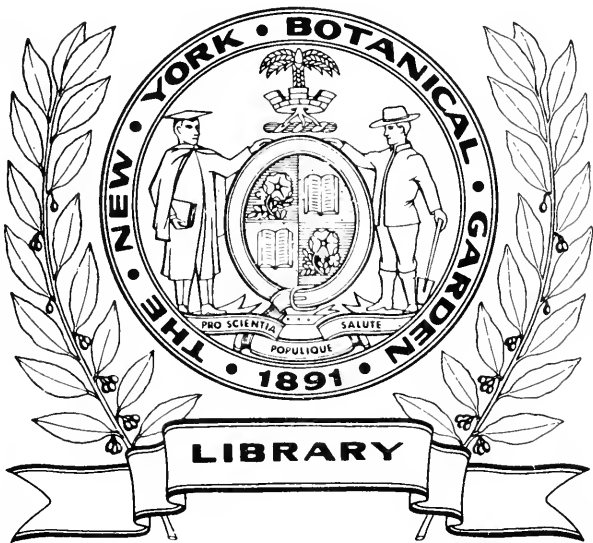


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FLORA
OF
LANCASTER COUNTY

BEING DESCRIPTIONS OF
THE SEED-PLANTS GROWING NATURALLY
IN LANCASTER COUNTY, PENNSYLVANIA

BY
JOHN KUNKEL SMALL
AND
JOEL JACKSON CARTER

NEW YORK
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1913

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By JOHN KUNKEL SMALL

DEDICATED
TO THE MEMORY OF
GOTTHILF HEINRICH ERNST MUILENBERG
FIRST PRESIDENT OF FRANKLIN COLLEGE
AND
AUTHOR OF THE FIRST FLORA LANCASTRIENSIS
—
PUBLISHED AS A JUBILEE GIFT
TO
FRANKLIN AND MARSHALL COLLEGE
ON HER ONE HUNDRED AND TWENTY-FIFTH
ANNIVERSARY

PREFACE.

This handbook presents short descriptions of the seed-plants growing naturally in Lancaster County, Pennsylvania, together with statements of the habitats and distribution of the species, and also their flowering seasons. Analytical keys, formed by contrasting diagnostic characters, precede the descriptions of the families, genera, and species, and a general key to the orders precedes the descriptive flora.

The region covered by this flora has been the scene of almost continuous botanical exploration and study for nearly a century and a half, definitely beginning with the observations of Gotthilf Heinrich Ernst Muhlenberg at Lancaster in the year 1780. However, only one authentic list¹ of the flowering plants known to grow naturally in the county has been published. In the preface to this catalogue the author says:

"The following catalogue is based upon the results of explorations made during a residence in the city of Lancaster between the years 1853 and 1866. All the plants contained in it were seen and examined by the author, with the single exception of *Quercus phellos*, L.,² and specimens of the rarer species, about which there might be any question, are at hand for reference in his own herbarium³ and in the herbaria of the Linnaean Society⁴ and the State Normal School at Millersville."

"In the annals of American Botany, Lancaster county is classic ground. It was the home of the distinguished Muhlenberg, who probably collected on her soil, at the beginning of the century, many of the species first described by him and by the German botanist Willdenow, with whom he carried on a long and active correspondence. He left behind him in manuscript a *Flora Lancastriensis*, which unfortunately has either been lost, or is no longer accessible."⁵

"The aim of the author has been to lay a good foundation upon which any one who may wish to continue the work hereafter can build with confidence, for the field is by no means exhausted. . . ."

¹ An enumeration of the indigenous and naturalized plants found growing in the County of Lancaster, Pennsylvania, by Thos. C. Porter, published in *An Authentic History of Lancaster County*, by J. I. Mombert, 1869.

² This species is not uncommon on the Martic Hills along the Pequea Creek.

³ Now at Lafayette College, Easton, Pa.

⁴ Linnaean Society of Lancaster.

⁵ The manuscript of Muhlenberg's *Flora Lancastriensis*, and seven other manuscripts relating to the plants of Lancaster County, have since been found in the library of the American Philosophical Society at Philadelphia, Pa.

The list referred to above forms the basis of the present flora. Numerous additional species have been collected in the county by the authors of this volume and by their many associates and correspondents. Specimens of these species have been widely distributed, but the more complete sets occur in the herbarium of the New York Botanical Garden, the herbarium of Franklin and Marshall College, the herbarium of J. J. Carter, the herbarium of the Field Museum of Natural History, the herbarium of A. A. Heller, and the herbarium of the Academy of Natural Sciences of Philadelphia. All records of species on the following pages are based on specimens collected in the county.

Lancaster County comprises almost 1000 square miles. Its extreme width, east and west is 47 miles, its extreme length, north and south, 41 miles. It lies southeast of the Appalachian Mountain System. There are no considerable altitudes attained by its hills, but the surface is quite diversified. Rolling hills and winding streams are numerous. The latter flow, without exception, either directly or indirectly into the Susquehanna River. The Susquehanna runs along the western boundary of the county for a distance of more than 40 miles, and for over half of this distance it passes through a most picturesque cañon with steep sides and wild lateral branches. This cañon has a southern exposure, and plants of a typically more southern flora have here made themselves at home. On the other hand, plants of a typically more northern flora are found in the cool sphagnum swamps among the hills of both the northern and the southern parts of the county. These two somewhat extraneous elements, together with the plants typical of the greater part of our area and the contiguous territory, comprise a flora of more than ordinary interest and diversity.

The county is divided by its main geological formations into three topographical or geographical belts or zones. They are: (1) a northern belt of sandstones and shales, (2) a middle belt of limestones, and (3) a southern belt of schists. On the one hand, all three belts contain trap-dikes or outcrops of trap rock. On the other, the sandstones and shales are uninterrupted, except for a bay of limestone prolonged northward from the middle belt; the uniformity of the limestones is broken mainly by several small outcrops of quartzite, while the schists contain some small projections of limestone at the northern edge and several outcrops of serpentine at the southern end.

On the following pages when a species is confined to one or several parts of the county the fact is indicated by N. (northern), M. (middle), S. (southern), W. (western), E. (eastern). Likewise, when a species is confined to one or two geological formations or is characteristic of such, the fact is so indicated. When a species is generally distributed only its habitat is mentioned. Other abbreviations used are Spr. (spring), Sum. (summer), Eu. (Europe), As. (Asia), Nat. (native).

Joel Jackson Carter was a native and a resident of Lancaster County. His interest in its flora extended over a period of more than fifty years, as did his father's, which began about the beginning of the last century. Mr. Carter died May 4, 1912, shortly after the first galleys of this flora were received from the printer. However, a duplicate copy of the manuscript of the descriptive part of the work had been in his hands for several years.

The writer's interest in the plants of Lancaster County began in 1888. During a residence at Lancaster, from 1888 to 1892, while attending Franklin and Marshall College, nearly all parts of the county were visited and the plants collected; this exploration has since been supplemented by frequent visits to various parts of the county.

J. K. SMALL.

THE NEW YORK BOTANICAL GARDEN,
September 3, 1913.

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KEY TO THE ORDERS.

SUBKINGDOM SPERMATOPHYTA.

- Ovules, and seeds, borne on the face of a bract or a scale: stigmas wanting.
Class 1. GYMNOSPERMAE.
·Ovules, and seeds, in a closed cavity, the ovary: stigmas present.
Class 2. ANGIOSPERMAE.

CLASS 1. Gymnospermae.

Plants growing by lateral and terminal buds, with scale-like, flat or needle-like leaves: embryo with 2-several cotyledons. Order PINALES.

CLASS 2. Angiospermae.

- Cotyledon 1: stem endogenous. Subclass 1. MONOCOTYLEDONES.
Cotyledons typically 2: stem exogenous (with rare exceptions). Subclass 2. DICOTYLEDONES.

SUBCLASS 1. MONOCOTYLEDONES.

Perianth rudimentary or degenerate, the members often bristles or mere scales, not corolla-like, or wanting.

Flowers not in the axils of dry or chaffy bracts (scales or glumes).

Perianth of bristles or chaffy scales.

Order PANDANALES.

Perianth fleshy or herbaceous, or wanting.

Fruit baccate: endosperm present.

Order ARALES.

Fruit drupaceous: endosperm wanting.

Order NAIADALES.

Flowers in the axils of dry or chaffy, usually imbricated, bracts (scales or glumes). Order POALES.

Perianth of 2 distinct series, the inner series usually corolloid.

Gynoecium of distinct carpels.

Order ALISMALES.

Gynoecium of united carpels.

Endosperm mealy.

Order XYRIDALES.

Endosperm fleshy, horny or cartilaginous.

A. Ovary, and fruit, superior.

Inflorescence not a fleshy spadix.

Order LILIALES.

Inflorescence a fleshy spadix subtended by a spathe.

Order ARALES.

B. Ovary, and fruit, wholly inferior or half-inferior.

Endosperm present and usually copious.

Order AMARYLLIDALES.

Endosperm wanting.

Flowers regular, monoecious or dioecious: aquatic plants.

Order HYDROCHARITALES.

Flowers irregular, perfect: terrestrial or epiphytic plants.

Order ORCHIDALES.

SUBCLASS 2. DICOTYLEDONES.

A. Corolla wanting, except in the pistillate flowers of *Juglans* (Juglandaceae).

Calyx wanting, at least in the staminate flowers.

Herbs.

Flowers mainly perfect.

Seeds solitary in each carpel or in each cavity of the ovary: endosperm present.

Flowers spicate: styles wanting: stigmas sessile.

Order PIPERALES.

Flowers axillary: styles present.

Callithichaceae in Order EUPHORBIALES.

Seeds numerous in each cavity of the ovary: endosperm wanting.

Podostemaceae in Order ROSALES.

Flowers monoecious or dioecious.

Order EUPHORBIALES.

Trees or shrubs: flowers monoecious or dioecious, or polygamous.

Fruit 1-seeded: seeds without tufts of hairs.

Ovules 1 or 2 in each cavity of the ovary: flowers not in heads.

Pistillate flowers without a calyx: ovule erect and orthotropous.

Order MYRICALES.

Pistillate flowers with a calyx: ovule pendulous and anatropous.

Leaf-blades simple.

Fruit a nut or an achene.

Corylaceae in Order FAGALES.

Fruit a drupe.

Oleaceae in Order OLEALES.

KEY TO THE ORDERS.

- Leaf-blades compound: fruit a samara.
 Oleaceae in Order OLEALES.
- Ovules many: flowers aggregated into dense heads.
 Altingiaceae in Order ROSALES.
- Fruit many-seeded: seeds each with a tuft of hairs.
 Order SALICALES.
- Calyx present at least in the staminate or in the perfect flowers.
 Flowers, at least the staminate, in aments, or ament-like spikes.
 Leaf-blades simple: ovule pendulous and anatropous.
 Pistillate flowers separate at maturity: fruit a nut or an achene.
 Order FAGALES.
- Pistillate flowers forming aggregate fruits: fruit drupe-like.
 Artocarpaceae in Order URTICALES.
- Leaf-blades pinnately compound: ovule erect and orthotropous.
 Order JUGLANDALES.
- Flowers, at least the staminate, not in aments.
 a. Ovary superior.
 Gynoecium of 1 or several and distinct carpels: stigma and style solitary.
 Carpel solitary.
 Ovary neither enclosed nor seated in a hypanthium or a calyx-tube.
 Flowers not solitary in axils: land plants.
 Urticaceae in Order URTICALES.
- Flowers solitary in axils: aquatic plants.
 Ceratophyllaceae in Order RANALES.
- Ovary enclosed in or seated in a hypanthium or a calyx-tube.
 Order THYMELEALES.
- Carpels several:
 Stamens inserted below the ovary. Families in Order RANALES.
 Stamens inserted on the edge of a cup-shaped hypanthium.
 Rosaceae in Order ROSALES.
- Gynoecium of 2 or several united carpels: stigmas or styles 2 or several.
 * Ovary, by abortion, 1-celled and 1-ovuled.
 Leaves with sheathing stipules (ocreae). Order POLYGONALES.
 Leaves estipulate, or if stipules are present they are not sheathing.
 Trees or shrubs.
 Anthers opening by slits: ovary not seated in a hypanthium.
 Ulmaceae in Order URTICALES.
- Anthers opening by hinged valves: ovary seated in an accrescent hypanthium.
 Lauraceae in Order THYMELEALES.
- Herbs or vines.
 † Leaves with stipules.
 Stipules herbaceous: inflorescence spicate or racemose: leaf-blades palmately veined.
 Cannabinaceae in Order URTICALES.
- Stipules scarious or hyaline: inflorescence cymose: leaf-blades pinnately veined.
 Families in Order CHENOPODIALES.
- ‡‡ Leaves without stipules.
 Stigmas entire. Order CHENOPODIALES.
 Stigmas 2-cleft.
 Euphorbiaceae in Order EUPHORBIALES.
- ** Ovary several-celled, or with several placentae, several-ovuled.
 Stamens hypogynous, inserted under the gynoecium in the perfect flowers, not on a disk in the pistillate flowers.
 Herbs.
 Flowers perfect.
 Ovary several-celled.
 Fruit baccate or nut-like, or a circumscissile capsule, the carpels terminal on the receptacle.
 Families in Order CHENOPODIALES.
- Fruit of several carpels, lateral on the receptacle, each carpel circumscissile.
 Penthoraceae in Order ROSALES.
- Ovary 1-2-celled.
 Stamens not tetradynamous, 4-8: ovary 1-celled.
 Order CHENOPODIALES.
- Stamens tetradynamous: ovary 2-celled.
 Brassicaceae in Order PAPAVERALES.
- Flowers monoecious or dioecious.
 Euphorbiaceae in Order EUPHORBIALES.
- Trees or shrubs.
 Ovary 4-celled: fleshy maritime shrubs.
 Batidaceae in Order CHENOPODIALES.
- Ovary 2-celled: plants not fleshy.
 Oleaceae in Order OLEALES.

- Stamens perigynous or epigynous, inserted on the margin of a
 hypanthium or a disk.
 Fruit a samara. Families in Order SAPINDALES.
 Fruit not a samara.
 Fruit drupe-like or berry-like: shrubs or trees.
 Order RHAMNALES.
 Fruit a capsule: herbs. Order ARISTOLOCHIALES.
- b. Ovary inferior.
 Flowers not in involucre heads.
 Fruit a berry or a drupe, or nut-like.
 Stamens as many as the perianth-members and alternate with
 them, or fewer.
 Herbs, with succulent stems and leaves, or woody below:
 flowers perfect. Tetragnoniaceae in Order CHENOPODIALES.
 Trees or shrubs: flowers dioecious.
 Nyssaceae in Order AMMIALES.
 Stamens as many as the perianth-member\$ and opposite them,
 or twice as many.
 Styles present.
 Ovules mostly on basal placentae, sometimes pendulous:
 cotyledons not convolute: tree- or root-parasites.
 Order SANTALALES.
 Ovules not on basal placentae: cotyledons convolute: not
 parasitic plants. Families in Order MYRTALES.
 Styles wanting: stigmas sessile.
 Gummeraceae in Order MYRTALES.
- Fruit a capsule.
 Sepals as many as the ovary-cavities or one-half as many.
 Calyx regular and the sepals half as many as the cavities in
 the ovary, or irregular. Order ARISTOLOCHIALES.
 Calyx regular and the sepals as many as the cavities in the
 ovary. Order MYRTALES.
 Sepals (4-5) at least twice as many as the ovary-cavities (2).
 Saxifragaceae in Order ROSALES.
 Flowers, at least the staminate, in involucre heads.
 Ambrosiaceae in Order CARDUALES.
- B. Corolla present.
 * Petals distinct, at least at the base.
 Carpels solitary, or several and distinct, or united only at the base.
 Stamens at the base of the receptacle, *i. e.*, hypogynous.
 Flowers in monoecious heads. Platanaceae in Order ROSALES.
 Flowers not in monoecious heads.
 Plants with relatively firm stems and leaves, not succulent.
 Order RANALES.
 Plants with succulent stems and leaves.
 Sedaceae in Order ROSALES.
- Stamens on the margin of a hypanthium (the hypanthium very small in
 some Saxifragaceae). Order ROSALES.
 Carpels several and united.
 † Ovary superior.
 ‡ Stamens inserted at the base of the ovary or receptacle.
 § Stamens numerous.
 Sepals imbricated.
 Calyx deciduous. Order PAPAVERALES.
 Calyx persistent.
 Styles or stigmas distinct or united, but not discoid.
 Leaves glandular or pellucid-punctate.
 Rutaceae in Order GERANIALES.
 Leaves not glandular.
 Capparidaceae in Order PAPAVERALES.
 Styles or stigmas united into a disk.
 Petals and sepals numerous: leaves with flat blades:
 aquatic plants. Nymphaeaceae in Order RANALES.
 Petals and sepals few: leaves with pitcher-like organs:
 bog plants.
 Sarraceniaceae in Order SARRACENIALES.
- Sepals valvate.
 Stamens with distinct filaments.
 Ovary 1-celled: placentae parietal.
 Capparidaceae in Order PAPAVERALES.
 Ovary 2-several-celled: placentae axile or central.
 Families in Order MALVALES.
 Stamens with united filaments. Order MALVALES.
- §§ Stamens few, not over twice as many as the petals.
 Stamens as many as the petals and opposite them.
 Anther-sacs opening by hinged valves.
 Podophyllaceae in Order RANALES.
 Anther-sacs opening by slits.

KEY TO THE ORDERS.

- Flowers monoecious.
 Euphorbiaceae in Order EUPHORBIALES.
- Flowers perfect. Portulacaceae in Order CHENOPODIALES.
- Stamens as many as the petals and alternate with them, or more, sometimes twice as many.
 Stamens 6: petals 4: sepals 2 or 4.
 Families in Order PAPAVERALES.
- Stamens, petals and sepals of the same number, or stamens more, usually twice as many as the sepals or petals.
 Ovary 1-celled.
 Ovules, or seeds, on basal or central placentae.
 Families in Order CHENOPODIALES.
- Ovules, or seeds, on parietal placentae.
 Stigmas 2-cleft.
 Droseraceae in Order SARRACENIALES.
- Stigmas entire.
 Stamens with united filaments and no staminalia.
 Families in Order MALVALES.
- Stamens with distinct filaments.
 Families in Order HYPERICALES.
- Ovary several-celled.
 Stamens adnate to the gynoecium.
 Asclepiadaceae in Order ASCLEPIADALES.
- Stamens not adnate to the gynoecium.
 Stamens with wholly or partly united filaments.
 Anthers opening lengthwise.
 Families in Order GERANIALES.
- Anthers opening by pores.
 Polygalaceae in Order POLYGALALES.
- Stamens with distinct filaments.
 Anthers opening by pores.
 Families in Order ERICALES.
- Anthers opening by slits.
 Stigmas or styles distinct and cleft, or foliaceous, or united by pairs.
 Order EUPHORBIALES.
- Stigmas or styles all distinct or all united, neither cleft nor foliaceous.
 Stamens 2. Oleaceae in Order OLEALES.
- Stamens more than 2.
 Leaves with compound blades.
 Families in Order GERANIALES.
- Leaves with simple blades.
 Ovule solitary in each carpel.
 Styles distinct: ovule pendulous.
 Families in Order GERANIALES.
- Styles united: ovule erect or ascending.
 Limnanthaceae in Order SAPINDALES.
- Ovules 2 or more in each carpel.
 Flowers irregular: stamens united at the top or converging.
 Placentae axile.
- Balsaminaceae in Order GERANIALES.
 Placentae parietal.
- Violaceae in Order HYPERICALES.
 Flowers regular: stamens neither united nor converging at the top.
 Carpels not circumscissile at maturity.
 Placentae parietal.
- Cistaceae in Order HYPERICALES.
 Placentae axile or central.
- Tiliaceae in Order MALVALES.
 Carpels circumscissile at maturity.
- Penthoraceae in Order ROSALES.
- ‡‡ Stamens inserted on the margin of a disk or hypanthium (perigynous or hypogynous).
 Stamens as many as the petals and opposite them.
 Styles and upper part of the ovaries distinct: ovules and seeds many.
 Saxifragaceae in Order ROSALES.
- Styles united.
 Order RHAMNALES.

- Stamens as many as the petals and alternate with them, or more or many.
- Styles distinct.
- Upper part of the ovaries distinct, at least at maturity.
- Saxifragaceae in Order ROSALES.
- Upper part of the ovaries united.
- Order SAPINDALES.
- Styles united.
- Hypanthium flat or obsolete: disk fleshy.
- Plants without secreting glands in the bark.
- Order SAPINDALES.
- Plants with secreting glands in the bark.
- Families in Order GERANIALES.
- Hypanthium cup-shaped or campanulate: disk obsolete or inconspicuous.
- Order MYRTALES.
- ††Ovary inferior.
- Stamens numerous.
- Styles and stigmas united into a disk: water-plants with endogenous stems.
- Nymphaeaceae in Order ROSALES.
- Styles distinct, or united, but not forming a disk with radiating stigmas: land-plants with exogenous stems.
- Styles distinct.
- Families in Order ROSALES.
- Styles united.
- Shrubs or trees; not succulents, sometimes woody vines.
- Hypanthium not produced beyond the ovary.
- Escalloniaceae in Order ROSALES.
- Hypanthium produced beyond the ovary.
- Families in Order MYRTALES.
- Herbs, or shrub-like or tree-like succulents.
- Order OPUNTIALES.
- Stamens not more than twice as many as the petals.
- Styles wanting: stigmas sessile.
- Gunneraceae in Order MYRTALES.
- Styles present.
- Styles distinct.
- Ovules several in each cavity of the ovary: fruit a capsule or a fleshy many-seeded berry.
- Fruit, if dehiscent, valvate.
- Families in Order ROSALES.
- Fruit circumscissile.
- Portulacaceae in Order CHENOPODIALES.
- Ovules solitary in each cavity of the ovary: fruit a drupe or 2-5 more or less united achenes.
- Order AMMIALES.
- Styles united, or single.
- Plants without tendrils.
- Ovary enclosed in or surpassed by the hypanthium or adnate to it.
- Anther-sacs opening by pores.
- Vacciniaceae in Order ERICALES.
- Anther-sacs opening by slits.
- Ovules solitary in each cavity of the ovary.
- Order AMMIALES.
- Ovules several in each cavity.
- Families in Order MYRTALES.
- Ovary exceeding the hypanthium, the top free.
- Escalloniaceae in Order ROSALES.
- Plants with tendrils.
- Herbs: fruit a pepo: leaf-blades palmately veined.
- Cucurbitaceae in Order CAMPANULALES.
- Shrubby vines: fruit drupaceous, separating into nutlets: leaf-blades pinnately veined.
- Rhamnaceae in Order RHAMNALES.
- ** Petals more or less united.
- Ovary superior.
- Stamens free from the corolla.
- Gynoecium of a single carpel.
- Families in Order ROSALES.
- Ovary of several united carpels.
- Filaments united.
- Stamens diadelphous.
- Fumariaceae in Order PAPAVERALES.
- Stamens monadelphous.
- Anther-sacs opening by slits.
- Oxalidaceae in Order GERANIALES.
- Anther-sacs opening by pores.
- Calyx and corolla very irregular.
- Order POLYGALALES.
- Calyx and corolla regular.
- Families in Order ERICALES.
- Filaments distinct.
- Style wanting or very short: stigma sessile.
- Aquifoliaceae in Order SAPINDALES.
- Styles elongated.
- Families in Order ERICALES.
- Stamens partially adnate to the corolla.
- Stamens as many as the lobes of the corolla and opposite them, or twice as many or more.

- Ovary 1-celled. Order PRIMULALES.
 Ovary several-celled.
 Upper portion of the ovaries distinct. Sedaceae in Order ROSALES.
 Upper portion of the ovaries united. Order ERENALES.
 Stamens as many as the lobes of the corolla and alternate with them, or fewer.
 Corolla not scarious, veiny: fruit various, but not a pyxis.
 Gynoecium of 3-6 carpels. Aquifoliaceae in Order SAPINDALES.
 Shrubs or trees: ovules and seeds few. Herbs, or creeping or tufted shrubby plants: ovules and seeds numerous. Families in Order POLEMONIALES.
 Gynoecium of 2 carpels.
 Carpels distinct, except sometimes at the apex. Order ASCLEPIADALES.
 Carpels united.
 Ovary 1-celled, with central placentae. Order GENTIANALES.
 Ovary 2-celled, or falsely 4-celled, or if 1-celled with parietal placentae. Order OLEALES.
 Stamens 2 and opposite each other, or 3. Stamens usually 4 or 5, if 2 by reduction not opposite each other. Leaves with stipules or stipular lines at their bases. Spigeliaceae in Order GENTIANALES.
 Leaves with no traces of stipules. Order POLEMONIALES.
 Corolla scarious, veinless: fruit a pyxis. Order PLANTAGINALES.
 Ovary inferior.
 Stamens with the filaments free from the corolla. Stamens 10: anther-sacs opening by terminal pores or chinks. Vacciniaceae in Order ERICALES.
 Stamens 5 or fewer: anther-sacs opening by longitudinal slits. Order CAMPANULALES.
 Stamens adnate to the corolla.
 Ovary with 2-many fertile cavities and 2-many ovules: calyx unmodified, at least not a pappus. Cucurbitaceae in Order CAMPANULALES.
 Plants tendril-bearing. Plants not tendril-bearing. Ovules mostly on basal placentae: plants parasitic. Order SANTALALES.
 Ovules variously borne, but not on a basal placenta: plants not parasitic. Order RUBIALES.
 Ovary with one fertile cavity. Ovules numerous on a basal placenta. Primulaceae in Order PRIMULALES.
 Ovule solitary, the placentae not basal. Flowers not in heads, often in head-like spikes or racemes. Order VALERIANALES.
 Flowers in involucrate heads. Order CARDUALES.

DESCRIPTIVE FLORA.

Subkingdom **SPERMATOPHYTA.** SEED PLANTS.

Plants producing flowers and seeds. A seed contains an embryo consisting of a short stem (radicle), one, two, or several rudimentary leaves (cotyledons) and a terminal bud (plumule).

Ovules, and seeds, borne on the face of a bract or a scale: stigma wanting.

Ovules, and seeds, borne in a closed cavity, the ovary: stigma present.

Class 1. GYMNOSPERMAE.

Class 2. ANGIOSPERMAE.

CLASS I. **GYMNOSPERMAE.** CONE PLANTS.

Carpel, or pistil, represented by a scale upon the face of which the ovules are borne and the naked seeds are matured.

Order **PINALES.**

Shrubs or trees. Leaves scale-like, narrow, or needle-like and often in bundles. Flowers mainly monoecious, the cones of spirally imbricate scales, or in *Taxaceae* the ovulate flowers often solitary. Seeds in dry or fleshy cones, or sometimes wholly or partially naked.

Carpellary scales with bracts, dry at maturity: ovules inverted: buds scaly.

Fam. 1. PINACEAE.

Carpellary scales without bracts, fleshy or peltate at maturity: ovules erect: buds naked.

Fam. 2. JUNIPERACEAE.

FAMILY 1. **PINACEAE.** PINE FAMILY.

Mostly evergreen, resiniferous shrubs or trees, typically conic, with flaky or brittle bark. Leaves narrow and solitary, or needle-like and usually several together, each group with a sheath at the base. Ovulate aments with bracted scales. Ovules inverted. Cone of dry scales. Seeds samara-like.

Leaves borne 2-5 together in a sheath, half-terete or 3-angled: cones maturing the second year.

Cone-scales with dorsal spine-armed appendages: leaves borne in 2's or 3's: cones spreading.

1. PINUS.

Cone-scales with apical inconspicuous appendages: leaves borne in 5's: cones drooping.

2. STROBUS.

Leaves borne singly without a sheath, flat: cones maturing the first year.

3. TSUGA.

1. **PINUS** [Tourn.] L. Leaves needle-like, in 2's and 3's, each with 2 fibro-vascular bundles. Cones spreading: scales at length woolly and spreading or recurved, each with a dorsal usually spine-armed appendage. Seeds samara-like. — Spr. — PINE.

- Scales of the ovulate aments stout, each with a short tip which scarcely equals the body in length. 1. *P. chinata*.
- Scales of the ovulate aments slender, each with a subulate tip several times the length of the body.
- Cones conic when closed, ovoid when open; twigs glaucous. 2. *P. virginiana*.
- Cones ovoid when closed, globose-ovoid or depressed when open; twigs yellow.
- Scales of the ovulate aments recurved: cone-scales with rather thin appendages, the spines recurved. 3. *P. rigida*.
- Scales of the ovulate aments ascending: cone-scales with thick appendages, the spines incurved. 4. *P. pungens*.

1. *P. echinata* Mill. A tree becoming 40 m. tall, the bark very rough and coarsely furrowed. Leaves in 2's or 3's, deep-green, 8-12 cm. long, slender; sheath 10-15 mm. long; cones 5-6.5 cm. long, ovoid when open, each scale-appendage armed with a slender spine.—N. Rare, apparently only near Manheim.—*Sandstones and shales*.—SHORT-LEAF. YELLOW-PINE.

2. *P. virginiana* Mill. A tree becoming 36 m. tall, the bark rough, flaky, the twigs glaucous. Leaves in 2's, deep-green, 4-7 cm. long, rather stout; sheaths 5-8 mm. long; cones 5-7 cm. long, ovoid when open, each scale-appendage with a curved spine.—N.S. Rather common, usually in poor soil on ridges.—*Sandstones and shales, schists*.—SCRUB-PINE. JERSEY-PINE.

3. *P. rigida* Mill. A tree becoming 25 m. tall, the bark very rough, the twigs yellow. Leaves in 3's, bright-green, 6-12 cm. long; sheaths 10-15 mm. long; cones 4-7 cm. long, globose-ovoid or depressed when open.—N.S. Rather rare, usually on rocky ridges.—*Sandstones and shales, schists*, and more common on *serpentine*.—PITCH-PINE.

4. *P. pungens* Lamb. A tree becoming 18 m. tall, the bark rather smooth but flaky. Leaves in 2's, bright-green, 5-10 cm. long, stout; sheaths less than 1 cm. long; cones 8-12 cm. long, very persistent, globose-ovoid or depressed when open.—Lower Susquehanna valley. Rare, confined to the dry precipitous river banks and neighboring islands.—*Schists*.—TABLE-MOUNTAIN-PINE.

2. **STROBUS** Opiz. Leaves needle-like, in 5's, mostly with 1 fibro-vascular bundle each. Cones drooping; scales leathery, with neither dorsal appendages nor spines. Seeds samara-like.

1. **S. Strobis** (L.) Small. A tree becoming 52 m. tall, with relatively smooth bark and approximately whorled branches. Leaves 5-10 cm. long, glaucous, very slender; cones narrow, 1-2 dm. long, often curved.—N.S. Not common, growing generally as solitary specimens in woodlands.—*Sandstones and shales, schists*.—Spr.—WHITE-PINE.

3. **TSUGA** Carr. Leaves separate, distichously spreading; blades linear, glaucous beneath. Pollen-sacs opening transversely. Ovulate aments with inconspicuous bracts. Cones drooping.

1. **T. canadensis** (L.) Carr. A tree becoming 31 m. tall. Leaves loosely spreading, 6-14 mm. long, obtuse at the apex; staminate flowers about 2 mm. in diameter; cones 18-23 mm. long; scales suborbicular; seed-wings mainly less than 1 cm. long.—N.S. Rather common, generally in ravines.—*Sandstones and shales, schists*.—Spr.—HEMLOCK. SPRUCE-PINE.

FAMILY 2. JUNIPERACEAE. JUNIPER FAMILY.

Mostly evergreen, often resiniferous shrubs or trees, with fibrous shreddy bark. Leaves mainly appressed scales, sometimes subulate and spreading. Ovulate aments with bractless scales. Ovules erect. Cone of dry often peltate scales, or baccate or drupaceous. Seed wingless, or winged, the wing a portion of the testa.

Aments axillary, the ovulate with smaller scales at the top: leaves subulate and spreading on mature branches. 1. JUNIPERUS.
 Aments terminal, the ovulate with larger scales at the top: leaves scale-like and appressed on mature branches. 2. SABINA.

1. **JUNIPERUS** [Tourn.] L. Leaves in 3's, subulate, neither imbricate nor appressed, glandless. Staminate ament axillary. Ovulate aments with the ovules alternate with the scales.

1. **J. communis** L. An erect shrub, or small tree. Leaves slender, 10-20 mm. long, spreading: cones 6-8 mm. in diameter. — Rare, generally on creek banks. Mostly confined to a grove on the *shales* and *sandstones* near Reinholds and a few trees on the Conestoga creek below Lancaster on *limestone*, and scattered on the *serpentine* barrens. — Spr. — JUNIPER.

