, in summer)
Mad-dog Skullcap, *Scutellaria lateriflora*.
16b. Corolla 6—10 mm. long; flowers axillary, solitary (1—3 dm.
high; flowers violet, early summer)
Skullcap, *Scutellaria parvula*.
16c. Corolla 12—30 mm. long; flowers axillary or in terminal
racemes (4—8 dm. high; flowers blue, summer) —17.
17a. Stem-leaves cordate **Skullcap, *Scutellaria versicolor*.**
17b. Stem-leaves not distinctly cordate —18.
18a. Stem-leaves sessile or nearly so; plant of swamps and
riverbanks **Skullcap, *Scutellaria galericulata*.**
18b. Stem-leaves with petioles 1 cm. or more long; plants of dry
or moist woods —19.
19a. Stem glandular-pubescent toward the summit; corolla 16 mm.
long or less **Skullcap, *Scutellaria pilosa*.**
19b. Stem not glandular; corolla 20 mm. long
Skullcap, *Scutellaria incana*.
20a. Calyx-teeth 5, all equal or nearly so at the time of flower-
ing —28.
20b. Calyx-teeth 5, one of them different in size and shape from
the other four (2—6 dm. high; flowers light blue, summer)
Dragon Head, *Dracocephalum parviflorum*.
20c. Calyx-teeth 5, two of them different in size and shape from
the other three —21.
20d. Calyx-teeth 10, subulate (woolly plant 4—10 dm. high, with
whitish flowers in axillary clusters in summer)
Hoarhound, *Marrubium vulgare*.

- 21a. Corolla deeply split on the upper side and the stamens protruding; upper lip of the calyx much shorter than the lower (5—10 dm. high; flowers pink-purple, in terminal spikes, summer) (Wood Sage) —22.
- 21b. Corolla not deeply split on the upper side —23.
- 22a. Calyx canescent **Wood Sage, *Teucrium canadense*.**
- 22b. Calyx villous **Wood Sage, *Teucrium occidentale*.**
- 23a. Flowers in dense terminal head-like spikes, none axillary (1—5 dm. high; flowers pink-purple or blue, in summer) **Self-heal, *Prunella vulgaris*.**
- 23b. Some or all of the flowers in axillary clusters —24.
- 24a. Leaves linear, entire (1—4 dm. high; flowers purple, summer) —25.
- 24b. Leaves oblong to ovate (summer) —26.
- 25a. Pedicels shorter than the calyx **Summer Savory, *Satureja hortensis*.**
- 25b. Pedicels much longer than the calyx **Calamint, *Satureja glabra*.**
- 26a. Leaves 1 cm. long or less, entire (stems growing in mats, 1—3 dm. long; flowers purple, in summer) **Wild Thyme, *Thymus serpyllum*.**
- 26b. Leaves dentate (flowers purple, summer) —27.
- 27a. Flowers subtended by bracts as long as the calyx (2—5 dm. high) **Basil, *Satureja vulgaris*.**
- 27b. Flowers with minute bracts or none (1—3 dm. high) **Basil-thyme, *Satureja acinos***
- 28a. Corolla 2-lipped or nearly regular, the upper lip flattened, not conspicuously arched over the stamens —29.
- 28b. Corolla conspicuously 2-lipped, the stamens ascending under the concave upper lip —42.
- 29a. Flowers in dense terminal spikes; corolla 2-lipped (8—15 dm. high; summer) —30.
- 29b. Flowers peduncled, 1—4 in the axils of linear leaves —25b.
- 29c. Flowers in many-flowered whorls, which are axillary or terminal, or aggregated into terminal spikes or racemes —31.
- 30a. Corolla yellowish **Giant Hyssop, *Agastache nepetoides*.**
- 30b. Corolla purplish **Giant Hyssop, *Agastache scrophulariaefolius*.**
- 31a. Corolla distinctly irregular, the lower lip longer than the upper —32.
- 31b. Corolla almost regular, the lobes nearly uniform in size —35.
- 32a. Stem-leaves sessile or very nearly so (flowers blue) —33.
- 32b. Stem-leaves long-petioled —34.

- 33a. Leaves linear-oblong, acute at both ends (3—8 dm. high; summer) **Hyssop, *Hyssopus officinalis*.**
- 33b. Leaves oblong to ovate, rounded at the ends (2—4 dm. high; late spring) **Bugle, *Ajuga reptans*.**
- 34a. Leaves ovate to oblong, acute; flowers pink, white, or pale purple (6—15 dm. high; summer) **Catnip, *Nepeta cataria*.**
- 34b. Leaves nearly circular or kidney-shape; flowers blue (creeping; flowers in spring and summer) **Ground Ivy, *Nepeta hederacea*.**
- 35a. Flowers in terminal spikes, or the lower axillary (3—8 dm. high; flowers pink-purple or white, summer) (Mint) —36.
- 35b. Flowers all in axillary whorls (flowers pink-purple or white, summer) (Mint) —38.
- 35c. Flowers in terminal capitate corymbed clusters (4—8 dm. high; flowers white or dotted with purple, summer) (Mountain Mint) —41.
- 36a. Leaves sessile or with very short petiole **Spearmint, *Mentha spicata*.**
- 36b. Leaves with manifest petioles —37.
- 37a. Principal leaves less than half as broad as long **Peppermint, *Mentha piperita*.**
- 37b. Principal leaves more than half as broad as long **Bergamot Mint, *Mentha citrata*.**
- 38a. Stem glabrous; leaves ovate to obovate (4—8 dm. high) **Downy Mint, *Mentha gentilis*.**
- 38b. Stem pubescent, at least on the angles (1—6 dm. high) —39.
- 39a. Principal leaves distinctly petioled and somewhat rounded at base **Wild Mint, *Mentha arvensis*.**
- 39b. Leaves tapering to the base —40.
- 40a. Leaves and stem pubescent **Wild Mint, *Mentha arvensis* var. *canadensis*.**
- 40b. Leaves glabrous; stem pubescent on the angles only **Wild Mint, *Mentha arvensis* var. *glabrata*.**
- 41a. Leaves linear; calyx-teeth awl-shape **Mountain Mint, *Pycnanthemum flexuosum*.**
- 41b. Leaves narrowly lanceolate; calyx-teeth triangular-ovate **Mountain Mint, *Pycnanthemum virginianum*.**
- 42a. Stems decumbent to diffuse; leaves cordate to nearly circular (stems 2—5 dm. long or high; flowers in spring and summer) (Dead Nettle) —43.
- 42b. Stem erect; leaves palmately cleft; calyx-teeth spiny (6—15 dm. tall; flowers pink, in summer) **Motherwort, *Leonurus cardiaca*.**
- 42c. Stems erect or ascending; leaves ovate-lanceolate to linear (summer) —45.

- 43a. Upper leaves closely sessile (flowers red-purple)
Dead Nettle, *Lamium amplexicaule*.
- 43b. Leaves all petioled —44.
- 44a. Flowers red or purple Dead Nettle, *Lamium maculatum*.
- 44b. Flowers white Dead Nettle, *Lamium album*.
- 45a. Flowers 2—2.5 cm. long, in loose terminal spikes (5—10 dm. tall; flowers rose-color)
False Dragon Head, *Physostegia virginiana*.
- 45b. Flowers 1—2 cm. long, in axillary and terminal spiked whorls —46.
- 46a. Calyx-teeth spiny pointed (flowers pink or pale-purple) (Hemp Nettle) —47.
- 46b. Calyx-teeth acute to awl-shape, but not spiny (3—10 dm. high; flowers pale-purple) (Hedge Nettle) —48.
- 47a. Leaves ovate (3—8 dm. high) Hemp Nettle, *Galeopsis tetrahit*.
- 47b. Leaves linear to lanceolate (1—4 dm. high) Hemp Nettle, *Galeopsis ladanum*.
- 48a. Leaves glabrous —49.
- 48b. Leaves distinctly pubescent —50.
- 49a. Leaves ovate-lanceolate, serrate Hedge Nettle, *Stachys tenuifolia*.
- 49b. Leaves linear-oblong, entire or nearly so Hedge Nettle, *Stachys hyssopifolia*.
- 50a. Stem pubescent on the angles alone; leaves petioled Hedge Nettle, *Stachys tenuifolia* var. *aspera*.
- 50b. Stem pubescent on both sides and angles; leaves nearly sessile —51.
- 51a. Leaves oblong or oblong-lanceolate, more than 1 cm. wide Hedge Nettle, *Stachys palustris*.
- 51b. Leaves linear-lanceolate, 1 cm. wide or less Hedge Nettle, *Stachys arenicola*.

VERBENACEAE, the Verbena Family

Herbs, with simple opposite leaves and slightly irregular flowers in spikes or heads; petals 5, united and bearing the 4 stamens in the corolla-tube; ovary 1, 2-celled or 4-celled, with 1 style.

- 1a. Plants prostrate or spreading —2.
- 1b. Plants erect (flowers in summer) (Vervain) —3.
- 2a. Leaves serrate; flowers in short dense spikes (flowers pale-blue, summer) Fog Fruit, *Lippia lanceolata*.
- 2b. Leaves pinnatifid; flowers in loose bracted spikes (flowers light-purple, summer) Vervain, *Verbena bracteosa*.

- 3a. Spikes dense, continuous (flowers purple or blue, varying to white) —4.
- 3b. Spikes slender, interrupted, the flowers scattered (corolla white or pale-blue) —6.
 - 4a. Leaves lanceolate, manifestly petioled (1—2 m. high)
Vervain, Verbena hastata.
 - 4b. Leaves sessile, not lanceolate (5—8 dm. high) —5.
- 5a. Leaves narrowly oblanceolate, tapering at the entire base
Vervain, Verbena angustifolia.
- 5b. Leaves oblong to obovate, not tapering at the base
Vervain, Verbena stricta.
- 6a. Leaves incised, tapering to a sessile base (5—10 dm. high)
Vervain, Verbena officinalis
- 6b. Leaves serrate, petioled (1—2 m. high)
Vervain, Verbena urticaefolia.

SOLANACEAE, the Nightshade Family

Herbs or shrubs, with alternate leaves and regular or slightly irregular flowers; sepals 5, united; corolla of 5 united petals, bearing the 5 stamens attached; ovary 1, 2—5 (usually 2)-celled, with a slender style.

- 1a. Corolla rotate; anthers close together (flowers in summer) —2.
- 1b. Corolla not rotate; anthers separate —5.
 - 2a. Stem and leaves prickly (3—8 dm. high) —3.
 - 2b. Stem and leaves not prickly —4.
- 3a. Flowers white or bluish **Horse Nettle, Solanum carolinense.**
- 3b. Flowers yellow **Buffalo Bur, Solanum rostratum.**
- 4a. Climbing vine; leaves frequently lobed (flowers blue)
Bittersweet, Solanum dulcamara.
- 4b. Not climbing; leaves toothed (flowers white)
Nightshade, Solanum nigrum.
- 5a. Climbing or trailing shrub, with purplish, white, or greenish flowers about 1 cm. wide (frequently thorny; flowers in summer)
Matrimony Vine, Lycium halimifolium.
- 5b. Herbaceous plants, not climbing —6.
 - 6a. Flowers white, red, or blue, 2.5 cm. or more wide (summer) —7.
 - 6b. Flowers yellow, yellowish-white, or greenish-yellow (summer) —12.
- 7a. Corolla-tube 10 cm. long or more (5—12 dm. high) —8.
- 7b. Corolla-tube 5 cm. long or less —10.
 - 8a. Stem finely pubescent; leaves entire or nearly so
Thorn-apple, Datura metel.
 - 8b. Stem glabrous; leaves coarsely toothed (Jimson Weed) —9.
- 9a. Stem green; corolla white **Jimson Weed, Datura stramonium.**
- 9b. Stem purple; corolla light-blue or purple
Jimson Weed, Datura tatula.

10a. Corolla pale-blue (5—10 dm. high)

Apple of Peru, Nicandra physalodes.

10b. Corolla red or violet (2—4 dm. high)

Petunia, Petunia violacea.

10c. Corolla white —11.

11a. Corolla all white (2—4 dm. high)

Petunia, Petunia axillaris.

11b. Corolla with yellow center

White Ground Cherry, Physalis grandiflora.

12a. Corolla 30 mm. wide or more, somewhat irregular; stamens declined to one side (3—6 dm. high)

Henbane, Hyoscyamus niger.

12b. Corolla smaller, strictly regular —13.

13a. Flowers in terminal panicles; corolla tubular, with slightly spreading lobes (5—10 dm. high)

Wild Tobacco, Nicotiana rustica.

13b. Flowers solitary in the axils; corolla short, widely spreading (3—8 dm. high) (Ground Cherry) —14.