2. **SABINA** Haller. Leaves scale-like, except sometimes on twigs, appressed, often imbricate, each with a gland in the back. Staminate aments terminal on branchlets. Ovulate aments with ovules opposite the scales.

1. **S. virginiana** (L.) Antoine. A conic tree becoming 30 m. tall. Scale-like leaves, 4-ranked, 1-4 mm. long, acute: cones ovoid, 5-6 mm. long, annual: seeds 3-4 mm. long, smooth. — Common, most abundant in hilly districts. — Spr. — CEDAR. RED-CEDAR.

CLASS II. **ANGIOSPERMAE.** FRUIT PLANTS.

Carpel, or pistil, formed by the union of the margins of one, or of several, rudimentary leaves; within the cavity thus formed the ovules are borne and the seeds matured.

Cotyledon 1: leaf-blades with the primary or lateral veins parallel: stem endogenous. Subclass 1. MONOCOTYLEDONES.
 Cotyledons typically 2: leaf-blades with the veins netted: stem exogenous. Subclass 2. DICOTYLEDONES.

SUBCLASS 1. **MONOCOTYLEDONES.**

Stem consisting of a ground mass of soft tissue in which bundles of wood-cells are irregularly placed. Early leaves alternate.

Order **PANDANALES.**

Perennial, aquatic or marsh herbs, with elongate rootstocks. Leaves with narrow blades. Flowers in narrow or globular spikes or racemes. Perianth of scales or bristles. Androecium of 2-7 stamens. Gynoecium 1- or 2-carpellary. Fruit nut-like.

Racemes cylindric: perianth of bristles: gynoecium stipitate. Fam. 1. TYPHACEAE.
 Spikes (heads) globular: perianth of scales: gynoecium sessile. Fam. 2. SPARGANIACEAE.

FAMILY 1. **TYPHACEAE.** CAT-TAIL FAMILY.

Raceme solitary and terminal, subtended by deciduous bracts, the staminate portion uppermost. Perianth of bristles. Pistil stipitate: stigma spatulate, oblong or rhomboidal.

1. **TYPHA** [Tourn.] L. Plants growing in swamps. Leaves erect, or rarely floating, narrowly elongate. Mature pistillate raceme terminal, cylindrical, compact. — Sum. — CAT-TAIL. REED-MACE.

Pollen-grains simple: pistillate part of the rachis with persistent pedicels 1 mm. long or less. 1. *T. angustifolia*.

Pollen-grains in 4's: pistillate part of the rachis with persistent pedicels 2-3 mm. long. 2. *T. latifolia*.

1. *T. angustifolia* L. Stem slender, 1.5-3 m. tall: leaf-blades 5-15 mm. wide: spike brown, the pistillate portion 0.5-1.5 cm. thick, separated from the staminate: stigmas narrow: nutlets terete. — Rare, in shallow water or mud.

2. *T. latifolia* L. Stem stout, 1-2.5 m. tall: leaf-blades 10-25 mm. wide: spike dark-brown or black, the pistillate portion 2.5-3 cm. thick, contiguous to the staminate: stigmas spatulate or rhomboidal: nutlets furrowed. — Common, in ponds and still water.

FAMILY 2. SPARGANIACEAE. BUR-REED FAMILY.

Spikes in racemes or panicles, or spicate, their bracts persistent. Perianth of scales. Pistil sessile: stigma subulate, sometimes oblique.

1. **SPARGANIUM** [Tourn.] L. Plants growing in low grounds or deep water. Leaves erect and triangular-keeled at the base or floating and flat. — Sum. — BUR-REED.

Achenes fusiform, the body stalked.

Inflorescence branched, the branches geniculate and bearing 3 or more staminate spikes. 1. *S. androcladum*.

Inflorescence simple, or if branched the branches strict and bearing less than 3 staminate spikes. 2. *S. americanum*.

Achenes obovoid or obpyramidal, sessile. 3. *S. eurycarpum*.

1. *S. androcladum* (Engelm.) Morong. Plants 2-7 dm. tall, branched: staminate heads mostly less than 1 cm. thick: fruit-heads 1-2 cm. thick: achene-body 6-7 mm. long, abruptly narrowed at the apex, long-stipitate. — N.S. Common, in shallow water. — *Sandstones and shales, schists*.

2. *S. americanum* Nutt. Plants 2-8 dm. tall, simple, the lower flower-heads sometimes peduncled: achene-body about 5 mm. long, short-stipitate, gradually narrowed at the apex. — M. Rare, in shallow water. — *Limestones*.

3. *S. eurycarpum* Engelm. Plants 8-20 dm. tall: staminate heads about 1 cm. thick: fruit-heads 2.5-3 cm. thick: achene-body 7-8 mm. long, rounded or depressed at the apex, sessile. — Susquehanna valley. Rather rare, in shallow water.

Order NAIADALES.

Perennial, aquatic or marsh herbs. Leaves various, sometimes mere phyllodia. Flowers usually symmetrical. Perianth wanting or imperfect. Androecium usually of 1-4 stamens. Gynoecium simple or several-carpellary.

Gynoecium of distinct carpels: anthers with petal-like connectives: leaf-blades not spiny-toothed. Fam. 1. ZANNICHELLIACEAE.

Gynoecium of united carpels: anthers with inconspicuous connectives: leaf-blades spiny-toothed. Fam. 2. NAIADACEAE.

FAMILY 1. ZANNICHELLIACEAE. PONDWEED FAMILY.

Aquatic caulescent herbs. Leaves alternate, filiform, or with blades, entire. Flowers perfect or monoecious, in spikes or clusters from a spathe. Androecium of 1, or mostly 2-4, distinct stamens. Gynoecium of several distinct carpels. Fruit a cluster or spike of drupelets.

1. **POTAMOGETON** [Tourn.] L. Herbs growing mostly in fresh water. Leaves various, the submerged and the floating ones usually different. Flowers

perfect, spicate. Stamens 4, with appendaged anthers. Carpels 4. Drupelets 4 together, spicate, sessile. — PONDWEED.

Stipules axillary, free from the rest of the leaf.

Plants with both submerged and floating leaves.

Submerged leaves without blades.

Submerged leaves with blades.

Submerged leaves with linear or nearly linear blades.

Leaf-blades with coarse cellular reticulation in the middle.

Leaf-blades with inconspicuous cellular reticulation.

Submerged leaves with lanceolate, oblong or oblanceolate blades.

Submerged leaves with petioles, the blades narrower than those of the floating ones.

Submerged leaves sessile or nearly so, the blades broader than those of the upper.

Plants with submerged leaves only.

Leaf-blades broad.

Leaf-blades perfoliate, entire; drupelets abruptly short-beaked.

Leaf-blades sessile, serrulate; drupelets gradually long-beaked.

Leaf-blades narrow, linear or filiform.

Leaf-blades linear, over 1 mm. wide; drupelets crested.

Leaf-blades 3-veined; plants without propagating buds.

Leaf-blades many-veined; plants with propagating buds.

Leaf-blades narrowly linear or linear-filiform, less than 1 mm. wide; drupelets crestless.

Stipules adnate to the blades, or to the petioles, of the submerged leaves.

Plants with submerged and floating leaves; drupelets crested.

Plants with submerged leaves only; drupelets crestless.

Leaf-blades setaceous or filiform, entire; drupelets obscurely beaked.

Leaf-blades linear, serrulate; drupelets prominently beaked.

1. *P. natans*.

2. *P. epihydrus*.

3. *P. heterophyllus*.

4. *P. americanus*.

5. *P. alpinus*.

6. *P. perfoliatus*.

7. *P. erispus*.

8. *P. compressus*.

9. *P. obtusifolius*.

10. *P. pusillus*.

11. *P. diversifolius*.

12. *P. pectinatus*.

13. *P. Robbinsii*.

1. *P. natans* L. Leaves of two kinds, the submerged ones phyllodia, the floating ones with ovate to oval blades 4-9 cm. long, rounded or subcordate at the base; drupelets obovoid, 4-4.5 mm. long, scarcely keeled. — Susquehanna and tributaries. Rather common, in still water. — Sum.

2. *P. epihydrus* Raf. Leaves of two kinds, the submerged ones with linear 5-nerved blades, the floating ones with oblong, elliptic, or obovate blades 3-8 cm. long; drupelets globose-obovoid, 2.5-3 mm. long, with an elevated shoulder back of the beak, the middle keel sharp. — Susquehanna and tributaries. Rather rare. — Sum.

3. *P. heterophyllus* Schreb. Leaves of two kinds, the submerged ones narrowed upward, the floating with oval or elliptic blades, 1.5-4 cm. long, abruptly pointed; drupelets 2-3 mm. long, with a horizontal shoulder back of the beak, indistinctly 3-keeled. — Creeks and Susquehanna. Rather common, in still water. — Sum.

4. *P. americanus* Cham. & Schlecht. Leaves of two kinds, the submerged ones with elongate blades, the floating ones with oblong to elliptic long-petioled blades 4-15 cm. long, usually acute; mature spikes 2.5 cm. long, terminating peduncles 5-8 cm. long; drupelets 3.5-4 mm. long, the middle keel prominent. — Susquehanna and tributaries. Rather common, in slow-flowing water. — Sum. and fall.

5. *P. alpinus* Balbis. Leaves of two kinds, the submerged ones with mostly linear-oblong to linear-lanceolate blades, the floating ones with mostly spatulate to oblanceolate blades 2-12 cm. long; peduncles thinner than the stem; drupelets about 2.5 mm. long, 3-keeled, the middle keel sharp. — Susquehanna. Rather rare, in still water. — Sum.

6. *P. perfoliatus* L. Leaves all submerged; blades suborbicular to orbicular-ovate, 2-4 cm. long, usually obtuse and serrulate at the apex, cordate-perfoliate, 13-23-veined: drupelets 2.5-3 mm. long, obscurely 3-keeled. — Susquehanna and tributaries. Rather rare, in flowing water. — Sum. and fall.
7. *P. crispus* L. Leaves 2-ranked; blades mainly oblong to linear-oblong, 3-10 cm. long, serrulate, obtuse, crisped, sessile or partly clasping, 3-7-veined: drupelets 5-6 mm. long, acuminate-beaked, 3-keeled, the prominent even middle keel ending in a spur at the base. — Susquehanna and Conestoga Creek. Rare, in slow-flowing water. — Sum.
8. *P. foliosus* Raf. Leaves not 2-ranked; blades linear or filiform, 1.5-5 cm. long and 3-veined, acute: drupelets mostly 4 together, 1.5-2 mm. long, abruptly short-beaked, the middle keel crest-like, sinuate-undulate and usually extended into a shoulder at each end. — Susquehanna. Rare, in slow-flowing water. — Sum.
9. *P. obtusifolius* Mert. & Koch. Leaves 5-8 cm. long; blades linear, obtuse, but often mucronate, mostly 3-veined, the midrib broad: mature spikes continuous: drupelets about 3 mm. long, 3-keeled, the middle keel often undulate. — Susquehanna and tributaries. Rather rare, in slow-flowing water. — Sum.
10. *P. pusillus* L. Leaves 2-8 cm. long; blades very narrowly linear or linear-filiform, 3-veined, acute: spikes globular, not interrupted: drupelets about 2 mm. long, the middle keel not crest-like, or obsolete. — Susquehanna and tributaries. Rather rare, in slow-flowing or still water. — Sum.
11. *P. diversifolius* Raf. Leaves of two kinds, the submerged ones linear-setaceous and 1-veined, the floating ones elliptic, oval or oblong-lanceolate, 1-2.5 cm. long: drupelets about 1 mm. long, cochleate, the middle keel crest-like, usually with 7 or 8 teeth. — Susquehanna, creeks and ponds. Rather common, in slow-flowing or still water. — Spr. and sum.
12. *P. pectinatus* L. Leaves 2.5-15 cm. long; blades setaceous or filiform, attenuate, 1-veined, sometimes obscurely so: spikes interrupted: drupelets 3-4 mm. long, crestless. — Susquehanna. Rather rare, in flowing water. — Sum.
13. *P. Robbinsii* Oakes. Leaves 7-13 cm. long; blades linear, acuminate, many-veined: spikes interrupted: drupelets about 4 mm. long and fully $\frac{1}{2}$ as wide, narrowed at the base, prominently beaked, 3-keeled. — Susquehanna. Rare, in flowing water. — Sum. and fall.

FAMILY 2. NAIADACEAE. NAIAS FAMILY.

Mostly fresh-water herbs. Leaves mainly opposite: blades mostly toothed, the bases dilated. Flowers dioecious, axillary: staminate, a double perianth and a single stamen: pistillate, a gynoeceium consisting of an ovary, a style and 2 or 3 stigmas. Fruit drupaceous.

1. *NAIAS* L. Submerged plants with usually much-branched stems. Leaves numerous, the margins prominently or inconspicuously toothed.

1. *N. flexilis* (Willd.) Rostk. & Schmidt. Stems slender: leaves many; blades linear, mainly acuminate, minutely serrulate: drupelets 3-4 mm. long, oblong. — Susquehanna and tributaries. Rare, in slow-flowing water. — Sum. — NAIAD.

Order ALISMALES.

Marsh or aquatic herbs. Leaves alternate, mere phyllodia, or with dilated blades. Flowers regular. Perianth of sepals, and usually also of petals. Androeceium of 3-6 stamens or more. Gynoeceium of 3-many carpels.

FAMILY 1. ALISMACEAE. WATER-PLANTAIN FAMILY.

Annual or perennial herbs. Leaves basal, the blades flat, often with basal lobes, or mere phyllodia. Flowers perfect, monoecious, or dioecious, whorled. Sepals herbaceous. Petals tender, white or pink. Gynoecium of few to many carpels. Style manifest. Fruit a head of flattened carpels.

Carpels borne in one series: achenes verticillate.

1. ALISMA.

Carpels borne in several series: achenes capitate.

2. SAGITTARIA.

1. **ALISMA** L. Leaves without basal lobes. Flowers perfect, in compound panicles. Stamens mostly 6. Achenes in 1 whorl.

1. **A. subcordatum** Raf. Leaf-blades ovate, usually broadly so, or orbicular-ovate, mostly pointed: sepals suborbicular, about 2.5 mm. long at maturity: petals 2-4 mm. long: fruit-heads 3-4 mm. wide; achenes less than 2.5 mm. wide, the beak below the top. — Common, in shallow water and swamps. — Spr.-fall. — WATER-PLANTAIN.

2. **SAGITTARIA** L. Leaves often with basal lobes, sometimes lobeless or mere phyllodia. Flowers monoecious or dioecious, the upper ones usually staminate. Stamens mainly numerous. Achenes numerous, in dense heads. — Sum. and fall. — ARROW-HEAD. WAMPEE.

Filaments dilated, pubescent.

Pistillate flowers pedicelled: achene with a minute horizontal beak below the top of the body. 1. *S. graminea*.

Pistillate flowers sessile: achene with a large, ascending beak at the top of the body. 2. *S. rigida*.

Filaments slender, glabrous.

Achenes with horizontal or nearly horizontal beaks.

Inflorescence-rachis, bracts, pedicels, and sepals glabrous. 3. *S. latifolia*.

Inflorescence-rachis, bracts, pedicels, and sepals pubescent. 4. *S. pubescens*.

Achenes with erect beaks. 5. *S. longirostra*.

1. **S. graminea** Michx. Leaf-blades linear, lanceolate, or elliptic, 5-15 cm. long, or wanting: scapes 1-6 dm. tall, with few-many flower-whorls: bracts ovate, united to about the middle: fruit-heads less than 10 mm. thick: achenes 1.5 mm. long, winged, the minute beak horizontal. — Susquehanna valley and adjacent parts. Rather rare, in sand or shallow water. Chiefly on *schists*.

2. **S. rigida** Pursh. Leaf-blades linear to broadly ovate, sometimes with basal lobes, 5-20 cm. long: scapes weak, 1-8 dm. long, with 5-9 flower-whorls: fruit-heads 8-15 mm. thick, sessile or nearly so: achenes 3-4 mm. long, winged, the beak ascending. — Conestoga Creek and tributaries. Rather rare, usually in shallow water. — *Limestones*.

3. **S. latifolia** Willd. Leaf-blades broad, 15-40 cm. long, glabrous, the basal lobes narrower and rather shorter than the terminal one: scapes 3-6 dm. tall: pedicels of pistillate flowers much longer than the acute bracts: fruit-heads 15-30 mm. thick: achenes about 3 mm. long, the beak ascending or recurved. — Common, in swamps, ponds, or shallow water along streams.

4. **S. pubescens** Muhl. Leaf-blades 8-25 cm. long, with the terminal lobe more rounded than in no. 3, puberulent or hirsute: scapes 3-6 dm. tall: pedicels of pistillate flowers about as long as the obtuse bracts or slightly longer: fruit-heads 8-15 mm. thick: achenes 2-3 mm. long, the beak horizontal or somewhat declined. — M.S. Rather rare, in swamps and wet places. — *Limestones, schists*.

5. **S. longirostra** (Micheli) J. G. Smith. Leaf-blades 10-25 cm. long, the terminal lobe broadly ovate, the basal lobes as long but narrower: scapes 4-8 dm. tall, with a few flower-whorls: bracts acuminate: fruit-heads 12-18 mm. thick, short-pedicelled: achenes 4 mm. long, with facial wings, the dorsal wing partially crenate, the beak erect. — Lower Susquehanna valley. Rare, usually in shallow water. — *Schists*.

Order HYDROCHARITALES.

Perennial aquatic herbs with rootstocks. Leaves usually with blades. Flowers monoecious or dioecious, or rarely perfect, from spathes. Perianth double, or corolla wanting. Androecium of 1-12 stamens. Gynoecium 3-15-carpellary. Ovary inferior. Fruit capsular or baccate.

FAMILY 1. ELODEACEAE. TAPE-GRASS FAMILY.

Plants with leafy stems, or leaves basal, often greatly elongate. Gynoecium 2-5-carpellary, the ovary 1-celled.

Acaulescent herbs: leaf-blades greatly elongate: staminate flowers with 1-3 stamens.

1. VALLISNERIA.

Caulescent herbs: leaf-blades relatively short: staminate flowers with 9 stamens.

2. PHILOTRIA.

1. **VALLISNERIA** [Mich.] L. Fresh water herbs. Leaves basal, with elongate ribbon-like blades. Flowers dioecious, the staminate numerous, crowded on a spadix, the pistillate few, each solitary at the end of an elongate spiral scape. Fruit subtended by the spathe.

1. **V. spiralis** L. Leaf-blades narrowly linear, 1-18 dm. long: staminate flowers inconspicuous: pistillate flowers floating: spathe 1-2 cm. long: fruit cylindric, 3-15 cm. long. — Susquehanna and tributaries. Common, in flowing water. — Sum. — EEL-GRASS. TAPE-GRASS.

2. **PHILOTRIA** Raf. Fresh water herbs. Leaves cauline, opposite or whorled. Flowers dioecious, polygamous, or perfect, the staminate with 9 stamens, the perfect with 3-6 stamens, the pistillate slender-pedicelled. Fruit subtended by the spathe. — Sum. — WATER-WEED.

Leaf-blades oblong or ovate-oblong, mostly 1 cm. long or less.

1. *P. canadensis*.

Leaf-blades linear, mostly over 1 cm. long.

2. *P. angustifolia*.

1. **P. canadensis** (Michx.) Britton. Leaf-blades 4-15 mm. long, relatively broad, serrulate to the base, sometimes obscurely so: spathes 10-18 mm. long. — N.S. Rather common, in still or slow-flowing water.

2. **P. angustifolia** (Muhl.) Britton. Leaves usually less crowded than those of *P. canadensis*, the upper ones mostly 1-2 cm. long, longer and narrower than the lower ones; blades linear to linear-lanceolate, entire below the middle, remotely toothed above, acuminate. — Susquehanna. Rather rare, in slow-flowing or still water.

Order POALES.

Mostly perennial caulescent or acaulescent plants, known as grasses and sedges. Stems sometimes conspicuously jointed. Leaves alternate, mostly sheathing at the base: blades usually narrow and elongate, entire or nearly so. Flowers variously disposed in a simple or compound inflorescence, perfect or rarely monoecious or dioecious, incomplete, inconspicuous, borne in the axils of chaffy bracts or scales (glumes). Fruit a caryopsis (grain) or an achene, or rarely a nut, or baccate.

Leaves 2-ranked, their sheaths with un-united margins: stems mostly hollow: fruit a grain (caryopsis).

Fam. 1. POACEAE.

Leaves 3-ranked, their sheaths with united margins: stem solid: fruit an achene.

Fam. 2. CYPERACEAE.

FAMILY 1. **POACEAE.** GRASS FAMILY.

Annual or perennial herbs, or rarely shrub-like or tree-like plants. Stems (culms) usually hollow, the nodes closed. Leaves with a scarious ring (ligule) at the sheath-orifice. Inflorescence of spikes, racemes, or panicles. Spikelets of 2-many 2-ranked imbricate bracts (scales), the upper ones bearing a flower surrounded by a bract-like organ (palea) which is placed with its back to the axis (rachilla), which is often thickened and appears as a hard projection (callus) at the base of the scale. Flowers perfect, staminate, or pistillate. Stamens 1-6, rarely more, usually 3. Fruit sometimes nut-like.—The following treatment of the grasses is based on that published in my Flora of the Southeastern United States.—*J. K. S.*

A. Spikelets falling from the pedicel entire (see also nos. 22, 27, 33 of section B). naked, or enclosed in bristles or a bur-like involucre, or immersed in the internodes of a readily disarticulating rachis. 1-flowered, or if 2-flowered the lower flower staminate; no upper empty scales: rachilla not extending beyond the uppermost scale.

Spikelets terete or somewhat dorsally compressed; empty scales manifest: hilum punctiform.

Flowering scale, and palea, hyaline, thin, much more delicate in structure than the thick-membranous or coriaceous empty scales.

Spikelets unisexual, the pistillate borne in the lower, the staminate in the upper part of the same spike. Tribe I. MAYDEAE.

Spikelets in pairs, one sessile, the other pedicellate, the former perfect, the latter sometimes perfect, more commonly with a staminate flower, often empty or reduced to one or two scales, or occasionally wanting.

Tribe II. ANDROPOGONEAE.

Flowering scale, at least that of the perfect flower, similar in texture to the empty scales, or frequently thicker and firmer, never hyaline and thin.

Tribe III. PANICEAE.

Spikelets much compressed laterally; empty scales none or rudimentary: hilum linear.

Tribe IV. ORYZEAE.

B. Spikelets with the empty scales persistent, the rachilla hence articulated above them (below them in nos. 22, 27, 33, and the spikelet falling entire), 1-many-flowered: frequently the upper scales are empty: rachilla often produced beyond the uppermost scale.

Spikelets borne in open or spike-like panicles or racemes, usually upon distinct and often long pedicels.

Spikelets 1-flowered.

Empty scales 4: palea 1-nerved.

Tribe V. PHALARIDEAE.

Empty scales 2 (rarely 1): palea 2-nerved.

Tribe VI. AGROSTIDEAE.

Spikelets 2-many-flowered.

Flowering scales usually shorter than the empty ones, the awn dorsal and usually bent.

Tribe VII. AVENEAE.

Flowering scales usually longer than the empty ones, the awn terminal and straight, rarely dorsal, sometimes wanting.

Tribe IX. FESTUCEAE.

Spikelets in two rows:

On one side of the continuous axis, forming one-sided spikes or racemes.

Tribe VIII. CHLORIDEAE.

On opposite sides of an axis which is often articulated, forming equilateral spikes.

Tribe X. HORDEAE.

TRIBE I. MAYDEAE.

Fertile spikelets imbedded in the internodes of the thick rachis.

1. TRIPSACUM.

TRIBE II. ANDROPOGONEAE.

Racemes singly disposed: apex of the rachis-internodes a translucent cup-shaped, entire or irregularly toothed appendage.

2. SCHIZACHYRIUM.

Racemes disposed in pairs or more: apex of the rachis-internodes not appendaged.
 Inflorescence of spike-like silky racemes.
 Inflorescence paniculate.

3. ANDROPOGON.
 4. SORGHIASTRUM.

TRIBE III. PANICEAE.

Spikelets naked, not involucrate.

Empty scales 2.

Spikelets ovate to orbicular, plano-convex, usually obtuse, rarely acute.

Spikelets lanceolate, acute or acuminate.

Empty scales 3.

Empty scales not awned.

Spikelets in very slender one-sided racemes which are usually whorled or approximate.

Spikelets in panicles or paniced racemes, the latter never whorled, commonly distant.

Empty scales awned or awn-pointed.

Spikelets involucrate.

Involucre of numerous bristles.

Involucre of two spine-bearing valves.

5. PASPALUM.
 6. SYNTHESISMA.
 6. SYNTHESISMA.
 8. PANICUM.
 7. ECHINOCHELOA.
 9. CHAETOCHELOA.
 10. CENCHRUS.

TRIBE IV. ORYZEAE.

Spikelets monoecious: tall reed-like grasses.

Spikelets perfect.

11. ZIZANIA.
 12. HOMALOCENCHRUS.

TRIBE V. PHALARIDEAE.

Third and fourth scales awnless.

Third and fourth scales awned on the back.

13. PHALARIS.
 14. ANTHOXANTHUM.

TRIBE VI. AGROSTIDEAE.

Flowering scale indurated when mature and very closely embracing the grain, or at least firmer than the empty scales.

Rachilla not extending beyond the palea.

Flowering scale 3-awned.

Flowering scale 1-awned.

Awn twisted.

Awn not twisted.

Flowering scale broad: awn deciduous.

Flowering scale narrow: awn persistent.

Rachilla extending beyond the palea.

Flowering scale usually hyaline or membranous at maturity, at least more delicate than the empty ones: grain loosely enclosed.

Inflorescence a spike.

Rachilla of the spikelets articulated above the empty scales which are therefore persistent.

Flowering scale slightly exceeding the empty ones.

Flowering scale much shorter than the empty ones.

Rachilla of the spikelets articulated below the empty scales, hence deciduous, entire.

Inflorescence an open or spike-like panicle.

Grain not permanently enclosed in the flowering scale and palea: pericarp opening readily when mature.

Grain permanently enclosed in the flowering scale and palea: pericarp adherent.

Palea 1-nerved and 1-keeled: stamen 1.

Palea 2-nerved and 2-keeled: stamens 3.

Flowering scale with long hairs at the base.

Flowering scales naked at the base.

15. ARISTIDA.
 16. STIPA.
 17. ORYZOPSIS.
 18. MUHLENBERGIA.
 19. BRACHELYTRUM.

20. HELEOCHLOA.
 21. PILEUM.
 22. ALOPECURUS.

23. SPOROBOLUS.
 24. CINNA.
 25. CALAMAGROSTIS.
 26. AGROSTIS.

TRIBE VII. AVENEAE.

Spikelets readily deciduous as a whole.

Spikelets with the empty scales persistent, the flowering scales deciduous.

Flowering scale awned below the teeth.

Flowers all perfect.

Grain free, unfurrowed: spikelets less than 1 cm. long.

Flowering scales crose-toothed or shortly 2-lobed at the apex.

27. NOTHOLCUS.
 28. DESCHAMPSIA.

- Flowering scales cleft or 2-toothed, the teeth extending into awns. 29. TRisetum.
- Grain furrowed, adherent to the scale: spikelets exceeding 1 cm. in length. 30. AVENA.
- Flowers various, the upper perfect, the lower staminate and with the scale strongly awned. 31. ARRIENATHERUM.
- Flowering scales awned between their usually awned teeth. 32. DANTHONIA.

TRIBE VIII. CHLORIDEAE.

- Spikelets deciduous as a whole. 33. SPARTINA.
- Spikelets with at least the empty scales persistent. 34. ATHEROPOGON.
- Spikelets with one perfect flower. 35. ELEUSINE.
- Spikelets with 2 or 3 perfect flowers.

TRIBE IX. FESTUCEAE.

- Flowering scale 1-3-nerved, or rarely with faint additional intermediate nerves. 36. TRIDENS.
- Lateral nerves of the flowering scale pilose. 37. ERAGROSTIS.
- Lateral nerves of the flowering scale glabrous. Second empty scale similar to the first. 38. SPHENOPHOLIS.
- Second empty scale very dissimilar to the first, broad and rounded at the summit.
- Flowering scales 5-many-nerved. 39. MELICA.
- Spikelets with two or more of the upper scales empty, broad and enfolding each other. 40. UNIOLA.
- Spikelets with the upper scales flower-bearing, or smaller and empty. 41. DACTYLIS.
- Empty basal scales 3-6.
- Empty basal scales 2. Spikelets borne in fascicles which are arranged in a glomerate or interrupted panicle. 42. POA.
- Spikelets borne in panicles or racemes but not in fascicles. 43. PANICULARIA.
- Stigmas inserted at or near the apex of the ovary: spikelets small. Flowering scales with the nerves parallel. Flowering scales with the lateral nerves converging above toward the mid-nerve. 44. FESTUCA.
- Flowering scales strongly keeled on the back, pubescent on some or all of the nerves: hilum punctiform. 45. BROMUS.
- Flowering scales rounded on the back, at least below: hilum linear.
- Stigmas plainly inserted below the apex of the ovary: spikelets large.

TRIBE X. HORDEAE.

- Spikelets singly arranged at the rachis-nodes. 46. LOLIUM.
- Spikelets with the flowering scales with their backs to the rachis: empty scale 1. 47. AGROPYRON.
- Spikelets with the flowering scales with their sides to the rachis: empty scales 2. 48. ELYMUS.
- Spikelets 2-6 at each rachis-node. 49. HYSTRIX.
- Empty scales usually as long as the flowering ones.
- Empty scales wanting or minute.

1. **TRIPSACUM** L. Tall perennial monoecious grasses, with stout rootstocks, and spicate inflorescence. Spikes articulated, elongate. Staminate spikelets 2-flowered, in pairs at each joint of the upper portion of the axis, of 4 scales, the outer 2 empty, coriaceous and shining, the inner 2 thinner, each enclosing a hyaline palet and a flower consisting of 3 stamens. Pistillate spikelets 1-flowered, in excavations in the lower internodes of the rachis, the outer scale very hard, thick and shining, concealing the more delicate remaining scales, the fourth scale enclosing a flower with a slender style. Stigmas 2, exerted. Grain enclosed in the appressed outer scale and the internode.

1. **T. dactyloides** L. Stems 1-3 m. tall: leaf-blades 6 dm. long or less, 1-4 cm. wide: spikes in 2's-4's, 1-3 dm. long: pistillate spikelets 7-10 mm. long; staminate spikelets 7-10 mm. long.—Lower Susquehanna valley. Rather rare, on river banks and islands.—*Schists.*—Spr.—GAMA-GRASS or SESAME-GRASS.

2. **SCHIZACHYRIUM** Nees. Annual or perennial grasses, tufted, or from rootstocks, with flat or involute leaf-blades, and spike-like racemes, singly disposed, terminating the stem or its branches. Spikelets in pairs at each node of the articulated and frequently hairy rachis, one sessile, the other pedicellate. Sessile spikelet of 4 scales, the outer 2 indurated, sometimes pubescent, the remainder of the scales hyaline, the fourth scale entire or 2-toothed at the apex, bearing a straight, contorted or spiral awn; palea small, hyaline. Pedicellate spikelet sterile, of 1 or 2 scales, or wanting. Stamens 1-3. Styles distinct.

1. **S. scoparium** (Michx.) Nash. Plants green or purplish, sometimes glaucous. Stems tufted, 4.5-15 dm. tall: leaf-blades 5 dm. long or less, 8 mm. wide or less: racemes 3-6 cm. long: sessile spikelet 5-7 mm. long, the awn geniculate, 8-15 mm. long; pedicellate spikelet 2-4.5 mm. long.—Common, in old fields and on roadsides.—Sum. and fall.—BROOM-GRASS. BEARD-GRASS.

3. **ANDROPOGON** [Royer] L. Perennial grasses, tufted or from elongate rootstocks, with flat or involute leaf-blades, and spike-like racemes, disposed in pairs or sometimes in 3's or more, terminating the stem or its branches, and often protruding from the side of a membranous spathe-like sheath. Spikelets sometimes with a ring of short hairs at the base, in pairs at each node of the articulated and frequently hairy rachis, one sessile, the other pedicellate. Sessile spikelet of 4 scales, the outer 2 indurated, often pubescent, the remainder of the scales usually hyaline, the fourth scale entire or 2-toothed at the apex, bearing a straight contorted or spiral awn, or sometimes awnless; palea small, hyaline. Pedicellate spikelet usually sterile, of 1 or 2 scales, sometimes of four scales and enclosing a staminate or more rarely a perfect flower, or frequently entirely wanting, the first scale rarely short-awned. Stamens 1-3.—BEARD-GRASS. BROOM-GRASS. SAND-GRASS.

Pedicellate spikelet much smaller than the sessile one, sterile, with 1 or 2 scales.

Inflorescence with its branches many times divided, the lower ones elongate, thus forming a corymbiform mass or masses: upper stem-leaves usually exceeding the inflorescence. 1. *A. corymbosus*.

Inflorescence with its branches not much divided and the lower branches not excessively elongate, hence long and narrow: upper stem-leaves usually shorter than the inflorescence. 2. *A. virginicus*.

Pedicellate spikelet as large as the sessile one or larger, consisting of 4 scales, with a staminate flower, or rarely a perfect flower. 3. *A. furcatus*.

1. **A. corymbosus** (Chapm.) Nash. Stems 4-10 dm tall: stem-leaves with blades 3 dm. long or less, 5 mm. wide or less, rough: spathes very rough, tightly enrolled around the peduncle: racemes in pairs, 2-3 cm. long: sessile spikelet 4-5 mm. long, the awn 12-13 mm. long; pedicellate spikelet usually present as a subulate scale.—N. M. Rather rare, mostly in swamps.—Fall.

2. **A. virginicus** L. Stems tufted, 5-10 dm. tall: leaf-blades 4 dm. long or less, 2-5 mm. wide: spathes 3-5 cm. long, extending beyond the racemes: racemes in pairs, 2-3 cm. long: sessile spikelet 3-4 mm. long, the awn straight, 10-15 mm. long; pedicellate spikelet wanting, or rarely present as a minute scale.—Rather common, especially in old fields.—Fall.

3. **A. furcatus** Muhl. Stems 1-2 m. tall: leaf-blades 6 dm. long or less, 12 mm. wide or less: racemes in 2's-6's, 5-10 cm. long: sessile spikelet 7-10 mm. long,

the awn 7-15 mm. long, geniculate, twisted at the base; pedicellate spikelet as large as the sessile, staminate, awnless. — Common, generally in rather moist soil. — Sum. and fall.

4. SORGHASTRUM Nash. Usually tall perennial grasses, with flat leaf-blades and terminal panicles with the primary branches usually solitary and branched from the base, hence appearing as if whorled. Sessile spikelets dorsally compressed, of 4 scales, the outer 2 indurated, often hairy, the third and fourth scales hyaline, the latter long-awned, the awn spiral at the base. Pedicellate spikelets wanting, or very rarely present as a minute rudiment, usually only the hairy pedicels present, a single one at the side of each sessile spikelet, or 2, one on each side, at the end of the branches. Stamens 3.

1. S. nutans (L.) Nash. Stems 1-2.5 m. tall: leaf-blades 6 dm. long or less, 13 mm. wide or less, very rough; panicle 2-5 dm. long, loose, the apex usually nodding: spikelet 6-8 mm. long, lanceolate, the awn 1-1.5 cm. long. — N. S. Common, in old fields and on roadsides. — *Sandstones and shales, schists.* — INDIAN-GRASS. WOOD-GRASS.

5. PASPALUM L. Usually perennial grasses with flat leaf-blades and an inflorescence composed of one or more unilateral racemes, arranged singly, in pairs, or in panicles. Spikelets 1-flowered, obtuse, or rarely short-acuminate, nearly sessile or short-pedicelled, alternately disposed, singly or in pairs, in 2 rows on one side of a narrow and usually winged rachis. Scales 3, rarely 4, the 2 outer, rarely 3, empty, membranous, usually equal in length, the flowering scales glabrous and shining, more or less convex, with its back turned toward the rachis, at length indurated, enfolding a shorter palet of similar texture and a perfect flower. Stamens 3.

Plants without raceme-bearing branches from the uppermost sheath.

Spikelets oval, $\frac{1}{2}$ as thick as broad or more, the outer scales firm.

Spikelets circular or nearly so, about $\frac{1}{2}$ as thick as broad, the outer scales very thin.

Plants with raceme-bearing branches from the uppermost sheath.

1. *P. laeve*.

2. *P. circulare*.

3. *P. Muhlenbergii*.

1. P. laeve Michx. Stems tufted, 3-6 dm. tall: leaf-sheaths compressed, glabrous; blades short, those on the stem usually less than 1.5 dm. long, 5-8 mm. wide, pubescent above near the base: racemes 2 or 3, spreading, 4-8 cm. long: spikelets glabrous, oval, 2.5-3 mm. long, 2-2.5 mm. wide. — Common, in pastures and fields and on roadsides.

2. P. circulare Nash. Stems tufted, 4-8 dm. tall: leaf-sheaths hirsute with long hairs, compressed; blades 2 dm. long or less, 5-8 mm. wide, glabrous beneath or hirsute along the midnerve, the upper surface hirsute with long hairs: racemes 2-4, spreading or ascending, 4-6 cm. long: spikelets glabrous, about 2.5 mm. in diameter. — S. Rare, in moist soil. — *Schists.*

3. P. Muhlenbergii Nash. Stems tufted, at first erect, finally reclining, 4-8 dm. tall, smooth and glabrous: leaf-blades 0.5-2 dm. long, rarely longer, usually 7-11 mm. wide, or sometimes narrower, ciliate on the margins with usually long hairs, more or less pubescent on both surfaces with long hairs: racemes 5-10 cm. long: spikelets glabrous, about 2 mm. long and 1.8 mm. wide, oval or broadly obovate. — Rather common, in fields and thickets.

6. SYNTHESISMA Walt. Annual grasses, with flat leaf-blades and an inflorescence composed of spike-like racemes which are disposed in whorls, or scattered and approximate, at the summit of the stems. Spikelets narrow, acute,

in 2's or 3's on one side of the flat and winged or triangular rachis, one of the spikelets generally longer-pedicelled than the rest. Scales 3 or 4, the 3 outer membranous, the first small or wanting, the fourth scale chartaceous, glabrous and shining, at length indurated, enclosing a palet of similar texture and a perfect flower. Stamens 3. Styles distinct. Stigmas plumose. — CRAB-GRASS. FINGER-GRASS.

Rachis of the racemes merely angled: first scale wanting or rarely rudimentary.

1. *S. filiforme*.

Rachis of the racemes with the lateral angles winged.

Foliage glabrous: spikelets usually of 3 scales.

2. *S. humifusum*.

Foliage pubescent: spikelets of 4 scales.

3. *S. sanguinale*.

1. *S. filiforme* (L.) Nash. Stems 1.5–7 dm. tall: leaf-blades 3–20 cm. long, 1–4 mm. wide, erect: racemes 2–5, 2–10 cm. long, erect or ascending, alternate: spikelets about 1.8 mm. long, 0.75 mm. wide, appressed-pubescent with long glandular-tipped hairs. [*Panicum filiforme* L.] — Common, on roadsides and in fields. — Sum. and fall.

2. *S. humifusum* (Pers.) Rydb. Stems 2–5 dm. long: leaf-blades 1.5–15 cm. long, 2.5–6 mm. wide: racemes 2–5, 2–8 cm. long: spikelets slightly exceeding 2 mm. long, appressed-pubescent, the second about equalling the third, the fourth deep chestnut-brown when mature. — Rather rare, in waste grounds and fields. Nat. of Eu. — Sum. and fall.

3. *S. sanguinale* (L.) Dulac. Stems 1 m. long or less: lower leaf-sheaths densely papillose-hirsute; blades 4–20 cm. wide, more or less papillose-hirsute: racemes 3–10, 5–18 cm. long: spikelets 2.5–3 mm. long, appressed-pubescent, the second scale about $\frac{1}{2}$ as long as the spikelets, the fourth yellowish-white when mature. — Common, in cultivated and waste grounds. Nat. of Eu. — Sum. and fall.

7. **ECHINOCHLOA** Beauv. Often tall grasses, with flat leaf-blades, the inflorescence composed of several to many unilateral more or less spreading spike-like racemes. Spikelets 1–2-flowered, lanceolate to ovate or orbicular-ovate, crowded in small clusters or racemes in 2 rows on one side of the flat rachis. Scales 4, the 3 outer membranous, spiny-hirsute or hispid externally, the first much shorter than the spikelet, often awn-pointed, the second and third awn-pointed or awned (rarely awnless), the latter bearing the longer awn and rarely enclosing a palet and sometimes also a staminate flower; fourth scale chartaceous, glabrous and shining, at length indurated, acute or acuminate, enclosing a shorter palet of similar texture and a perfect flower.

1. *E. Crus-galli* (L.) Beauv. Stems 6–12 dm. tall: leaf-blades 1.5–6 dm long, 6–25 mm. wide: panicle of 5–15 branches: spikelets ovate, about 4 mm. long, exclusive of the awn, hispidulous, hispid on the nerves. — Common, in cultivated soil. Nat. of Eu. — Sum. and fall. — BARNYARD-GRASS.

8. **PANICUM** L. Annual or perennial grasses, varying much in habit, with elongate or flat and broad leaf-blades, and the spikelets in open or contracted panicles. Spikelets 1–2-flowered, lanceolate, oblong, ovate to obovate or globose, obtuse to acute or acuminate. Scales 4, the 3 outer membranous, the first and second empty, the first usually much shorter than the spikelet, sometimes minute, the third one empty or enclosing a shorter hyaline palet and often also a staminate flower; fourth scale shorter and usually more obtuse than the others, chartaceous, glabrous and shining, at length indurated, enclosing a palet of similar texture and a perfect flower. — PANIC-GRASS.

Leaves elongate: spikelets lanceolate to ovate, commonly the former, acute or acuminate.

Lower leaf-sheaths terete or but little flattened, not keeled.

Stems finally branched: plants without long rootstocks or stolons.

Sheaths very pubescent.

Spikelets lanceolate, 3 mm. long or less.

Stems stout: panicle usually included at the base, its many branches repeatedly divided and bearing numerous spikelets.

1. *P. capillare*.

Stems slender: panicle exerted, its few branches but little divided and bearing comparatively few spikelets.

Spikelets 2 mm. long, acute.

Spikelets 3 mm. long, acuminate.

Spikelets ovate, 5 mm. long or more.

Sheaths glabrous.

Stems simple, from long stout rootstocks.

Lower leaf-sheaths much compressed, broad, keeled, often equitant.

Plants with no long rootstocks.

Fourth scale of the spikelet sessile.

Ligule naked: stems finally much branched.

Ligule ciliate: stems simple or nearly so.

Fourth scale of the spikelet distinctly stalked.

Plants with long scaly rootstocks.

Leaves not elongate, except in nos. 11 and 12: rosulate tufts of leaves often present in the fall: spikelets oval to obovate or globose, obtuse, or rarely acutish (acute in no. 12).

Middle leaf-blades of the main stem less than 1.5 cm. broad, usually less than 1 cm., the base rounded or truncate, rarely subcordate, sometimes narrowed.

Leaf-blades elongate, erect or nearly so, narrow, distinctly narrowed toward the base, especially the lower ones.

Spikelets less than 3 mm. long, obtuse or acutish, pubescent.

Spikelets 3-4 mm. long, acute, glabrous.

Leaf-blades not elongate, lanceolate, not manifestly narrowed toward the base.

Stems, leaf-blades and sheaths glabrous, or the latter two parts merely ciliate on the margins.

Spikelets glabrous.

Nodes of the stem naked.

Nodes of the stem densely barbed.

Spikelets pubescent.

Stems, leaf-blades, or sheaths, or all of them pubescent.

Spikelets 2.5 mm. long or less.

Leaf-blades glabrous, or sometimes pubescent beneath.

Spikelets about 1.25 mm. long: stems glabrous.

Spikelets about 2.5 mm. long: stems puberulent.

Leaf-blades strongly pubescent beneath, usually also above.

Hairs on the lower surface long and stiff.

Hairs on the lower surface soft and copious.

Spikelets exceeding 3 mm. in length.

Middle leaf-blades of the main stem 1.5 cm. wide, often 3 cm., the base cordate and clasping.

Spikelets less than 3 mm. long.

Spikelets about 1.5 mm. long: panicle oblong and dense: stems simple.

Spikelets more than 2 mm. long: panicle ovoid and open: stems branched.

Leaf-sheaths glabrous.

Leaf-sheaths papillose-hispid, especially the short terminal ones on branches.

Spikelets 3 mm. long or more.

Nodes naked.

Nodes manifestly and copiously barbed.

2. *P. philadelphicum*.

3. *P. flexile*.

4. *P. miliacum*.

5. *P. dichotomiflorum*.

6. *P. virgatum*.

7. *P. agrostoides*.

8. *P. longifolium*.

9. *P. stipitatum*.

10. *P. anceps*.

11. *P. linearifolium*.

12. *P. depauperatum*.

13. *P. dichotomum*.

14. *P. microcarpon*.

19. *P. sphacrocarpum*.

15. *P. Lindheimeri*.

22. *P. Ashei*.

16. *P. Huachucae*.

17. *P. tenuis-scense*.

18. *P. Scribnerianum*.

20. *P. polyanthes*.

21. *P. commutatum*.

24. *P. claudetinum*.

23. *P. latifolium*.

25. *P. Boscii*.

1. *P. capillare* L. Stems 3-6 dm. tall, simple, or branched near the base, stout: leaf-sheaths usually purplish, papillose-hirsute; blades 1.5-8 dm. long, 6-16 mm. wide, pubescent: primary panicle 2-3.5 dm. long, the lateral panicles smaller: spikelets very numerous, 2-2.5 mm. long, lanceolate, acuminate. — Common, in waste grounds and cultivated soil. — Sum. and fall.
2. *P. philadelphicum* Bernh. Stems erect, 2-6 dm. tall, slender, somewhat branched at the base: leaf-sheaths hirsute; blades 5-10 cm. long, 2-6 mm. wide, erect, pubescent: panicle 10-23 cm. long: spikelets about 1.5 mm. long, elliptic, acute. — S. Rather rare, borders of woodland. — *Schists.* — Sum. and fall.
3. *P. flexile* (Gattinger) Scribn. Stems erect, 1.5-4.5 dm. tall, slender: leaf-sheaths papillose-hirsute; blades 10-23 cm. long, 4-6 mm. wide, erect, long-acuminate, pubescent: panicle 1-2.5 dm. long: spikelets about 3 mm. long, acuminate. — M. Rare, in moist soil, Dillerville swamp. — *Limestones.* — Sum. and fall.
4. *P. miliaceum* L. Stems erect or decumbent, 3 dm. tall or more: leaf-sheaths papillose-hirsute; blades 1-2.5 dm. long, 8-25 mm. wide, pubescent: panicle rather dense, 1-2.5 dm. long: spikelets 5 mm. long, acuminate. — M. Rather rare, in waste or cultivated grounds. Nat. of Eu. — Sum. and fall. — MILLER.
5. *P. dichotomiflorum* Michx. Stems at first erect, 3-6 dm. tall, simple, later decumbent, 1-1.5 m. long, branched at all the upper nodes: leaf-sheaths loose, glabrous, somewhat flattened; blades 1.5-6 dm. long, 4-20 mm. wide: panicle pyramidal, 1-4 dm. long: spikelets 2-3 mm. long, lanceolate, acute. — Common, on roadsides and in moist soil. — Sum. and fall.
6. *P. virgatum* L. Glabrous. Stems erect, 9-15 dm. tall: leaf-blades elongate, 3 dm. long or more, 6-12 mm. wide, flat: panicle 1.5-5 dm. long: spikelets ovate, acuminate, 4-4.5 mm. long. — Common, in moist pastures, and on roadsides and river banks. — Sum. and fall.
7. *P. agrostoides* Muhl. Stems 4-8 dm. tall, much branched, compressed: leaf-blades 3 dm. long or more, 4-8 mm. wide: panicle pyramidal, 1-3 dm. long, its branches spreading: spikelets 1.5-2 mm. long, acute, straight. — Frequent, in moist grounds. — Sum. and fall.
8. *P. longifolium* Torr. Stems 3-6.5 dm. tall, slender, usually simple: leaf-blades 2-3 dm. long, 2-4 mm. wide: panicle 1-2.5 dm. long: spikelets 2 mm. long, acuminate. — S. Rare, in swamps. — *Schists.* — Sum. and fall.
9. *P. stipitatum* Nash. Stems erect, 9-15 dm. tall, much branched: leaf-blades 3 dm. long or more, 4-8 mm. wide, acuminate: panicle pyramidal, 1-3 dm. long: spikelets about 2.5 mm. long, acuminate, the fourth scale on a delicate stalk about 0.5 mm. long. — Common, in pastures and moist soil. — Sum.
10. *P. anceps* Michx. Stems erect, 4-15 dm. tall, branched: leaf-blades 3 dm. long or more, 4-10 mm. wide: panicles 1.5-3 dm. long: spikelets 2.5-3.5 mm. long, lanceolate, acuminate, curved at the apex. — Common, in meadows and low grounds. — Sum.
11. *P. linearifolium* Scribn. Stems tufted, slender, erect, simple, 1.5-4 dm. tall: leaf-blades elongate, 7-25 cm. long, 2-4 mm. wide: primary panicle loose and open, 4-10 cm. long: spikelets 2-2.5 mm. long, obtuse or acutish, pubescent with spreading hairs. — Common, in dry soil, mostly on banks. — Sum.
12. *P. depauperatum* Muhl. Stems erect, 3 dm. tall or less, simple: leaf-blades 8-15 cm. long, elongate, 1-4 mm. wide: primary panicle much exerted, 2-8 cm. long, usually linear: spikelets 3-4 mm. long, glabrous, acute. — Common, on dry banks. — Sum.
13. *P. dichotomum* L. Light green, glabrous, or the lower nodes sometimes barbed. Stems tufted, slender, 2-6 dm. tall, rarely taller, finally much branched about the middle: leaf-blades widely spreading, linear-lanceolate, the primary

ones 4-8 cm. long, usually 4-8 mm. wide, rarely wider, those on the branches much smaller, often involute: panicle 4-8 cm. long, broadly ovate: spikelets rather few, 1.75-2 mm. long and 0.8-1 mm. wide, elliptic, glabrous. — Common, on roadsides and in thickets. — Sum.

14. *P. microcarpon* Muhl. Glabrous. Stems densely tufted, at first erect, finally much branched and decumbent, the nodes strongly barbed with silky somewhat reflexed hairs: primary leaf-blades spreading, sometimes somewhat reflexed, usually 6-10 cm. long, 8-15 mm. wide, lanceolate, the blades on the branches much smaller: panicle finally much exserted, 7-11 cm. long, oval: spikelets 1.5-1.8 mm. long and about 0.8 mm. broad, elliptic, glabrous. [*P. nitidum* var. *barbulatum* (Michx.) Wood.] — Rather common, in moist grounds and thickets. — Sum.

15. *P. Lindheimeri* Nash. Stems tufted, 4-8 dm. tall, glabrous, finally much branched: leaf-blades erect, glabrous, or the lower surface sometimes minutely pubescent with short hairs, ciliate at the base, the primary ones 2-8 cm. long, 3-8 mm. wide, lanceolate, firm, the blades on the branches much smaller: panicle 3-8 cm. long, broadly ovoid: spikelets about 1.5 mm. long and 0.8 mm. wide, obovoid. — S. Frequent, on dry sandy banks. — *Schists*. — Sum.

16. *P. Huachucae* Ashe. Stems at first erect and simple, later profusely branched and leaning or ascending, glabrous or pubescent: leaf-sheaths hirsute, often papillose; blades hirsute, especially beneath, erect or spreading, those on the main stem 5-8 cm. long, those on the branches much shorter: primary panicle less than 8 cm. long, ovoid: spikelets hardly 2 mm. long. [*P. pubescens* A. Gray, not Lam.] — Common, in dry soil. — Sum.

17. *P. tennesseense* Ashe. Stems tufted, 4-6 dm. tall, rather weak and ascending, papillose-hirsute with long spreading hairs, finally much branched and prostrate: leaf-sheaths densely papillose-hirsute with long spreading hairs; blades ascending, lanceolate, the upper surface with scattered hairs, the primary blades 4-10 cm. long, 5-10 mm. wide, those on the branches much shorter and spreading with the upper surface nearly glabrous: panicle 7-10 cm. long, ovoid, its branches ascending: spikelets 1.7-2 mm. long, 0.8-0.9 mm. wide, elliptic or obovoid. — M. S. Rather rare, in dry soil. — *Limestones, schists*. — Sum.

18. *P. Scribnerianum* Nash. Stems tufted, erect, 1.5-6 dm. tall, simple, finally dichotomously branched above: leaf-sheaths strongly papillose-hispid; blades 5-10 cm. long, 6-12 mm. wide, spreading, glabrous: primary panicle ovoid, 4-8 cm. long: spikelets turgid, obovoid, about 3 mm. long, glabrous, or sometimes pubescent with short spreading hairs. — S. Rather rare, in dry thickets. — *Schists*. — Sum. and fall.

19. *P. sphaerocarpon* Ell. Stems generally erect, simple or somewhat branched at the base, 2.5-6 dm. tall: leaf-blades 5-10 cm. long, 4-14 mm. wide, rough above, smooth beneath, the margins cartilaginous and minutely serrulate, ciliate toward the base: panicle ovoid, 5-10 cm. long: spikelets less than 2 mm. long, nearly spherical, or a little longer than thick, obtuse. — M. S. Rather rare, in dry woods and thickets. — *Limestones, schists*. — Sum.

20. *P. polyanthes* Schult. Stems generally erect, 6-9 dm. tall, simple, glabrous: leaf-blades 1-2 dm. long, 1-2.5 cm. wide, long-acuminate, smooth, cordate-clasping and sparingly ciliate at the base: panicle 7-20 cm. long, ovoid to oblong: spikelets 1.5 mm. long, obovoid to nearly spherical, numerous, puberulent. — Common, along the Susquehanna. In dry thickets or woods. — *Limestones, schists*. — Sum.

21. *P. commutatum* R. & S. Stems tufted, glabrous, erect, 3-6 dm. tall, finally rather sparingly branched: leaf-blades ciliate on the margin, otherwise glabrous, cordate and clasping at the base, those on the stem larger than the basal ones, 5-12 cm. long, 1-2 cm. wide, ovate-lanceolate: panicle 5-10 cm. long, broadly ovoid: spikelets 2.5-3 mm. long and about 1 mm. wide, elliptic, obtuse or acutish,

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pubescent. — S., especially along the Susquehanna. Rather rare in woods. — *Schists*. — Sum. and fall.

22. *P. Ashei* G. Pearson. Stems tufted, 2–4 dm. tall, erect, usually sparingly branched, rarely much branched and prostrate, puberulent: leaf-blades lanceolate, sparsely ciliate at the base, with long hairs, usually 5–8 cm. long, 6–10 mm. wide, a little cordate at the base, the upper blades about the same length, the lower ones shorter, the early basal blades ciliate: panicle 5–7 cm. long: spikelets about 2.3 mm. long and about 1 mm. wide, elliptic. — Lower Susquehanna valley. Rather rare, in woods. — *Schists*. — Sum.

23. *P. latifolium* L. Stems 3–9 dm. tall, erect, simple, or somewhat branched above: leaf-blades 7–18 cm. long, 2–4 cm. wide, cordate-clasping at the base, acuminate, ciliate: panicle 8–15 cm. long: spikelets 3–4 mm. long, turgid, oval to obovoid, pubescent. — Frequent, in woods. — Sum.

24. *P. clandestinum* L. Stems tufted, 6–14 dm. tall, the branches clothed with the papillose-hispid overlapping leaf-sheaths: leaf-blades ciliate at the cordate and clasping base, the primary ones 1–2 dm. long, 1.5–2.5 cm. wide, acuminate, lanceolate, those on the branches ovate-lanceolate and usually less than 1 dm. long: primary panicle long-exserted, 9–12 cm. long, broadly ovate, the later panicles wholly or partially concealed in the sheaths: spikelets 2.7–3 mm. long and about 1.3 mm. wide, elliptic, pubescent with spreading hairs. — M. S. Rather common, in moist soil. — *Limestones, schists*. — Sum.

25. *P. Boscii* Poir. Stems tufted, erect, pubescent or glabrous, finally branching: leaf-sheaths glabrous, or softly pubescent; blades ovate-lanceolate, cordate and clasping at the base, glabrous or pubescent, 6–12 cm. long, 2–4 cm. wide: panicle 6–12 cm. long: spikelets 4–6 mm. long, 1.5–2 mm. wide, the scales distant, pubescent with long weak hairs. — Rather common, in woods. — Sum.

9. **CHAETOCHELOA** Scribn. Annual or perennial grasses, with usually flat, sometimes complanate, leaf-blades and dense terminal cylindric spike-like or narrowly thyrsoid panicles. Spikelets with one or a cluster of 2–several sterile barbed bristle-like persistent branches. Scales 4, the 3 outer membranous, the first often very short and together with the larger second one empty, the third scale frequently longer than the second, empty, or rarely enclosing a palet and also sometimes a staminate flower, the fourth scale usually shorter than the spikelet, chartaceous, glabrous, shining, often transversely rugose, finally indurated, obtuse, enclosing a shorter palet of similar texture and a perfect flower. Stamens 3. Styles distinct, elongate. Stigmas plumose. [*Setaria* Beauv., not Achar.] — **FOXTAIL**. **FOXTAIL-GRASS**.

Inflorescence with the spikelets racemosely arranged: bristles 5–16 at the base of each spikelet, involucrate.

Inflorescence with the spikelets in clusters or on branches: bristles 1–3 at the base of each spikelet, not involucrate.

Bristles downwardly barbed.

Bristles upwardly barbed.

Panicle usually 1 cm. thick or less: bristles commonly green: spikelets about a mm. long.

Panicle usually 2–3 cm. thick: bristles usually purple: spikelets 2.5–3 mm. long.

1. *C. glauca*.

2. *C. verticillata*.

3. *C. viridis*.

4. *C. italica*.

1. *C. glauca* (L.) Scribn. Stems tufted, 3–12 dm. tall: leaf-blades 1.5 dm. long or less, 4–8 mm. wide, glaucous, at least the lower ones pilose near the base on the upper surface: racemes dense, about 1 cm. in diameter, 2–10 cm. long: spikelets broadly ovoid, 3 mm. long and 2 mm. wide, the acute flowering scale striate, coarsely transversely rugose. — Common, in waste and cultivated grounds. Nat. of Eu. — Sum. — **PIGEON-GRASS**.

2. *C. verticillata* (L.) Scribn. Stems 3-6 dm. tall, erect or ascending; leaf-blades 7-18 cm. long, 6-12 mm. wide; bristles flexuous, 3-6 mm. long; spikelets narrowly elliptic-ovate, acute, 2-2.5 mm. long, the flowering scale rounded at the shortly apiculate apex, smooth, or with very fine transverse wrinkles below the middle. — M. Rather rare, in waste places and cultivated grounds. Nat. of Eu. — *Limestones*. — Sum.

3. *C. viridis* (L.) Scribn. Stems tufted, 2-9 dm. tall; leaf-blades 3 dm. long or less, 4-10 mm. wide; panicles 2-10 cm. long, green; bristles 1-1.5 cm. long; spikelets about 2 mm. long, elliptic. — Common, in waste and cultivated grounds. Nat. of Eu. — Sum. and fall. — BOTTLE-GRASS.

4. *C. italica* (L.) Scribn. Stems simple, or branched at the base; leaf-blades long-acuminate, 2-4 dm. long, 1.5-3 cm. wide, rough; panicles dense, cylindrical, 8-20 cm. long, 2-3 cm. in diameter, obtuse or truncate at both ends; bristles 1-3, 3-10 mm. long, often shorter than the spikelets or nearly wanting; spikelets elliptic, 2.5-3 mm. long. — Rather rare, in fields and waste places. Nat. of Eu. — Sum. and fall. — HUNGARIAN-GRASS.

10. **CENCHRUS** L. Annual or perennial grasses, with flat, convolute or complanate leaf-blades and terminal spikes. Spikelets 2-6, in an ovate or globose involucre, consisting of two thick hard valves which are exteriorly armed with stout spines and sometimes also with basal bristles which are thickened at the base, the involucres articulated to the rachis and readily deciduous, carrying the persistent spikelets with them. Scales 4, awnless, the first and second empty, the first small or minute, the third equalling or longer than the second, enclosing a palet and also sometimes a staminate flower, the fourth scale chartaceous, firmer, enclosing a palet of similar texture and a perfect flower. Stamens 3. Styles often connate at the very base. Stigmas plumose.

1. *C. carolinianus* Walt. Stems at first erect, later prostrate and forming mats, 2-6 dm. long, branching; leaf-blades 6-12 cm. long, 4-8 mm. wide; spikes 3-6 cm. long; involucres 6-20, 3-5 mm. broad, enclosing 2 spikelets, pubescent, the spines 3-4 mm. long; spikelets 6-7 mm. long. — Rather common, in sandy soil. — Sum. and fall. — BUR-GRASS. SAND-BUR. SAND-SPUR. COCKSPUR.

11. **ZIZANIA** [Gronov.] L. Tall robust annual monoecious aquatic grasses, with broad flat leaf-blades and ample terminal panicles. Spikelets of two kinds, articulated below the scales, 1-flowered, each with a more or less prominent cartilaginous ring at the base, narrow, the staminate readily deciduous, on the more or less spreading lower branches, the pistillate tardily deciduous, on the erect or appressed upper branches of the panicle. Scales 2, the first empty, the second enclosing a flower but no palet: scales of the staminate spikelets membranous, concave, acute or awn-pointed; those of the pistillate spikelets linear, firmer, involute, the first long-awned, longer than the awn-pointed second. Stamens 6. Styles nearly distinct. Stigmas plumose with short hairs.

1. *Z. aquatica* L. Stems 1-3 m. tall; leaf-sheaths smooth and glabrous; blades 1.5-8 dm. long, 5-25 mm. broad, usually rough; panicle 2-3 dm. long; staminate spikelets 7-8 mm. long; pistillate spikelets 12-20 mm. long, the awn 2.5-5 cm. long. — Susquehanna valley. On the shores of the river and low islands. — Sum. and fall. — WILD-RICE. INDIAN-RICE. WATER-OATS.

12. **HOMALOCENCHRUS** Mieg. Grasses of wet situations, with flat leaf-blades and usually open, rarely contracted, terminal panicles, the branches

of which are slender. Spikelets often with a cartilaginous ring at the base, articulated below the scales, compressed, 1-flowered. Scales 2, compressed-keeled, somewhat rigid, awnless, the first scale empty, usually ciliate on the keel, broader than the second which encloses a perfect flower but no palet. Stamens 1-6. Styles short or slender, distinct. Stigmas plumose with branched hairs. [*Lecersia* Sw., not Hedw.] — CUT-GRASS.

Panicle-branches singly disposed, usually less than 8: stamens 1 or 2.

Panicle-branches, at least the lower ones, in whorls or approximate in pairs, usually exceeding 15: stamens 3.

1. *H. virginicus*.

2. *H. oryzoides*.

1. *H. virginicus* (Willd.) Britton. Stems 6-13 dm. tall, slender, pubescent at the nodes; leaf-blades erect or ascending, 3-20 cm. long, 2-11 mm. wide; panicle 6-20 cm. long, its branches finally spreading, slender: stamens 2. — Rather common, in swamps and wet places. — Sum. and fall. — WHITE-GRASS.

2. *H. oryzoides* (L.) Poll. Stems 8-15 dm. tall, often rooting at the lower nodes; leaf-blades 6-20 cm. long, 5-13 mm. wide; panicle 1-2 dm. long; spikelets 4-4.5 mm. long, about 1.5 mm. broad, the keels aculeate, the surface hispidulous: stamens 3. — Rather common, in swamps. — Sum. and fall. — RICE CUT-GRASS.

13. **PHALARIS** L. Annual or perennial grasses, with flat leaf-blades and terminal panicles which are cylindric and spike-like, capitate, or densely thyrsoid and somewhat interrupted. Spikelets articulated above the empty scales, compressed, 1-flowered, crowded. Scales 5, the 2 lower persistent, larger than the rest, thin-paleaceous, compressed-keeled, the keel usually more or less winged, sometimes wingless, awnless; third and fourth scales shorter, very thin and narrowly lanceolate, sometimes reduced to bristles, or rarely one of them wanting; a fifth scale chartaceous, at length indurated, awnless, sometimes pointed, obscurely 3-5-nerved, the midnerve sometimes obsolete, enclosing a faintly 2-nerved palet of similar texture and a perfect flower. Stamens 3. Styles distinct. Stigmas plumose.