14a. Annuals with branching slender roots —15.

14b. Perennials with thickened roots and rootstocks —16.

15a. Plants pubescent

Ground Cherry, Physalis pubescens.

15b. Plants smooth, or with a few scattered hairs

Ground Cherry, Physalis ixocarpa.

16a. Stem viscid-pubescent

Ground Cherry, Physalis heterophylla.

16b. Stem glabrous or slightly pubescent, not viscid —17.

17a. Leaves and stem distinctly pubescent

Ground Cherry, Physalis virginiana.

17b. Leaves and stem almost glabrous

Ground Cherry, Physalis subglabrata.

SCROPHULARIACEAE, the Figwort Family

Herbs with opposite or alternate leaves and usually irregular flowers; corolla of united petals, bearing the 2 or 4 (or rarely 5) stamens attached; petals actually 5, but sometimes apparently only 2 or 4; a sterile fifth stamen sometimes present; ovary superior, 2-celled.

1a. Anther-bearing stamens 5 (6—15 dm. high; flowers in summer) (Mullein) —2.

1b. Anther-bearing stamens 4; a sterile fifth stamen may or may not be present —3.

1c. Anther-bearing stamens 2 —37.

2a. Leaves densely white-woolly; flowers yellow, in dense spikes
Mullein, Verbascum thapsus.

2b. Leaves smooth or nearly so; flowers yellow or white, in loose racemes
Moth Mullein, Verbascum blattaria.

- 3a. Flowers (not the bracts) greenish-yellow, yellow, or orange —4.
- 3b. Flowers blue, purple, brown, red, pink, or white, never yellow —16.
 - 4a. Flowers in dense terminal leafy-bracted spikes —5.
 - 4b. Flowers in loose racemes or axillary —9.
- 5a. Corolla 7 mm. long or less, or none —6.
- 5b. Corolla 12 mm. long or more —7.
 - 6a. Leaves alternate (3—6 dm. high; early summer) **Synthyris, Synthyris bullii.**
 - 6b. Leaves opposite (1—2 dm. high; summer) **Eyebright, Euphrasia arctica.**
- 7a. Stem-leaves entire (2—6 dm. high; summer) **Painted Cup, Castilleja pallida var. septentrionalis.**
- 7b. Stem-leaves palmately lobed, bracteal leaves scarlet (3—6 dm. high; early summer) **Painted Cup, Castilleja coccinea.**
- 7c. Stem-leaves pinnately lobed or incised (Lousewort) —8.
 - 8a. Flowers in spring (2—4 dm. high) **Lousewort, Pedicularis canadensis.**
 - 8b. Flowers in late summer (3—8 dm. high) **Lousewort, Pedicularis lanceolata.**
- 9a. Upper lip of the corolla very different in size and shape from the lower lip —10.
- 9b. Upper lip of the corolla resembling the lower lip in shape, and not very different in size (5—12 dm. high; summer) (False Foxglove) —13.
 - 10a. Leaves alternate (2—5 dm. high; summer) **Butter-and-eggs, Linaria vulgaris.**
 - 10b. Leaves opposite —11.
- 11a. Stem erect; leaves narrowed at the base —30b.
- 11b. Stem creeping or spreading (summer) —12.
 - 12a. Leaves pinnately veined, ovate **Musk-Flower, Mimulus moschatus.**
 - 12b. Leaves palmately veined, circular or nearly so **Yellow Monkey Flower, Mimulus glabratus var. jamesii.**
- 13a. Stem glabrous —14.
- 13b. Stem pubescent —15.
 - 14a. Principal stem-leaves pinnatifid **False Foxglove, Gerardia virginica.**
 - 14b. Principal stem-leaves entire **False Foxglove, Gerardia laevigata.**
- 15a. Corolla hairy on the outside **False Foxglove, Gerardia pedicularia.**
- 15b. Corolla smooth on the outside **False Foxglove, Gerardia flava.**

16a. Leaves all basal; flowers on leafless stalks (1 dm. high or less; flowers pink or white, summer)

Mudwort, *Limosella aquatica* var. *tenuifolia*.

16b. Leaves opposite (those subtending the flowers may be alternate) —20.

16c. Leaves alternate or irregularly scattered —17.

17a. Leaves entire —18.

17b. Leaves pinnately lobed or incised —8a.

17c. Leaves palmately veined and lobed; stem trailing (flowers blue, summer) **Kenilworth Ivy, *Linaria cymbalaria*.**

18a. Corolla-tube less than 1 cm. long, spurred —19.

18b. Corolla more than 2 cm. long, not spurred (3—8 dm. high; flowers red-purple, summer) **Snapdragon, *Antirrhinum majus*.**

19a. Stem and foliage pubescent (1—3 dm. high; flowers blue, summer) **Small Snapdragon, *Linaria minor*.**

19b. Stem and foliage glabrous (2—6 dm. high; flowers blue, summer) **Toad-flax, *Linaria canadensis*.**

20a. Leaves with 1 or 2 lobes near the base (3—5 dm. high; flowers purple, summer) **Gerardia, *Gerardia auriculata*.**

20b. Leaves linear (2—6 dm. high; flowers rose-purple, summer and autumn) (*Gerardia*) —21.

20c. Leaves lanceolate or broader, not lobed —26.

21a. Pedicels equaling or but little longer than the calyx, and conspicuously shorter than the subtending leaf —22.

21b. Pedicels much longer than the calyx, and generally equaling or exceeding the subtending leaf —24.

22a. Plants of moist ground, bogs, and shores —23.

22b. Plants of dry uplands **Gerardia, *Gerardia aspera*.**

23a. Corolla about 25 mm. long **Gerardia, *Gerardia purpurea*.**

23b. Corolla less than 20 mm. long **Gerardia, *Gerardia paupereula*.**

24a. Stem rough on the angles —25.

24b. Stem glabrous **Gerardia, *Gerardia tenuifolia*.**

25a. Leaves 2—5 mm. wide

Gerardia, *Gerardia tenuifolia* var. *macrophylla*.

25b. Leaves thread-like, 1 mm. wide or less

Gerardia, *Gerardia skinneriana*.

26a. Corolla 16 mm. long, or shorter —27.

26b. Corolla 20 mm. long, or longer —32.

27a. Corolla dull-purple, brown, or greenish; one sterile stamen present (1—2.5 m. high; flowers in summer) (*Figwort*) —28.

27b. Corolla blue or white (1—4 dm. high) —29.

28a. Sterile stamen purple **Figwort, *Scrophularia marilandica*.**

28b. Sterile stamen yellow **Figwort, *Scrophularia leporella*.**

- 29a. Flowers nearly or quite sessile (summer) —30.
29b. Flowers on pedicels 10 mm. long or more (spring) —31.
30a. Foliage-leaves prominently toothed —6b.
30b. Foliage-leaves entire, or with 1 or 2 small teeth at the base
Cow Wheat, *Melampyrum lineare*.
31a. Corolla more than 10 mm. long, blue and white
Blue-eyed Mary, *Collinsia verna*.
31b. Corolla 5—8 mm. long, blue and white
***Collinsia*, *Collinsia parviflora*.**
32a. Flowers solitary in the axils of the upper foliage-leaves (4—8 dm. high; flowers blue, in summer) (Monkey Flower) —33.
32b. Flowers in dense terminal or subterminal spikes (3—9 dm. high; summer) —34.
32c. Flowers in loose terminal panicles (flowers white or pale-violet) (Beard-tongue) —35.
33a. Leaves clasping at the base **Monkey Flower, *Mimulus ringens*.**
33b. Leaves petioled, not clasping **Monkey Flower, *Mimulus alatus*.**
34a. Stem and foliage glabrous (flowers white)
Turtlehead, *Chelone glabra*.
34b. Stem and foliage pubescent (flowers purple)
Blue Hearts, *Buchnera americana*.
35a. Stem finely pubescent (3—6 dm. high; flowers pale-violet, late spring) **Beard-tongue, *Pentstemon hirsutus*.**
35b. Stem glabrous below the inflorescence (6—12 dm. high) —36.
36a. Corolla-tube gradually enlarged from base to tip (flowers pale-violet, in early summer)
Beard-tongue, *Pentstemon laevigatus*.
36b. Corolla-tube abruptly enlarged just beyond the calyx (flowers white, early summer)
Beard-tongue, *Pentstemon laevigatus* var. *digitalis*.
37a. Corolla distinctly irregular, 2-lipped (1—4 dm. high; flowers yellowish or white, summer) —38.
37b. Corolla regular or nearly so and 2-lobed, or none —6a.
37c. Corolla regular or nearly so, 4-lobed —40.
38a. Leaves narrowed at the base, with midvein
Hedge Hyssop, *Gratiola virginiana*.
38b. Leaves rounded or somewhat clasping at the base, with 3—5 principal veins (False Pimpernel) —39.
39a. Peduncles longer than the subtending leaves
False Pimpernel, *Ilysanthes anagallidea*.
39b. Peduncles shorter than the subtending leaves
False Pimpernel, *Ilysanthes dubia*.
40a. Leaves whorled (8—20 dm. high; flowers white or pale-blue, in spikes, summer) **Culver's Root, *Veronica virginica*.**
40b. Leaves alternate or opposite (Speedwell) —41.

- 41a. Flowers in racemes, which arise from the axils of the opposite leaves (flowers pale-blue to nearly white, late spring and summer) —42.
- 41b. Flowers solitary in the axils of leaf-like bracts, or in terminal bracted racemes (1—4 dm. high; spring and summer) —46.
- 42a. Stem and foliage glabrous; swamp plants 2—7 dm. high —43.
- 42b. Stem and foliage pubescent; plants of dry ground, 1—3 dm. high —45.
- 43a. Leaves linear or narrowly lanceolate
Marsh Speedwell, *Veronica scutellata*.
- 43b. Leaves ovate or ovate-lanceolate —44.
- 44a. Stem-leaves sessile and somewhat clasping
Water Speedwell, *Veronica anagallis-aquatica*.
- 44b. Stem-leaves on short petioles **Brooklime, *Veronica americana***
- 45a. Leaves narrowed at base into a petiole
Speedwell, *Veronica officinalis*.
- 45b. Leaves rounded or heart-shape at the base
Speedwell, *Veronica chamaedrys*.
- 46a. Bracteal leaves entire; stem glabrous or minutely pubescent —47.
- 46b. All leaves serrate; foliage pubescent (flowers blue) —48.
- 47a. Flowers white, about 2 mm. wide
Speedwell, *Veronica peregrina*.
- 47b. Flowers pale-blue with darker stripes, 3—4 mm. wide
Speedwell, *Veronica serpyllifolia*.
- 48a. Flowers nearly sessile, about 2 mm. wide
Speedwell, *Veronica arvensis*.
- 48b. Flowers on slender pedicels, 5—8 mm. wide
Speedwell, *Veronica tournefortii*.

LENTIBULARIACEAE, the Bladderwort Family

Small herbs, growing on rocks, in mud, or in water; calyx and corolla both 2-lipped; stamens 2, attached to the corolla; ovary 1-celled.

- 1a. Corolla purple —2.
- 1b. Corolla yellow (flowers in summer) (Bladderwort) —4.
- 2a. Leaves oval to elliptical, entire (about 1 dm. high, on rocks; flowers in summer) **Butterwort, *Pinguicula vulgaris*.**
- 2b. Leaves dissected or none, submerged (flowers in summer) (Bladderwort) —3.

- 3a. Flower-stalk with a single bract near the middle
Bladderwort, *Utricularia resupinata*.
- 3b. Flower-stalk without bracts, except at the base of the pedicels
Bladderwort, *Utricularia purpurea*.
- 4a. Stem and numerous dissected leaves floating in water
Bladderwort, *Utricularia vulgaris* var. *americana*.
- 4b. Stem and minute leaves creeping on the bottom of ponds or in mud, while the flowers are borne on erect stalks, easily detached from the delicate stems —5.
- 5a. Upper lip of corolla conspicuous, as long or nearly as long as the lower lip; lower lip with a prominent raised palate —6.
- 5b. Upper lip of corolla half as long as the lower lip, or less —7.
- 6a. Spur of corolla very short and blunt
Bladderwort, *Utricularia gibba*.
- 6b. Spur of corolla very long and slender
Bladderwort, *Utricularia cornuta*.
- 7a. Spur of corolla very short and blunt, or almost none
Bladderwort, *Utricularia minor*.
- 7b. Spur of corolla long and slender
Bladderwort, *Utricularia intermedia*.

OROBANCHACEAE, the Broom-rape Family

Parasitic plants without green color and with scales in place of leaves; corolla 2-lipped, of united petals; stamens 4, attached to the corolla.