Outer scales of the spikelets not winged: panicle elongate.

1. *P. arundinacea*.

Outer scales of the spikelets winged: panicle short.

2. *P. canariensis*.

1. *P. arundinacea* L. Stems erect, 6-15 dm. tall; leaf-blades 1-2.5 dm. long, 6-14 mm. wide, smooth or rough; panicle 7-20 cm. long, its branches erect or ascending; spikelets 5-6 mm. long. Rather common, in wet places. — Sum. — REED CANARY-GRASS.

2. *P. canariensis* L. Stems 3-9 dm. tall, erect; leaf-blades 5-30 cm. long, 4-12 mm. wide, very rough; panicle ovoid or oblong, 1.5-4 cm. long, 1-2 cm. in diameter; spikelets 6-8 mm. long. — Common, in waste places about towns and cities. Nat. of Eu. — Sum. — CANARY-GRASS.

14. **ANTHOXANTHUM** L. Erect aromatic annual or perennial grasses, with flat leaf-blades and terminal usually dense spike-like panicles. Spikelets articulated above the empty scales, 1-flowered, narrow, a little compressed, crowded. Scales 5, the 2 outer persistent, empty, acute, mucronate, or short-awned, the second longer than the others, the third and fourth scales much shorter, empty, narrow, keeled, awned at the middle or near the base, the fifth scale shorter than the remainder, hyaline, obtuse, awnless, enclosing a 1-nerved palet and a perfect flower. Stamens 2. Styles distinct. Stigmas elongate, plumose.

1. *A. odoratum* L. Stems 3-6 dm. tall, erect, tufted: leaf-blades 1-15 cm. long, 2-6 mm. wide: panicle 2-6 cm. long: spikelets 8 mm. long.—Common, in fields and pastures. Nat. of Eu.—Sum.—SWEET VERNAL-GRASS.

15. **ARISTIDA** L. Tufted grasses, with narrow and often convolute or setaceous leaf-blades and contracted or open panicles, which are sometimes nearly racemose. Spikelets 1-flowered, narrow. Scales 3, the outer 2 membranous, persistent, empty, narrow, keeled, awnless, usually longer than the third scale which is of firmer texture, narrow, rigid, strongly convolute about the 2-nerved palet and the perfect flower, often with a prominent callus at the base, 3-awned from the apex, the generally spreading awns glabrous to plumose, the central awn commonly flexuous, coiled, or bent, the lateral awns often shorter, occasionally very short and erect, the 3 awns sometimes more or less connate at the base and the column thus produced articulated to the scale. Stamens 3. Styles distinct. Stigmas plumose.—POVERTY-GRASS. WIRE-GRASS.

Central awn coiled at the base.

Central awn not coiled at the base.

First scale shorter than the second.

First scale longer than the second.

1. *A. dichotoma*.

2. *A. gracilis*.

3. *A. purpurascens*.

1. *A. dichotoma* Michx. Stems 2-6 dm. tall: leaf-blades 2-9 cm. long, 1.5 mm. wide or less: panicle 3.5-7 cm. long, the branches erect: spikelets 7-9 mm. long, the 2 outer scales about equal in length, or the first a little the shorter, usually awn-pointed, the flowering scale 5-7 mm. long, the lateral awns very short, erect, the central awn spreading, the straight portion 2-5 mm. long, rarely longer.—Common, in dry soil.—Sum. and fall.

2. *A. gracilis* Ell. Stems 1.5-6 dm. tall, slender: leaf-blades 3-12 cm. long, 1 mm. wide or less: panicle 5-15 cm. long, its short branches appressed: spikelets 5-7 mm. long, the 2 outer scales usually awn-pointed, the flowering scale 5-6 mm. long, more or less hispidulous, especially on the keel, the central awn spreading, 6-10 mm. long, the lateral awns erect, 1-3 mm. long.—N. Rare, in sandy soil.—Sandstones and shales.—Sum.

3. *A. purpurascens* Poir. Stems 3-8 dm. tall: leaf-blades 0.5-2 dm. long, 1-2 mm. wide, flat, long-acuminate: panicle 1.5-3 dm. long, its branches appressed: spikelets 9-12 mm. long, the 2 outer scales 1-nerved, the first one usually exceeding the second, occasionally equalling it, the flowering scale 6-8 mm. long, the awns more or less spreading, especially the central one which is 1.5-2.5 cm. long, the lateral awns from $\frac{2}{3}$ as long to nearly equalling it.—Lower Susquehanna valley. Rather rare, on the banks of the river.—Schists.—Sum. and fall.

16. **STIPA** L. Tufted grasses, with convolute or flat leaf-blades and terminal contracted or open, often slender, panicles. Spikelets narrow, 1-flowered, usually few and large, or sometimes smaller and numerous. Scales 3, the 2 outer empty, persistent, narrow, keeled, acute, rarely awned, the third scale tightly convolute about the 2-nerved or 2-keeled palet and the perfect flower, rigid, narrow, the apex usually attenuated into a more or less geniculate awn (or rarely 2-toothed or shortly 2-cleft, with the awn strict and arising between the teeth) which is often spiral or twisted at the base, and generally deciduous at the articulation to the scale, rarely not articulated and persistent. Stamens 3, or rarely fewer, the anthers very often barbellate at the apex. Styles short, distinct. Stigmas plumose.—FEATHER-GRASS.

1. *S. avenacea* L. Stems 3-8 dm. tall: leaf-blades involute-filiform: panicle 1-2 dm. long, its branches lax and finally spreading: empty scales of the

spikelet 8–12 mm. long; flowering scale shorter, black, hairy at the base, and with a ring of short hairs at the top, the awn 4–7 cm. long, bent, loosely spiral below. — Susquehanna valley. Rather rare, on dry banks. — *Schists.* — Sum. — BLACK OAT-GRASS.

17. **ORYZOPSIS** Michx. Sparingly tufted grasses, with flat or convolute leaf-blades and narrow, often contracted, panicles. Spikelets broad, 1-flowered. Scales 3, the 2 outer ones nearly equal, awnless, the third scale broad, shorter or longer than the outer ones and terminating in a deciduous awn. Stamens 3. Styles distinct. Stigmas plumose.

1. *O. melanocarpa* Muhl. Plant glabrous, the stems 4–12 dm. tall; leaf-blades 1–3.5 dm. long, 4–15 mm. wide; panicle 7.5–30 cm. long; spikelets, excluding the awns, 7–9 mm. long, the awn about twice or thrice as long; body of the third scale shorter than the outer scales, becoming dark-colored. — M. Rare, on shaded creek banks. — *Limestones.* — Sum. — MOUNTAIN-RICE.

18. **MUHLENBERGIA** Schreb. Perennial or rarely annual grasses, various in habit, with flat or often involute leaf-blades, and terminal contracted or open panicles, which are often slender, densely thyrsoid, or almost spike-like, or diffuse with long capillary branches. Spikelets 1-flowered, small. Scales 3 (or rarely 4), the outer 2 empty, persistent, membranous or hyaline, from minute to almost equalling the third scale, keeled, acute, mucronate or rarely short-awned, the second occasionally 3-toothed, the third scale somewhat rigid, convolute about the 2-keeled hyaline palet and the perfect flower, at the apex entire or rarely 2-toothed, obtuse, acute, mucronate to long-awned, the awn very often capillary, a fourth awned scale very rarely present. Stamens usually 3, rarely fewer. Styles distinct. Stigmas plumose.

Panicle contracted, its branches erect or nearly so: spikelets on short pedicels.

Empty scales at least $\frac{1}{2}$ as long as the spikelet.

Flowering scale not awned, but sometimes awn-pointed.

Empty scales not awned, about $\frac{1}{2}$ as long as the flowering scale, acute.

Empty scales long-acuminate, awn-pointed or awned.

Empty scales about as long as the flowering scale, sharp-pointed, about 3 mm. long.

Empty scales exceeding the flowering scale, usually twice as long, awned, about 5 mm. long.

Flowering scale long-awned, the awn usually twice as long as the scale.

Empty scales about equalling the flowering scale.

Empty scales $\frac{1}{2}$ – $\frac{2}{3}$ as long as the flowering scale.

Empty scales minute, the first one often wanting.

Panicle open, its branches filiform, spreading or ascending: spikelets on very long capillary pedicels.

1. *M. sobolifera.*

2. *M. mexicana.*

3. *M. racemosa.*

4. *M. umbrosa.*

5. *M. tenuiflora.*

6. *M. Schreberi.*

7. *M. capillaris.*

1. *M. sobolifera* (Muhl.) Trin. Stems 3–9 dm. tall, erect, slender; leaf-blades rough, those on the stem 1–1.5 dm. long, 2–6 mm. wide, those on the branches 2–8 cm. long and about 2 mm. wide; panicle 7–15 cm. long, slender; empty scales about 1 mm. long, the flowering one obtuse, scabrous, the midnerve usually excurrent as a short tip. — M. Rather rare, in woods. — *Limestones, sandstones and shales.* — Sum.

2. *M. mexicana* (L.) Trin. Stems 6–12 dm. long, erect, or often prostrate, much branched; leaf-blades rough, those on the stem 1–1.5 dm. long, 2–6 mm. wide, the branch blades smaller; panicle 5–15 cm. long, contracted; spikelets 2.5–3 mm. long, the outer scales somewhat unequal, acuminate or short-awned, rough, especially on the keel, the third scale acuminate, rough. — Rather common, in fields and fence rows. — Sum. and fall.

3. *M. racemosa* (Michx.) B.S.P. Stems 3-9 dm. tall, erect, usually much branched: leaf-blades 5-13 cm. long, 2-6 mm. wide, rough: panicle 5-12 cm. long, usually dense and interrupted: spikelets much crowded, the empty scales acuminate, 4-6 mm. long, including the awn, the flowering scale $\frac{1}{2}$ - $\frac{2}{3}$ as long, acuminate, the strongly scabrous midnerve excurrent as a short point. [*M. glomerata* Trin.]—S. Rare, in swamps.—*Schists.*—Sum. and fall.

4. *M. umbrosa* Scribn. Stems 3-9 dm. tall, erect, branched: leaf-blades 5-18 cm. long, 2-6 mm. wide, rough: panicle 7-18 cm. long: empty scales of the spikelet 2.5-3 mm. long, awn-pointed, rough, the third scale equalling or somewhat exceeding the outer ones, very rough, attenuate into a slender awn 2-4 times its length.—S. Rather rare, in moist soil.—*Schists.*—Sum. and fall.

5. *M. tenuiflora* (Willd.) B.S.P. Stems 3-9 dm. tall, erect, slender: leaf-blades 6-18 cm. long, 2-8 mm. wide, rough: panicle 1-2.5 dm. long, slender: empty scales of the spikelet unequal, $\frac{1}{2}$ - $\frac{2}{3}$ the length of the flowering scale, awn-pointed, rough, the flowering one 2.5-3 mm. long, rough, bearing an awn 2-4 times its length. [*M. Willdenovii* Trin.]—M. Rare, in woods and thickets.—*Limstones.*—Sum.

6. *M. Schreberi* Gmel. Stems 3-9 dm. long, decumbent, diffusely branched: leaf-blades 4-9 cm. long, 1-4 mm. wide, rough: panicle 5-20 cm. long, slender: empty scales of the spikelet minute, the lower one often wanting, the flowering scale, exclusive of the awn, about 2 mm. long, the awn 1-4 mm. long.—S. Rather rare, in dry soil.—*Schists.*—Sum. and fall.

7. *M. capillaris* (Lam.) Trin. Stems erect, wiry, tufted, 5-12 dm. tall: leaf-blades long, often involute when dry, 1-3 mm. wide: panicle 1.5-4 dm. long: spikelets, exclusive of the awn, 3.5-4 mm. long, lanceolate, acuminate, the empty scales usually $\frac{1}{2}$ as long as the spikelet or less, commonly bearing a short awn, the flowering scale bearing an awn longer than its body, sometimes 2 cm. long. [*M. caespitosa* Chapm.]—S. Rather rare, in rocky or sandy soil.—*Schists.*—Fall.

19. **BRACHYELYTRUM** Beauv. Tall perennial grasses, with rather broad flat leaf-blades and a terminal narrow panicle, its branches few, erect and filiform. Spikelets 1-flowered, narrow, the rachilla produced beyond the flower into a long glabrous stipe which sometimes bears a small scale at its apex. Scales 3 (or rarely 4), the 2 outer empty, persistent, very small, the first minute, sometimes almost wanting, the third scale elongate, rather rigid, acuminate into a long erect awn and enclosing a somewhat short dorsally sulcate 2-nerved palet of similar texture and a perfect flower, a fourth scale sometimes terminating the rachilla-prolongation. Stamens 2. Styles short, distinct. Stigmas elongate, plumose.

1. *B. erectum* (Schreb.) Beauv. Stems 3-9 dm. tall: leaf-blades 5-13 cm. long, 6-18 mm. wide, rough: panicle 5-15 cm. long, slender: flowering scale exclusive of the awn, 9-12 mm. long, rough, the awn erect, 2-2.5 cm. long.—Rather common, in woods and on moist banks.—Sum.

20. **HELEOCHLOA** Host. Tufted or creeping, perennial grasses, with flat leaf-blades and usually contracted panicles. Spikelets flattened, 1-flowered. Scales 3, awnless, the 2 outer ones unequal, empty, ciliate-keeled, acute, the third scale fully as long as the outer scales, otherwise similar. Stamens 3. Styles distinct. Stigmas plumose.

1. *H. schoenoides* (L.) Host. Plant glabrous, the stem and branches prostrate or nearly so, 1-5 dm. long: leaf-blades 2.5-7.5 cm. long, 2-4 mm. wide: panicle spike-like, 1.5-4 cm. long, partially enclosed in a leaf-sheath: spikelets

crowded, 2.5 mm. long; scales 1-nerved, acute.—M. Rather rare, in waste places. Nat. of Eu.—Sum.

21. **PHLEUM** L. Annual or perennial grasses, with flat leaf-blades and terminal, often long-pedunculate, dense spike-like panicles, which are from elongate, narrow and cylindric, to short, oblong or nearly ovoid. Spikelets crowded, 1-flowered, compressed. Scales 3, the 2 outer empty, persistent, membranous, compressed-keeled, obliquely truncate at the summit, awned, the third scale much shorter, hyaline, truncate and denticulate at the apex, enclosing a narrow palet of similar texture and a perfect flower. Stamens 3. Styles distinct, rather long. Stigmas plumose.

1. **P. pratense** L. Stems 3–12 dm. tall; leaf-blades 7–23 cm. long, 4–6 mm. wide: spike cylindric, 3–18 cm. long, 5–8 mm. in diameter: empty scales of the spikelet, exclusive of the awn, 2.5 mm. long, the awn less than $\frac{1}{2}$ their length.—Common, in fields and on roadsides.—Sum.—TIMOTHY.

22. **ALOPECURUS** L. Annual or perennial grasses, erect, or decumbent at the base, with flat and lax or rather rigid or convolute leaf-blades, and dense terminal spike-like cylindric panicles. Spikelets articulated below the empty scales, readily deciduous, 1-flowered, compressed, crowded. Scales 3, the 2 outer empty, acute, sometimes short-awned, usually more or less united at the base, compressed-keeled, the keel ciliolate or somewhat winged, the third scale broad, hyaline, obtuse, bearing a short awn or point on the back, the margins sometimes united into a short tube at the base, enclosing a perfect flower and sometimes also a hyaline keeled palet. Stamens 3. Styles distinct, or rarely more or less united at the base. Stigmas elongate, somewhat plumose with short hairs.

1. **A. myosuroides** Huds. Stems 3–6 dm. tall; leaf-blades 4–18 cm. long, 2–6 mm. wide: spike 4–10 cm. long, 4–8 mm. in diameter: empty scales of the spikelet narrowly winged, 4–5 mm. long, the flowering scale equalling or slightly exceeding the empty ones, the awn inserted near the base and about twice its length, bent.—S. Rare, in fields near Pleasant Grove. Nat. of Eu.—Sum.—FOXTAIL.

23. **SPOROBOLUS** R. Br. Perennial or rarely annual grasses, varying much in habit, with flat or convolute leaf-blades and terminal panicles, which are contracted, sometimes cylindric and spike-like, often elongate, or open and diffuse. Spikelets small, sometimes minute, 1-flowered, or very rarely 2–4-flowered. Scales 3, rarely 4–6, membranous, acute or obtuse, rarely awn-pointed or short-awned, the 2 outer empty, the first shorter than the second, the remaining scale or scales longer or about equalling the second scale, enclosing a perfect flower, and a 2-nerved, often deeply 2-cleft or 2-parted, palet which is equal in length to, or a little shorter than, the scale, rarely awned and exceeding it. Stamens 2 or 3. Styles short, distinct. Stigmas plumose.—Sum. and fall.—RUSH-GRASS. DROPSEED.

Upper leaf-sheaths enclosing panicles which are usually concealed or sometimes partially protruding: terminal panicle contracted, narrow. 1. *S. clandestinus*.

Flowering scale appressed-pubescent below with long hairs.

Flowering scale glabrous.

2. *S. asper*.

Upper leaf-sheaths not enclosing panicles.

3. *S. heterolepis*.

1. **S. clandestinus** (Spreng.) A. Hitchc. Stems 6–12 dm. tall; leaf-blades 7–35 cm. long, 2–4 mm. wide, attenuate into a long slender involute tip: panicle 5–13

em. long: spikelets 6-8 mm. long, the empty scales unequal, acute, the flowering scale appressed-pubescent below, much longer than the second one and much exceeded by the long-acuminate palet. — M. Rare, in dry soil. — *Limestones*.

2. *S. asper* (Michx.) Kunth. Stems 4-12 dm. tall: leaf-blades 5 dm. long or less, 2-5 mm. wide: panicle 2-3 dm. long, usually more or less included in the upper leaf-sheath: spikelets 5-6 mm. long, the scales obtuse, the first about $\frac{2}{3}$ as long as the second, the flowering scale glabrous, considerably exceeding the second one, about equalling the palet or a little shorter or longer than it. — M. Rare, in sandy soil. — *Limestones*.

3. *S. heterolepis* A. Gray. Stems 3-10 dm. tall: leaf-blades involute-setaceous: panicle 7-25 cm. long: spikelets 4-5.5 mm. long, the empty scales unequal, acuminate, the lower subulate, about $\frac{1}{2}$ as long as the broad second one, sometimes awn-pointed, the flowering scale obtuse or acute. — S. Very rare, on dry banks. — *Schists*.

24. **CINNA** L. Tall perennial grasses, with flat leaf-blades and long terminal contracted or open panicles, often nodding, its branches slender and usually drooping. Spikelets numerous, flattened, 1-flowered, the rachilla articulated below the empty scales. Scales 3, the 2 outer empty, persistent, keeled, acute, the third one similar in texture, stalked, bearing just below the somewhat obtuse apex a short awn or awn-like point, the scale enclosing a slightly smaller 1-nerved keeled palet, the keel minutely ciliate, and a perfect flower. Stamen 1. Styles short, distinct. Stigmas plumose.

1. *C. arundinacea* L. Stems 6-15 dm. tall: leaf-blades 1.5-3 dm. long, 4-14 mm. wide: panicle 1.5-3 dm. long: scales of the spikelet acute, rough, the flowering scale slightly exceeded or equalled by the second, usually bearing an awn about 0.5 mm. long from the 2-toothed apex. — Rather common, in moist woods and along streams. — Sum. and fall. — WOOD REED-GRASS.

25. **CALAMAGROSTIS** Adans. Erect usually perennial grasses, with generally flat, sometimes involute leaf-blades, and terminal contracted or open panicles. Spikelets numerous, 1-flowered, commonly small, the rachilla usually prolonged beyond the flower, the prolongation either pilose throughout, the usual state, or with a terminal tuft of long hairs. Scales 3, the 2 outer empty, persistent, narrow, keeled, acute or acuminate, the third scale much shorter than the others, very thickly hyaline, with a basal ring of hairs which are from one-half as long as the scale to somewhat exceeding it, rarely very short or almost wanting, bearing a usually delicate dorsal awn which is rarely twisted at the base, and enclosing a small narrow thinly hyaline palet and a perfect flower. Stamens 3. Styles short, distinct. Stigmas plumose. — REED BENT-GRASS.

Rachilla with its prolongation hairy the whole length.

1. *C. canadensis*.

Rachilla with its prolongation hairy only at the top.

2. *C. cinnoides*.

1. *C. canadensis* (Michx.) Beauv. Stems 6-15 dm. tall: leaf-blades 1-3 dm. long or more, 2-8 mm. wide: panicle 1-2 dm. long, open, usually purplish, naked at the base: spikelets 3-3.5 mm. long; flowering scale with a delicate awn, the basal hairs equalling or a little shorter than the scale. — N. S. Frequent, in swamps. — *Sandstones and schales, schists*. — Sum. — BLUE-JOINT GRASS.

2. *C. cinnoides* (Muhl.) Scribn. Stems 9-15 dm. tall: leaf-blades 1-3 dm. long or more, 4-10 mm. wide: panicle 7-18 cm. long, contracted: spikelets 6-8 mm.

long, the scales very hispidulous, the outer ones about equal, acuminate and awn-pointed, the flowering scale obtuse, the basal hairs from $\frac{1}{2}$ – $\frac{2}{3}$ its length, the awn stout, exceeding or equalling the scale. [*C. Nuttalliana* Steud.]—S. Rather rare, in swamps.—*Schists.*—Sum.

26. **AGROSTIS** L. Annual or perennial usually tufted grasses, with flat or setaceous leaf-blades and terminal often slender contracted or open panicles with numerous branches. Spikelets very numerous, small, 1-flowered, the rachilla articulated above the empty scales. Scales 3, the 2 outer empty, persistent, membranous, keeled, acute, awnless, the third one shorter, thin-hyaline, awnless, or sometimes bearing a slender dorsal often geniculate awn, enclosing a perfect flower and frequently also a short very thin hyaline palet rarely more than $\frac{1}{2}$ as long as the scale, sometimes minute or wanting. Stamens usually 3. Styles distinct, very short. Stigmas plumose.—BENT-GRASS.

Palet of the spikelet conspicuous, at least $\frac{1}{2}$ as long as the scale.

Palet inconspicuous, minute, or wanting.

Stems weak, usually decumbent and often prostrate at the base: leaf-blades lax: panicle oblong, the spikelets about 1.5 mm. long.

Stems, and usually also the leaf-blades, erect.

Branches of the panicle capillary, elongate, commonly dividing above the middle.

Branches of the panicle not elongate, dividing at the middle or below it.

1. *A. alba*.

2. *A. Schweinitzii*.

3. *A. hyemalis*.

4. *A. perennans*.

1. *A. alba* L. Stems 2–8 dm. tall, often stoloniferous: leaf-blades 5–20 cm. long, 2–6 mm. wide: panicle 5–23 cm. long, usually open, or sometimes contracted after flowering, green or purplish: spikelets 2–2.5 mm. long, the empty scales about equal, acute, hispidulous on the keel.—Common, in fields and on roadsides. Nat. of Eu.—Sum.—RED-TOP.

2. *A. Schweinitzii* Trin. Stems 3–8 dm. long from a decumbent or prostrate base, weak: leaf-blades 5–15 cm. long, 2–4 mm. wide, lax: panicle 1–2 dm. long, open, oblong, its branches widely spreading, the branchlets and pedicels divergent: spikelets 1.5–2 mm. long, the empty scales hispidulous on the keel.—S. Frequent, in woods and low grounds.—*Schists.*—Sum. and fall.—THIN-GRASS.

3. *A. hyemalis* (Walt.) B.S.P. Stems 3–6 dm. tall, slender: leaf-blades 5–13 cm. long, 1–3 mm. wide, usually erect, roughish: panicle 1.5–6 dm. long, usually purplish, the very rough capillary branches ascending or spreading, often drooping, the lower ones 7–15 cm. long: spikelets 1.5–2 mm. long. [*A. scabra* Willd.]—Common, on dry banks.—Sum.—HAIR-GRASS.

4. *A. perennans* (Walt.) Tuckerm. Stems 3–9 dm. tall, tufted, rather slender: leaf-blades 1–2.5 dm. long, 2–6 mm. wide, rough: panicle 1–2.5 dm. long, its ascending branches 3.5–8 cm. long: spikelets about 2 mm. long, on appressed pedicels. [*Agrostis intermedia* Scribn., not Balb.]—M. Rather rare, in woods.—*Quartzite.*—Sum.

27. **NOTHOLCUS** Nash. Annual or perennial grasses, with usually flat leaf-blades and terminal spike-like contracted or open often interrupted panicles. Spikelets crowded, 2-flowered, the lower flower perfect, the upper one staminate, the rachilla articulated below the empty scales. Scales 4, the 2 outer empty, keeled, the first 1-nerved, acute, the second broader, 3-nerved, acute or short-awned, the third and fourth scales shorter than the second, membranous, at length rigid, enclosing flowers, the former awnless, the latter bearing a slender dorsal awn which is often hooked when dry; palet narrow, 2-keeled. Stamens 3, styles distinct. Stigmas plumose.

1. *N. lanatus* (L.) Nash. Softly and densely pubescent. Stems 4-9 dm. tall; leaf-blades 2.5-15 cm. long, 4-12 mm. wide; spikelets 4 mm. long; the upper one awn-pointed, the flowering scales 2 mm. long, glabrous, shining, the upper one 2-toothed and bearing a finally hooked awn just below the apex. — Common, in moist fields and meadows. Nat. of Eu. — Sum. — VELVET-GRASS.

28. **DESCHAMPSIA** Beauv. Perennial grasses, with narrow convolute or flat leaf-blades and terminal contracted or open panicles. Spikelets 2-flowered, the rachilla articulated above the empty scales and prolonged beyond the flowers. Scales 4, the 2 outer empty, persistent, keeled, acute, membranous, usually somewhat shining, the flowering scales thin-membranous, almost hyaline, entire or toothed, acute, obtuse, or truncate and denticulate at the apex, each bearing a slender dorsal straight or geniculate awn which is twisted at the base; palea narrow, 2-nerved. Stamens 3. Styles distinct. Stigmas plumose. — HAIR-GRASS.

Flowering scales about 2.5 mm. long, erose-truncate: leaf-blades flat.

Flowering scales about 4 mm. long, acute or obtuse: leaf-blades involute.

1. *D. caespitosa*.

2. *D. flexuosa*.

1. *D. caespitosa* (L.) Beauv. Stems 6-12 dm. tall; leaf-blades 2-3 mm. wide, the basal ones numerous, those on the stem 5-15 cm. long; panicle open, 7-23 cm. long, naked at the base; spikelets 3.5-4 mm. long, the flowering scales about 2.5 mm. long, erose-truncate at the apex, the awns somewhat shorter or a little longer than the scale. — M. S. Rare, in swamps. — *Limestones, schists*. — Sum.

2. *D. flexuosa* (L.) Trin. Stems 3-8 dm. tall; leaf-blades involute-setaceous, the basal very numerous; panicle open, 5-20 cm. long, flexuous; spikelets 4.5-5 mm. long, the flowering scales about 4 mm. long, acutely toothed at the apex, the awns bent and twisted, much exceeding the scale. — Susquehanna valley. Common, on dry or rocky hills. — *Limestones, schists*. — Sum.

29. **TRisetum** Pers. Annual or perennial tufted grasses, with flat leaf-blades and terminal spike-like contracted or open panicles. Spikelets usually 2-flowered, rarely 3-6-flowered, the flowers perfect, or the upper one staminate, the rachilla glabrous or pilose, articulated between the flowering scales and prolonged beyond them. Scales 4, rarely 5-8, keeled, the 2 outer empty, membranous, unequal, acute, entire at the apex, awnless, persistent, the flowering scales usually shorter, sometimes longer, 2-toothed at the apex, the teeth acuminate and often terminating in a bristle or slender awn, awned, or the lower flowering scale rarely awnless, the awn often twisted, inserted below the apex and arising between the teeth; palea hyaline, 2-toothed. Stamens 3. Styles distinct. Stigmas plumose.

1. *T. pennsylvanicum* (L.) B.S.P. Stems 3-9 dm. tall; leaf-blades 1 dm. long or less, 1-4 mm. wide; panicle 6-15 cm. long, its branches erect or ascending; spikelets of four scales, the empty ones about equal, the flowering scales 4-5 mm. long, the second one hispidulous or nearly glabrous. — M. S. Rather rare, in swamps and wet places. — *Limestones, schists*. — Sum.

30. **AVENA** [Tourn.] L. Annual or perennial grasses, varying in habit, with usually flat leaf-blades and terminal contracted or open panicles. Spikelets generally large, erect or pendulous, usually 2-several-flowered, rarely 1-flowered, the rachilla articulated between the fertile flowers, the lower flowers perfect,

the upper ones often staminate or wanting. Scales 4—several, rarely 3, the 2 outer empty, membranous, exceeding or shorter than the flowering scales, persistent, the flowering scales 5–9-nerved, rounded on the back, the apex frequently shortly 2-toothed, the scales enclosing perfect flowers and bearing a dorsal twisted geniculate awn, the upper empty ones or those infolding staminate flowers awnless; palet 2-cleft or 2-toothed, narrow. Stamens 3. Styles distinct. Grain deeply furrowed, usually pubescent.

1. *A. sativa* L. Annual. Stems 8–15 dm. tall: leaf-blades flat, 2.5 dm. long or less, 5–10 mm. wide or more: panicle usually 1.5–4 dm. long: empty scales of the spikelet 2–3 cm. long, acuminate, the flowering ones shorter, awned or awnless.—Common in fields and waste places and on roadsides. Nat. of Eu.—Sum.—OAT.

31. **ARRHENATHERUM** Beauv. Tall perennial grasses, with flat leaf-blades and terminal open or contracted panicles. Spikelets 2-flowered, the lower flower staminate, the upper one perfect or pistillate, the rachilla articulated above the empty scales and prolonged beyond the flowers. Scales 4, the 2 outer empty, persistent, thin-membranous, keeled, the flowering scales more rigid, somewhat toothed at the apex, the lower one bearing near the base a long dorsal twisted and geniculate awn, the upper scale awnless, or short-awned below the apex; palet 2-keeled, hyaline, narrow. Stamens 3. Styles short, distinct. Stigmas plumose. Grain hardly sulcate.

1. *A. elatius* (L.) Beauv. Stems 6–12 dm. tall, leaf-blades 6–30 cm. long, 2–8 mm. wide: panicle 1–3 dm. long: empty scales of the spikelet unequal, the flowering scales about 8 mm. long. [*A. avenaceum* Beauv.]—M. Rather common, in fields and waste places. Nat. of Eu.—Sum.—TALL OAT-GRASS.

32. **DANTHONIA** DC. Usually perennial grasses, various in habit, with flat or convolute leaf-blades and terminal dense and contracted or open diffuse panicles. Spikelets 2-many-flowered, the flowers perfect or the upper ones staminate, the rachilla pilose, articulated between the scales and prolonged beyond them. Scales 5—many, the 2 outer empty, persistent, usually extending beyond the flowering scales, rarely shorter, keeled, acute or acuminate, the flowering scales rounded on the back, the margins often ciliate, 2-toothed at the apex, the teeth often awned, with an awn arising between the teeth which is more or less flattened and very often twisted at the base and frequently geniculate, the remaining scales often small and enclosing a palet only, or empty; palet obtuse or 2-toothed, 2-keeled, hyaline. Stamens 3. Styles distinct. Stigmas plumose.

1. *D. spicata* (L.) Beauv. Stems 3–8 dm. tall: leaf-blades 2 mm. wide or less, usually involute, the lower ones 1–1.5 dm. long: panicle 2–5 cm. long: spikelets 5–8-flowered, the empty scales 8–10 mm. long, the flowering scales broadly oblong, sparingly appressed-pubescent with silky hairs.—Rather common, in dry soil, especially in pastures and on dry hills.—Sum.—WILD OAT-GRASS.

33. **SPARTINA** Schreb. Often tall grasses, with flat or convolute leaf-blades and spicate inflorescence, the spikes one-sided, the rachis extending beyond the spikelets. Spikelets 1-flowered, sessile or nearly so, much crowded and imbricated in 2 rows. Scales 3, firm-membranous, the 2 outer empty, narrow, very unequal, keeled, the flowering scale equalling or a little longer and

broader than the second scale; palet thin or almost hyaline, enclosing a perfect flower, obscurely 2-nerved, scarcely included in the scale which it often slightly exceeds. Stamens 3. Styles elongate. Stigmas 2, thread-like, papillose or shortly plumose.

1. **S. Michauxiana** A. Hitchc. Stems 6–18 dm. tall; leaf-blades 3 dm. long or more, 6–14 mm. wide; spikes 5–30, 5–13 cm. long; spikelets strongly imbricated, 12–14 mm. long, the empty scales strongly hispid on the keel. — Susquehanna valley. Common, in wet ground. — *Limestones, schists.* — Sum. and fall. — SLOUGH-GRASS. MARSH-GRASS.

34. **ATHEROPOGON** Muhl. Perennial grasses, with narrow flat leaf-blades and an inflorescence composed of numerous scattered short few-flowered spikes. Spikelets 1-flowered, sessile, crowded in 2 rows, imbricated, the rachilla extending beyond the flower, its summit bearing scales or awns. Scales 3 or more, the 2 lower empty, unequal, narrow, acute, keeled, the third scale thinner and broader, 3-toothed at the apex, the teeth more or less awned, enclosing a narrow hyaline 2-toothed palet and a perfect flower, the small upper scales empty, awned. Stamens 3. Styles distinct. Stigmas plumose.

1. **A. curtipendulus** (Michx.) Fourn. Stems 3–9 dm. tall; leaf-blades 5–30 cm. long, 4 mm. wide or less; spikes 6–16 mm. long, widely spreading or reflexed; spikelets 4–12, diverging from the rachis, 7–10 mm. long. [*Bouteloua racemosa* Lag.] — Conestoga and lower Susquehanna valleys. Rare, on dry banks. — *Limestones, schists.* — Sum.

35. **ELEUSINE** Gaertn. Annual, or perennial and creeping, grasses, with flat leaf-blades, and an inflorescence composed of normally several spikes arranged digitately or approximately with sometimes an additional single spike below. Spikelets numerous, much crowded, imbricated, sessile, alternate in 2 rows, several-flowered, the flowers perfect, or the upper ones staminate. Scales several, obtuse or acute, flattened, keeled, thin, the 2 lower empty, a little shorter than the others, the remaining scales usually more obtuse, each of the lower ones enclosing a scarcely shorter compressed 2-keeled palet and a flower, the terminal scales empty. Stamens 3. Styles distinct. Stigmas plumose.

1. **E. indica** (L.) Gaertn. Stems 1.5–6 dm. tall; leaf-blades 7–30 cm. long, 2–6 mm. wide; spikes 2–10, 2–8 cm. long; spikelets 3–4 mm. long, 3–6-flowered. — Common, in waste places and on roadsides. Nat. of the Old World. Sum. — GOOSE-GRASS. YARD-GRASS.

36. **TRIDENS** R. & S. Usually perennial grasses, with flat or involute leaf-blades and the inflorescence composed of open or contracted and sometimes spike-like panicles. Spikelets 3–many-flowered, the flowers perfect or the upper ones staminate. Scales 5–many, membranous, sometimes firmer, the 2 lower empty, keeled, obtuse to acuminate, usually shorter than the rest, sometimes longer; flowering scales 3-nerved, the midnerve or all the nerves excurrent, the midnerve and the lateral nerves or the margins pilose, the apex entire or shortly 2-toothed, the teeth obtuse to acute, the callus short and obtuse; palet shorter than the scale, compressed, 2-keeled. Stamens 3. Styles short, distinct. Stigmas plumose.

1. **T. flava** (L.) A. Hitchc. Stems 5–16 dm. tall; leaf-blades elongate, the basal and lower ones 2–6 dm. long, 5–15 mm. wide, the uppermost one 6–20 cm.

long: panicle loose and open, 1.5-4 dm. long: spikelets numerous, 5-8-flowered, 7-10 mm. long; empty scales acute, 1-nerved; flowering scales about 4 mm. long, the apex 2-toothed between the excurrent nerves. [*Triodia cuprea* Jacq.] — Common, on roadsides, and in fields and fence rows. — Sum. — TALL RED-TOP.

37. ERAGROSTIS Beauv. Low or tall annual or perennial tufted rarely dioecious grasses, the stems sometimes prostrate or creeping, with flat or convolute leaf-blades and open or contracted panicles. Spikelets numerous, arranged singly or in fascicles, 2-many-flowered, the flowers perfect or unisexual. Scales 4-many, membranous, compressed, keeled, the 2 lower empty, unequal, the remaining scales larger, 3-nerved, obtuse or acute at the apex; palea shorter than the scale, prominently 2-nerved or 2-keeled, often incurved and persistent on the rachilla after the fall of the scale. Stamens 2 or 3. Styles distinct, short. Stigmas plumose.

Stems not creeping: flowers perfect.

Annuals.

Spikelets 2-5-flowered.

Pedicels and branches of the panicle short: stems usually branched above.

1. *E. Frankii*.

Pedicels and branches of the diffuse panicle long and capillary: stems branched only at the base.

2. *E. capillaris*.

Spikelets more than 5-flowered.

Spikelets 1.5 mm. wide or less: paleas remaining attached to the continuous rachis for some time after the flowering scales have fallen.

Flowering scales thin, usually bright purplish, the lateral nerves faint or wanting: spikelets about 1 mm. wide.

3. *E. pilosa*.

Flowering scales firm, usually dull purple or green, the lateral nerves very prominent: spikelets about 1.5 mm. wide.

4. *E. Purshii*.

Spikelets exceeding 2 mm. wide: paleas falling with the flowering scales and the internodes of the rachis.

5. *E. major*.

6. *E. pectinacea*.

7. *E. hypnoides*.

Perennial.

Stems creeping, rooting at the nodes.

1. ***E. Frankii*** Steud. Stems 1.5-4 dm. tall: leaf-blades 5-13 cm. long, 2-4 mm. wide: panicle 5-15 cm. long, open: spikelets ovate, 2-3 mm. long, 3-5-flowered, the flowering scales acute, the lower ones 1.5 mm. long, their lateral nerves obscure. — Lower Susquehanna valley. Rare, on sandy shores and islands. — Fall.

2. ***E. capillaris*** (L.) Nees. Stems 2-5 dm. tall, slender: leaf-blades 7-25 cm. long, 2-4 mm. wide: panicle diffuse, 1-4 dm. long: spikelets ovate, 2-3 mm. long, 2-4-flowered, the flowering scales acute, 1.5 mm. long, their lateral nerves obscure. — Rather common, in dry soil. — Sum. and fall.

3. ***E. pilosa*** (L.) Beauv. Stems 1.5-5 dm. tall: leaf-blades 2-13 cm. long, 2 mm. wide or less: panicle 5-15 cm. long, its branches finally spreading, often hairy in the axils: spikelets 5-12-flowered, 3-6 mm. long, about 1 mm. wide, the flowering scales acute, the lower ones 1.5 mm. long, thin. — Rather common, in cultivated grounds and waste places. Nat. of Eu. — Sum. and fall.

4. ***E. Purshii*** Schrad. Stems 1.5-5 dm. tall: leaf-blades 3-9 cm. long, 2 mm. wide or less: panicle 7-20 cm. long, open, naked in the axils: spikelets 5-15-flowered, 3-8 mm. long, about 1.5 mm. wide, the flowering scales acute, firm, the lower ones 1.5 mm. long. — Susquehanna valley. Rather rare, on the river shore. — Sum.

5. ***E. major*** Host. Ill-scented. Stems 1.5-6 dm. tall: leaf-blades 5-18 cm. long, 2-6 mm. wide: panicle 5-15 cm. long: spikelets 8-35-flowered, 5-16 mm. long and about 3 mm. wide, the flowering scales obtuse, 2-2.5 mm. long, the lateral nerves prominent. [*E. megastachya* Link.] — Common, in waste places and cultivated grounds. Nat. of Eu. — Sum. and fall.

6. **E. pectinacea** (Michx.) Steud. Stems 3-8 dm. tall, rigid: leaf-blades 1-3 dm. long, 4-8 mm. wide: panicle 1.5-6 dm. long, strongly bearded in the axils: spikelets 5-15-flowered, 3-8 mm. long, the flowering scales about 1.75 mm. long, their lateral nerves very prominent.—S. Rather rare, in dry soil.—*Schists.*—Sum.

7. **E. hypnoides** (Lam.) B.S.P. Stems 2-5 dm. long, creeping and rooting at the nodes: leaf-blades commonly 1-4 cm. long, 1-2 mm. wide: panicle 1.5-5 cm. long: spikelets 10-35-flowered, 4-16 mm. long, the flowering scales 1.5-2 mm. long, glabrous, those of the pistillate spikelets more sharply acute than those of the staminate.—Susquehanna valley. Rather rare, in wet sand on the river shore and islands.—Sum.

38. **SPHENOPHOLIS** Scribn. Tufted perennial grasses, with flat or convolute leaf-blades and usually narrow and contracted, or sometimes open panicles. Spikelets numerous, 2-3-flowered, shining. Scales 4 or 5, membranous, the 2 outer empty, the first very narrow, 1-nerved, acuminate, the second much broader, obovate when spread out, obtuse, truncate, and sometimes apiculate at the apex, 3-nerved, the remaining scales narrower, obtuse or somewhat acute; palet narrow, 2-nerved. Stamens 3. Styles distinct, short. Stigmas plumose. [*Eatonia* Endl. Not Raf.]

Empty scales usually unequal, the first commonly shorter and not more than $\frac{1}{2}$ as wide as the second.

Second scale obovate in side view, rounded at the summit. 1. *S. obtusata.*

Second scale oblanceolate in side view, acute or acutish at the apex. 2. *S. pallens.*

Empty scales usually equal, the first at least $\frac{1}{2}$ as broad as the second. 3. *S. nitida.*

1. **S. obtusata** (Michx.) Scribn. Stems 3-8 dm. tall, glabrous or pubescent: leaf-sheaths and blades usually rough, the latter 2.5-23 cm. long, 1-5 mm. wide, rarely wider: panicle 5-15 cm. long, dense and usually spike-like, sometimes purple: spikelets crowded, 2.5-3 mm. long.—S. Rather rare, in woods.—*Schists.*—Sum.

2. **S. pallens** (Spreng.) Scribn. Stems 3-9 dm. tall: leaf-blades 6-18 cm. long, 2-6 mm. wide, rough: panicle 7-18 cm. long, often nodding at the summit, lax: spikelets 3-3.5 mm. long, the flowering scales narrow, acute.—M. Rare, on dry banks.—*Limestones.*—Sum.

3. **S. nitida** (Spreng.) Scribn. Stems tufted, slender, 3-6 dm. tall: leaf-blades 1-8 cm. long, 2 mm. wide or less: panicle 5-15 cm. long, lax, its branches spreading at flowering time, finally erect: spikelets 3 mm. long. [*E. Dudleyi* Vasey.]—Rather rare, in woods.—Sum.

39. **MELICA** L. Perennial grasses, with flat or convolute leaf-blades and contracted or open panicles which are sometimes almost racemose. Spikelets few-many, erect or nodding, 1-several-flowered, the flowers perfect or the upper ones staminate. Scales 3-several, the 2 lower empty, membranous, or hyaline, obtuse or acutish, unequal in length, the flowering scales larger, membranous, the lateral nerves vanishing at the broad hyaline margin, acute or obtuse at the apex, the remaining scales empty, gradually smaller, convolute and involving each other and forming a clavate to obovoid mass; palet shorter than the scale, 2-keeled. Stamens 3. Styles distinct. Stigmas plumose.

1. **M. mutica** Walt. Stems 3-9 dm. tall: leaf-blades 1-2.5 dm. long, 2-10 mm. wide: panicle 1-2.5 dm. long, its branches spreading or ascending: spikelets 7-9 mm. long, about 2-flowered, nodding, on flexuous pubescent pedicels, the flowering scales 6-8 mm. long, usually very obtuse.—Lower Susquehanna valley. Rather rare, on the river hills.—*Schists.*—Sum.

40. **UNIOLA** L. Usually tall perennial grasses, with flat or convolute leaf-blades and contracted or open panicles, the branches sometimes nodding. Spikelets many, erect, or sometimes nodding, laterally compressed, 2-edged, 3-many-flowered, the flowers perfect or the upper ones staminate. Scales 6-many, compressed-keeled, sometimes winged, the lower 3-6 empty, gradually enlarging, the flowering scales many-nerved, similar to the upper ones of the lower empty scales but larger, the remaining scales, if any, empty; palea somewhat rigid, 2-keeled, the keels narrowly winged. Stamens 1-3. Styles distinct. Stigmas plumose.

1. **U. latifolia** Michx. Stems 6-15 dm. tall; leaf-blades 1-2.5 dm. long, 6-25 mm. wide; panicle lax, 1.5-2.5 dm. long; spikelets many-flowered, oval to ovate, much flattened, 2.5-4 cm. long, on long capillary pendulous pedicels, the flowering scales 9-12 mm. long, ciliate-hispid on the winged keel. — Susquehanna valley. Rather rare, on the river shore and islands. — *Schists*. — Sum. — SPIKE-GRASS.

41. **DACTYLIS** L. Perennial usually tall grasses, with flat leaf-blades and open or contracted panicles. Spikelets in head-like clusters which are unilaterally arranged and crowded at the ends of the branches, 3-5-flowered, the flowers perfect or the upper ones staminate. Scales 5-7, keeled, the 2 lower empty, unequal, mucronate, the second the larger, the flowering scales larger, more rigid, the keel ciliate and excurrent as a mucro or short awn; palea nearly as long as the scale, 2-keeled. Stamens 3. Styles distinct. Stigmas plumose.

1. **D. glomerata** L. Stems 6-12 dm. tall; leaf-blades 7-23 cm. long, 2-6 mm. wide; panicle 7-20 cm. long; spikelets in dense capitate clusters, 3-5-flowered, the flowering scales 4-6 mm. long, rough, pointed or short-awned, ciliate on the keel. — Common, on roadsides and in fields and orchards. Nat. of Eu. — Sum. — ORCHARD-GRASS.

42. **POA** L. Annual or perennial grasses, rarely dioecious, with flat leaf-blades and open sometimes contracted panicles, the branches often drooping. Spikelets 2-6-flowered, the flowers perfect, or rarely unisexual, the glabrous or rarely somewhat pilose rachilla articulated between the flowers. Scales 4-8, membranous, keeled, acute or obtuse, awnless, the 2 lower empty, persistent, the flowering scales usually longer, frequently pubescent on the callus and the mid-nerve and marginal nerves, the hairs often long and curled; palea shorter than the scale, 2-nerved or 2-keeled. Stamens 3. Styles short, distinct. Stigmas plumose. — MEADOW-GRASS. SPEAR-GRASS. BLUE-GRASS.

Annuals or biennials: stems densely tufted, low, usually less than 3 dm. long.

1. *P. annua*.

Perennials: stems usually exceeding 3 dm. tall.

Plants green with no long rootstocks.

Flowering scales with long crimped hairs at the base.

Flowering scales with only the midnerve pubescent.

2. *P. trivialis*.

Flowering scales with the midnerve and lateral nerves pubescent.

Midnerve of the flowering scale pubescent only below the middle.

Flowering scales 2-3 mm. long: basal leaves usually relatively short.

3. *P. pratensis*.

Flowering scales 4-5 mm. long: basal leaves very long, often equalling the stem or nearly so.

4. *P. brachyphylla*.

Midnerve of the flowering scale pubescent the whole length, or nearly so.

5. *P. sylvestris*.

Flowering scales with no crimped hairs at the base. 6. *P. autumnalis*.
 Plants dull bluish green, with long stout often branching rootstocks; stems much compressed. 7. *P. compressa*.

1. *P. annua* L. Stems 5–30 cm. tall; leaf-blades 1–10 cm. long, 1.5–3 mm. wide; panicle 1–10 cm. long, its branches spreading; spikelets 3–5-flowered, 3–5 mm. long, the flowering scales 2.5–3 mm. long.—Common, in cultivated grounds and fields. Nat. of Eu.—Spr.—fall.—LOW SPEAR-GRASS.

2. *P. trivialis* L. Stems 3–9 dm. tall; leaf-sheaths very rough; blades 5–18 cm. long, 2–4 mm. wide, rough; panicle 1–1.5 dm. long; spikelets 2–3-flowered, 3 mm. long, the scales acute, the flowering scales 2–3 mm. long, 5-nerved, the intermediate nerves prominent.—Occasional, in waste places and meadows. Nat. of Eu.—Sum.

3. *P. pratensis* L. Stems 3–12 dm. tall; leaf-blades 1–6 mm. wide, those on the stem 5–15 cm. long, the basal much longer; panicle 6–20 cm. long, usually pyramidal; spikelets 3–5-flowered, 4–5 mm. long, the scales acute, the flowering scales 3 mm. long, 5-nerved.—Common, in fields, pastures and woods. Nat. of Eu.—Sum. and fall.—KENTUCKY BLUE-GRASS.

4. *P. brachyphylla* Schult. Stems 3–9 dm. tall; leaf-blades 2–4 mm. wide, abruptly acute, those on the stem 1–10 cm. long; panicle 6–13 cm. long, its branches widely spreading or often reflexed, spikelet-bearing at the ends; spikelets 3–6-flowered, 5–7 mm. long, the flowering scales 4–5 mm. long, obtuse, the intermediate nerves prominent.—M. S. Rather rare, on rocky banks.—*Limestones, schists*.—Spr.

5. *P. sylvestris* A. Gray. Stems 3–9 dm. tall; leaf-blades 2–6 mm. wide, those on the stem 4–15 cm. long, the basal much longer; panicle 7–18 cm. long, the branches spreading or ascending, sometimes reflexed when old, spikelet-bearing at the ends; spikelets 2–4-flowered, 2–4 mm. long, the flowering scales about 2.5 mm. long, obtuse.—M. S. Rather rare, in damp woods.—*Limestones, schists*.—Sum.

6. *P. autumnalis* Muhl. Stems 3–9 dm. tall; leaf-blades 2 mm. wide or less, those on the stem 4–15 cm. long, the basal much longer; panicle 7–22 cm. long, the branches long and slender and spikelet-bearing at the ends; spikelets 3–5-flowered, 5–6 mm. long, the flowering scales rounded or retuse at the apex, 3–4 mm. long, pubescent on the lower part of the internerves.—S. Rare, in woods.—*Schists*.—Spr.

7. *P. compressa* L. Stems 1.5–6 dm. tall; leaf-blades 2–10 cm. long, about 2 mm. wide; panicle usually contracted; spikelets 3–9-flowered, 3–6 mm. long, the flowering scales 2–2.5 mm. long, obscurely 3-nerved.—Common, in cultivated grounds, waste places, and woods. Nat. of Eu.—Sum. and fall.—CANADA BLUE-GRASS.

43. **PANICULARIA** Fabr. Usually perennial, rarely annual, sometimes aquatic grasses, with commonly flat leaf-blades and open or contracted panicles, the branches sometimes drooping. Spikelets usually numerous, ovate to linear, few-many-flowered, the glabrous rachilla articulated between the perfect flowers, the upper flowers sometimes imperfect. Scales few-many, awnless, the 2 lower empty, obtuse or acute, unequal, the flowering scales longer, obtuse to truncate and denticulate, rarely acute or acuminate at the more or less hyaline apex, convex on the back but not keeled, usually prominently nerved, the nerves vanishing at the hyaline margin; palea 2-keeled, equalling or shorter than, rarely exceeding, the scale. Stamens 3. Style short, distinct. Stigmas plumose.—MANNA-GRASS.

Lancaster County Flora 3.

Spikelets ovate or oblong, 8 mm. long or less.

Flowering scales very broad, obscurely or at least not sharply nerved.

Flowering scales narrow, sharply and distinctly 7-nerved.

Panicle elongate, its branches erect or appressed.

Panicle not elongate, its branches usually spreading or ascending, sometimes drooping.

Spikelets 3 mm. long or less: branches of the panicle often drooping.

Spikelets 4-6 mm. long: branches of the panicle ascending or spreading.

Spikelets linear, 12 mm. long or more.

1. *P. canadensis*.

2. *P. Torreyana*.

3. *P. nervata*.

4. *P. grandis*.

5. *P. fluitans*.

1. *P. canadensis* (Michx.) Kuntze. Stems 6-10 dm. tall: leaf-blades 1.5-3.5 dm. long, 4-8 mm. wide: panicle 1.5-3 dm. long, open, the slender branches drooping: spikelets 5-12-flowered, 5-8 mm. long, the flowering scales broad, 3-4 mm. long, obtuse or abruptly pointed. — N. S. Rather rare, in swamps. — *Sandstones and shales, schists*. — Sum. — RATTLESNAKE-GRASS.

2. *P. Torreyana* (Spreng.) Merrill. Stems 6-9 dm. tall: leaf-blades 1.5-3 dm. long, 3-6 mm. wide: panicle elongate, usually nodding at the summit, 1.5-3 dm. long: spikelets 3-4-flowered, 3-4 mm. long, the flowering scales about 2 mm. long, obtuse or acutish. — N. Rare, in swamps. — *Sandstones and shales*. — Sum. and fall.

3. *P. nervata* (Willd.) Kuntze. Stems 3-9 dm. tall: leaf-blades 1.5-3 dm. long, 4-10 mm. wide: panicle 7-20 cm. long, often purple, the branches spreading, ascending, or often drooping: spikelets 3-7-flowered, 2-3 mm. long, the flowering scales about 1.5 mm. long, obtuse or rounded. — Rather common, in swamps and low woods. — Sum. — FOWL MEADOW-GRASS.

4. *P. grandis* (S. Wats.) Nash. Stems 9-15 dm. tall: leaf-blades 2-3 dm. long or more, 6-16 mm. wide: panicle 2-4 dm. long, the lower branches 1-2 dm. long: spikelets 4-7-flowered, 4-6 mm. long, the flowering scales about 2 mm. long. — S. Rare, in swamps. — *Schists*. — Sum. — REED MEADOW-GRASS.

5. *P. fluitans* (L.) Kuntze. Stems 1-1.5 m. long: leaf-blades 1-3 dm. long or more, 4-12 mm. wide, rough, often floating: panicle 2-4.5 dm. long, its branches finally ascending: spikelets 7-13-flowered, 2-2.5 cm. long, the flowering scales 4-5 mm. long, thick, oblong, rounded or truncate at the erose apex, hispidulous. — N. S. Rare, in swamps. — *Sandstones and shales, schists*. — Sum.

44. **FESTUCA** L. Usually perennial, rarely annual, tufted grasses, with flat or convolute sometimes setaceous leaf-blades and contracted often spike-like or open panicles which are sometimes nearly racemose. Spikelets 2-several-flowered, the flowers perfect or the upper ones staminate, the rachilla articulated between the flowers. Scales 4-several, membranous, the 2 lower empty, unequal, acute, keeled, the flowering scales rounded on the back, at least below, acute or rarely obtuse, usually more or less awned, occasionally awnless, the remaining scales if any, empty; palea a little shorter than the scale, 2-keeled. Stamens 1-3. Styles very short, distinct, terminal or nearly so. Stigmas plumose. — FESCUE-GRASS.

Plants annual: stamens 1 or 2.

Plants perennial: stamens 3.

Panicle open, its branches at maturity ascending or spreading: spikelets usually less than 6-flowered.

Panicle branches elongate, spikelet-bearing toward the end.

Panicle branches not elongate, spikelet-bearing from at or below the middle.

Panicle contracted, its branches erect or appressed: spikelets often 10-flowered.

1. *P. octoflora*.

2. *F. nutans*.

3. *F. Shortii*.

4. *F. elatior*.

1. **F. octoflora** Walt. Stems 1-5 dm. tall; leaf-blades 4-8 cm. long, involute; panicle or raceme often one-sided, 2.5-15 cm. long, contracted; spikelets 6-13-flowered, 6-10 mm. long, the flowering scales, exclusive of the awn, 3-5 mm. long, acuminate into an awn nearly as long as itself or shorter, or sometimes awnless. — Rather common, in dry soil. — Sum.

2. **F. nutans** Willd. Stems 6-9 dm. tall; leaf-blades 1-3 dm. long, 4-6 mm. wide; panicle 1-2.5 dm. long; spikelets lanceolate, 3-5-flowered, 5-6 mm. long, the flowering scales 3-4 mm. long. — Rather rare, in woods. — Sum.

3. **F. Shortii** Kunth. Stems 6-12 dm. tall; leaf-blades 1-2.5 dm. long, 2-6 mm. wide; panicle 7-18 cm. long; spikelets broadly obovate when mature, 3-6-flowered, 5-6 mm. long, the flowering scales 4-5 mm. long. — M. S. Rather rare, in swamps. — *Limestones, schists.* — Sum.

4. **F. elatior** L. Stems 6-15 dm. tall; leaf-blades 1-4 dm. long, 4-8 mm. wide; panicle 1-4 dm. long; spikelets 5-10-flowered, 9-12 mm. long, the flowering scales acute or short-pointed, 5-6 mm. long, indistinctly 5-nerved. — Common, in fields and on roadsides. Nat. of Eu. — Sum. — MEADOW-FESCUE.

45. **BROMUS** L. Annual or perennial grasses, with usually closed leaf-sheaths, flat blades and contracted or open sometimes almost racemose panicles, the branches often nodding. Spikelets usually large, often drooping, few-many-flowered, the flowers perfect or the upper ones imperfect. Scales few-many, membranous, the 2 lower empty, persistent, narrow, unequal, acute or the second sometimes short-awned; flowering scales longer and often broader, rounded on the back, at least below, usually awned, rarely awnless, the straight or rarely recurved awn dorsal and inserted just below the 2-toothed or shortly 2-cleft apex; palea shorter than the scale, 2-keeled. Stamens 3, rarely fewer. Ovary crowned by a villous appendage, at the base of which arise the very short but distinct styles. Stigmas plumose. — BROME-GRASS. CHESS. CHEAT.

Lower empty scale 1-nerved, the upper 3-nerved.

Flowering scales glabrous, or pubescent on the margins.

Flowering scales densely pubescent all over the back.

Lower empty scale 3-nerved, the upper 5-9-nerved.

Flowering scales awned.

Flowering scales pubescent.

Flowering scales glabrous, sometimes slightly roughened.

Leaf-sheaths glabrous: nerves of the turgid fruiting scales obscure.

Leaf-sheaths softly and densely pubescent with reflexed hairs: nerves of the flowering scales prominent.

Flowering scales not awned, nearly as broad as long.

1. *B. ciliatus.*

2. *B. purgans.*

3. *B. Kalmii.*

4. *B. secalinus.*

5. *B. racemosus.*

6. *B. brizaciformis.*

1. **B. ciliatus** L. Stems 7-12 dm. tall; leaf-sheaths retrorsely short-pilose or almost glabrous; blades lax, 2.5-4 dm. long and about 1 cm. wide; panicle 1.5-3 dm. long, the lower branches drooping; spikelets 5-9-flowered, 15-22 mm. long, the flowering scales 10-12 mm. long, pubescent on each side for about $\frac{2}{3}$ the length, the awn straight, slender, 3-5 mm. long. — S. Rather rare, in thickets. — *Schists.* — Sum.

2. **B. purgans** L. Stems 7-15 dm. tall; leaf-sheaths usually coarsely retrorsely pubescent; blades 1.5-3 dm. long, 5-15 mm. wide; panicle lax, nodding, 1.5-3 dm. long; spikelets 7-11-flowered, 2-2.5 cm. long, the flowering scales 10-12 mm. long, pubescent all over the back, the awn straight, 4-6 mm. long. — M. S. Rather common, in woods and thickets. — *Limestones, schists.* — Sum.

3. **B. Kalmii** A. Gray. Stems 4.5-10 dm. tall; leaf-sheaths villous; blades 0.5-1.8 dm. long, 2-8 mm. wide; panicle 5-15 cm. long; spikelets 6-10-flowered, 1.2-2.5 cm. long, the flowering scales about 8 mm. long, densely silky, the awn 2-3 mm. long. — W. Rare, in woods, near Conewago. — *Sandstones and shales.* — Sum. — WILD-CHESS.

4. **B. secalinus** L. Stems 3-9 dm. tall: leaf-sheaths commonly glabrous; blades 5-23 cm. long, 2-6 mm. wide: panicle 5-10 cm. long: spikelets turgid when in fruit, 6-10-flowered, the flowering scales 6-8 mm. long, rough toward the apex, awnless, or bearing a straight awn 8 mm. long or less between the obtuse short teeth. — Common, in fields and waste places. Nat. of Eu. — Sum. — CHEAT. CHESS.

5. **B. racemosus** L. Stems 3-7 dm. tall, commonly puberulent just below the panicle: leaf-sheaths, at least the lower ones, rather densely pubescent; blades 7-14 cm. long, pubescent, or sometimes glabrous above: spikelets 1.5-2 cm. long, acute, 5-9-flowered, the flowering scales elliptic, 6-8 mm. long, smooth or rough, the awn 5-8 mm. long, arising just below the apex. — Common, in thickets, fields and waste places, and on roadsides. Nat. of Eu. — Sum.

6. **B. brizaeformis** Fisch. & Mey. Stems 1-6 dm. tall: leaf-sheaths softly villous; blades 0.3-1.8 dm. long, 2-6 mm. wide: panicle 3.5-20 cm. long, the branches drooping: spikelets few, 1.3-2.5 cm. long, the flowering scales very broad, 6-8 mm. long, awnless. — S. Rare, in fields and thickets near Smithville. Nat. of Eu. — Sum.

46. **LOLIUM** L. Annual or perennial grasses, with flat leaf-blades and terminal simple usually elongate spikes. Spikelets with the edge (backs of the scales) to the rachis, scattered, erect, alternate, sessile and solitary in the rachis-excavations, compressed, several-many-flowered, the flowers perfect or the upper ones imperfect, the rachilla articulated between the flowers. Scales rigid, rounded on the back, obtuse to acuminate, awned or awnless, the nerves connivent above or confluent into the awn, the lower scale of the lateral spikelets and the 2 lower scales of the terminal spikelet empty, narrow, longer than the remaining scales, thin; flowering scales short, imbricate; palea shorter than the scale, 2-keeled. Stamens 3. Styles distinct, very short. Stigmas plumose. — DARNEL. RYE-GRASS.

Empty scale shorter than the spikelet.

Flowering scales awnless.

Flowering scales awned.

Empty scale equalling or extending beyond the flowering scales.

1. *L. perenne*.

2. *L. multiflorum*.

3. *L. temulentum*.

1. **L. perenne** L. Stems 1.5-8 dm. tall: leaf-blades 5-13 cm. long, 2-4 mm. wide: spike 7-20 cm. long: spikelets 5-10-flowered, 8-12 mm. long, the empty scale strongly nerved, the flowering scales 4-6 mm. long, acuminate, awnless. — Rather common, in fields and on roadsides. Nat. of Eu. — Sum. — COMMON-DARNEL.

2. **L. multiflorum** Lam. Stems 6-10 dm. tall: leaf-sheaths glabrous; blades 1-2 dm. long, 3-7 mm. wide: spikes 2-3 dm. long: spikelets 20-30, 1.5-2 cm. long, the flowering scales bearing an awn equalling or a little shorter than the body. — Rather rare, in fields and waste places. Nat. of Eu. — Sum. — ITALIAN RYE-GRASS.

3. **L. temulentum** L. Stems 6-12 dm. tall: leaf-blades 1-2.5 dm. long, 2-6 mm. wide: spike 1-3 dm. long: spikelets 4-8-flowered, 1-2 cm. long, the empty scale strongly nerved, the flowering scales awned or awnless. — Rare, in fields and on roadsides. Nat. of Eu. — Sum. — BEARDED-DARNEL.

47. **AGROPYRON** J. Gaertn. Annual or perennial grasses, with flat or convolute leaf-blades and terminal usually rigid 2-4-sided spikes. Spikelets compressed, with the side (edge of the scales) toward the continuous or rarely articulated rachis, sessile, alternate, single in the rachis-excavations, appressed or oblique to the rachis, several-many-flowered, the flowers perfect or

the upper ones imperfect, the rachilla articulated between the flowers. Scales several-many, the 2 lower empty, the flowering ones broader, rigid, rounded on the back, obtuse to acuminate, awned or awnless, the nerves connivent at the apex or confluent into the awn, the remaining scales, if any, empty; palea shorter than the scale, 2-keeled, the keels usually ciliate. Stamens 3. Styles very short, distinct. Stigmas plumose. — WHEAT-GRASS.

1. **A. repens** (L.) Beauv. Stems 3-12 dm. tall, from a long rootstock; leaf-blades 7-30 cm. long, 2-10 mm. wide: spike 5-20 cm. long: spikelets 3-7-flowered, the empty scales strongly 5-7-nerved, usually acute or awn-pointed, sometimes obtuse, the flowering scales glabrous, acute or short-awned. — Rather common in cultivated grounds and waste places. Nat. of Eu. — Sum. — COUCH-GRASS. QUITCH-GRASS. QUICK-GRASS.