- 1a. Flowers in a widely branching panicle, numerous; growing under beech trees (1—5 dm. high; flowers white and purple, late summer)
Beech Drops, *Epifagus virginiana*.
- 1b. Flowers sessile in a dense bracted spike (1—2 dm. high; flowers pale-yellow, early summer)
Squaw-root, *Conopholis americana*.
- 1c. Flowers 1—15, each on a long erect naked peduncle (1—2 dm. high; flowers yellowish or pale-violet, spring and summer) (Cancer-root) —2.
- 2a. Stem erect and scaly, 5—10 cm. high
Cancer-root, *Orobanche fasciculata*.
- 2b. Stem very short, almost below the surface of the ground, with long erect peduncles
Cancer-root, *Orobanche uniflora*.

ACANTHACEAE, the Acanthus Family

Herbs with opposite simple leaves; corolla of united petals, 2-lipped or almost regular; stamens 2 or 4, attached to the corolla; ovary 2-celled.

- 1a. Corolla about 10 mm. long; flowers in dense heads (4—10 dm. high; flowers blue or white, summer)

Water Willow, *Dianthera americana*.

- 1b. Corolla about 30 mm. long; flowers axillary (3—8 dm. high; flowers blue, in summer) (*Ruellia*) —2.

- 2a. Foliage glabrous or slightly pubescent

***Ruellia*, *Ruellia strepens*.**

- 2b. Foliage densely hirsute

***Ruellia*, *Ruellia ciliosa*.**

PHRYMACEAE, the Lopseed Family

Herb with opposite leaves and irregular flowers in long slender spikes; petals united, corolla 2-lipped; stamens 4, attached to the corolla; ovary 1-celled.

One species only, 5—10 dm. high; flowers purple, in summer

Lopseed, *Phryma leptostachya*.

PLANTAGINACEAE, the Plantain Family

Herbs with basal leaves and small white flowers in spikes; sepals 4; petals 4, united; stamens 4; ovary 2-celled.

- 1a. Leaves linear (1—4 dm. high; summer) —2.

- 1b. Leaves broader, lanceolate to broadly ovate or cordate (summer) —3.

- 2a. Spikes mixed with bracts several times longer than the flowers

Buckhorn, *Plantago aristata*.

- 2b. Bracts about as long as the flowers

Plantain, *Plantago purshii*.

- 3a. Leaves cordate, pinnately veined; plant of wet ground and marshes (4—8 dm. tall)

Plantain, *Plantago cordata*.

- 3b. Leaves with 3 to many longitudinal ribs or veins —4.

- 4a. Leaves densely pubescent with grayish hairs —5.

- 4b. Leaves smooth or slightly pubescent —6.

- 5a. Flower-stalks 3—6 dm. high

Plantain, *Plantago media*.

- 5b. Flower-stalks less than 3 dm. high

Plantain, *Plantago virginica*.

- 6a. Flower-stalks 3—6 dm. high; spikes not over 10 cm. long

English Plantain, *Plantago lanceolata*.

- 6b. Scapes 1—4 dm. high; spikes long and slender, usually equaling or longer than the peduncle; dooryard plantains —7.

- 7a. Leaves green at the base

Plantain, *Plantago major*.

- 7b. Leaves reddish at the base

Plantain, *Plantago rugelii*.

RUBIACEAE, the Madder Family

Herbs or shrubs, with opposite or whorled leaves and regular flowers; sepals 4, or minute or almost wanting; petals 4, united; stamens 4; ovary inferior.

- 1a. Shrub (1—3 m. tall; flowers white, in spherical heads, summer)
Button Bush, Cephalanthus occidentalis.
- 1a. Herbaceous —2.
 - 2a. Leaves opposite —3.
 - 2b. Leaves whorled; flowers white, green, or purple (Bedstraw)
—6.
 - 2c. Leaves whorled; flowers yellow **Bedstraw, Galium verum.**
- 3a. Leaves about as long as wide (trailing; flowers paired, white, in spring)
Partridge Berry, Mitchella repens.
- 3b. Leaves at least twice as long as wide —4.
 - 4a. Corolla salver-form, about 1 cm. wide; peduncles 1-flowered (about 1 dm. high; flowers blue or white, in spring)
Bluets, Houstonia coerulea.
 - 4b. Corolla funnel-form, about 5 mm. wide; flowers in clusters (1—2 dm. high; flowers white or pale-purple, summer) (Houstonia) —5.
- 5a. Basal leaves strongly ciliate **Houstonia, Houstonia ciliolata.**
- 5b. Basal leaves smooth **Houstonia, Houstonia longifolia.**
 - 6a. Leaves in whorls of 4 —7.
 - 6b. Leaves in whorls of 6—8 —16.
- 7a. Ovary and fruit hispid with hooked bristles (3—7 dm. high; summer) —8.
- 7b. Ovary and fruit not bristly (early summer) —11.
 - 8a. Leaves with 1 principal vein (flowers dull purple)
Bedstraw, Galium pilosum.
 - 8b. Leaves with 3 principal veins —9.
- 9a. Flowers bright-white **Bedstraw, Galium boreale.**
- 9b. Flowers greenish, yellowish, or purplish —10.
 - 10a. Leaves acuminate **Bedstraw, Galium lanceolatum.**
 - 10b. Leaves acute or obtuse **Bedstraw, Galium circaezans.**
- 11a. Corolla-lobes 3 (2—6 dm. high; flowers white or greenish) —12.
- 11b. Corolla-lobes 4 —13.
 - 12a. Flowers in clusters of 2 or 3 **Bedstraw, Galium claytoni.**
 - 12b. Flowers solitary in the axils, on long hair-like pedicels
Bedstraw, Galium trifidum.
- 13a. Corolla brownish or purple (3—6 dm. high)
Bedstraw, Galium latifolium.
- 13b. Corolla white (1—4 dm. high) —14.
 - 14a. Flowers rather numerous in small cymes
Bedstraw, Galium palustre.
 - 14b. Flowers in clusters of 2 or 3, or solitary —15.

- 15a. Principal leaves spreading or ascending
Bedstraw, *Galium thuctorium*.
- 15b. Principal leaves recurved or reflexed
Bedstraw, *Galium labradoricum*.
- 16a. Ovary and fruit bristly or hispid —17.
- 16b. Ovary and fruit not bristly (summer) —18.
- 17a. Leaves narrowly lanceolate to linear, mostly 6—8 in a whorl (stem 5—15 dm. long; flowers white; spring and summer)
Bedstraw, *Galium aparine*.
- 17b. Leaves narrowly oval or elliptical, mostly in whorls of 6; flowers in clusters of 3 (1—5 dm. high; flowers greenish, summer)
Bedstraw, *Galium triflorum*.
- 18a. Leaves cuspidate or mucronate at the apex (flowers white) —19.
- 18b. Leaves obtuse at the apex (flowers white or greenish; 2—6 dm. high) —21.
- 19a. Flowers very numerous in terminal panicles (stem 3—8 dm. long)
Bedstraw, *Galium mollugo*.
- 19b. Flowers in axillary clusters (1—3 dm. high)
Bedstraw, *Galium tricornis*.
- 19c. Flowers few, in small loose terminal cymes —20.
- 20a. Stem smooth or nearly so (2—4 dm. high)
Bedstraw, *Galium concinnum*.
- 20b. Stem hispid with reflexed bristles (5—15 dm. long)
Bedstraw, *Galium asprellum*.

CAPRIFOLIACEAE, the Honeysuckle Family

Shrubs or herbs, with opposite leaves; corolla regular or irregular, petals 4 or 5, united; stamens 4 or 5; ovary inferior, 1—5-celled.

- 1a. Leaves compound (shrubs 1—4 m. high; flowers white, in large clusters in early summer) (Elder) —2.
- 1b. Leaves simple —3.
- 2a. Pith of the twigs white; inflorescence flattened or convex
Elder, *Sambucus canadensis*.
- 2b. Pith of the twigs brown; inflorescence pyramidal
Elder, *Sambucus racemosa*.
- 3a. Plant trailing; flowers nodding, in pairs (1 dm. high; flowers pink, summer) **Twin Flower, *Linnaea borealis* var. *americana*.**
- 3b. Erect herbs (6—12 dm. high; flowers dull-red, axillary, early summer) (Feverwort) —4.
- 3c. Shrubs, small trees, or woody vines —5.
- 4a. Leaf-bases broadly connate and 2—5 cm. wide
Feverwort, *Triosteum perfoliatum*.
- 4b. Leaf-bases narrowly connate, not over 1 cm. wide
Feverwort, *Triosteum aurantiacum*.

- 5a. Climbing vines (spring and early summer) (Honeysuckle) —6.
- 5b. Erect or spreading shrubs or small trees —11.
 - 6a. Flowers in 2-flowered axillary clusters (flowers white or pink) **Honeysuckle, *Lonicera japonica*.**
 - 6b. Flowers in terminal clusters —7.
- 7a. Leaves distinctly pubescent beneath (flowers yellow) —8.
- 7b. Leaves glabrous beneath, or very minutely puberulent —9.
 - 8a. Leaves pubescent above **Honeysuckle, *Lonicera hirsuta*.**
 - 8b. Leaves glabrous above **Honeysuckle, *Lonicera glaucescens*.**
- 9a. Corolla purple on the outside, glabrous within **Honeysuckle, *Lonicera caprifolium*.**
- 9b. Corolla yellow on the outside (or slightly tinged with purple), pubescent within —10.
 - 10a. Corolla-tube 6—8 mm. long **Honeysuckle, *Lonicera dioica*.**
 - 10b. Corolla-tube 11—14 mm. long **Honeysuckle, *Lonicera sullivanii*.**
- 11a. Corolla tubular at base; style long and slender —12.
- 11b. Corolla rotate or somewhat bell-shape, style very short (flowers white, late spring or early summer) —22.
 - 12a. Flowers yellow or yellowish (spring and early summer) —13.
 - 12b. Flowers white, pink, or red —18.
- 13a. Leaves serrate (5—10 dm. tall) **Bush Honeysuckle, *Diervilla lonicera*.**
- 13b. Leaves entire; flowers in pairs (Honeysuckle) —14.
 - 14a. Each pair of flowers subtended by 2 broad leaf-like bracts (1—3 m. high) **Honeysuckle, *Lonicera involucrata*.**
 - 14b. Bracts at the base of each pair of flowers linear or narrowly lanceolate —15.
- 15a. Native species of woods and bogs —16.
- 15b. Introduced species, growing mostly near dwellings; leaves very pubescent beneath **Honeysuckle, *Lonicera xylosteum*.**
 - 16a. Peduncles 15 mm. long or more (1—4 m. high) —17.
 - 16b. Peduncles about 5 mm. long (1 m. high, or less) **Honeysuckle, *Lonicera coerulea* var. *villosa*.**
- 17a. Leaves ciliate **Honeysuckle, *Lonicera canadensis*.**
- 17b. Leaves not ciliate **Honeysuckle, *Lonicera oblongifolia*.**
 - 18a. Corolla irregular, over 1 cm. long (1—4 m. high; spring) **Honeysuckle, *Lonicera tatarica*.**
 - 18b. Corolla regular, less than 1 cm. long (5—15 dm. high; flowers white or pink, in axillary clusters, early summer) —19.
- 19a. Flowers in axillary spikes **Wolfberry, *Symphoricarpos occidentalis*.**
- 19b. Flowers almost sessile in the axils —20.
 - 20a. Flowers numerous in each axil **Indian Currant, *Symphoricarpos orbiculatus*.**
 - 20b. Flowers 1 or 2 in each axil (Snowberry) —21.

- 21a. Leaves green beneath **Snowberry, Symphoricarpos racemosus.**
21b. Leaves whitened beneath
Snowberry, Symphoricarpos racemosus var. pauciflorus.
22a. Leaves palmately lobed —23.
22b. Leaves not lobed —25.
23a. Outermost flowers of the cluster enlarged and imperfect (1—4 m. high) **Cranberry Tree, Viburnum opulus var. americanum.**
23b. All flowers of the cluster alike —24.
24a. Flower-clusters 4—10 cm. broad (1—2 m. high)
Arrow Wood, Viburnum acerifolium.
24b. Flower-clusters 2—3 cm. broad
Squashberry, Viburnum pauciflorum.
25a. Outer flowers of the cluster enlarged and imperfect (1—3 m. high)
Hobble-bush, Viburnum alnifolium.
25b. All flowers of the cluster alike —26.
26a. Leaves finely serrate; the veins not prominent —27.
26b. Leaves coarsely serrate, all or most of the teeth terminating in a prominent vein —29.
27a. Peduncle of the flower-cluster, below its branches, at least 2 cm. long (1—3 m. high) **Withe-rod, Viburnum cassinoides.**
27b. Peduncle of the cluster 1 cm. long, or even shorter (3—8 m. high) —28.
28a. Leaves distinctly acuminate
Sheep-berry, Viburnum lentago.
28b. Leaves obtuse or barely acute
Black Haw, Viburnum prunifolium.
29a. Leaves densely pubescent beneath (6—15 dm. high)
Arrow-wood, Viburnum pubescens.
29b. Leaves glabrous beneath, or with tufts of hairs in the forks of the veins (1—4 m. high) **Arrow-wood, Viburnum dentatum.**

VALERIANACEAE, the Valerian Family

Herbs with opposite leaves and small nearly or quite regular flowers; petals 5, united; stamens 3; sepals minute or wanting; ovary inferior.

- 1a. Stem-leaves pinnately cleft (3—10 dm. high; flowers white or pinkish, summer) —2.
1b. Stem-leaves entire or dentate (2—6 dm. high; flowers white, summer) (Corn Salad) —3.
2a. Leaf-segments parallel-veined **Valerian, Valeriana edulis.**
2b. Leaf-segments net-veined
Swamp Valerian, Valeriana uliginosa.
3a. Upper stem-leaves entire **Corn Salad, Valerianella chenopodifolia.**
3b. Upper stem-leaves dentate **Corn Salad, Valerianella radiata.**

DIPSACACEAE, the Teasel Family

Herbs with opposite leaves, and small pale blue flowers aggregated in dense heads; calyx minute; petals 4, united; stamens 4, attached to the corolla; ovary inferior.

One species in Michigan, 1—2 m. high, with prickly leaves and stem, blooming in summer

Teasel, *Dipsacus sylvestris*.

CUCURBITACEAE, the Gourd Family

Herbs, climbing by tendrils, with alternate palmately lobed leaves and imperfect flowers; staminate flowers in showy clusters, with 5—6 petals and 3 stamens; pistillate flowers small.

1a. Leaves 5-angled or shallowly 5-lobed (flowers white, summer)

Bur Cucumber, *Sicyos angulatus*.

1b. Leaves 5-lobed to about the middle (commonly cultivated and frequently wild; flowers white, summer)

Wild Cucumber, *Echinocystis lobata*.

CAMPANULACEAE, the Bellflower Family

Herbs with alternate simple leaves and milky juice; sepals 5; petals 5, united; stamens 5, attached at the very base of the corolla; ovary inferior.

1a. Stem-leaves circular or nearly so, cordate-clasping at base (2—6 dm. high; flowers blue, axillary, in summer)

Venus' Looking Glass, *Specularia perfoliata*.

1b. Stem-leaves linear or nearly so, not over 1 cm. wide (summer) —2.

1c. Stem-leaves ovate to lanceolate, 2 cm. wide or more (flowers blue, in a terminal spike or raceme, summer) (Bellflower) —4.

2a. Stem and leaves glabrous (or rarely pubescent) (1—6 dm. high; flowers blue)

Harebell, *Campanula rotundifolia*.

2b. Stem and leaves rough with reflexed bristles (marsh plants, with weak slender stems 3—10 dm. long; flowers white or pale-blue) (Marsh Bellflower) —3.

3a. Corolla 5—8 mm. long **Marsh Bellflower, *Campanula aparinoides*.**

3b. Corolla 10—12 mm. long **Marsh Bellflower, *Campanula uliginosa*.**

4a. Corolla rotate; flowers in spikes (6—15 dm. high)

Bellflower, *Campanula americana*.

4b. Corolla bell-shape; flowers in one-sided racemes (4—10 dm. high)

Bellflower, *Campanula rapunculoides*.

LOBELIACEAE, the Lobelia Family

Herbs with alternate simple leaves and milky juice; flowers irregular; petals 5, united; corolla split down the upper side; stamens 5, united by their anthers into a ring or tube surrounding the style; ovary 2-celled, inferior. Flowers in summer and autumn.

- 1a. Leaves all basal, tubular; flowers on leafless stalks (aquatic, 1—4 dm. high; flowers blue) **Water Lobelia, Lobelia dortmanna.**
- 1b. Leaves normal, on the stem —2.
 - 2a. Flowers more than 2 cm. long (5—10 dm. high) —3.
 - 2b. Flowers about 1 cm. long, or shorter (flowers light blue) —4.
- 3a. Flowers scarlet **Cardinal Flower, Lobelia cardinalis.**
- 3b. Flowers blue **Great Lobelia, Lobelia siphilitica.**
 - 4a. Flowers in loose racemes, pedicelled —5.
 - 4b. Flowers in slender terminal spike-like racemes, nearly sessile (4—10 dm. high, usually unbranched) **Lobelia, Lobelia spicata.**
- 5a. Foliage pubescent (3—8 dm. high) **Indian Tobacco, Lobelia inflata.**
- 5b. Foliage glabrous (1—4 dm. high) **Lobelia, Lobelia kalmii.**

COMPOSITAE, the Composite Family

Herbs, with various types of foliage, but with flowers of characteristic structure, resembling a sunflower, a thistle, or a dandelion. Each apparent flower is a head of numerous small flowers, attached side by side to the expanded end of the stem, and subtended and partly enclosed by a series of bracts, called the involucre, which resembles a calyx.

The calyx of the individual flower is minute or actually wanting, and is usually modified to aid in seed dispersal. It appears at the base of the corolla, at the summit of the inferior ovary, and is known as pappus. The structure of the pappus is best observed in the ripe fruit.

The corolla of the individual flowers consists of 5 (or rarely 4) united petals. In some flowers the petals are united to form a tubular or bell-shape corolla. In others they are united to form a flat or strap-shape corolla. The stamens are attached to the corolla, and are united by their anthers into a tube which surrounds the style, and above which the 2-lobed stigma protrudes.

The apparent flower of a Composite, composed of several or many individual flowers, is termed a head. It may be composed entirely of tubular flowers, as the thistle or bone-set; or entirely of strap-shape flowers, as the dandelion; or of both sorts together, as the aster or sunflower. In the latter case, the tubular flowers invariably occupy the center of the head, called the disk, and the larger strap-shape flowers are at the margin, where their projecting corollas, called rays, may be very conspicuous. Such heads are called radiate.

In a few composites (see 1a below) the flowers have minute corollas without colored parts.

In identifying a composite, determine first whether the heads are composed of tubular flowers, of strap-shape flowers, or of both sorts together; and, secondly, observe the nature of the pappus, using preferably the ripe heads, or at least the oldest flower-heads available. No further difficulties will be encountered.

- 1a. Flowers without petal-like or brightly colored parts; staminate and pistillate flowers in separate heads (or rarely in the same heads); coarse weeds with inconspicuous flowers (summer and autumn) —2.
- 1b. Flowers with some petal-like parts, usually brightly colored or white —10.
 - 2a. Leaves toothed or lobed —3.
 - 2b. Leaves deeply pinnatifid or dissected (4—15 dm. high; flowers in erect spikes) (Ragweed) —7.
- 3a. Fruit or pistillate flowers thickly covered with sharp hooked spines (3—10 dm. high) (Cocklebur) —4.
- 3b. Fruit not spiny —8.
 - 4a. With spines on the stem at the base of the leaves
Cocklebur, *Xanthium spinosum*.
 - 4b. Without any spines on the stem —5.
- 5a. Body of the bur smooth or slightly hairy
Cocklebur, *Xanthium canadense*.
- 5b. Body of the bur and the spines densely pubescent —6.
 - 6a. Body of the bur more than twice as long as thick; a common weed
Cocklebur, *Xanthium commune*.
 - 6b. Body of the bur less than twice as long as thick
Cocklebur, *Xanthium echinatum*.
- 7a. Leaves twice-pinnatifid **Ragweed, *Ambrosia artemisiifolia*.**
- 7b. Leaves once-pinnatifid **Ragweed, *Ambrosia psilostachya*.**
 - 8a. Leaves deeply 3-lobed (1—5 m. high)
Giant Ragweed, *Ambrosia trifida*.
 - 8b. Leaves serrate or obscurely lobed —9.
- 9a. Stem simple or sparingly branched; pistillate heads in the axils of the upper leaves (1—3 m. high)
Giant Ragweed, *Ambrosia trifida* var. *integrifolia*.
- 9b. Stem much branched; heads all alike, in panicles
Marsh Elder, *Iva xanthifolia*.
 - 10a. Flowers all strap-shape; juicy milky (The central flowers must be examined carefully, since they are frequently much smaller than the marginal ones) —11.
 - 10b. Flowers all tubular, with regular, 4—5-lobed corollas —45.
 - 10c. Flowers both tubular and strap-shape; heads radiate (in a few species the rays are small and may be overlooked by mistake) —108.

- 11a. Flowers blue (summer and autumn) —12.
- 11b. Flowers orange, yellow, white, or purplish —15.
 - 12a. Heads 2.5 cm. wide, or larger —13.
 - 12b. Heads 1.5 cm. wide, or smaller —14.
- 13a. Leaves linear; bracts longer than the flowers, heads 5—10 cm. wide (6—15 dm. high) **Salsify, Tragopogon porrifolius.**
- 13b. Leaves broader, mostly serrate; bracts shorter than the flowers; heads 2.5—4 cm. wide **Chicory, Cichorium intybus.**
- 14a. Heads in a narrow crowded cluster (5—15 dm. high) —30b.
- 14b. Heads in a spreading open panicle (Wild Lettuce) —22.
- 15a. Heads solitary at the summit of leafless stalks —16.
- 15b. Heads several, on leafy, naked, or scaly stalks —19.
 - 16a. Basal leaves strictly entire; heads about 2.5 cm. wide (summer and autumn) —35a.
 - 16b. Basal leaves toothed, lobed, or pinnatifid (spring and summer) —17.
- 17a. Heads 8—14 mm. wide (1—4 dm. high) **Dwarf Dandelion, Krigia virginica.**
- 17b. Heads 25—50 mm. wide (1—6 dm. high) (Dandelion) —18.
- 18a. Outer involucrel bracts reflexed **Dandelion, Taraxacum officinale.**
- 18b. Outer involucrel bracts erect or spreading **Dandelion, Taraxacum erythrospermum.**
- 19a. Pappus none; heads about 1 cm. wide (4—10 dm. high; summer) **Nipplewort, Lapsana communis.**
- 19b. Pappus of an inner row of bristles and an outer row of short scales; heads about 3 cm. wide (3—8 dm. high; early summer) **Cynthia, Krigia amplexicaulis.**
- 19c. Pappus of feathery bristles (summer) —20.
- 19d. Pappus of simple bristles —25.
- 20a. Flower-stalk scaly, without foliage leaves (2—6 dm. high) **Fall Dandelion, Leontodon autumnalis.**
- 20b. Stem leafy (3—10 dm. high) —21.
- 21a. Leaves entire, linear-lanceolate **Meadow Salsify, Tragopogon pratensis.**
- 21b. Leaves serrate, oblong-lanceolate **Picris, Picris hieracioides.**
- 22a. Pappus tawny in color (1—3 m. high) —23.
- 22b. Pappus white —24.
- 23a. Leaves pinnatifid **Wild Lettuce, Lactuca spicata.**
- 23b. Leaves undivided, dentate **Wild Lettuce, Lactuca spicata var. integrifolia.**
- 24a. Upper leaves entire; heads about 1.5 cm. wide (5—10 dm. high) **Wild Lettuce, Lactuca pulchella.**
- 24b. Upper leaves dentate or lobed; heads about 1 cm. wide (1—3 m. high) **Wild Lettuce, Lactuca floridana.**

- 25a. Achene tipped with a slender beak, bearing the pappus at its summit (summer) (Wild Lettuce) —26.
- 25b. Achene without a beak —29.
 - 26a. Leaves hirsute or hispid on the mid-veins beneath —27.
 - 26b. Leaves glabrous —28.
- 27a. Leaves pubescent on both sides (1—2 m. high)
 - Wild Lettuce, *Lactuca hirsuta*.**
- 27b. Leaves glabrous, except on the mid-vein (5—15 dm. high)
 - Wild Lettuce, *Lactuca scariola* var. *integrata*.**
 - 28a. Leaves entire or sparsely toothed (1—2 m. high)
 - Wild Lettuce, *Lactuca sagittifolia*.**
 - 28b. Leaves chiefly sinuate-pinnatifid (1—3 m. high)
 - Wild Lettuce, *Lactuca canadensis*.**
- 29a. Flowers white, cream-color, or purplish (summer and autumn) (Rattlesnake Root) —30.
- 29b. Flowers bright-yellow or orange —33.
 - 30a. Heads nodding (6—20 dm. high) —31.
 - 30b. Heads pointing in various directions, in spike-like panicles; involucre pubescent (5—15 dm. high)
 - Rattlesnake Root, *Prenanthes racemosus*.**
- 31a. Heads with 5—7 flowers in each
 - Rattlesnake Root, *Prenanthes altissima*.**
- 31b. Heads with 8—12 flowers —32.
- 31c. Heads with 20 or more flowers
 - Rattlesnake Root, *Prenanthes crepidinea*.**
- 32a. Pappus dark reddish-brown.
 - Rattlesnake Root, *Prenanthes alba*.**
- 32b. Pappus pale-brown or nearly white
 - Rattlesnake Root, *Prenanthes trifoliata*.**
- 33a. Pappus tawny or brown in color (summer and autumn) (Hawkweed) —34.
- 33b. Pappus white —42.
 - 34a. Heads 2.5 cm. in diameter, or larger —35.
 - 34b. Heads 1—2 cm. in diameter (4—10 dm. high) —37.
- 35a. Leaves all basal (1—4 dm. high)
 - Hawkweed, *Hieracium pilosella*.**
- 35b. Stem-leaves present (4—15 dm. high) —36.
 - 36a. Leaves rounded at the sessile base
 - Hawkweed, *Hieracium canadense*.**
 - 36b. Leaves narrowed toward the base
 - Hawkweed, *Hieracium umbellatum*.**
- 37a. A rosette of basal leaves conspicuous at flowering time —38.
- 37b. No rosette of basal leaves at time of flowering —41.
 - 38a. Leaves glabrous on the upper side —39.
 - 38b. Leaves hairy on the upper side —40.