48. **ELYMUS** L. Usually tall perennial grasses, with flat or convolute often rigid leaf-blades and a terminal cylindrical dense spike which is sometimes interrupted and usually covered with long awns. Spikelets numerous, sessile, crowded, usually in alternate pairs, sometimes in 3's or more, at each node of the continuous rachis, 2-several-flowered (rarely 1-flowered). Scales 4-several (rarely 3), the 2 lower empty, rigid, awn-like, subulate, or linear, persistent, awn-pointed or awned, those at each node forming an apparent involucre, the flowering, usually in pairs, rarely in 3's, sessile, the clusters alternate or opposite, acute, usually awned, rarely awnless, the remaining scales if any smaller and empty; palea shorter than the scale, 2-keeled. Stamens 3. Styles very short, distinct. Stigmas plumose. — LYME-GRASS. WILD-RYE.

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| Empty scales narrowly subulate: spike relatively slender. | 1. <i>E. striatus</i> . |
| Empty scales linear or linear-lanceolate: spike relatively stout. | |
| Flowering scales glabrous. | 2. <i>E. virginicus</i> . |
| Flowering scales pubescent. | |
| Empty scales linear, thick, the awn usually shorter than the body. | 3. <i>E. hirsutiglumis</i> . |
| Empty scales narrowly lanceolate, thin, the awn as long as the body or longer. | |
| Flowering scales minute. | 4. <i>E. canadensis</i> . |
| Flowering scales minutely hispidulous. | 5. <i>E. glabripforus</i> . |

1. **E. striatus** Willd. Stems 3-9 dm. tall: leaf-sheaths glabrous or hirsute; blades 1-2.5 dm. long, 4-10 mm. wide: spike 6-12 cm. long, often nodding, slender: spikelets 1-3-flowered, the empty scales 2-2.5 cm. long, including the slender rough awn, 1-3-nerved, the nerves, and often the whole scale, hirsute, the flowering scales about 6 mm. long, hispid, each bearing a slender awn 1.5-3 cm. long. — S. Rather rare, on roadsides and in woods. — *Schists*. — Sum.

2. **E. virginicus** L. Stems 6-9 dm. tall: leaf-sheaths sometimes pubescent, the uppermost usually inflated and enclosing the base of the spike; blades 1-3.5 dm. long, 4-16 mm. wide: spike 5-18 cm. long, broad, stout, upright: spikelets 2-3-flowered, the empty scales very thick and rigid, lanceolate, 1.5-2.5 cm. long, including the short awn, 5-7-nerved, the flowering scales 6-8 mm. long, each bearing a rough awn 4-18 mm. long, or rarely awnless. — Rather common, in moist thickets or on banks. — Sum.

3. **E. hirsutiglumis** Scribn. & Sm. Stems 3-9 dm. tall: blades 2-3 dm. long, 8-18 mm. wide: spike 6-15 cm. long, stout: spikelets 2-5-flowered, the empty scales linear, 10-12 mm. long, thick, 3-5-nerved, the nerves hirsute, each acuminate into an awn as long as or shorter than the body of the scale, the flowering scales lanceolate, 8-10 mm. long, each acuminate into a rough awn 12-16 mm. long. — Lower Susquehanna valley. Rather rare, on the river shores and islands. — *Schists*. — Sum.

4. *E. canadensis* L. Stems 6-15 dm. tall; leaf-blades 1-3 dm. long or more, 4-20 mm. wide; spike 1-3 dm. long, nodding; spikelets 3-5-flowered, the empty scales awl-shaped, rigid, 3-5-nerved, 16-32 mm. long, including the slender rough long awn, the flowering scales 8-14 mm. long, nearly glabrous to hirsute and each bearing a slender rough awn 2-5 cm. long. — Susquehanna valley. Rather common, on river banks. — Sum.

5. *E. glabriflorus* (Vasey) Scribn. & Ball. Stems 5-10 dm. tall; leaf-blades 1.5-3 dm. long, 6-10 mm. wide; spike erect or nodding, 1-1.5 dm. long, sometimes glaucous; spikelets crowded, the empty scales 11-15 mm. long, each bearing an awn about 2 cm. long, the flowering scales 9-12 mm. long, hispidulous, each bearing an awn 2-3 cm. long. — Susquehanna valley. Rather rare, in rich woods and thickets. — *Schists.* — Sum.

49. **HYSTRIX** Moench. Usually tall grasses, with simple stems, flat leaf-blades and terminal spikes. Spikelets numerous, at length spreading, 2-several-flowered, usually in pairs, rarely in 3's, sessile, the clusters alternate on opposite sides of the continuous rachis, the rachilla articulated below the flowering scales. Scales 2-several, the 2 lower empty, subulate, wanting in all but the lowest spikelets, the flowering scales lanceolate, rigid, convolute, rounded on the back, the nerves confluent into the long awn; palet somewhat shorter than the scale, 2-keeled. Stamens 3. Styles very short, distinct. Stigmas plumose. Grain oblong, adherent to the palet when dry.

1. *H. Hystrix* (L.) Millsp. Stems 6-12 dm. tall; leaf-blades 1-2.5 dm. long, 6-12 mm. wide; spike 7-18 cm. long; spikelets 8-12 mm. long, exclusive of the awn, the flowering scales 8-12 mm. long, each acuminate into an awn about 2.5 cm. long. — Rather common, on wooded banks and in rocky thickets. — Sum. — BOTTLE-BRUSH.

FAMILY 2. CYPERACEAE. SEDGE FAMILY.

Grass-like or rush-like caulescent or scapose herbs, often perennial by long rootstocks. Stems or scapes (culms) slender, solid or rarely hollow, triangular, quadrangular, terete or flattened. Leaves 3-ranked, with closed sheaths: blades narrow. Flowers perfect or imperfect, arranged in spikelets, one (rarely 2) in the axil of each scale (glume, bract), the spikelets solitary or clustered, 1-many-flowered. Scales 2-ranked or spirally imbricate, persistent or deciduous. Perianth hypogynous, composed of bristles, or scale-like parts, rarely calyx-like, or wanting. Androecium of 1-3 stamens, or rarely more. Filaments slender or filiform. Anthers 2-celled. Gynoeceium of 2 or 3 united carpels. Ovary 1-celled. Styles, or stigmas, 2 or 3, the former often more or less united. Fruit a lenticular, plano-convex, or 3-angled achene.

Spikelets with at least 1 perfect flower.

Spikelets perfect.

Scales of the spikelets 2-ranked.

Perianth present, the members bristle-like: achene beaked.

1. DULICHIMUM.
2. CYPERUS.

Perianth wanting: achene beakless.

Scales of the spikelets spirally imbricate.

Style-base not at all or only slightly thickened, deciduous.

3. ERIOPHORUM.
4. SCIRPUS.

Perianth-members conspicuously elongate.

Perianth-members not conspicuously elongate.

Style-base markedly swollen, persistent as a tubercle, or deciduous.

Perianth present.

5. ELEOCHARIS.

- Perianth wanting.
 Achenes tuberculate at the apex.
 Achenes not tuberculate.
- Spikelets polygamous.
 Stigmas 3: style deciduous.
 Stigmas 2: style persistent.
- Spikelets with monoecious or dioecious flowers.
 Achene not enclosed in a utricle (perigynium).
 Achene enclosed in a utricle (perigynium).
6. FIMBRISTYLIS.
 7. STENOPHYLLUS.
 8. MARISCUS.
 9. RYNCHOSPORA.
 10. SCLERIA.
 11. CAREX.

1. **DULICHIMUM** L. C. Rich. Perennial caulescent herbs, with terete, hollow, conspicuously jointed stems. Lower leaves mere sheaths. Spikes axillary, peduncled. Spikelets 2-ranked, flat, very narrow, 6-10-flowered. Scales 2-ranked, carinate, decurrent. Perianth of 6-9 retrorsely barbed bristles. Stamens 3. Style persistent. Stigmas 2. Achenes narrow, beaked.

1. **D. arundinaceum** (L.) Britton. Stems 3-10 dm. tall; leaves numerous; blades flat, 2-8 cm. long, spreading or ascending; spikelets narrowly linear, spreading, 1-2.5 cm. long; scales lanceolate, acuminate, strongly several-nerved, appressed, brownish; bristles rigid, longer than the achene; achenes linear-oblong. [*D. spathaceum* (L.) Pers.] — Occasional in swamps. — Sum.

2. **CYPERUS** [Tourn.] L. Annual or perennial scapose herbs. Leaves basal; blades narrow. Scapes simple, triangular, with one or more bracts at the summit forming an involucre to the simple or compound, umbellate or capitate inflorescence. Rays of the umbel sheathed at the base, usually very unequal. Spikelets flat or nearly terete, the scales falling away from the rachis as they mature or persistent and the spikelets falling away from the axis of the head or spike with the scales attached. Scales 2-ranked, all flower-bearing, or the lower ones empty. Perianth none. Stamens 1-3. Style deciduous. Stigmas 2 or 3. Achene beakless. — GALINGALE.

- Style-branches or stigmas 2: achene lenticular.
 Achenes suborbicular, the superficial cells oblong.
 Achenes oblong to obovoid, the superficial cells quadrate.
 Spikelet-scales dull: style-branches or stigmas conspicuously exserted: stamens 2.
 Spikelet-scales shining: style-branches or stigmas scarcely exserted: stamens 3.
- Style-branches or stigmas 3: achenes three-angled.
 Scales falling away from the persistent rachis of the flattened spikelets.
 Spikelet-scales with recurved awn-tips: plants annual.
 Spikelet-scales acute or mucronate: plants perennial.
 Spikelets mainly reddish-brown; scales with lax mucronate tips.
 Spikelets mainly straw-colored or pale-brown; scales with acute tips.
- Scales and rachis of the spikelets falling away.
 Achenes narrowly linear-oblong, $2\frac{1}{2}$ -4 times as long as thick.
 Spikelets decidedly flattened, several-many-flowered.
 Spikelets nearly terete, 1-few-flowered.
 Spikelets borne in a loose spike.
 Spikelets borne in a dense or head-like spike.
 Spikes globular: spikelets spreading.
 Spikes cylindrical to oval or obovoid: spikelets becoming refracted.
- Achenes oblong or obovoid, less than twice as long as thick.
1. *C. flavescens*.
 2. *C. diandrus*.
 3. *C. rivularis*.
 4. *C. inflexus*.
 5. *C. dentatus*.
 6. *C. esculentus*.
 7. *C. strigosus*.
 8. *C. refractus*.
 9. *C. ovularis*.
 10. *C. lancastricensis*.
 11. *C. filiculmis*.

1. **C. flavescens** L. Annual. Leaves yellowish-green: scapes very slender, tufted, 7-30 cm. tall: spikelets linear, yellow, many-flowered, flat, 8-18 mm. long, the clusters terminal and sessile, or on 1-4 short rays: scales short,

appressed, twice as long as the achene: stigmas 2: achenes orbicular or orbicular-obovoid, black, obtuse, shining. — Common, in low grounds. — Sum. and fall.

2. *C. diandrus* Torr. Annual. Leaves deep-green: scapes tufted, slender, 5–40 cm. tall: spikelets 8–18 mm. long, linear-oblong, acute, flat, many-flowered: scales short, green or brown, or with brown margins, obtuse, 1-nerved, thin, dull: stigmas 2, much exserted: achenes lenticular, oblong, dull. — Rather rare, in swampy places. — Sum. and fall.

3. *C. rivularis* Kunth. Similar to the next preceding species: scapes slender, tufted: spikelets linear or linear-oblong, acutish, 8–20 mm. long: scales dark-green or brown, or with brown margins, appressed, thick, shining, obtuse: stigmas 2, scarcely exserted: achenes oblong or oblong-obovoid, lenticular, dull. — M. S. Rather common, in low grounds. — *Limestones, schists*. — Sum. and fall.

4. *C. inflexus* Muhl. Annual, fragrant in drying. Leaves bright-green: scapes slender or almost filiform, tufted: umbel sessile, capitate or 1–3-rayed: spikelets linear-oblong, 6–10-flowered, 4–6 mm. long: scales light-brown, lanceolate, several-nerved, each tapering into a long, recurved awn: stigmas 3: achene 3-angled, narrowly obovate, mucronate, brown. — Susquehanna valley. Rather rare, in wet sandy soil. — *Schists*.

5. *C. dentatus* Torr. Perennial. Leaves light-green: scapes 2–5 dm. tall: umbel somewhat compound: spikelets few, light reddish-brown, linear, very flat, many-flowered, mostly blunt, 10–20 mm. long, nearly 4 mm. wide: scales thin, keeled, 5–7-nerved, mucronate: achene 3-angled, obovoid, less than 1 mm. long, mucronate, light-brown, much shorter than the scale. — Susquehanna valley. Rather common, in sand, on the river shore and low islands. — Sum.

6. *C. esculentus* L. Perennial. Leaves light-green: scapes 3–8 dm. tall: umbel 4–10-rayed, often compound: spikelets numerous in loose spikes, straw-color or yellowish-brown, flat, spreading, 1–2.5 cm. long, about 3 mm. wide, many-flowered: scales rather acute, 3–5-nerved: achene obovoid, fully 1 mm. long, obtuse, 3-angled. — Common in moist fields; a troublesome weed in places. — Sum.

7. *C. strigosus* L. Perennial. Leaf-blades rough-margined, 4–6 mm. wide: scapes rather stout, 3–9 dm. tall: umbel several-rayed, some of the primary rays often 10–15 cm. long, their sheaths terminating in two bristles: spikes oblong or ovoid: spikelets flat, linear, 8–19 mm. long, 2 mm. wide or less, 7–15-flowered: scales straw-colored, strongly several-nerved, appressed: achenes linear-oblong, 3-angled, about 2 mm. long, acute, about $\frac{1}{2}$ as long as the scale. — Common, in swamps and waste places. — Sum.

8. *C. refractus* Engelm. Perennial. Leaf-blades 5–8 mm. wide, rough-margined: scapes stout, smooth, 3–9 dm. tall: umbel 6–13-rayed, usually compound, the longer rays sometimes 20 cm. long, their sheaths terminating in 1 or 2 short teeth: spikes lax: spikelets very narrowly linear, loosely spicate, acute, 1–2 cm. long, 1 mm. thick, 3–6-flowered, the upper spreading, the lower reflexed: scales yellowish-green, closely appressed, 9–11-nerved: achenes linear, about 3 mm. long, obtuse and apiculate, about 5 times as long as thick, and $\frac{1}{2}$ as long as the scale. — Susquehanna valley. Rather rare, on dry banks. — Sum.

9. *C. ovularis* (Michx.) Torr. Perennial. Leaf-blades smooth: scape usually strict, smooth, 2–8 dm. tall, longer than the leaves: umbel simple, few-rayed: spikes globose, 8–14 mm. in diameter, very dense, the spikelets radiating in all directions: spikelets 4–7 mm. long, usually 3-flowered: scales green, several-nerved: achenes linear-oblong, 3-angled, about 1.5 mm. long, 1–3 times as long as thick. — S. Rather rare, in old fields and on dry banks. — *Schists*. — Sum.

10. *C. lancastriensis* Porter. Perennial. Leaf-blades 1 cm. wide or less: scapes slender, smooth, 3–8 dm. tall: umbel 5–9-rayed: spikes oval, obtuse, 1–2.5 cm. long: spikelets densely clustered, 8–10 mm. long, linear, nearly terete, 2–6-

flowered, the lower reflexed, the middle ones spreading, all separating from the axis at maturity: scales green, several-nerved: achenes linear, 2.5-3 mm. long, apiculate, 2-3 times as long as thick, $\frac{2}{3}$ as long as the scale. — Susquehanna valley. Common, on the dry river shores and islands. — *Schists.* — Sum.

11. C. filiculmis Vahl. Perennial. Leaf-blades 2-4 mm. wide: scape smooth, slender, often wiry, ascending or reclined, 1.5 dm. long: spikelets densely clustered in a sessile head, or in 1-7 peduncled heads, linear, acute, 5-11-flowered, subterete or compressed, 5-12 mm. long, 2 mm. wide or less: scales pale-green, 7-11-nerved, appressed: achenes oblong or obovoid, fully 2 mm. long, 3-angled, dull gray, about twice as long as thick. — S. Occasional, in sand near Peach Bottom.

3. ERIOPHORUM L. Bog herbs, perennial by rootstocks. Stems erect, triangular or nearly terete. Leaves with linear blades, or 1 or 2 of the upper mere bladeless sheaths. Spikelets terminal, solitary, capitate, or in umbels, subtended by an involuere of 1-several bracts, or naked. Scales spirally imbricate, usually all flower-bearing. Perianth of 6 or many, filiform smooth soft bristles, white or brown, the bristles straight or crisped, much exerted. Stamens 1-3. Style deciduous. Stigmas 3. Achene 3-angled, often broad.

1. E. virginicum L. Stems stiff, smooth, 4-12 dm. tall: leaf-blades narrowly elongate-linear, flat: bracts of the involuere spreading or deflexed: spikelets several or numerous in a dense terminal cluster, erect, or the outer spreading: scales acute, brown with a green center: perianth-bristles numerous, dingy-brown or copper-colored, about 3 times as long as the scale: achenes linear-oblong, acute, apiculate, brown. — E. S. Common in swamps. — *Quartzite, schists.* — Sum. — COTTON-GRASS.

4. SCIRPUS [Tourn.] L. Annual or perennial small or large caulescent or scapose herbs, the leaves sometimes reduced to basal sheaths. Spikelets few-many-flowered, terete or flattened, solitary, capitate, spicate, or umbellate, often subtended by an involuere. Scales spirally imbricate or nearly 2-ranked, the 1-3 lower sometimes empty. Perianth of 1-6 slender or rigid bristles or rarely wanting. Stamens 2 or 3. Style not swollen at the base, wholly deciduous from the achene, or its base persistent. Stigmas 2 or 3. Achene triangular, lenticular or plano-convex. — BULRUSH. CLUB-RUSH.

Involuere of a single bract, or wanting.

Spikelets solitary, terminal.

Spikelets typically several or numerous, often apparently lateral.

Spikelets few, 1-12, appearing lateral.

Scapes bluntly 3-angled: plants annual.

Scapes acutely 3-angled: plants perennial.

Spikelets several or numerous, in umbels or umbel-like clusters.

Involuere of 2 or more bracts with flat blades.

Spikelets relatively large, few-several, capitate or umbellate.

Spikelets relatively small, very numerous, umbellate.

Perianth-bristles downwardly barbed, or wanting: spikelets in umbellate heads.

Perianth-bristles equalling the achene or slightly exceeding it: leaf-blades 6-16 mm. wide.

Spikelet-scales obtuse: perianth-bristles barbed throughout.

Spikelet-scales acute: perianth-bristles barbed above.

Perianth-bristles twice as long as the achene: leaf-blades 4-6 mm. wide.

Perianth-bristles smooth or merely pubescent: umbel compound.

Spikelets sessile, borne in small heads.

Spikelets, or some of them, distinctly peduncled.

1. *S. planifolius.*

2. *S. debilis.*

3. *S. americanus*

4. *S. validus.*

5. *S. fluriatilis.*

6. *S. sylvaticus.*

7. *S. atrovirens.*

8. *S. polyphyllus.*

9. *S. cyperinus.*

10. *S. Eriophorum.*

1. **S. planifolius** Muhl. Perennial. Scapes tufted, slender, 3-angled, 1.5-4 dm. tall: leaves various, the lower sheaths with short blades, the upper terminating in a flat narrowly linear blade as tall as the scape: spikelet solitary, ovoid or oblong, 5-7 mm. long, several-flowered, the involueral bract usually overtopping it: scales yellowish-brown, except the green midvein, ovate-lanceolate: perianth-bristles 4-6, upwardly barbed, usually about as long as the achene: stigmas 3: achene broadly oblong, 3-angled, 1.5-2 mm. long, smooth, light-brown. — M. Occasional, in woods. — *Quartzite*. — Spr.
2. **S. debilis** Pursh. Annual. Scapes slender, tufted, terete or nearly so, 1.5-5 dm. high: sheaths obliquely truncate, the upper ones rarely bearing short subulate blades: spikelets solitary or in clusters of 2-12, ovoid-oblong, many-flowered, appearing lateral: scales light yellowish-brown with a green midvein, broadly ovate, obtuse or acute: perianth-bristles 4-6, downwardly barbed, fully as long as the achene: stigmas 2 or rarely 3: achenes plano-convex, broadly obovoid or orbicular, 1.5-2 mm. long, smooth or slightly roughened, dark-brown, shining, mucronulate. — M. S. Rare, in swamps, on river shores and low islands. — *Limestones, schists*. — Sum. and fall.
3. **S. americanus** Pers. Perennial. Scapes stout, sharply triangular, stiff, 3-11 dm. tall: sheaths bearing 1-3 linear, keeled blades, shorter than the scape: spikelets oblong-ovoid, 8-12 mm. long, in clusters of 2-7, appearing lateral: scales broadly ovate, brown, often emarginate or 2-cleft, the midvein extended into a subulate awn: perianth-bristles 2-6, downwardly barbed, shorter than the achene: achenes obovoid, plano-convex, about 2.5 mm. long, smooth, dark-brown. — M. S. Rather rare, in swamps or low grounds. — *Limestones, schists*. — Sum.
4. **S. validus** Vahl. Perennial. Scapes stout, light-green, terete, 1-3 m. tall: sheaths bladeless or nearly so: involueral bract shorter than the umbel: umbel compound, appearing lateral, its primary rays 3-10 cm. long: spikelets becoming oblong-cylindric, in mostly capitate clusters of 2-5, 5-16 mm. long: scales sub-orbicular, ciliate, mucronate: perianth-bristles 4-6, downwardly barbed, equaling or longer than the achene: stigmas 2: achenes plano-convex, obovoid, mostly 2 mm. long or less, black or nearly so, mucronate. — Common, in swamps. — Sum.
5. **S. fluviatilis** (Torr.) A. Gray. Perennial, 1-2 m. tall. Leaves elongate; blades 8-20 mm. wide, long-attenuate: umbel terminal, compound, the rays mostly recurved-spreading: spikelets oblong, ovoid, or oblong-cylindric, 15-25 mm. long, solitary or clustered: scales terminating in a curved tip: perianth-bristles 6, rigid, as long as the achene or somewhat shorter: stigmas 3: achenes 3-angled, obovoid, dull. — Lower Susquehanna valley. Rather rare, on river shores and islands. — *Schists*. — Sum. — RIVER-BULRUSH.
6. **S. sylvaticus** L. Perennial, 1-2 m. tall. Leaves elongate; blades 1-1.6 cm. wide, rough-margined: umbel terminal, sometimes 3 dm. broad, about 3 times compound, the rays ascending or recurved: spikelets ovoid or ovoid-oblong, 3-5 mm. long, in clusters at the ends of the raylets: scales obtuse, brown with a green center: perianth-bristles 6, downwardly barbed, slightly exceeding the achene: achenes broadly oblong or obovoid, fully 1 mm. long, 3-angled, nearly white. — E. S. Rare, in swamps. — *Schists, quartzite*. — Sum.
7. **S. atrovirens** Muhl. Perennial, leafy, 5-12 dm. high. Leaf-blades elongate, bright-green, 6-15 mm. wide, rough-margined: spikelets ovoid-oblong, 3.5-9 mm. long, densely capitate at the ends of the rays or raylets: scales greenish-brown, 1.5-2 mm. long, the midvein excurrent: perianth-bristles usually 6, downwardly barbed above, about as long as the achene: achenes oblong-obovoid, 1 mm. long, 3-angled, pale-brown, dull. — Common, in swamps. — Sum. and fall.
8. **S. polyphyllus** Vahl. Perennial, very leafy, 3-11 dm. tall. Leaf-blades pale-green, 4-6 mm. wide, rough-margined: spikelets ovoid, 2.5-3.5 mm. long, capitate at the ends of the raylets: scales 1-1.5 mm. long, bright-brown, mostly obtuse and mucronulate: perianth-bristles 6, downwardly barbed above the middle, twice as

long as the achene: achenes obovoid, fully 1 mm. long, 3-angled, with a broad face and narrower sides, dull. — N. Rather rare, in swamps. — *Sandstones and shales*. — Sum. and fall.

9. *S. cyperinus* (L.) Kunth. Perennial. Stems smooth, stiff, 2 m. tall or less: leaves elongate; blades stiff, 3-6 mm. wide, rough-margined: umbel terminal, decomposed, the rays at length somewhat drooping: spikelets ovoid-oblong, 3-5 mm. long, in capitate clusters of 3-15; perianth-bristles 6, entangled, much longer than the achene, conspicuously exerted beyond the scales, and grayish-brown at maturity: achenes 3-angled, barely 1 mm. long, nearly white. — Common, in swamps. — Sum. and fall.

10. *S. Eriophorum* Michx. Similar to the next preceding species in habit. Involucre more ferruginous at the base; umbel with laxer branches, the rays elongate and drooping at the ends: spikelets ovoid or oblong-ovoid, 3.5-6 mm. mostly 4.5 mm. long, more deeply colored, at least some of them distinctly peduncled. — Lower Susquehanna valley. Rather rare, in swamps. — *Schists*. — Sum. and fall.

5. **ELEOCHARIS** R. Br. Annual or perennial scapose herbs. Leaves reduced to sheaths, or the lowest very rarely blade-bearing. Scapes simple, terete, flattened, variously angled, or fluted. Spikelets solitary, terminal, erect, several-many-flowered, without an involucre, or rarely with 2 small bracts. Scales spirally imbricate. Perianth of 1-12 bristles, usually retrorsely barbed, or wanting. Stamens 2 or 3. Stigmas 2 or 3. Achene lenticular or biconvex, or 3-angled, but sometimes with very obtuse angles and appearing turgid, each tubercled by the persistent style-base. — SPIKE-RUSH.

Style-branches, or stigmas, 2: achene lenticular or biconvex.

Annual plants with fibrous roots.

Spikelets twice as long as thick or less: perianth-bristles much longer than the achene: tubercle $\frac{1}{2}$ as long as the achene. 1. *E. obtusa*.

Spikelets elongate: perianth-bristles as long as the achene or shorter: tubercle $\frac{1}{4}$ as long as the achene. 2. *E. Engelmannii*.

Perennial plants with horizontal rootstocks.

Tubercle of the achene flat-conic or ovate.

Scapae and spike stout: tubercle ovate.

Scapae and spike slender: tubercle conic.

Tubercle of the achene swollen, bulb-like.

3. *E. palustris*.

4. *E. glaucescens*.

5. *E. Smallii*.

Style-branches, or stigmas, 3: achene 3-angled, or turgid.

Achene cancellate, narrow.

Achene papillose or nearly smooth, broad.

Tubercle depressed: perianth-bristles $\frac{1}{2}$ as long as the achene, or wanting.

Tubercle subulate: perianth-bristles longer than the achene.

6. *E. acicularis*.

7. *E. tenuis*.

8. *E. intermedia*.

1. *E. obtusa* Schult. Annual. Scapes tufted, relatively stout, rather deep-green, nearly terete, 0.5-5 dm. tall: spikelet ovoid or oblong-ovoid, obtuse, many-flowered, 3-13 mm. long: scales obovate, oblong-obovate, or oblong-orbicular, rounded, brown, each with a broad green midvein and scarious margins; perianth-bristles 6-8, deciduous, longer than the achene: achenes pale-brown, shining, lenticular, obovoid-oblong, smooth, 1 mm. long or more; tubercle deltoid, acute, compressed, scarcely constricted at the base, about $\frac{1}{4}$ as long as the achene. — Common, in wet soil. — Sum.

2. *E. Engelmannii* Steud. Annual, similar to the next preceding species, but commonly taller, sometimes 5 dm. high. Spikelet cylindrical, obtuse or rather acute, 4-20 mm. long, many-flowered: scales ovate, pale-brown with a green midvein and narrow scarious margins, obtuse: perianth-bristles about 6, not longer than the achene, or very short or wanting: achenes obovoid or cuneate-obovoid, fully 1 mm. long, brown, smooth, lenticular; tubercle broad, low, covering the top of the achene, less than $\frac{1}{4}$ its length. — W. Rather rare, in wet soil. — *Sandstones and shales*. — Sum.

3. *E. palustris* (L.) R. & S. Perennial. Scapes not tufted, 3-15 dm. tall, stout, striate: spikelet conic-cylindric, 10-25 mm. long, thicker than the scape, acute: scales ovate-oblong, reddish-brown, except the whitish margin and the greenish midvein, or pale-green: perianth-bristles usually 4, much longer than the achene, downwardly barbed, or wanting: achenes obovoid, lenticular, about 2 mm. long, yellowish, about twice as long as the ovate tubercle. — Susquehanna valley. Frequent, on the river shore and low islands. — Sum.

4. *E. glaucescens* (Willd.) Schult. Perennial. Scapes tufted, slender, 1-9 dm. long, bright- or deep-green: spikelet oblong or oblong-lanceolate, 0.5-1.5 cm. long, acute or rather obtuse: scales brown or dark-green, blunt, or acute in age: perianth-bristles usually 4, about as long as the achene or shorter, or nearly wanting: achenes lenticular, obovoid, about 1.5 mm. long, excluding the narrow conic tubercle, brown. — Lower Susquehanna valley. Rather rare, in wet sandy places. — Sum.

5. *E. Smallii* Britton. Perennial. Scapes slightly tufted, rather stout, 4-7 dm. tall: spikelet cylindric, about 1.5 cm. long, about as thick as the scape, acute: scales oblong-lanceolate, acuminate: perianth-bristles usually 4, downwardly barbed, about as long as the achene, including the tubercle: achenes obovoid, lenticular, about 1.5 mm. long, dark-brown; tubercle bulb-like, one fourth as long as the achene-body and about one half as wide, constricted at the base. — Susquehanna valley. Frequent, in shallow water about sandy islands and shores. — Sum. and fall.

6. *E. acicularis* (L.) R. & S. Perennial. Scapes tufted, filiform, capillary, or setaceous, obscurely 4-angled and grooved, 5-20 cm. long: spikelet compressed, narrowly ovate or linear-oblong, acute, 3-10-flowered, 3-10 mm. long, 1 mm. wide: scales thin, obtuse, or the upper acutish, pale-green, usually with a narrow brown line on each side of the midvein: perianth-bristles 3-4, fugacious, shorter than the achene: achenes obovoid-oblong, 0.5 mm. long, pale, 3-angled with a rib on each angle and 6-9 lower facial ribs connected by the fine ridges; tubercle conic, acute, $\frac{1}{4}$ as long as the achene-body. — Rather rare, in swamps and low grassy places. — Sum.

7. *E. tenuis* (Willd.) Schult. Perennial by rootstocks. Scapes tufted, filiform, mostly erect, 4-angled, 2-4 dm. tall: spikelet oblong, acutish, many-flowered, 6-10 mm. long, about 2 mm. in diameter: scales thin, obtuse, chestnut-purple, except the greenish midvein, the margins scarious: perianth-bristles 2-4, shorter than the achene, fugacious, or wanting: achenes obovoid, about 1 mm. long, obtusely 3-angled, yellow to brown, irregularly ridged-reticulate or papillose, more or less persistent on the rachis of the spikelet after the scales have fallen; tubercle depressed-conic. — M. S. Rather rare, in swamps or low grounds. — *Limestones, schists.* — Sum.

8. *E. intermedia* (Muhl.) Schult. Annual. Scapes very slender, densely tufted, diffusely spreading and partially decumbent, 1-4 dm. long: spikelet ovoid-oblong, acutish, 8-20-flowered, 3-7 mm. long: scales purple-brown, except the greenish midvein, tardily deciduous: perianth-bristles 6, longer than the achene, downwardly barbed, persistent: achenes obovoid, fully 1 mm. long, 3-angled, light-brown, finally reticulate, fully twice as long as the conic-subulate, tubercle. — M. S. Rare, in the Dillerville swamp and near Quarryville. — Sum.

6. *FIMBRISTYLIS* Vahl. Annual or perennial scapose herbs. Spikelets umbellate or capitate, several-many-flowered, terete, involucrate. Scales spirally imbricate, mostly deciduous, all flower-bearing. Perianth wanting. Stamens 1-3. Style pubescent or glabrous, with its base dilated or swollen, wholly deciduous at maturity. Stigmas 2-3. Achenes lenticular, or 2-angled, reticulate, cancellate, striate or ribbed. — Fall.

Style-branches, or stigmas, 2: achene lenticular.

Plants perennial: leaf-blades involute: stamens 2 or 3: spikelets obtuse.

1. *F. puberula*.