- 39a. Stem glabrous, leafless or with one or two leaves
Hawkweed, Hieracium venosum.
- 39b. Stem with several leaves, hairy below
Hawkweed, Hieracium marianum.
- 40a. Leaves with short scattered hairs above
Hawkweed, Hieracium gronovii.
- 40b. Leaves and stem densely covered with very long hairs
Hawkweed, Hieracium longipilum.
- 41a. Leaves glabrous
Hawkweed, Hieracium paniculatum.
- 41b. Leaves very hairy
Hawkweed, Hieracium scabrum.
- 42a. Bracts of the involucre smooth (5—20 dm. tall; summer and autumn) (Sow Thistle) —43.
- 42b. Bracts of the involucre hairy —44.
- 43a. The clasping leaf-bases acute
Sow Thistle, Sonchus oleraceus.
- 43b. The clasping leaf-bases rounded
Sow Thistle, Sonchus asper.
- 44a. Heads 2.5—5 cm. broad; involucre 2 cm. long (4—10 dm. high)
Sow Thistle, Sonchus arvensis.
- 44b. Heads 1—2 cm. broad; involucre 6—10 mm. long (3—6 dm. high; summer)
Hawksbeard, Crepis tectorum.
- 45a. Leaves or involucre or both spiny (thistles, burdock, etc.) —46.
- 45b. Neither leaves nor involucre spiny —60.
- 46a. Leaves 1—4 dm. broad, not spiny (flowers purple or white; summer) (Burdock) —47.
- 46b. Leaves narrower, not spiny —48.
- 47a. Diameter of involucre at flowering time 3—5 cm. (1—3 m. high)
Burdock, Aretium lappa.
- 47b. Diameter of involucre at flowering time 1.5—3 cm. (5—15 dm. high)
Burdock, Aretium minus.
- 48a. Each head 1-flowered; heads aggregated in a globular head-like cluster (1—2 m. high; flowers blue or white, summer)
Globe Thistle, Echinops sphaerocephalus.
- 48b. Each head many-flowered —49.
- 49a. Principal involucre bracts with stout spreading spines 2—4 cm. long (5—15 dm. high; flowers purple, summer)
Milk Thistle, Silybum marianum.
- 49b. Principal involucre bracts with slender spines or none —50.
- 50a. Pappus feathery; receptacle bristly (summer and autumn) (Thistle) —51.
- 50b. Pappus not feathery (flowers purple, summer) —59.
- 51a. Heads subtended by a circle of large leafy bracts (5—15 dm. high; flowers pale-yellow)
Thistle, Cirsium spinoissimum.
- 51b. Heads not subtended by several leafy bracts —52.
- 52a. Leaves conspicuously white-woolly on both sides (4—10 dm. high) —53.
- 52b. Leaves conspicuously white-woolly or brown-woolly below, not above (flowers purple or pink) —54.
- 52c. Leaves green on both sides (flowers pink or purple, rarely white) —56.

- 53a. Leaves deeply pinnately parted with linear divisions; flowers almost white **Thistle, *Cirsium pitcheri*.**
- 53b. Leaves irregularly pinnatifid; flowers purple-pink **Thistle, *Cirsium undulatum*.**
- 54a. Stem-leaves entire or shallowly lobed (1—3 m. high) **Thistle, *Cirsium altissimum*.**
- 54b. Stem-leaves obviously pinnatifid (1—2 m. high) —55.
- 55a. Leaves decurrent on the stem **Thistle, *Cirsium lanceolatum*.**
- 55b. Leaves not decurrent **Thistle, *Cirsium discolor*.**
- 56a. Outer and middle involucre bracts appressed, pointless or with weak short prickles —57.
- 56b. Outer and middle bracts erect, not appressed, acuminate into a long slender more or less prickly tip (4—10 dm. high) —58.
- 57a. Heads numerous 2—2.5 cm. broad, in close clusters (5—12 dm. high) **Canada Thistle, *Cirsium arvense*.**
- 57b. Heads few or solitary, 3—5 cm. broad (1—2 m. high) **Thistle, *Cirsium muticum*.**
- 58a. Principal bracts with a conspicuous viscid stripe down the middle; heads 6—19 cm. broad, solitary or few **Thistle, *Cirsium hillii*.**
- 58b. Principal bracts not viscid **Thistle, *Cirsium pumilum*.**
- 59a. Receptacle not bristly; heads 3—5 cm. wide (1—3 m. high; flowers pale-purple, summer) **Cotton Thistle, *Onopordum acanthium*.**
- 59b. Receptacle bristly; heads 2—2.5 cm. wide (5—12 dm. high; flowers purple to white, late summer) **Thistle, *Carduus crispus*.**
- 60a. Leaves basal; stem-leaves none or reduced to scales (2—8 dm. high; flowers whitish, in spring) —61.
- 60b. Stem-leaves present; basal leaves present or absent —62.
- 61a. Leaves toothed or lobed; flower-stalk not scaly **Adenocaulon, *Adenocaulon bicolor*.**
- 61b. Leaves deeply cleft; flower-stalk scaly —197a.
- 62a. Leaves compound or dissected (flowers in summer and autumn) —63.
- 62b. Leaves merely lobed, never truly compound or dissected —72.
- 62c. Leaves entire or serrate —78.
- 63a. Some of the involucre bracts leaf-like, longer than the heads (3—20 dm. high; flowers yellow or greenish, summer and autumn) (Beggar Ticks) —126.
- 63b. Bracts short and not leaf-like —64.
- 64a. Heads 7—20 mm. wide, in a flat-topped or convex cluster (3—10 dm. high; flowers yellow, summer) (Tansy) —65.
- 64b. Heads smaller, in spikes, racemes, or panicles (flowers yellow or greenish, late summer and autumn) (Wormwood) —66.

- 65a. Heads 7—10 mm. wide, numerous in a dense cluster
Tansy, *Tanacetum vulgare*.
- 65b. Heads 10—20 mm. wide, few, 2—10 in a loose open cluster
Tansy, *Tanacetum huronense*.
- 66a. Heads 2—3 mm. broad (4—15 dm. high) —67.
- 66b. Heads 4—6 mm. broad (3—10 dm. high) —69.
- 67a. Leaf-lobes narrowly linear, strictly entire
Wormwood, *Artemisia caudata*.
- 67b. Leaf-lobes serrate —68.
- 68a. Heads in a loose spreading panicle
Wormwood, *Artemisia annua*.
- 68b. Heads in axillary clusters, producing a leafy spike-like panicle
Wormwood, *Artemisia biennis*.
- 69a. Leaf-lobes narrowly linear —70.
- 69b. Leaf-lobes oblong to obovate, not linear —71.
- 70a. Shrubby; involucre pubescent
Southernwood, *Artemisia abrotanum*.
- 70b. Herbaceous; involucre glabrous or rarely pubescent
Wormwood, *Artemisia canadensis*.
- 71a. Leaves finely gray-pubescent on both sides
Wormwood, *Artemisia absinthium*.
- 71b. Leaves smooth or nearly so above, densely white-woolly beneath
Mugwort, *Artemisia vulgaris*.
- 72a. Heads 2—4 cm. broad, purple, blue, or rarely white (3—6 dm. high; summer) —92.
- 72b. Heads 1 cm. wide or less —73.
- 73a. Leaves densely white-woolly beneath (flowers yellowish, late summer) —74.
- 73b. Leaves smooth or hairy, never white-woolly —75.
- 74a. Heads 6—8 mm. wide (4—8 dm. high)
Wormwood, *Artemisia stelleriana*.
- 74b. Heads 3—4 mm. wide (5—10 dm. high)
Wormwood, *Artemisia ludoviciana*.
- 75a. Principal bracts of the involucre 5, with frequently a few much smaller ones —76.
- 75b. Principal bracts of the involucre numerous —77.
- 76a. Heads few in small terminal clusters; foliage somewhat viscid-pubescent (6—15 dm. high; flowers yellow, summer) —114a.
- 76b. Heads very numerous in flat-topped clusters; foliage never viscid-pubescent (1—2 m. high; flowers white, late summer) —105c.

- 77a. Leaves broadly halberd-shape, 3-lobed (1—2 m. high; flowers white, late summer) —105b.
- 77b. Leaves lobed only at the base (5—10 dm. high; flowers yellow, summer) —93a.
- 77c. Leaves pinnatifid (2—8 dm. high; flowers yellow) —172.
- 78a. Bracts of the involucre dry and chaffy, at least at the tip; plants always pubescent and usually white-woolly —79.
- 78b. Bracts of the involucre green or colored, but never dry and chaffy —90.
- 79a. Pappus none; heads 3—4 mm. wide, in ample paniced spikes (flowers yellowish, late summer) —74b.
- 79b. Pappus a minute ring or crown; leaves crenate (5—10 dm. high; flowers yellow, summer) —93a.
- 79c. Pappus of hairs; heads in flat-topped clusters or slender spikes —80.
- 80a. Heads sessile or subsessile in small flat-topped clusters; flowering in spring or early summer; principal leaves basal (1—4 dm. high; flowers white or purplish) (Everlasting) —81.
- 80b. Heads in terminal spikes (2—6 dm. high; flowers purplish, summer) **Cudweed, Gnaphalium purpureum.**
- 80c. Heads in small or large flat-topped clusters, flowering in summer or autumn; principal leaves on the stem —88.
- 81a. Stolons from the basal rosette of leaves leafy throughout and ascending at the tip —82.
- 81b. Stolons prostrate throughout, leafy only at the tip —87.
- 82a. Basal leaves 2—5 cm. long, 1-nerved —83.
- 82b. Basal leaves 5—12 cm. long, 3-nerved —84.
- 83a. Basal leaves spatulate or oblanceolate, smooth above **Everlasting, Antennaria canadensis.**
- 83b. Basal leaves obovate, pubescent above **Everlasting, Antennaria neodioica.**
- 84a. Basal leaves smooth above **Everlasting, Antennaria parlinii.**
- 84b. Basal leaves dull green and pubescent above —85.
- 85a. Heads 6—8 mm. high. **Everlasting, Antennaria plantaginifolia.**
- 85b. Heads 8—11 mm. high —86.
- 86a. Leaf-blade ovate or obovate **Everlasting, Antennaria fallax.**
- 86b. Leaf-blade spatulate, with rounded tip **Everlasting, Antennaria occidentalis.**
- 87a. Styles crimson **Everlasting, Antennaria neglecta.**
- 87b. Styles pale yellow **Everlasting Antennaria petaloidea.**
- 88a. Erect; involucre bracts pearly white (4—9 dm. high) **Pearly Everlasting, Anaphalis margaritacea.**
- 88b. Erect; involucre bracts dull white or pale brown, somewhat pubescent (4—8 dm. high) (Cudweed) —89.
- 88c. Diffusely branched; heads in dense clusters; bracts brown (1—2 dm. high) **Cudweed, Gnaphalium uliginosum.**