Plants annual: leaf-blades flat or nearly so: stamen 1: spikelets acute.

2. *F. Baldwiniana*.

Style-branches, or stigmas, 3: achene 3-angled.

Umbel simple or sparingly branched: spikelets stout, ovoid or oval, obtuse.

3. *F. geminata*.

Umbels much branched: spikelets narrow, often linear-oblong, acute.

4. *F. autumnalis*.

1. **F. puberula** (Michx.) Vahl. Plant thickened at the base. Leaves erect; blades involute, thus often very slender, their sheaths green or purple-tinged, pubescent: scapes slender, 3-6 dm. tall: bracts of the involucre mostly 2-4, minutely pubescent, stiff: umbel with the central spikelet sessile: spikelets ovoid, 5-10 mm. long: scales thinnish, brown, with pale keel-like excurrent midribs, broad, minutely pubescent: achenes obovoid, about 1 mm. long, cancellate, brownish. — S. Rare, in low grounds. — *Schists*.

2. **F. Baldwiniana** Torr. Plant tufted. Leaves pale-green; blades flat, 1 mm. wide: scapes slender, flattened, striate, 5-40 cm. long: spikelets ovoid or ovoid-oblong, 6-12 mm. long: scales ovate, pale greenish-brown: stigmas 2: achenes lenticular, obovoid, fully 1 mm. long, brown, longitudinally ribbed, the tubercled ribs connected by fine cross-lines. — S. Rare, in moist soil. — *Serpentine*.

3. **F. geminata** (Nees) Kunth. Plant lower than in the following species, leaves often shorter: umbel mostly simple: spikelets, or most of them, capitate and sessile, ovoid or oval, obtuse: achenes fully 0.5 mm. long, markedly reticulate. — Lower Susquehanna valley. In wet ground, on an island, near Peach Bottom.

4. **F. autumnalis** (L.) R. & S. Plants 0.7-4 dm. tall. Leaves glabrous; blades narrowly linear, flat, 1-2 mm. wide: scapes densely tufted, flat: spikelets linear-oblong, acute, 6-40 mm. long: scales ovate-lanceolate, acutish, strongly mucronate, greenish-brown: stigmas 3: achenes obovoid, about 0.5 mm. long, nearly white, smooth or indistinctly reticulate, the 3 angles ridged. — Rather common, in moist soil.

7. **STENOPHYLLUS** Raf. Annual scapose herbs. Leaves basal: blades narrowly linear or filiform, the sheaths ciliate or pubescent. Spikelets umbellate, capitate, or solitary, involucre. Scales spirally imbricate, mostly deciduous. Perianth wanting. Stamens 2 or 3. Style glabrous, the swollen base persistent as a tubercle on the achene. Stigmas 2 or 3. Achene lenticular or 3-angled.

1. **S. capillaris** (L.) Britton. Leaves shorter than the scape, their sheaths with long hairs: scapes filiform, densely tufted, 5-40 cm. tall: involucre bracts setaceous: spikelets narrowly oblong, 5-8 mm. long, several in a terminal umbel: scales pulverulent, dark-brown except the green keel: stigmas 3: achenes obovoid, yellow-brown, rounded or truncate, nearly 1 mm. long, transverse-wrinkled; tubercle depressed. — Common, in wet soil and on roadsides. — Sum.

8. **MARISCUS** [Hall.] Zinn. Perennial herbs, similar to *Rynchosporae* in habit. Spikelets oblong or ovoid, few-flowered, few together in clusters. Scales imbricate, the lower empty, the middle ones mostly subtending imperfect flowers, the upper one with a perfect flower. Perianth wanting. Stamens 2 or sometimes 3. Style deciduous from the summit of the achene. Stigmas 2-3. Achene ovoid to globose, smooth or longitudinally striate: tubercle wanting.

1. **M. mariscoides** (Muhl.) Kuntze. Stems 3-9 dm. tall, stiff, smooth, obscurely 3-angled: leaves very narrow, with long compressed tips: umbels 2-4, compound: spikelets oblong, 5 mm. long, clustered on the stiff raylets: scales chest-

nut-brown, acute: achenes ovoid, about 2 mm. long, acute, longitudinally striate.—M. Rare, mostly in the Dillerville swamp.—Sum.—TWIG-RUSH.

9. **RYNCHOSPORA** Vahl. Caulescent herbs, mostly perennial by root-stocks. Leaves few: blades narrow, flat or involute. Spikelets ovoid, oblong, or fusiform, variously clustered. Scales thin, 1-nerved, imbricate, usually mucronate by the excurrent midvein, the lower empty. Upper flowers imperfect. Perianth of 1-24 (mostly 6) barbed or scabrous bristles, or wanting. Stamens commonly 3. Stigmas 2. Achene lenticular, often turgid, smooth, cancellate or transversely wrinkled, crowned with the base of the style (tubercle), or in some species with the whole style.—BEAK-RUSH.

Perianth-bristles retrorsely barbed.

Spikelet-scales white or pale: perianth-bristles 9-15.

1. *R. alba*.

Spikelet-scales brown: perianth-bristles 6.

Achene oblong or oblong-ovoid: leaves with filiform blades.

2. *R. capillacea*.

3. *R. glomerata*.

Achene obovoid: leaves with flat linear blades.

4. *R. cymosa*.

Perianth-bristles upwardly barbed.

1. **R. alba** (L.) Vahl. Pale-green: stems slender, 1.5-6 dm. tall: leaves much shorter than the stem; blades very slender: spikelets whitish or pale-green, narrowly oblong or lanceolate, in 1-4 dense clusters, 4-6 mm. long: scales acute: perianth-bristles 9-15, about as long as the achene and tubercle: achenes obovoid-oblong, fully 1.5 mm. long, smooth, pale-brown; tubercle lanceolate, fully $\frac{1}{2}$ as long as the achene-body.—Rather common, in swamps.—Sum. and fall.

2. **R. capillacea** Torr. Deep-green: stems slender, 1-4.5 dm. tall: leaves much shorter than the stems; blades filiform: spikelets few, chestnut-brown, oblong or oblong-lanceolate, in 1-3 lax clusters, 4-6 mm. long: scales mucronate: perianth-bristles 6, or rarely 12, stout: achenes oblong to oblong-ovoid, 1.5-2 mm. long, minutely wrinkled, brown, short-stipitate; tubercle lanceolate, about $\frac{1}{2}$ the length of the achene-body.—M. Rare, in the Dillerville swamp.—Sum.

3. **R. glomerata** (L.) Vahl. Deep-green: stems 3-10 dm. tall: leaf-blades flat, rough-margined: spikelets oblong, narrow at both ends, 3-4 mm. long, in 3-7 corymbose-capitate axillary clusters: scales lanceolate, dark-brown: achenes obovoid, above the slender base, about 1.5 mm. long, smooth, dark-brown; tubercle subulate, nearly as long as the achene.—Rather rare, in swamps.—Sum. and fall.

4. **R. cymosa** Ell. Light-green: stems tufted, 3-11 dm. tall: leaf-blades flat, smooth: spikelets ovoid-oblong, acute, 3 mm. long, sessile or nearly so, capitate in 2's-7's on the ultimate axillary and terminal branches: scales dark-brown, broadly ovate: achenes broadly obovoid or orbicular-obovoid, 1.5 mm. long, transversely wrinkled; tubercle conic, about as high as wide, $\frac{1}{2}$ - $\frac{2}{3}$ as long as the achene.—S. Rather rare, in swamps.—*Schists, serpentine*.—Sum. and fall.

10. **SCLERIA** Berg. Perennial or rarely annual, caulescent herbs. Spikelets small, in terminal, or terminal and axillary fascicles, or rarely interruptedly glomerate-spicate. Flowers monoecious, the fertile spikelets 1-flowered, the staminate many-flowered. Scales loosely imbricate, the 1-3 lower ones, and sometimes also the upper ones of the pistillate spikelets empty. Perianth wanting. Stamens 1-3. Stigmas 3. Ovary often supported by a disk (hypogynium). Achenes globose or ovoid, crustaceous, enamel-like, or bony, white.—NUT-RUSH.

Inflorescence of a single terminal cluster, or of several terminal and lateral clusters.

Achene smooth.

1. *S. triglomerata*.

Achene ridged, reticulate, or papillose.

Achene irregularly ridged or reticulate.

Spikelet-clusters sessile or nearly so: achene glabrous.

Spikelet-clusters, at least the lower ones, filiform-peduncled: achene pubescent.

Achene papillose.

Inflorescence interruptedly glomerate-spicate.

2. *S. reticularis*.

3. *S. setacea*.

4. *S. pauciflora*.

5. *S. verticillata*.

1. *S. triglomerata* Michx. Perennial. Stems 4-10 dm. tall: leaf-blades flat, glabrous or nearly so, roughish, 3-9 mm. wide: spikelets terminal, and usually also 1 or 2 lower peduncled ones: achenes ovoid or ovoid-globose, above the hypogynium, obtuse, bony, smooth, bright-white, shining, 2-3 mm. high; hypogynium low, papillose-crustaceous. — *S.* Rather rare, in woods and swamps. — *Schists, serpentine*. — Sum.

2. *S. reticularis* Michx. Perennial. Stems 3-6 dm. tall: leaf-blades narrowly linear, glabrous or nearly so, 2-3 mm. wide: spikelets in a terminal cluster and also in 1-3 remote axillary sessile or nearly sessile clusters: achenes globose, dull-white, reticulate, 1 mm. in diameter, glabrous. — *S.* Rare, in swamps. — *Serpentine*. — Sum.

3. *S. setacea* Poir. Perennial. Stems spreading or diffuse, 3-6 dm. long: leaf-blades linear, nearly flat, glabrous, 3-8 mm. wide: spikelets in a loose terminal cluster, and also in 1-3 filiform-stalked drooping axillary ones: achenes globose above the hypogynium, somewhat pointed, 2-2.5 mm. in diameter, irregularly rugose-reticulate with low ridges, the ridges pubescent. — *S.* Rare in low grounds. — *Schists*. — Sum.

4. *S. pauciflora* Muhl. Perennial, pubescent. Stems slender, usually tufted, 2-5 dm. tall: leaf-blades narrowly linear, less than 2 mm. wide, the upper elongate and often overtopping the stem: spikelets in a small terminal cluster and also in 1 or 2 axillary ones: achenes globular, 1.5-2 mm. in diameter, papillose, the lower papillae elongate and reflexed: hypogynium obtusely triangular, supporting 6 distinct tubercles. — *S.* Rather rare, in dry soil. — *Schists, serpentine*. — Sum.

5. *S. verticillata* Muhl. Annual. Stems very slender or filiform, 1-5 dm. tall: leaf-blades very narrowly linear, 0.5-1 mm. wide, erect, weak, shorter than the stem: spikelets in several separated clusters: achenes globose, fully 1 mm. in diameter, with short transverse ridges or somewhat reticulate: hypogynium none. — *M.* Rare, in swamps. — *Limestone's*. — Sum. and fall.

11. *CAREX* L.¹ Perennial grass-like herbs. Culms (stems or scapes) mostly 3-angled and tufted. Leaves 3-ranked. Bracts elongate or very short, subtending the spikes, or wanting. Flowers monoecious or dioecious, solitary in the axils of small bracts (scales). Spikes either wholly pistillate, wholly staminate, or sometimes bearing both staminate and pistillate flowers. Perianth wanting. Staminate flowers of 3 stamens: filaments filiform. Pistillate flowers of a single pistil with a style and 2 or 3 stigmas, borne on a very short axis in the axil of a sac-like bractlet or second bract called the perigynium (utricule), which completely encloses the achene. Achene 3-angled or lenticular. — *SEDGE*.

A. Achenes lenticular and stigmas 2: lateral spikes sessile; terminal spike partly pistillate, or if staminate, the lateral spikes short or heads dioecious. *Vigna*. Spikes always with staminate flowers at apex.

Perigynia 2-5 mm. long, the beak not exceeding the body.

Spikes usually ten or less, green or reddish-brown tinged: sheaths loose, or if tight neither red-dotted nor transversely rugulose. I. MUELENBERGIANAE.

Spikes numerous, yellow or brown: sheaths tight, the opaque part either red-dotted or transversely rugulose.

¹ Contributed by Mr. Kenneth K. Mackenzie.

- Perigynia plano-convex, yellowish: opaque part of leaf-sheath transversely rugulose.
 Perigynia thick, much rounded on outer surface, brownish: opaque part of leaf sheath not transversely rugulose.
- Perigynia 4-9 mm. long, spongy at base: beak exceeding the body.
- Spikes with staminate flowers at base, rarely entirely staminate or pistillate.
- Perigynia spongy at base, the body not wing-margined.
- Perigynia not spongy at base, the body wing-margined.
- B. Achenes triangular or lenticular; if lenticular the lateral spikes elongate and peduncled, and terminal spike staminate. **Eucarex.**
- Scales bract-like: achenes strongly constricted at the base.
- Scales not bract-like: achenes not strongly constricted at the base.
- Spike solitary, the perigynia rounded and beakless at the apex.
- Spikes one to many; when one, the perigynia not as above.
- Perigynia triangular, membranous, closely enveloping the achene, nerveless, or 2-ribbed, pubescent or puberulent, stipitate: bracts sheathless or nearly so.
- Perigynia obtusely triangular: foliage not pubescent.
- Perigynia acutely triangular: foliage pubescent.
- Perigynia not as above, or if so, bracts strongly sheathing.
- Lowest bract strongly sheathing: perigynia beakless to beaked, entire, oblique or emarginate at the apex; or long-beaked and apex hyaline, becoming bidentate, teeth weak.
- Bracts with obsolete or rudimentary blades.
- Bracts with well-developed blades.
- Pistillate spikes short-oblong to linear, erect, or if drooping the spikes short and the perigynia acutely triangular: terminal spike staminate.
- Perigynia with few to many strong nerves, or nerveless.
- Perigynia tapering at the base, triangular, closely enveloping the achene.
- Rootstock long-creeping.
- Rootstock not long-creeping.
- Perigynia rounded at the base, suborbicular in cross-section, loosely enveloping the achene.
- Perigynia finely many-striate.
- Perigynia tapering at the base, constricted at the apex, obtusely triangular, closely enveloping achene.
- Perigynia rounded at both ends, in cross-section suborbicular.
- Pistillate spikes elongate-linear to cylindrical, slender-peduncled, the lower ones drooping.
- Perigynia beakless or short-beaked.
- Perigynia conspicuously or strongly beaked.
- Lowest bract sheathless, or if sheathing, perigynia with strongly bidentate non-hyaline apex, and stiff teeth.
- Perigynia or foliage (at least lower sheaths) pubescent; perigynia beakless, or beak not strongly bidentate.

II. MULTIFLORAE.

III. PANICULATAE.

IV. STENORHYNCHIAE.

V. ELONGATAE.

VI. OVALES.

VII. PHYLLOSTACHYAE.

VIII. POLYTRICHOIDEAE.

IX. MONTANAE.

X. TRIQUETRAE.

XI. PEDUNCULATAE.

XII. PANICEAE.

XIII. LAXIFLORAE.

XIV. GRANULARES.

XV. OLIGOCARPAE.

XVI. GRISEAE.

XVII. GRACILLIMAE.

XVIII. DEBILES.

XIX. VIRESCENTES.

- Perigynia and foliage glabrous, or if pubescent the beak of perigynium strongly bidentate.
- Perigynia rough papillose, conspicuously beaked. XX. ANOMALAE.
- Perigynia not rough-papillose.
- Achenes lenticular; stigmas two.
- Scales obtuse to acuminate, not long-aristate.
- Scales broad, long-aristate. XXI. RIGIDAE.
- Achenes triangular; stigmas three. XXII. CRYPTOCARPAE.
- Perigynia beakless or very short-beaked.
- Scales dark-tinged. XXIII. ATRATAE.
- Scales not dark-tinged. XXIV. SHORTIANAE.
- Perigynia with strongly bidentate beaks.
- Perigynia coriaceous, little if any inflated, often pubescent; bracts sheathless.
- Perigynia membranous or papery, from little to much inflated, never pubescent (rarely hispidulous).
- Perigynia lanceolate, many-nerved, tapering to the beak.
- Perigynia broader, strongly-ribbed, abruptly contracted into the beak. XXV. HIRTAE.
- Perigynia less than 10 mm. long.
- Perigynium-body ovoid or globose, not truncately contracted.
- Perigynia coarsely ribbed. XXVI. FOLLICULATAE.
- Perigynia finely and closely ribbed.
- Perigynium-body obovoid or obconic, truncately contracted into the prominent beak.
- Perigynia 10 mm. long or longer. XXVII. PHYSOCARPAE.
- XXVIII. PSEUDO-CYPERAE.
- XXIX. SQUARROSAE.
- XXX. LUPULINAE.

I. MULLENBERGIANAE.

Sheaths tight, inconspicuously if at all septate-nodulose.

Perigynia corky-thickened at the base, usually widely radiating or reflexed at maturity.

Perigynium-beak smooth; scales acuminate, deciduous; spikes mostly appressed. 1. *C. retroflexa*.

Perigynium-beak minutely roughened; scales obtuse or acutish, persistent. 2. *C. rosea*.

Perigynia not corky-thickened at the base, spreading or ascending.

Head 15-36 mm. long, the lower spikes distinct. 3. *C. Muhlenbergii*.

Head 8-20 mm. long, the spikes densely capitate. 4. *C. cephalophora*.

Sheaths loose and membranous, easily breaking, conspicuously septate-nodulose. 5. *C. sparganioides*.

II. MULTIFLORAE.

A single species in our range. 6. *C. vulpinoidea*.

III. PANICULATAE.

A single species in our range. 7. *C. prairiea*.

IV. STENORHYNCHAE.

Opaque part of sheaths conspicuously transversely rugulose. 8. *C. stipata*.

Opaque part of sheaths not transversely rugulose. 9. *C. lacini-vaginata*.

V. ELONGATAE.

Perigynia 4-5.5 mm. long, ascending or appressed, the body not margined. 10. *C. bromoides*.

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Perigynia shorter, usually spreading at maturity, thin-margined.

Perigynia little exceeding the scales: entirely staminate spikes numerous.

Perigynia much exceeding the scales: entirely staminate spikes normally absent.

Perigynia beak $\frac{1}{2}$ - $\frac{3}{4}$ the length of the scarcely serrulate body, the teeth very short, the suture on inner side inconspicuous: scales very obtuse to acutish.

Perigynia beak $\frac{1}{2}$ to nearly the length of the strongly serrulate body, strongly bidentate, the suture conspicuous: scales often sharper.

Perigynium-body lanceolate to broadly ovate, narrowed into a beak more than half its length, inconspicuously nerved on inner face.

Perigynium-body suborbicular, abruptly contracted into a beak less than half its length, conspicuously nerved on inner face.

11. *C. sterilis*.12. *C. interior*.13. *C. Leersii*.14. *C. incompta*.

VI. OVALES.

Perigynia narrowly to broadly lanceolate, at least $2\frac{1}{2}$ times as long as wide.

Leaf-blades at most 3 mm. wide, those of sterile shoots few, ascending.

Leaf-blades broader, those of sterile shoots numerous, widely spreading.

Tips of perigynia appressed or ascending: spikes 7-12 mm. long.

Tips of perigynia widely spreading or recurved: spikes 4-8 mm. long.

Perigynia ovate-lanceolate or broader, at most twice as long as wide.

Perigynia strongly exceeding the scales.

Perigynia narrowly to broadly ovate, 3-4 mm. long.

Perigynia ovate to reniform, 4 mm. or more long.

Spikes approximate or scattered, the head stiff: scales obtuse or acutish.

Spikes in a moniliform flexuous head: scales long-pointed.

Perigynia equalled by the scales.

15. *C. scoparia*.16. *C. tribuloides*.17. *C. cristatella*.18. *C. straminea*.19. *C. festucacea*.20. *C. hormathodes*.21. *C. foenea*.

VII. PHYLLOSTACHYAE.

Body of perigynium oblong: pistillate flowers usually 3-10.

Body of perigynium globose: pistillate flowers usually 2-3.

22. *C. Willdenorii*.23. *C. Jamesti*.

VIII. POLYTRICHOIDEAE.

A single species in our range.

24. *C. leptalea*.

IX. MONTANAE.

None of the culms short and hidden among the bases of the leaves.

Lower leaves reduced to sheaths: lower sheaths but little fibrillose: plants not stoloniferous.

Lower leaves blade-bearing: lower sheaths usually strongly fibrillose: plants stoloniferous.

Plants long-stoloniferous: staminate spike 12-24 mm. long.

Plants little stoloniferous: staminate spikes 4-12 mm. long.

Many of the culms short and hidden among the bases of the leaves.

25. *C. communis*.26. *C. pennsylvanica*.27. *C. varia*.28. *C. umbellata*.

X. TRIQUETRAE.

A single species in our range.

29. *C. hirtifolia*.

XI. PEDUNCULATAE.

A single species in our range.

30. *C. pedunculata*.

XII. PANICEAE.

Perigynium-beak none or very short, often bent.

Fertile culm-blades 6-10, 3-7 mm. wide: perigynia more

than 3 mm. long: spikes oblong or linear-oblong.
 Fertile culm-blades usually 3-5, 2-3.5 mm. wide: perigynia less than 3 mm. long: spikes linear.
 Perigynium-beak straight, prominent, $\frac{1}{4}$ - $\frac{1}{2}$ length of body.

31. *C. Meadii*.
 32. *C. tetanica*.
 33. *C. polymorpha*.

XIII. LAXIFLORAE.

Perigynia acutely triangular, short-tapering at the base.
 Leaf-blades very smooth (except edges), the larger ones 12 mm. wide or more, those of fertile culm much smaller than those of the sterile: perigynia smooth.
 Leaf-blades hispidulous on veins, 10 mm. wide or less: those of fertile culm moderately smaller than those of the sterile: perigynia minutely roughened.
 Perigynia short-beaked: second bract and leaves usually exceeding culm: blades 2.5-5 mm. wide, erect.
 Perigynia beakless or nearly so: second bract and leaves usually exceeded by the culm: blades 4-8 mm. wide, spreading.
 Perigynia obtusely triangular, long-tapering at the base, smooth.
 Pistillate scales very truncate; larger blades 15-40 mm. wide.
 Pistillate scales acuminate to strongly cuspidate: larger blades narrower.
 Spikes elongate, 8-20-flowered, the lower ones normally on erect, stiff peduncles.
 Perigynia obovoid; beak abruptly bent, minute: sterile shoots developing conspicuous culms.
 Culms stout: sheaths loose, the margins crisped: staminate spike short-stalked or sessile.
 Culms slender: sheaths rather tight, the margins little if at all crisped: staminate spike long- or rarely short-stalked.
 Perigynia obovoid or fusiform, with straight or oblique conspicuous beaks: sterile shoots reduced to tufts of leaves.
 Spikes short, 5-10-flowered, the lower ones on capillary, spreading or drooping peduncles.

34. *C. platyphylla*.
 35. *C. digitalis*.
 36. *C. laxiculmis*.
 37. *C. albursina*.
 38. *C. blanda*.
 39. *C. laxiflora*.
 40. *C. anceps*.
 41. *C. styloflexa*.

XIV. GRANULARES.

A single species in our range.

42. *C. granularis*.

XV. OLIGOCARPAE.

Sheaths smooth: perigynia 2.5-4 mm. long.
 Sheaths rough-pubescent: perigynia 4.5-5 mm. long.

43. *C. oligocarpa*.
 44. *C. Hitchcockiana*.

XVI. GRISAEAE.

Perigynia elliptic, 1.5 mm. wide: leaf-blades 4 mm. wide or less: bract-sheaths rough, and peduncles very rough.
 Perigynia oblong, 2 mm. wide: leaf-blades 3-7 mm. wide: bract-sheaths smooth, and peduncles nearly so.
 Leaf-blades not glaucous: larger spikes usually less than 12-flowered: lower scales usually equalling perigynia.
 Leaf-blades glaucous: larger spikes more than 12-flowered: lower scales shorter than perigynia.

45. *C. conoidea*.
 46. *C. grisea*.
 47. *C. glaucocoda*.

XVII. GRACILLIMAE.

Plants glabrous: perigynia 4 mm. long or less.
 Perigynia rounded at the apex, beakless.
 Perigynia sharp-pointed at the apex, short-beaked.
 Sheaths, and often foliage, pubescent: perigynia 4-5 mm. long.

48. *C. gracillima*.
 49. *C. prasina*.
 50. *C. Davisii*.

A single species in our range.

XVIII. DEBILES.

51. *C. flexuosa*.

XIX. VIRESCENTES.

Perigynia densely pubescent.
 Leaves exceeding the culms: lowest bract setaceous, 0.5 mm. wide: pistillate spikes oblong-cylindric: perigynia obovoid.

52. *C. Swanii*.

- Culms exceeding the leaves: lowest bract leaflet-like, 0.5-3 mm. wide: pistillate spikes linear-cylindric: perigynia elliptic. 53. *C. circoscens*.
- Perigynia glabrous at least at maturity. 54. *C. complanata*.
- Perigynia much flattened, rounded at the apex, lightly nerved.
- Perigynia swollen, nearly orbicular in cross-section, pointed at the apex, coarsely nerved.
- Perigynia 2 mm. long, brownish-green: scales not rough-cuspidate. 55. *C. caroliniana*.
- Perigynia longer, green: scales rough-cuspidate. 56. *C. Bushii*.
- XX. ANOMALAE.
- A single species in our range. 57. *C. scabrata*.
- XXI. RIGIDAE.
- Culms very strongly tufted, slender, very rough above: perigynium-beak very short, not twisted. 58. *C. stricta*.
- Culms tufted and short-stoloniferous, stout at the base, smooth above: perigynium-beak prominent, twisted when dry. 59. *C. torta*.
- XXII. CRYPTOCARPAE.
- Sheaths rough-hispid: lower pistillate scales tapering into awn. 60. *C. gymandra*.
- Sheaths smooth: lower pistillate scales abruptly contracted into awn. 61. *C. crinita*.
- XXIII. ATRATAE.
- A single species in our range. 62. *C. Buxbaumii*.
- XXIV. SHORTIANAE.
- A single species in our range. 63. *C. Shortiana*.
- XXV. HIRTAE.
- Perigynium-beak much shorter than body, the teeth 1 mm. long or less. 64. *C. lacustris*.
- Perigynia glabrous.
- Perigynia densely pubescent.
- Perigynium-beak with hyaline orifice at length somewhat bidentate: staminate spike usually one, sessile or short-stalked. 65. *C. vestita*.
- Perigynium-beak with non-hyaline strongly bidentate orifice: staminate spike long-stalked.
- Leaf-blades flat, more than 2 mm. wide. 66. *C. lanuginosa*.
- Leaf-blades involute, 2 mm. wide or less. 67. *C. lasiocarpa*.
- Perigynium-beak, including teeth, nearly as long as the body, the teeth 1.5 mm. long or more. 68. *C. trichocarpa*.
- XXVI. FOLLICULATAE.
- A single species in our range. 69. *C. folliculata*.
- XXVII. PHYSOCARPAE.
- Pistillate scales (except rarely the lowest) not rough-awned.
- Beak of perigynium smooth. 70. *C. monile*.
- Beak of perigynium rough. 71. *C. bullata*.
- Pistillate scales rough-awned. 72. *C. lurida*.
- XXVIII. PSEUDO-CYPERAE.
- Perigynia suborbicular in cross-section, more or less inflated. 73. *C. hystericina*.
- Perigynia obtusely triangular, scarcely inflated, closely enveloping achene. 74. *C. comosa*.
- XXIX. SQUARROSAE.
- Scales exceeding perigynia: terminal spike small, normally staminate. 75. *C. Frankii*.
- Scales much shorter than perigynia: terminal spike staminate at base, pistillate above. 76. *C. squarrosa*.

XXX. LUPULINAE.

Pistillate spikes globose or subglobose: style straight.

Scales strongly awned: pistillate spikes 1-12-flowered:

leaf-blades 2.5-7 mm. wide.

77. *C. intumescens*.

Scales obtuse to slightly cuspidate: pistillate spikes

6-30-flowered: leaf-blades 5-9 mm. wide.

78. *C. Asa-Grayi*.

Pistillate spikes oblong or cylindrical: style abruptly bent.

79. *C. lupulina*.

1. *C. retroflexa* Muhl. Leaves mostly shorter than the culm; blades 1-2.5 mm. in width: culms slender, 2-5 dm. tall: lower bract bristle-form: spikes 4-8, subglobose, 4-10-flowered, the upper all close together: staminate flowers terminal: scales ovate, acuminate, deciduous, about $\frac{1}{2}$ as long as the perigynia: perigynia ovate, radiating or reflexed at maturity, about 3 mm. long, smooth, compressed, but biconvex, corky-thickened at base, each tapering upwardly into a 2-toothed beak about $\frac{1}{2}$ the length of the body. — M. Rather rare, in thickets. — *Limestones*. — Spr.

2. *C. rosea* Schk. Leaves soft; blades flat, 1-2.5 mm. wide or less, shorter than the culm: culms slender or filiform, rough above, 3-7 dm. long: lower bract 1-6 cm. long: spikes 2-8, subglobose, 3-8 mm. in diameter, 2-15-flowered: scales ovate-oblong, white-hyaline, obtuse or acutish, persistent, $\frac{1}{2}$ as long as the perigynia: perigynia ovate-lanceolate, flattish, bright-green, radiately spreading, nerveless, shining, 2-4 mm. long, each narrowed into a stout 2-toothed roughened beak about $\frac{1}{4}$ the length of the body. — Common, in woods. — Sum.

3. *C. Muhlenbergii* Schk. Leaves usually shorter than the culm; blades 2-5 mm. wide, somewhat involute in drying: culms slender, erect, 3-angled, rough, at least above, 3-9 dm. tall: bracts bristle-form, very short: spikes 4-10, ovoid or subglobose, close together in an oblong head, the lower distinct: scales ovate-lanceolate, rough-cuspidate or short-awned, narrower and about length of the perigynia: perigynia broadly ovate-oval, 3 mm. long, strongly nerved to nearly nerveless, ascending or spreading, each with a short 2-toothed beak. — N. M. Rather rare, on dry hillsides. — *Sandstones and shales, limestones*. — Spr. and sum.

4. *C. cephalophora* Muhl. Leaf-blades 2-4 mm. wide: culms slender, rough above, 2.5-7 dm. tall: bracts of the lower spikes bristle-form: spikes few, subglobose, clustered in a short-oblong head 8-20 mm. long: scales ovate, rough-cuspidate or awned, the body strongly exceeded by perigynia: perigynia ovate, 2.5 mm. long, pale, nerveless or very faintly few-nerved, each tipped with a 2-toothed beak about $\frac{1}{4}$ the length of the body. — M. Rather common, on dry hillsides. — Spr. and sum.

5. *C. sparganioides* Muhl. Leaf-blades flat, 2.5-10 mm. wide, the lower very short; sheaths white or pale: culms rough, 3-angled, 5-9 dm. tall: spikes 6-12, oblong or subglobose, 5-8 mm. in diameter, the upper aggregated, the 2-4 lower ones commonly separated: lower bracts developed: scales ovate, acute or cuspidate, at least as long as the body of the perigynia: perigynia flat, ovate, 3 mm. long, spreading or radiating, pale, narrowly wing-margined, usually few-nerved on the outer face, the rough 2-toothed beak $\frac{1}{2}$ the length of the body. — Rather rare, in woods and thickets. — Sum.

6. *C. vulpinoidea* Michx. Many leaves exceeding the culm; blades 2-5 mm. wide: culms stiff, 3-angled, rough above, 3-12 dm. tall: bracts bristle-like, numerous: spikes ovoid-oblong, 4-8 mm. long, very numerous in a cluster, 3-13 cm. long: scales lanceolate, acuminate or awned, about as long as the perigynia, but narrower: perigynia ovate, 2-2.5 mm. long, greenish-yellow, flat, several-nerved on the outer face, nerveless or faintly 1-3-nerved on the inner, each tipped with a lanceolate 2-toothed beak about $\frac{1}{2}$ as long as the body. — Common, in low meadows or swamps. — Sum.

7. *C. prairea* Dewey. Leaves light-green, mostly shorter than the culm; blades plicate, 1-3 mm. wide: culms 3-10 dm. tall, very rough near the top: spikes

mainly brown, strongly separate and forming a flexuous head, 4-8 dm. long: bracts small or obsolete: scales ovate, thin, acute or short-awned: perigynia ovoid, light-brown, 2.5-3 mm. long, hard, plump, nearly flat on inner face, usually exceeded by the scales, the beak rather shorter than the body. — M. Rare, in the Dillerville swamp. — *Limestones*. — Sum.