- 89a. Leaves decurrent on the stem **Cudweed, *Gnaphalium decurrens*.**
89b. Leaves not decurrent on the stem
Cudweed, *Gnaphalium polycephalum*.
90a. Twining vine (flowers white, summer)
Hemp Weed, *Mikania scandens*.
90b. Not twining or climbing —91.
- 91a. Involucral bracts deeply fringed at the tip (flowers purple, blue,
or rarely white, summer; 3—6 dm. high) —92.
91b. Involucral bracts entire or nearly so —93.
- 92a. Upper leaves linear or narrowly lanceolate
Corn Flower, *Centaurea cyanus*.
92b. Upper leaves oblong or oblong-lanceolate
Knapweed, *Centaurea nigra*.
- 93a. Pappus none or a short ring or crown (5—10 dm. high; flowers
yellow, summer)
Costmary, *Chrysanthemum balsamita* var. *tanacetoides*.
93b. Pappus of 2—4 stiff awns (2—15 dm. high; flowers yellow, late
summer) (Bur Marigold) —130.
93c. Pappus of hairs or bristles —94.
- 94a. Leaves linear or narrowly lanceolate, entire; heads never
in a large flat-topped cluster —95.
94b. Leaves not linear —99.
- 95a. Heads showy, purple, in a long spike or raceme (late summer)
(Blazing Star) —96.
95b. Heads not showy, in a loose panicle or raceme —240b.
- 96a. Involucral bracts rounded at the tip, appressed (5—15 dm.
high) —97.
96b. Involucral bracts pointed (3—6 dm. high) —98.
- 97a. Heads 8—12-flowered **Blazing Star, *Liatris spicata*.**
97b. Heads with 25 flowers or more **Blazing Star, *Liatris scariosa*.**
- 98a. Involucral bracts long-acuminate, spreading
Blazing Star, *Liatris squarrosa*.
98b. Involucral bracts mucronate, appressed
Blazing Star, *Liatris cylindracea*.
- 99a. Flowers yellow (2—8 dm. high) —172b.
99b. Flowers bright-red or purple, in flat-topped clusters (8—20 dm.
high; late summer) (Ironweed) —100.
99c. Flowers blue (3—8 dm. high; late summer)
Mist Flower, *Eupatorium coelestinum*.
- 99d. Flowers flesh-color, pink, cream-color, or white (flowers in sum-
mer) —103.
- 100a. Leaves glabrous beneath or minutely pubescent; heads
15—30-flowered —101.
100b. Leaves tomentose beneath; heads 30—50-flowered —102.

- 101a. Inflorescence densely crowded; usually 1 m. or less high
Ironweed, *Vernonia fasciculata*.
- 101b. Inflorescence loose and open, 15—30 cm. wide; 1—2 m. high
Ironweed, *Vernonia altissima*.
- 102a. Pappus tawny in color **Ironweed, *Vernonia missurica*.**
- 102b. Pappus purple **Ironweed, *Vernonia illinoensis*.**
- 103a. Leaves alternate —104.
- 103b. Leaves opposite —106.
- 103c. Leaves whorled (1—3 m. high; flowers pink or purple, late summer) (Joe-Pye Weed) —107.
- 104a. Heads 5-flowered (5—20 dm. high; flowers white or pinkish, late summer) (Indian Plantain) —105.
- 104b. Heads 10—25-flowered (5—10 dm. high; flowers white, late summer) **False Boneset, *Kuhnia eupatorioides*.**
- 104c. Heads with more than 50 flowers (3—20 dm. high; flowers white, summer) **Fireweed, *Erechtites hieracifolia*.**
- 105a. Leaves entire, with many veins from base to apex
Indian Plantain, *Cacalia tuberosa*.
- 105b. Leaves sharply serrate **Indian Plantain, *Cacalia suaveolens*.**
- 105c. Leaves broadly triangular or kidney-shape, sinuate or entire
Indian Plantain, *Cacalia atriplicifolia*.
- 106a. Leaves united at the base (5—15 dm. high)
Boneset, *Eupatorium perfoliatum*.
- 106b. Leaves sessile but not united at the base (5—15 dm. high)
Upland Boneset, *Eupatorium sessilifolium*.
- 106c. Leaves petioled (4—12 dm. high)
White Snakeroot, *Eupatorium urticaefolium*.
- 107a. Inflorescence ovoid or pyramidal
Joe-Pye Weed, *Eupatorium purpureum*.
- 107b. Inflorescence depressed or flattened
Joe-Pye Weed, *Eupatorium purpureum* var. *maculatum*.
- 108a. Rays yellow or brown —109.
- 108b. Rays white to blue or red, never yellow or brown —197.
- 109a. Principal leaves basal, the stem merely with bract-like scales —110.
- 109b. Principal leaves on the stem, opposite or whorled —111.
- 109c. Principal leaves on the stem, alternate, or with smaller ones clustered in their axils —132.
- 110a. Flower-stalk 1—5 dm. high, 1-flowered (spring)
Coltsfoot, *Tussilago farfara*.
- 110b. Flower-stalk 1—3 m. high, several-flowered (summer)
Prairie Dock, *Silphium terebinthinaceum*.
- 111a. Ray-flowers pistillate (the 2-lobed style protrudes from their base) —112.
- 111b. Ray-flowers with neither stamens nor pistil —118.

- 123a. Rays yellow throughout **Tickseed, *Coreopsis verticillata*.**
 123b. Rays brown, at least at the base **Tickseed, *Coreopsis tinctoria*.**
 124a. Achenes wedge-shape, the inner ones less than 2 mm. wide —125.
 124b. Achenes obovate, the inner ones more than 2 mm. wide
Tickseed Sunflower, *Bidens aristosa*.
 125a. Leaf-lobes lanceolate **Tickseed Sunflower, *Bidens trichosperma*.**
 125b. Leaf-lobes linear
Tickseed Sunflower, *Bidens trichosperma* var. *tenuiloba*.
 126a. Outer leaf-like bracts 10—16; achenes brown
Beggar Ticks, *Bidens vulgata*.
 126b. Outer leaf-like bracts 5—8; achenes black
Beggar Ticks, *Bidens frondosa*.
 126c. Outer leaf-like bracts about 4
Beggar Ticks, *Bidens discoidea*.
 127a. Bracts of the involucre all essentially alike in form and texture (flowers in summer and autumn) (Sunflower) —179.
 127b. Bracts of the involucre in two distinct sets, differing in form or consistency or both —128.
 128a. Leaves entire (3—8 dm. high; late spring and summer) —120b.
 128b. Leaves serrate (late summer and autumn) (Bur Marigold) —129.
 129a. Rays large and conspicuous, 2—3 cm. long (3—10 dm. high)
Bur Marigold, *Bidens laevis*.
 129b. Rays 1 cm. long or less —130.
 130a. Outer bracts leaf-like, serrate, 3—8 cm. long (4—15 dm. high)
Bur Marigold, *Bidens comosa*.
 130b. Outer bracts 1—2.5 cm. long (2—15 dm. high) —131.
 131a. Heads nodding after flowering **Bur Marigold, *Bidens cernua*.**
 131b. Heads permanently erect **Bur Marigold, *Bidens connata*.**
 132a. Heads small, seldom more than 1 cm. wide, including the rays, blooming in late summer and autumn; flowers numerous, crowded in spikes, racemes, corymbs, or panicles (Goldenrod) —133.
 132b. Heads medium size or large, more than 1 cm. and usually exceeding 2 cm. in width, including the rays —165.
 133a. Heads chiefly in clusters or short racemes in the axils of ordinary foliage leaves, or occasionally the upper compacted into a leafy cluster terminating the stem —134.
 133b. Heads crowded at or near the ends of the branches at about the same distance from the base of the panicle, forming a rounded or flat-topped inflorescence —140.

- 133c. Heads more or less uniformly distributed along the length of the branches, forming a cylindrical or pyramidal inflorescence, never flat-topped —146.
- 134a. Stem and both sides of the leaves more or less pubescent or rough (4—10 dm. high) —135.
- 134b. Stem and both sides of the leaves essentially smooth or with very short hairs (3—10 dm. high) —136.
- 135a. Rays white **Goldenrod, Solidago bicolor.**
- 135b. Rays yellow **Goldenrod, Solidago hispida.**
- 136a. Basal leaves abruptly narrowed to winged petioles —137.
- 136b. Basal leaves not abruptly narrowed to winged petioles —138.
- 137a. Involucre 2—5 mm. long **Goldenrod, Solidago latifolia.**
- 137b. Involucre 8—12 mm. long **Goldenrod, Solidago macrophylla.**
- 138a. Lower leaves broadly oval, obtuse, thickish, crenate; achenes glabrous **Goldenrod, Solidago erecta.**
- 138b. Lower leaves lanceolate, acuminate, thin, sharply serrate; achenes hairy —139.
- 139a. Stem usually simple; heads few in very small clusters **Goldenrod, Solidago caesia var. axillaris.**
- 139b. Stem usually diffusely branched; heads numerous **Goldenrod, Solidago caesia.**
- 140a. Lower leaves ovate, oblong, or oval, pinnately veined (5—15 dm. high) —141.
- 140b. Lower leaves linear-lanceolate, 3—5-veined (3—12 dm. high) —142.
- 141a. Stem and leaves rough-hairy **Goldenrod, Solidago rigida.**
- 141b. Stem and leaves smooth **Goldenrod, Solidago ohioensis.**
- 142a. Heads very few in a small cluster; leaves few and scattered **Goldenrod, Solidago houghtonii.**
- 142b. Heads very many, in a large cluster; stem very leafy —143.
- 143a. Leaves hairy **Goldenrod, Solidago graminifolia var. nuttallii.**
- 143b. Leaves smooth —144.
- 144a. Leaves folded, 8—20 mm. wide **Goldenrod, Solidago riddellii.**
- 144b. Leaves flat, 1—8 mm. wide —145.
- 145a. Leaves 4—8 mm. wide, distinctly 3—5-ribbed **Goldenrod, Solidago graminifolia.**
- 145b. Leaves 1—4 mm. wide, usually with 1 midvein **Goldenrod, Solidago tenuifolia.**
- 146a. Only 2—5 stem-leaves below the inflorescence (1—3 dm. high) **Goldenrod, Solidago cutleri.**
- 146b. Stem-leaves numerous —147.

- 147a. Basal leaves much larger than the greatly reduced or bract-like upper ones —148.
- 147b. Leaves essentially uniform in size from base to summit of stem —157.
- 148a. Racemes or branches of the panicle either short and arranged along a more or less elongated central axis, or elongated and ascending, scarcely recurved, forming a narrow, more or less elongated panicle —149.
- 148b. Racemes or branches of the panicle usually elongated, spreading outwards, usually recurved, forming a widened panicle —153.
- 149a. Leaves mostly entire, the upper ones with smaller leaves fascicled in the axils (5—20 dm. high)
- Goldenrod, *Solidago speciosa*.**
- 149b. Leaves mostly serrate, at least the basal ones —150.
- 150a. Heads on pedicels 5—15 mm. long; achenes pubescent; stems usually clustered (1—5 dm. high, or prostrate) —151.
- 150b. Heads on pedicels not over 5 mm. long; achenes smooth or nearly so; stems usually single (6—12 dm. high) —152.
- 151a. Basal leaves 7—12 cm. long **Goldenrod, *Solidago racemosa*.**
- 151b. Basal leaves 15—30 cm. long
- Goldenrod, *Solidago racemosa* var. *gillmanii*.**
- 152a. Leaves pinnately veined **Goldenrod, *Solidago uliginosa*.**
- 152b. Leaves 3—5-ribbed **Goldenrod, *Solidago neglecta*.**
- 153a. Both sides of the leaf pubescent or rough —154.
- 153b. Leaf not pubescent or rough on both sides —155.
- 154a. Stem closely pubescent (2—8 dm. high)
- Goldenrod, *Solidago nemoralis*.**
- 154b. Stem glabrous (5—12 dm. high)
- Goldenrod, *Solidago juncea* var. *scabrella*.**
- 155a. Leaves rough above, smooth below (6—15 dm. high)
- Goldenrod, *Solidago patula*.**
- 155b. Leaves smooth on both sides (5—12 dm. high) —156.
- 156a. Branches of the panicle spreading or recurved
- Goldenrod, *Solidago juncea*.**
- 156b. Branches of the panicle upright
- Goldenrod, *Solidago juncea* var. *ramosa*.**
- 157a. Stem more or less pubescent or hairy throughout (5—20 dm. high) —158.
- 157b. Stem smooth, at least below the inflorescence —161.
- 158a. Involucre 2—2.7 mm. long **Goldenrod, *Solidago canadensis*.**
- 158b. Involucre 3—5 mm. long —159.

- 159a. Leaves pinnately veined, scabrous above
Goldenrod, *Solidago rugosa*.
- 159b. Leaves 3—5-ribbed, pubescent but not scabrous above —160.
- 160a. Stem and lower side of leaves covered with short hairs;
common species **Goldenrod, *Solidago altissima*.**
- 160b. Stem and lower side of leaves with distinct, loose, soft
hairs (shore of Lake Superior)
Goldenrod, *Solidago altissima* var. *procera*.
- 161a. Involucre 2—2.7 mm. long (5—20 dm. high) —158a.
- 161b. Involucre 3—6 mm. long —162.
- 162a. Racemes or branches of the panicle either short and ar-
ranged along a more or less elongated axis, or elongated and
ascending, scarcely recurved, forming a narrow more or less
elongated panicle (5—10 dm. high)
Goldenrod, *Solidago speciosa* var. *angustata*.
- 162b. Racemes or branches of the panicle usually elongated,
spreading outward, usually recurved, forming a widened
panicle; leaves distinctly serrate —163.
- 163a. Leaves pinnately veined (5—12 dm. high)
Goldenrod, *Solidago ulmifolia*.
- 163b. Leaves 3—5-ribbed (5—20 dm. high) —164.
- 164a. Leaves glabrous on both sides
Goldenrod, *Solidago serotina*.
- 164b. Leaves slightly pubescent beneath
Goldenrod, *Solidago serotina* var. *gigantea*.
- 165a. Ray-flowers pistillate (the 2-lobed style protrudes from their
base) —166.
- 165b. Ray-flowers with neither stamens nor pistil —174.
- 166a. Principal leaves more than 2 dm. long (1—3 m. high;
summer) —167.
- 166b. Principal leaves less than 1.5 dm. long —168.
- 167a. Leaves deeply lobed **Compass Plant, *Silphium laciniatum*.**
- 167b. Leaves toothed or serrate **Elecampane, *Inula helenium*.**
- 168a. Leaves narrowly linear (3—6 dm. high; late summer)
Sneezeweed, *Helenium tenuifolium*.
- 168b. Leaves of a broader shape —169.
- 169a. Heads 1—2 cm. wide; flowers in spring and early summer (2—8
dm. high) (Ragwort) —170.
- 169b. Heads 2—5 cm. wide; flowers in late summer and autumn —173.
- 170a. Basal leaves cordate at base **Ragwort, *Senecio aureus*.**
- 170b. Basal leaves narrowed to the base —171.

- 171a. Basal leaves obovate **Ragwort, Senecio obovatus.**
171b. Basal leaves oblong **Ragwort, Senecio balsamitae.**
- 172a. Introduced annual in waste places (1—4 dm. high; spring and summer) **Groundsel, Senecio vulgaris.**
172b. Native biennial in moist ground (3—8 dm. high; summer) **Squaw Weed, Senecio discoideus.**
- 173a. Leaves 2—5 cm. long, sharply spinulose-serrate; involucre viscid (3—6 dm. high; summer) **Gum Plant, Grindelia squarrosa.**
173b. Leaves 5—12 cm. long, merely serrate; involucre gray-pubescent (5—15 dm. high; late summer) **Sneeze Weed, Helenium autumnale.**
- 174a. Disk hemispherical or oblong-cylindrical (Summer) —175.
174b. Disk flat or somewhat convex (Sunflower) (summer and autumn) —179.
- 175a. Disk yellow or greenish-yellow (1—3 dm. high) —176.
175b. Disk gray-brown or purple (5—15 dm. high) —177.
- 176a. Principal stem-leaves pinnately divided **Golden Glow, Rudbeckia laciniata.**
176b. Principal stem-leaves merely serrate **Yellow Ironweed, Actinomeris alternifolia.**
- 177a. Rays drooping; leaves pinnately divided **Gray-headed Coneflower, Lepachys pinnata.**
177b. Rays spreading when in bloom —178.
- 178a. Lower leaves deeply 3-lobed **Coneflower, Rudbeckia triloba.**
178b. Stem-leaves sharply serrate **Coneflower, Rudbeckia speciosa var. sullivantii.**
178c. Stem-leaves entire or sparingly serrate **Black-eyed Susan, Rudbeckia hirta.**
- 179a. Disk-flowers brown or purple —180.
179b. Disk-flowers yellow —182.
- 180a. Stem-leaves ovate or ovate-lanceolate; petioles prominent, not winged —181.
180b. Stem-leaves ovate or ovate-lanceolate, contracted at the base into a winged petiole (6—15 dm. high) **Sunflower, Helianthus atrorubens.**
180c. Stem-leaves oblong-lanceolate, very thick and rigid, gradually narrowed to a sessile or short-petioled base (5—20 dm. high) **Sunflower, Helianthus scaberrimus.**
- 181a. Disk less than 2 cm. wide (3—10 dm. high) **Sunflower, Helianthus petiolaris.**
181b. Disk more than 2.5 cm. wide (1—3 m. high) **Sunflower, Helianthus annuus.**

- 182a. Leaves all or chiefly at the base (5—10 dm. high)
Sunflower, *Helianthus occidentalis*.
- 182b. Leaves chiefly scattered on the stem —183.
- 183a. Leaves mainly or all alternate, and not definitely 3-ribbed
(1—4 m. high) —184.
- 183b. Leaves mainly or all opposite, lanceolate to ovate, and 3-ribbed
—186.
- 184a. Stem glabrous **Sunflower, *Helianthus grosse-serratus*.**
- 184b. Stem hairy or rough —185.
- 185a. Leaves hairy beneath, rough above, lanceolate
Sunflower, *Helianthus giganteus*.
- 185b. Leaves rough on both sides, elongated
Sunflower, *Helianthus maximiliani*.
- 186a. Leaves sessile (5—15 dm. high) —187.
- 186b. Leaves petioled, or narrowed at the base into a petiole
(5—30 dm. high) —189.
- 187a. Leaves wedge-shape at the base
Sunflower, *Helianthus doronicoides*.
- 187b. Leaves rounded at the base —188.
- 188a. Stem glabrous or nearly so
Sunflower, *Helianthus divaricatus*.
- 188b. Stem densely and softly hirsute
Sunflower, *Helianthus mollis*.
- 189a. Stems rough, pubescent, or hispid —190.
- 189b. Stems glabrous or nearly so —193.
- 190a. Leaves narrowly lanceolate, more than 5 times as long
as wide **Sunflower, *Helianthus giganteus* var. *subtuberosus*.**
- 190b. Leaves ovate-lanceolate, not more than 4 times as long
as wide —191.
- 191a. Leaves rounded at base, above the petiole
Sunflower, *Helianthus hirsutus*.
- 191b. Leaves narrowed to the base —192.
- 192a. Bracts of the involucre spreading
Jerusalem Artichoke, *Helianthus tuberosus*.
- 192b. Bracts all appressed **Sunflower, *Helianthus laetiflorus*.**
- 193a. Heads 3 cm. wide or less, including the rays
Sunflower, *Helianthus microcephalus*.
- 193b. Heads 4 cm. wide or more, including the rays —194.
- 194a. Leaves narrowed at the base into a winged petiole —195.
- 194b. Petiole slender, not winged
Sunflower, *Helianthus decapetalus*.

- 195a. Leaves green on both sides; bracts longer than the disk
Sunflower, *Helianthus trachelifolius*.
- 195b. Leaves paler below than above; bracts not longer than the disk —196.
- 196a. Leaves minutely pubescent beneath
Sunflower, *Helianthus strumosus*.
- 196b. Leaves conspicuously downy beneath
Sunflower, *Helianthus strumosus* var. *mollis*.
- 197a. Leaves all basal, the flowers on scaly stalks (2—8 dm. high; flowers whitish, in spring) **Coltsfoot, *Petasites palmata*.**
- 197b. Stem-leaves present, opposite —198.
- 197c. Stem-leaves present, alternate —200.
- 198a. Leaves ovate, dentate, 2—6 cm. long (2—8 dm. high; summer) (*Galinsoga*) —199.
- 198b. Leaves lobed, 10—25 cm. long —113b.
- 199a. Pubescence sparse, appressed
***Galinsoga*, *Galinsoga parviflora*.**
- 199b. Pubescence abundant, spreading
***Galinsoga*, *Galinsoga parviflora* var. *hispida*.**
- 200a. Leaves dissected or deeply lobed or pinnatifid; pappus never capillary; rays white to pink (3—10 dm. high; summer and autumn) —201.
- 200b. Leaves entire or serrate —206.
- 201a. Heads 4—8 mm. wide (Yarrow) —202.
- 201b. Heads 12—50 mm. wide —203.
- 202a. Flower-clusters flat-topped Yarrow, ***Achillea millefolium*.**
- 202b. Flower-clusters very convex Yarrow, ***Achillea lanulosa*.**
- 203a. Principal leaves pinnatifid —213a.
- 203b. Principal leaves 1—3 times pinnately parted or dissected —204.
- 204a. Leaf-segments very narrowly linear; leaves 2—3-pinnate —205.
- 204b. Leaf-segments linear or lanceolate; heads 2.5—5 cm. wide
Camomile, *Anthemis arvensis*.
- 204c. Leaf-segments ovate to ovate-oblong; heads 1—2 cm. wide
Feverfew, *Chrysanthemum parthenium*.
- 205a. Foliage strongly scented **Dog Fennel, *Anthemis cotula*.**
- 205b. Foliage not ill-scented **Wild Camomile, *Matricaria inodora*.**
- 206a. Heads 3—6 mm. broad, including the rays (summer and autumn) —207.
- 206b. Heads 7 mm. broad or larger, including the rays —209.
- 207a. Rays purple (1—4 dm. high) **Horse Weed, *Erigeron divaricatus*.**
- 207b. Rays white —208.

208a. Leaves obovate to oblong (3—10 dm. high) —135a.

208b. Leaves linear or narrowly lanceolate (2—25 dm. high)

Horse Weed, *Erigeron canadensis*.

209a. Pappus none, or minute and not of hairs (summer and autumn) —210.

209b. Pappus of hairs —214.

210a. Disk-flowers purple or brown (4—12 dm. high; rays pink) (Purple Coneflower) —211.

210b. Disk-flowers yellow or nearly white —212.

211a. Leaves ovate or ovate-lanceolate, most of them serrate

Purple Coneflower, *Brauneria purpurea*.

211b. Leaves narrowly lanceolate, gradually narrowed at the base, entire

Purple Coneflower, *Brauneria pallida*.

212a. Rays broadly obovate; heads 1—2 cm. wide (3—6 dm. high)

Sneezewort, *Achillea ptarmica*.

212b. Rays oblong or narrowly elliptical —213.

213a. Leaves serrate (3—10 dm. high)

Ox-eye Daisy, *Chrysanthemum leucanthemum* var. *pinnatifidum*.

213b. Leaves entire (8—25 dm. high) ***Boltonia*, *Boltonia asteroides*.**

214a. Involucral bracts all the same length or nearly so and narrow, or with a few short outer ones; plants blooming in spring and summer, or a few plants persisting in bloom until autumn (Fleabane) —215.

214b. Involucral bracts unequal, the outer successively shorter (or rarely nearly equal), loosely or closely overlapping; plants 3—15 dm. high, blooming in late summer and autumn (Aster) —221.

215a. Rays short and inconspicuous, barely longer than the pappus (1—5 dm. high; summer)

Fleabane, *Erigeron acris* var. *asteroides*.

215b. Rays conspicuous, spreading, 3 mm. long or more —216.

216a. Rare plants of the Northern Peninsula, with entire leaves and stems 1—5 dm. high, from a thick woody root (flowers white or purple, summer) —217.

216b. Common species, with erect stems from fibrous roots; leaves toothed (except in one species) —218.

217a. Heads 3—5 cm. wide; rays about 100

Fleabane, *Erigeron glabellus*.

217b. Heads 1—2 cm. wide; rays 20—30

Fleabane, *Erigeron hyssopifolius*.

218a. Stem unbranched, except for the peduncles; leaves chiefly basal; heads 1—9 (2—5 dm. high; flowers pale-purple, spring)

Fleabane, *Erigeron pulchellus*.

218b. Stem branched; principal leaves on the stem; heads usually numerous (3—12 dm. high; spring and summer) —219.

- 219a. Stem-leaves linear, entire **Fleabane, Erigeron ramosus.**
 219b. Stem-leaves ovate-lanceolate, the principal ones toothed —220.
 220a. Rays 100 or more, light-purple or pink
Fleabane, Erigeron philadelphicus.
 220b. Rays much fewer, white **Fleabane, Erigeron annuus.**
 221a. Basal leaves petioled and heart-shape at the base —222.
 221b. Basal leaves not petioled; stem-leaves with heart-shape clasping bases —231.
 221c. Basal and stem-leaves sessile or petioled, but never heart-shape or clasping —240.
 222a. Rays white or violet —223.
 222b. Rays blue —225.
 223a. Plant glandular, especially on the pedicels and branches of the inflorescence **Aster, Aster macrophyllus.**
 223b. Plant not glandular —224.
 224a. Leaves rough above **Aster, Aster schreberi.**
 224b. Leaves smooth above **Aster, Aster divaricatus.**
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252b. Stem woolly with long hairs **Aster, Aster lateriflorus var. hirsuticaulis.**
- 253a. Bracts narrow, approximately equal in length **Aster, Aster longifolius.**
253b. Bracts of several lengths, the outer successively shorter —254.
- 254a. Heads 10—15 mm. wide, including the rays **Aster, Aster tradescanti.**
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- 255a. Bracts with conspicuous dilated or subrhombic tips **Aster, Aster salicifolius.**
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- 256a. Rays purple or rose; bog plant with linear leaves **Aster, Aster junceus.**
256b. Rays white, or slightly tinged with blue; leaves oblong to narrowly lanceolate **Aster, Aster paniculatus.**

GLOSSARY

- Achene.** A small, dry, hard, seed-like fruit containing a single seed.
- Acuminate.** Taper-pointed.
- Acute.** Ending with an acute angle.
- Alternate.** Located singly on the stem, with other leaves above or below.
- Annual.** Living but a single season.
- Anther.** The (usually) enlarged end of a stamen, bearing the pollen.
- Ascending.** Rising or curving obliquely upward.
- Auricle.** An ear-shape appendage at the base of a leaf or other organ.
- Auricled, auriculate.** Furnished with auricles.
- Awl-shape.** Tapering to a slender stiff point.
- Awn.** An awl-shape or bristle-shape appendage.
- Axil.** The point on a stem just above the base of a leaf or branch.
- Axillary.** Arising from or produced in the axil.
- Basal.** Arising from or produced at the base.
- Beak.** Ending in a prominent slender point.
- Bract.** A small leaf near the base of a flower or flower-stalk, or in a flower-cluster.
- Bracteal.** An adjective derived from bract.
- Bipinnate.** A leaf with a pinnately branched axis, bearing leaflets on the sides of the branches.
- Calyx.** The outer portion of the flower, usually green in color. In some plants it is colored to resemble (or replace) the corolla, and in others may be minute or wanting.
- Capitate.** Shaped like a head; or arranged in a dense compact cluster.
- Capsule.** A dry fruit with usually several seeds, opening at maturity.
- Catkin.** A cylindrical or ovoid cluster of inconspicuous flowers, for example, the "pussy willow."
- Cells of ovary.** The cavity or cavities within an ovary, in which the seeds are produced.
- Ciliate.** Provided with hairs at the margin.
- Clasping.** With the base of a leaf or other organ wholly or partly surrounding the stem.
- Cleft.** Deeply divided toward the base or the mid-rib.
- Closed sheath.** A leaf-sheath in which the margins are united to form a tube.
- Composite.** A flower-cluster containing several or many small flowers, closely crowded together and provided with calyx-like bracts, so that the whole cluster resembles a single flower.
- Compound.** Composed of 2 or more similar parts united, as a compound ovary.
- Compound leaf.** A leaf with two or more separate leaflets on a single petiole.

Connate. Grown together.

Cordate. Heart-shape. A whole leaf-blade may be cordate, or the term may be applied to the base of a leaf only.

Cordate-sagittate. Intermediate in shape between cordate and sagittate.

Corm. An enlarged stem-base, of solid structure and usually underground.

Corolla. The portion of a flower next to the calyx (in ordinary cases). It is generally the most conspicuous part of the flower, but may be completely absent, or inconspicuous, or replaced by the calyx.

Corymb. A flat-topped or convex-topped flower-cluster.

Creeping. With stems prostrate on the ground and rooting at intervals.

Crenate. With round-pointed teeth at the margin.

Crenulate. Finely or minutely crenate.

Cuspidate. Ending with a short sharp stiff point.

Deciduous. Not persistent for a long time; not evergreen.

Decomound. Repeatedly branched with numerous leaflets.

Decurrent. Extending with wing-like expansions down the stem.

Decumbent. A stem prostrate at the base, but with the tip more or less ascending.

Dehiscent. Breaking open at maturity to discharge the contents.

Deltoid. Broadly triangular.

Dioecious. Bearing staminate and pistillate flowers upon separate plants.

Dissected. Finely divided into numerous small or narrow segments.

Divided. With deep segments or lobes.

Elliptical. Having the shape of an ellipse.

Elliptical-lanceolate. Intermediate in shape between elliptical and lanceolate.

Entire. With an unbroken margin, without teeth or lobes.

Epiphyte. A plant growing attached to the bark of another plant, and without connection with the soil.

Erect. Growing in nearly or quite a vertical position.

Evenly pinnate. A compound leaf terminating in a pair of leaflets.

Filament. The (usually) slender basal portion of a stamen, supporting the anther at its tip.

Floweret. A small flower.

Gamopetalous. Composed of united petals.

Gamosepalous. Composed of united sepals.

Glabrous. Smooth; without hairs.

Glandular. Bearing glands.

Glaucous. Covered with a thin bluish or whitish deposit, easily rubbed off.

Glume. A bract at the base of a spikelet of a grass.

Half recurved. Curved half-way backward.

Hastate. Shaped like an arrow-head, but with the basal lobes pointing outwards instead of backward.

- Head.** A dense cluster of flowers, about as broad as long.
- Hirsute.** With stiff coarse hairs.
- Imperfect.** Flowers which contain either pistil or stamens, not both.
- Incised.** With deep, sharp, irregular, divisions.
- Indehiscent.** Not breaking open at maturity to discharge the contents.
- Inflorescence.** A cluster of flowers.
- Internode.** A section of stem between two joints, or nodes.
- Involucere.** A collection of bracts at the base of a flower-cluster.
- Irregular.** Possessing similar parts of different size or form. An irregular flower is generally distinguished by petals of unequal size or shape.
- Laciniate.** Cut into narrow pointed lobes or divisions.
- Lanceolate.** Shaped like a lance-head, several times longer than wide, and broadest below the middle.
- Linear.** Long and narrow, but with about uniform width.
- Linear-lanceolate.** Intermediate in shape between linear and lanceolate; narrowly lanceolate.
- Lip.** The largest and most conspicuous petal in an irregular corolla, usually applied to the lower petal of an orchid.
- Lobe.** A segment or division of any organ.
- Leaflet.** One portion of the blade of a compound leaf.
- Lemma.** One of the bracts in the spikelet of a grass, and described in the treatment of that family.
- Membranous.** Thin or membrane-like in texture.
- Monocious.** Bearing stamens and pistils in separate flowers, but on the same plant.
- Mucronate.** Tipped with a short small abrupt tip.
- Node.** A joint of a stem, at which leaves are borne and branches appear.
- Oblanceolate.** Reversed lanceolate in shape.
- Oblique.** With unequal sides.
- Oblong.** Somewhat rectangular in shape, with parallel sides.
- Oblong-lanceolate.** Intermediate in shape between oblong and lanceolate.
- Oblong-spatulate.** Intermediate in shape between oblong and spatulate.
- Obovate.** Reversed ovate in shape.
- Obtuse.** Blunt-tipped; terminating in an obtuse angle.
- Odd-pinnate.** A compound leaf terminating in a single leaflet.
- Once-compound.** A compound leaf bearing leaflets at the end or along the sides of the main axis.
- Once-pinnate.** A compound leaf bearing leaflets along the sides of the axis.
- Open sheath.** A leaf-sheath with separate margins.
- Opposite.** Situated in pairs on opposite sides of the stem or axis.
- Ovary.** The basal, usually swollen portion of the pistil, within which the seeds are produced.
- Ovate.** Egg-shape in outline.

- Ovate-lanceolate.** Intermediate in shape between ovate and lanceolate; broadly lanceolate or narrowly ovate.
- Ovate-oblong.** Intermediate in shape between ovate and oblong.
- Ovoid.** Egg-shape.
- Palmate.** With several organs or structures attached at or proceeding from the same point; applied chiefly to the arrangement of principal veins in a leaf and of leaflets in a compound leaf.
- Panicle.** A loose, more or less irregular, branching cluster of pedicelled flowers, usually much longer than thick.
- Parallel-veined.** With the principal veins of the leaf paralleling each other from the base to the apex, or (rarely) from the midrib to the margin.
- Pedicel.** The stalk of a single flower.
- Parasite.** A plant which grows attached to another and derives its nourishment from it.
- Peduncle.** The stalk of a flower-cluster, or of a solitary flower.
- Peltate.** Attached to the stalk by the lower surface, instead of the margin.
- Perennial.** Living through several seasons.
- Perfect.** Bearing stamens and pistils in the same flower.
- Perfoliate.** Claspings the stem so completely that the stem seems to pass through it.
- Perianth.** The calyx and corolla of a flower.
- Perigynium.** A sac-like structure surrounding the achene of a sedge.
- Persistent.** Remaining attached for a considerable time.
- Petal.** One member or segment of the corolla.
- Petiole.** The stalk of a leaf.
- Pinnate.** With several organs or structures attached at the sides of an axis or stalk; applied chiefly to the arrangement of the principal veins in a leaf and of leaflets in a compound leaf.
- Pinnatifid.** Deeply pinnately cut or divided.
- Pistil.** The central portion of a flower, consisting of ovary, style, and stigma; the seed-bearing part of the flower.
- Pistillate.** Bearing pistils.
- Polygamous.** Applied to plants in which some flowers are perfect and others either staminate or pistillate.
- Pubescent.** Hairy.
- Raceme.** A more or less elongated flower-cluster, bearing pedicelled flowers along a single axis.
- Racemose.** Arranged in racemes.
- Receptacle.** The end of a peduncle or pedicel upon which the organs of a flower, or the flowers of a head, are attached.
- Recurved.** Curved back.
- Reflexed.** Abruptly bent back or down.
- Regular.** Uniform in shape or structure. Flowers are generally considered regular when all the petals are of the same size and shape.
- Retorse.** Directed backward or downward.

Revolute. Rolled backward or under.

Rootstock. A horizontal subterranean stem, sending up leaves or stems.

Rotate. Wheel-shape; essentially flat and circular.

Sac-like. Inflated; sack-like.

Sagittate. Shaped like an arrow-head.

Salver-form. A corolla having a slender tube abruptly expanded at the summit into a flat or spreading portion.

Scape. A peduncle arising directly from the base of the plant, leafless or bearing bracts only.

Segment. One member or portion of an organ.

Sepal. One member or portion of the calyx.

Serrate. With sharp teeth at the margin.

Serrulate. Finely or minutely serrate.

Sessile. Without a stalk, petiole, or pedicel.

Sheathing. Inclosing.

Simple. In one piece; not compound; usually applied to leaves with a single blade.

Sinuate. Wavy-margined.

Sinus. The angle between two lobes or divisions.

Spadix. A short fleshy spike.

Spathe. A large bract or pair of bracts enclosing a flower-cluster.

Spatulate. Shaped like a spatula, with a narrow base and an enlarged, more or less rounded summit.

Spike. An elongated flower-cluster having sessile flowers upon an unbranched axis.

Spike-like. Resembling a spike.

Spinulose-serrate. Provided with teeth tipped with minute spines.

Spur. A hollow projection from the calyx or corolla, usually slender in shape, and generally directed backward.

Stamen. One of the organs of a flower, consisting of a filament and anther.

Staminate. Bearing stamens.

Stolon. A short stem arising from the base of a plant, prostrate or nearly so, and eventually taking root.

Striate. Marked with fine stripes or ridges.

Style. A portion of the pistil, usually slender, and connecting the ovary and stigma.

Superior. A superior ovary occupies the center of the flower and is not attached to any other floral organs.

Subtending. Situated at the base of an organ.

Subulate. Awl-shape.

Ternately. Divided by threes.

Tomentose. Densely hairy with matted or tangled hairs.

Trifoliolate. With three leaflets.

Truncate. Cut straight across at the tip, or nearly so.

Tube. The more or less cylindrical portion of a gamosepalous calyx or a gamopetalous corolla, distinguished from the expanded or lobed terminal portion.

Tubular. Shaped like a tube.

Twice-pinnate. Same as bipinnate.

Two-lipped. A calyx or corolla in which the upper half is decidedly different in size or shape from the lower.

Umbel. A flower-cluster with several or many pedicelled flowers all arising from the same point.

Undulate. With a wavy margin.

Viscid. Sticky.

Villous. With long soft hairs.

Whorl. An arrangement of 3 or more leaves or flowers in a circle around a node.

Whorled. In a whorl.

Wing. A thin flat expansion on the sides or edge of an organ.

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