8. *C. stipata* Muhl. Leaves green; blades flat, 4-8 mm. wide; sheaths strongly septate, the opaque part thin, strongly tranversely rugulose, easily breaking: culms stout at base, sharply 3-angled, 4-12 dm. tall: bracts bristle-form or wanting: spikes numerous, yellowish-brown, in a terminal oblong cluster 3-10 cm. long, the staminate flowers few, always terminal: scales ovate or lanceolate, acuminate, much shorter than the perigynia: perigynia lanceolate, 4-5 mm. long, each tapering into a rough flattened 2-toothed beak 1-2 times as long as the body. — Common, in meadows and swamps. — Sum.

9. *C. laevi-vaginata* (Küken.) Mackenzie. Leaves light-green; blades flat, 3-6 mm. wide; sheaths sparingly septate, the opaque part thickened at the mouth, not transversely rugulose, not easily breaking: culms little thickened at the base, sharply 3-angled, 4-8 dm. tall: bracts inconspicuous: spikes numerous, yellowish-green, in a terminal linear-oblong or oblong cluster, 2.5-6 cm. long, the staminate flowers few, always terminal: scales ovate or lanceolate, acuminate, much shorter than the perigynia: perigynia lanceolate, 4.5-5 mm. long, each tapering into a rough flattened 2-toothed beak longer than the body. — M. Frequent, in meadows and swamps. — *Limestones*. — Sum.

10. *C. bromoides* Schk. Leaves soft; blades 2 mm. wide or less, flat: culms slender, very rough above, 2-6 dm. long: bracts subulate or bristle-form, the lowest commonly elongated: spikes 3-7, narrowly oblong-cylindric, 7-18 mm. long, erect or ascending, mostly close together, the staminate flowers either basal, basal and terminal, or both: scales oblong-lanceolate, green, brownish tinged, obtusish to acuminate, shorter than the perigynia: perigynia linear-lanceolate, pale, little margined above, strongly several-nerved, 4-5.5 mm. long, the inner face flat, the tapering rough 2-toothed beak at least $\frac{1}{2}$ as long as the body. — M. Rare, in wet woods. — *Limestones*. — Sum.

11. *C. sterilis* Willd. Leaves shorter than the culm; blades 1-2 mm. wide: culms slender, 2-4.5 dm. tall, rough, at least above: spikes 3-8, subglobose or short-oblong, about 5 mm. thick: staminate flowers usually numerous at the bottom of the upper spike, or whole spikes staminate, or plants occasionally quite dioecious: scales ovate, shorter than the perigynia, obtuse or acutish: perigynia ovate, compressed, appressed or ascending, or in extreme age spreading, little exceeding scales, rough edged above, the teeth short and suture on inner face little developed, 2.5 mm. long, 1 mm. wide, several-nerved on outer face, obsolete nerved on inner face, each tapering into a sharp-edged 2-toothed rough beak not $\frac{1}{2}$ as long as the body. — M. Rare, in swamps. — *Limestones*. — Early sum.

12. *C. interior* Bailey. Similar to *C. Leersii* in habit. Leaves shorter than the culm; blades 1-2 mm. wide: culms slender, wiry, 2-6 dm. tall: spikes 2-4, nearly globular, 4 mm. in diameter: scales ovate, obtuse to acutish, conspicuously shorter than the perigynia: perigynia soon spreading, ovate, 2.25 mm. long or less, faintly few-nerved on the outer face, nearly nerveless on the inner, plump, each abruptly contracted into a roughened 2-toothed beak $\frac{1}{2}$ to $\frac{3}{4}$ as long as the very sparingly serrulate body, the teeth very short and suture on inner face not conspicuous. — M. Rather rare, in wet places. — *Limestones*. — Sum.

13. *C. Leersii* Willd. Light-green: leaves usually exceeding culm; blades 0.5-1 mm. wide: culms very slender, 1.5-3 dm. tall, smooth or very nearly so throughout: spikes 2-5, 2-8-flowered, more or less strongly separate: staminate flowers at base of terminal spike conspicuous: scales ovate, acute or short-cuspidate, much shorter than perigynia: perigynia light-green, 3-3.5 mm. long, plano-convex, obscurely nerved on inner face, widely spreading, tapering or

narrowed into a rough beak more than half the length of the body, the teeth and suture on inner face conspicuous. Our plant is *C. Loversii angustata* (Carey) Mackenzie. — N. Occasional, in boggy meadows. — *Sandstones and shales*. — Sum.

14. *C. incomperta* Bickn. Deep-green: leaves usually exceeding culm; blades 1–2 mm. wide: culms slender, 2–3 dm. tall, rough at least above: spikes 3–6, subglobose, 5–15-flowered, approximate or a little separate, about 5 mm. thick: staminate flowers at base of terminal spike conspicuous: scales ovate, acute or short-acuminate, much shorter and narrower than perigynia: perigynia deep-green, 2.5–3 mm. long, plano-convex, many-nerved on inner face, widely spreading or reflexed, the body broadly ovate or ovate-orbicular, abruptly contracted into a rough beak, half the length of the body, the teeth and suture on inner face conspicuous. — Occasional, in swamps and swampy woods. — Spr.

15. *C. scoparia* Schk. Culms slender, 1.5–7.5 dm. tall, roughish above: leaf-blades less than 3 mm. wide, those of sterile shoots few, ascending: spikes 3–10, oblong, narrowed at both ends, bright-brown, 6–16 mm. long, aggregated into an ovoid head or separated: scales thin, brown, acute or acuminate, shorter than the perigynia: perigynia lanceolate, 4–6.5 mm. long, rather less than 2 mm. wide, narrowly wing-margined, several-nerved on both faces, each tapering into a serrulate 2-toothed beak. — Rather common, in moist soil. — Sum.

16. *C. tribuloides* Wahl. Culms 2–9 dm. tall, roughish above: leaf-blades flat, 3–8 mm. wide, those of sterile shoots numerous, widely spreading: lower bract bristle-form: spikes 6–20, obovoid or top-shaped, varying to suborbicular, blunt, 7–12 mm. long: scales lanceolate, whitish, acute, about $\frac{1}{2}$ as long as the perigynia: perigynia lanceolate, greenish-brown, flat, 3.5–5 mm. long, 1.5 mm. wide, appressed or ascending, several-nerved on both faces, each with a sharply 2-toothed rough wing-margined beak. — Rather common, in moist soil. — Sum.

17. *C. cristatella* Britton. Culms 2.5–7.5 dm. tall, roughish above, overtopping the leaves: leaf-blades flat, 3–7 mm. wide, those of sterile shoots numerous, widely spreading: spikes 6–15, globose or subglobose, greenish or brownish, 4–8 mm. long, aggregated into a cylindrical or oblong head: scales lanceolate, whitish, much shorter than the perigynia: perigynia lanceolate or ovate-lanceolate, 3–4 mm. long, squarrose at maturity, narrowly wing-margined, several-nerved on both faces, each tapering into a serrulate 2-toothed beak. — Occasional, especially in the Susquehanna valley. — Sum.

18. *C. straminea* Willd. Culms slender, 3–7.5 dm. tall, roughish above, the top commonly nodding: leaves shorter than the culm; blades 2 mm. wide or less, long-pointed: bracts short or the lower bristle-form and exceeding its spike: spikes 3–8, slightly longer than thick, narrowed at the base, slightly obovoid, 4–5 mm. thick: scales lanceolate, acute, shorter and narrower than the perigynia: perigynia ascending or spreading, ovate, 3–4 mm. long, green, strongly several-nerved on the outer face, fewer-nerved or nerveless, on the inner, wing-margined, the tapering rough 2-toothed beak shorter than the body. — Rather rare, in meadows. — Sum.

19. *C. festucea* Schk. Culms slender or stoutish, 3–12 dm. tall, erect, roughened beneath head: leaves shorter than the culm; blades 2–4 mm. wide: bracts short or wanting: spikes 3–10, in a stiff head, approximate or separate, 7–15 mm. long, 4–9 mm. wide, rounded or narrowed at base: scales ovate-lanceolate, obtuse or acutish, shorter and narrower than the perigynia: perigynia spreading or ascending, orbicular to broadly ovate, 4–4.5 mm. long, 2.5–3.5 mm. wide, thickish, strongly nerved on outer face, nerveless or nearly so on inner face, green, strongly wing-margined, the rough bidentate beak one-third the length of the body. — Occasional, in low woods and swamps. — Sum.

20. *C. hormathodes* Fernald. Culms very slender, 3–9 dm. tall, the summit often nodding, usually strongly roughened above: leaves shorter than culm;

blades usually less than 2 mm. wide: sheaths without conspicuous white band: bracts narrow and bristle-form: spikes in a moniliform flexuous head, 3-9, ovoid, 7-16 mm. long, commonly clavate at base: scales lanceolate, long-acuminate or aristate, narrower than but nearly equalling perigynia: perigynia ascending, narrowly to broadly ovate, 4-6 mm. long, 2-3 mm. wide, thin, strongly about 10-nerved on each face, brownish at maturity, strongly wing-margined, the rough bidentate beak half length of body. — S. Occasional, in wet meadows and swamps. — *Schists.* — Spr.

21. *C. foenea* Willd. Culms 3-10 dm. tall, erect or nodding, little roughened above, exceeding leaves: leaf-blades 2-4 mm. wide: sheaths with conspicuous white band: bracts short or wanting: spikes 4-15, in a moniliform or flexuous head, subglobose, narrowed at base, 6-18 mm. long, 5-6 mm. wide: scales silvery-hyaline, ovate, acute to acuminate, about equalling perigynia and concealing them: perigynia ovate, appressed or loosely ascending in age, 3-4.5 mm. long, about 2 mm. wide, narrowly wing-margined, strongly several-nerved on both faces, tapering into a short rough 2-toothed beak half length of body. — S. Frequent, in rocky woods. — *Schists.* — Sum.

22. *C. Willdenovii* Schk. Leaves glabrous and pale-green, often 3-6 dm. long, much overlapping the spikes; blades 2-3 mm. wide, the lowest reduced to sheaths: culms 2-25 cm. high: spikes 1-5, androgynous, or sometimes completely staminate (the pistillate flowers usually 3-10), about 1.2 cm. long, appearing nearly basal, one of them or more on long filiform stalks: scales lanceolate, acute, acuminate or awned, hyaline-margined, finely several-nerved, the lower 1 or 2 commonly bract-like: body of the perigynium oblong, smooth, 2-3 mm. long, narrowed into a 2-edged rough beak of about its own length. — M. Rare, in thickets. — *Limestones.* — Spr.

23. *C. Jamesii* Schwein. Similar to the next preceding species, but the leaf-blades rather narrower, soft, spreading or ascending: spikes androgynous, the terminal staminate portion slender, the pistillate flowers only 1-4 and slightly separated: lower scales bract-like, the upper shorter and sometimes not exceeding the perigynia: body of the perigynium globose, 2 mm. in diameter, abruptly tipped by a subulate rough beak of more than its own length. — M. Rather rare, on dry banks and in thickets. — *Limestones.* — Spr.

24. *C. leptalea* Wahl. Leaves light-green and glabrous; blades not over 0.5 mm. wide: culms filiform, smooth, 1.5-6 dm. long: spike solitary, terminal, androgynous, linear, 4-16 mm. long: stigmas 3: perigynia few, linear-oblong, 3.5-5 mm. long, light-green, many-nerved, obtuse and beakless: scales membranous, the lowest sometimes becoming bract-like. — M. E. Rare, in swamps and low grounds. — *Limestones, quartzite.* — Spr. and sum.

25. *C. communis* Bailey. Plants not stoloniferous. Leaves light-green, shorter than the culms, the lower reduced to scarcely fibrillous sheaths; blades 2-4 mm. wide: culms slender, roughish above, 1.5-5 dm. long: lower bract 0.6-5 cm. long: staminate spike short-stalked, 4-25 mm. long: pistillate spikes 2-4, short-oblong, 3-10-flowered: scales green, ovate, mostly acute: perigynia obovoid, rather less than 2 mm. long, pale, pubescent, each with a subulate 2-toothed beak $\frac{1}{4}$ the length of the body. [*C. pedicellata* (Dewey) Britton.] — Rather rare, in dry soil. — Spr. and sum.

26. *C. pennsylvanica* Lam. Plants stoloniferous. Leaves dark-green or dull-green, the lower blade-bearing; blades 1-3 mm. wide, the old sheaths persistent and fibrillose: culms 1.5-6 dm. tall: lower bract rarely over 1 cm. long: staminate spike sessile or very short-stalked, 12-24 cm. long: pistillate spikes 1-4, short-oblong, 4-20-flowered, sessile: scales ovate, purplish, acute or cuspidate: perigynia obovoid, about 2 mm. long, pubescent, 1-ribbed on each side, each with a 2-toothed beak about $\frac{1}{4}$ the length of the body or in some forms longer. — Common, in dry soil. — Spr.

27. *C. varia* Muhl. Plants caespitose and scarcely stoloniferous. Leaf-blades 1-2.5 mm. wide, shorter or longer than the culm; culms filiform, erect or somewhat spreading, 1-4 dm. long; lower bract scale-like or subulate, rarely 2 cm. long; staminate spike 4-12 mm. long, sessile, usually rather prominent; pistillate spikes 1-4, 3-7 mm. long; scales ovate, green or purplish-tinged, cuspidate; perigynia oblong-ovoid, pubescent, about 2 mm. long, narrowed at the base, each with a subulate minutely 2-toothed beak commonly $\frac{1}{2}$ the length of the body. — Rather common, on hillsides and in woods. — Spr.
28. *C. umbellata* Schk. Plants short-stoloniferous. Leaves light-green, usually much exceeding the culms; blades 1-3 mm. wide, slender, ascending, the old sheaths fibrillose; culms tufted and matted, filiform, 2.5-15 cm. long; staminate spike commonly conspicuous; pistillate spikes 1-3, filiform-stalked from the basal sheaths or 1 or 2 of them sessile or very nearly so at the base of the staminate spike, ovoid-oblong, 4-12 mm. long; scales acuminate or short-awned, the lower hiding the perigynia; perigynia oval, pubescent, 3-angled, the body 1.5-2.5 mm. long, tipped with a subulate 2-toothed beak of nearly its length or much shorter. — M. Rare, in dry soil. — *Quartzite*. — Spr.
29. *C. hirtifolia* Mackenzie. Plants stoloniferous, pubescent all over. Leaves light-green, usually shorter than the culms; blades flat, 3-9 mm. wide; culms tufted from matted bases; staminate spike narrow, sessile or nearly so; pistillate spikes 2-4, oblong-cylindric, 6-22 mm. long, the lower short-stalked, the upper sessile or nearly so; scales obovate, thin, rough-cuspidate; perigynia oblong-obovoid, sharply triangular, about 4 mm. long, densely pubescent, more slender at the narrowed apex than at less narrowed base, about as long as the scales. — [*C. pubescens* Muhl.] — M. Occasional, in meadows and ravines. — *Limestones*. — Spr.
30. *C. pedunculata* Muhl. Plants forming dense mats. Leaves bright-green, mostly longer than the culms; blades flat, 2-4 mm. wide; culms 0.5-3 dm. tall, strongly purplish-tinged at base; upper bracts with reduced blades; staminate spike stalked, commonly 1-1.5 cm. long, often with few pistillate flowers at the base; pistillate spikes 2-4, remote, 3-8-flowered, slender-stalked, often staminate at apex; scales obovate, cuspidate, purplish-tinged; perigynia obovoid, sharply triangular above, about 4 mm. long, obscurely obliquely beaked, sparingly puberulent or becoming glabrous, the lower surpassed by the scales. — M. Rare, in woods. — *Limestones*. — Spr.
31. *C. Meadii* Dewey. Similar to the following species. Culms stouter, very rough, 2-4.5 dm. tall, usually with 6-10 developed leaf-blades, 3.5-7 mm. wide; bracts short, not overtopping the spikes; staminate spike long-stalked; pistillate spikes 1-3, oblong or linear-oblong, 8-30-flowered, dense, 1-2.5 cm. long, about 6 mm. in diameter, erect, stalked or the upper one sessile; scales ovate, green with purple-brown margins; perigynia obovoid, many-nerved, more than 3 mm. long, each tipped with a minute slightly bent beak. — S. Rare, in swamps. — *Serpentine*. — Sum.
32. *C. tetanica* Schk. Light-green and glabrous. Rootstocks deep-seated, elongate. Culms slender, rough above, 1.5-6 dm. tall, usually with 3-5 developed leaves; leaf-blades 2-3.5 mm. wide; bracts narrow, elongate; staminate spike stalked; pistillate spikes 1 to 3, erect, distant, linear, 6-20-flowered, 2.5 cm. long or less, or the lower filiform-stalked and drooping; scales ovate-oblong; perigynia oblong, obovoid, many-nerved, less than 3 mm. long, tapering to an entire orifice, beakless or minutely beaked. — Rather rare, in low woods and meadows. — Sum.
33. *C. polymorpha* Muhl. Rather dark-green from matted elongate stout rootstocks. Culms stiff, 3-6 dm. tall; leaf-blades 3-4 mm. wide, nearly erect; bracts usually little longer than the pistillate spike; staminate spikes 1 or rarely 2, long-stalked; pistillate spikes one or two, erect, short-stalked or sessile, densely 12-25-flowered, 1.5-4 cm. long, 8 mm. thick; scales red-brown, some-

what shorter than the perigynia: perigynia ovoid-oblong, obscurely 3-angled, 5 mm. long and 2.5 mm. in diameter, the beak $\frac{1}{2}$ as long as the body, straight, conspicuous, the orifice oblique. — S. Rare, in swamps. — *Schists.* — Spr. and sum.

34. *C. platyphylla* Carey. Leaves pale-green and glaucous, those of sterile culms much larger than those of fertile culms; blades elongate, 9–25 mm. wide, very smooth (except edges): culms 1–4 dm. long, spreading or reclining: staminate spike peduncled: pistillate spikes 2–4, all but the upper one slender-peduncled, erect, distant, loosely 4–10-flowered: scales acute to short-awned: perigynia acutely triangular, short-tapering at base, oblong, 2.5–3.5 mm. long, many-nerved, smooth, abruptly bent at the apex. — M. Rare, in thickets. — *Limestones.* — Spr. and sum.

35. *C. digitalis* Willd. Leaves bright-green; blades 2.5–5 mm. wide, hispidulous on veins, erect: culms weak, slender, 1–4.5 dm. long, usually exceeded by second bract and leaves: staminate spike stalked: pistillate spikes 2–4, linear, loosely alternately 3–12-flowered, 1–3 cm. long, the lower filiform-stalked, spreading or drooping: scales acute, acuminate or short-awned: perigynia oblong, minutely roughened, sharply triangular, many-nerved, 3 mm. long, more than 1 mm. thick, the short beak slightly oblique. — M. S. Rather rare, in woods. — *Schists, quartite.* — Spr. and sum.

36. *C. laxiculmis* Schwein. Leaves glaucous or at times green, spreading, hispidulous on veins; blades elongate, 4–12 mm. wide: culms slender, ascending or diffuse, 1.5–6 dm. long, usually exceeding second bract and leaves: staminate spike long-stalked: pistillate spikes 2–4, oblong, 5–10-flowered, 6–12 mm. long, about 4 mm. thick, drooping from long hair-like stalks or the upper short-stalked: perigynia ovoid-oblong, sharply 3-angled, short-tapering at base, many-nerved, minutely roughened, 3–4 mm. long, scarcely beaked, longer than the ovate green cuspidate or short-awned scales. — M. Rather rare, in woods and thickets. — Spr.

37. *C. albursina* Sheldon. Leaves deep-green; blades 7–40 mm. wide, soft: culms 1–5 dm. long, strongly flattened and winged above: staminate spike sessile or nearly so: pistillate spikes 2–4, the lower peduncled and distant, the upper approximate and sessile or nearly so: scales broadly oblong, half the length of the perigynia, very truncate, white, except the green midrib: perigynia obtusely triangular, long-tapering at base, obovoid, 3–4 mm. long, many-nerved, the beak abruptly bent. — S. Rare, in woods. — *Schists.* — Spr.

38. *C. blanda* Dewey. Leaf-blades 3–14 mm. wide, soft: culms loosely erect, coarsely cellular, nearly smooth, flattened, 1.5–6 dm. tall: sterile shoots developing conspicuous culms: bract-sheaths loose, the margins much crisped: staminate spike usually short-stalked or sessile: pistillate spikes 2–4, the upper two contiguous, the lower more or less remote, oblong or linear-oblong, erect, 6–16 mm. long, rather closely 8–25-flowered: perigynia as in *C. laxiflora* Lam. — Frequent, in rich woods and thickets. — Spr.

39. *C. laxiflora* Lam. Leaf-blades 3–7 mm. wide, soft: culms slender, roughish above, 1.5–6 dm. long, the sterile shoots developing conspicuous culms: bract-sheaths tight, the margins little crisped: staminate spike usually stalked: pistillate spikes 2–4, distant, linear-cylindric, 3–4 mm. thick, all slender-stalked, spreading or the upper erect and sessile, loosely several-many-flowered: scales ovate with broad white scarious margins, acute, cuspidate or awned: perigynia obovoid, obtusely triangular, long-tapering at base, more or less oblique, 2.5–3 mm. long, strongly many-nerved, each tapering into a short outwardly bent entire beak. — Common, in woods and thickets. — Spr.

40. *C. anceps* Muhl. Plants similar to *C. laxiflora* in habit, but usually larger, deep-green, the sterile shoots not developing conspicuous culms: leaf-blades, at least those of the lower leaves, 5–20 mm. wide, usually less than 3 dm. long:

culms nearly smooth, densely cespitose, slightly winged: staminate spike conspicuous, usually stalked: pistillate spikes few, remote, usually 2.5–4.5 cm. long, loosely flowered: scales ovate to obovate, with wide scarios margins, abruptly short-awned: perigynia appressed-ascending, obtusely triangular, narrowly obovoid or ellipsoid, 3.5 mm. long, more or less striate, narrowed at each end, the beak straight or slightly curved. — Common, in woods and thickets. — Spr. and sum.

41. *C. styloflexa* Buckl. Leaf-blades 3–6 mm. wide, shorter than the culm: culms slender, smooth, 3–8 dm. long, usually loosely cespitose: bracts short: staminate spike usually long-stalked: pistillate spikes 1–4, distant, loosely 5–10-flowered, 10–20 mm. long, the lower drooping on filiform stalks: scales ovate or ovate-lanceolate, acute, cuspidate or short-awned, usually reddish-brown tinged, shorter than the perigynia: perigynia elliptic-fusiform, 3-angled, many-nerved, 4–5 mm. long, 1.5 mm. thick, tapering into the slender beak. — Rare, in thickets. — *Schists*. — Spr. and sum.

42. *C. granularis* Muhl. Culms tufted, slender, smooth or nearly so, 1.5–7 dm. long: leaves slightly glaucous; blades 3–9 mm. wide, the basal shorter than the culm: bracts overtopping spikes: staminate spike sessile or short-stalked: pistillate spikes 3–5, erect or slightly spreading, 1–3 cm. long, 5 mm. thick, many-flowered, stalked or the upper sessile: scales ovate, acute or cuspidate: perigynia ovoid or obovoid, strongly many-nerved, 2–3 mm. long, each with a short, bent or nearly straight beak. — Common, in moist meadows and woods. — Spr. and sum.

43. *C. oligocarpa* Schk. Culms slender, roughish, 1.5–5 dm. long: leaf-blades 2.5–3.5 mm. wide, soft: sheaths smooth: bracts similar to the leaves: staminate spike long-stalked or nearly sessile: pistillate spikes 2–4, erect or nearly so, distant, loosely 2–8-flowered, 8–24 mm. long, less than 4 mm. thick, the lower filiform-stalked: scales ovate, cuspidate or short-awned: perigynia obovoid, pale, 2.5–4 mm. long, each narrowed into a short entire beak. — M. Rare, in woods and thickets. — *Limestones*. — Spr.

44. *C. Hitchcockiana* Dewey. Culms slender, 3–7 dm. tall: leaf-blades 3–7 mm. wide: bracts foliaceous, overtopping the spikes, the sheaths rough pubescent: staminate spike commonly solitary, stalked: pistillate spikes 2–4, erect, loosely 1–6-flowered, 1–2.5 mm. long: scales ovate or ovate-lanceolate, longer than the perigynia, rough awned: perigynia obovoid, green, 4.5–5 mm. long, obliquely short-beaked. — M. Occasional, in woods and thickets. — *Limestones*. — Spr.

45. *C. conoidea* Schk. Culms slender, 5–6 dm. tall: leaf-blades 2–4 mm. wide: lower bracts similar to the leaves, their sheaths rough: staminate spike long-stalked: pistillate spikes 1–3, distant, erect, oblong, 1–2.5 cm. long, 5 mm. thick, the lower long-stalked: peduncles very rough: scales broadly ovate, each contracted into a rough awn, the lower longer than the perigynia, the upper shorter than or equalling them: perigynia oblong, obtusely 3-angled, acute, beakless, 3 mm. long, 1.5 mm. thick, the orifice entire. — Rather rare, in swamps and meadows. — Sum.

46. *C. grisea* Wahl. Culms smooth or nearly so, 3–7.5 dm. long: leaves light-green, rarely slightly glaucous, 4–7 mm. wide: bracts similar to the leaves, much overtopping the spikes, their sheaths smooth: staminate spike sessile, or nearly so: pistillate spikes 3–5, oblong, 8–25 mm. long, about 4 mm. thick, the lower slender-stalked and distant: scales cuspidate or awned, the lower usually equalling perigynia: perigynia 5 mm. long, 2 mm. thick, beakless. — Common, in thickets and woods. — Sum.

47. *C. glaucodea* Tuckerm. Similar to *C. grisea*, but pale and very glaucous. Culms 1.5–6 dm. long: leaf-blades 4–10 mm. wide: bracts foliaceous: staminate spike sessile or nearly so: pistillate spikes 3–5, erect, densely flowered,

the larger usually more than 12-flowered, the lower slender-stalked: perigynia oblong, 3-4 mm. long, beakless, nearly twice as long as the scales. — S. Not common, in dry fields and banks. — *Schists, serpentine*. — Sum.

48. *C. gracillima* Schwein. Culms glabrous, 3-10 dm. long: leaves dark-green, glabrous; blades 3-9 mm. wide, shorter than the culm: lower bract foliaceous: spikes 3-5, 2-6 cm. long, nearly 4 mm. thick, filiform-stalked and drooping, the upper one partly or wholly staminate: scales ovate-oblong, pale, mostly $\frac{1}{2}$ as long as the perigynia: perigynia ovoid-oblong, rounded at apex, beakless, few-nerved, glabrous, 3 mm. long or less. — S. Rather rare, in meadows. — *Serpentine*. — Spr.

49. *C. prasina* Wahl. Leaves light-green; blades flaccid, roughish, 2.5-5 mm. wide: culms glabrous, slender, slightly roughened above, 3-angled, 3-7 dm. long: lower bract similar to the leaves, commonly overtopping the spikes: staminate spike short-stalked, often partly pistillate: pistillate spikes 2 to 4, narrowly linear-cylindric, drooping, the lower filiform-stalked, 2-6 cm. long, 4 mm. in diameter, rather loosely many-flowered: scales ovate, acute, acuminate, or short-awned, pale-green, shorter than the perigynia: stigmas 3: perigynia light-green, ovate-lanceolate, nerveless or nearly so, 3-4 mm. long, each tapering into a slender, minutely 2-toothed beak. — N. S. Rare, in rich woods and meadows. — *Sandstones and shales, schists*. — Sum.

50. *C. Davisii* Schwein. & Torr. Culms 3-9 dm. long: sheaths and often foliage pubescent. Leaves pubescent; blades 3-6 mm. wide: lower bract foliaceous: spikes 3-5, clustered, or the lower one distant, 6 mm. in diameter, 1-3.5 cm. long, at length spreading or drooping, the terminal one staminate at the base: scales ovate-lanceolate, long-awned, shorter or longer than the perigynia: perigynia much swollen, strongly several-nerved, 4-5 mm. long, each with a short minutely 2-toothed beak. — M. Rare, in moist meadows and thickets. — *Limestones*. — Spr. and sum.

51. *C. flexuosa* Muhl. Culms rough above, 1-9 dm. long: blades 2-5 mm. wide: staminate spike short-stalked, sometimes partly pistillate: pistillate spikes 2-4, linear, 3-4 mm. thick, filiform-stalked and spreading or drooping: scales ovate or oblong, $\frac{1}{2}$ as long as the perigynia or longer, usually tawny-tinged, obtuse to short cuspidate: perigynia spindle-shaped, membranous, sessile, glabrous, faintly few-nerved, obtusely 3-angled, 4.5-6.5 mm. long, less than 2 mm. thick, each tapering into a short 2-toothed beak. [*C. tenuis* Rudge.] — S. Rather rare, in woods. — *Schists*. — Sum.

52. *C. Swanii* (Fernald) Mackenzie. Culms slender, rough above, 1.5-5 dm tall: leaves light-green, pubescent, especially the sheaths; blades 2.5 mm. wide, narrowly linear-elongate: lower bract setaceous, 0.5 mm. wide, much exceeding spikes: spikes 2-5, short-stalked, oblong-cylindric, erect or nearly so, 6-20 mm. long, 3-5 mm. in diameter, the terminal one staminate below: scales oblong-ovate, cuspidate, slightly shorter than the perigynia: perigynia 3-sided, 2 mm. long, obovoid, pubescent, green, beakless, the orifice entire. [*C. virescens* authors, not Muhl.] — Common, in thickets. — Sum.

53. *C. virescens* Muhl. Similar to the next preceding species, but taller and more spreading. Lower sheaths strongly reddened: culms exceeding leaves: lowest bract leaf-like, 0.5-3 mm. wide, somewhat exceeding spikes. Leaves pubescent; blades 3-4 mm. wide: spikes 2-5, linear-cylindric, rather loose, 3 mm. in diameter, the terminal one staminate below, the lower one commonly filiform-stalked: scales ovate, shorter than the perigynia: perigynia elliptic, strongly several-ribbed, narrowed at each end, 2 mm. long, rather more than 1 mm. thick. [*C. costata* Schwein; *C. costellata* Brit.] — S. Rather rare, on moist banks. — *Schists*. — Sum.

54. *C. complanata* Torr. Culms rough above, 1.5-9 dm. long: leaves bright-green or light-green, pubescent; blades 2-4 mm. wide: spikes 2-5, dense, erect,

sessile or very nearly so, 6–20 mm. long, usually clustered, the terminal one staminate at the base: scales ovate, short-cuspidate or obtuse: perigynia oval or obovoid, flattened, not inflated, imbricate, rounded at apex, green or greenish-brown, few-nerved, slightly pubescent when young, glabrous when mature, 1–2 mm. long, the orifice entire: achenes elliptic-obovoid, its summit not bent. [*C. hirsuta* Muhl.] — Common, in meadows and thickets. — Sum.

55. *C. caroliniana* Schw. Culms slender, rough above, 3–8 dm. tall: leaves glabrous except on sheaths; blades 2–3 mm. wide: spikes 2–4, dense, erect, sessile or very nearly so, 8–18 mm. long, 4 mm. in diameter, clustered, the terminal one staminate at base: scales ovate, brown, mucronate: perigynia obovoid, squarrose, swollen, orbicular in cross-section, pointed at apex, brown, coarsely nerved, glabrous at maturity, 2 mm. long, 1 mm. in diameter, the orifice entire or emarginate: achenes pyriform. — N. Frequent, in meadows and woodlands. — *Sandstones and shales*. — Sum.

56. *C. Bushii* Mackenzie. Culms slender, roughish above, 4–8 dm. tall: sheaths pubescent; blades 2–3 mm. wide, glabrous or pubescent beneath: spikes 2–3, dense, erect, sessile or very nearly so, 6–20 mm. long, 5–8 mm. in diameter, clustered, the terminal one staminate at base: scales lanceolate, strongly rough-cuspidate: perigynia obovoid, ascending, swollen, orbicular in cross-section, pointed at apex, green, coarsely nerved, glabrous at maturity, 2.5–3 mm. long, 1.5 mm. in diameter, the orifice entire or emarginate: achenes obovoid, tipped with a bent style. — S. Frequent, in swamp, meadows, and rich woods. — *Schists, serpentine*. — Spr.

57. *C. scabrata* Schwein. Culms rough above, 3–10 dm. tall: leaves very rough above; blades much elongate, 5–18 mm. wide: bracts similar but narrower: staminate spike short-stalked: pistillate spikes 3–6, erect, the upper short-stalked, the lower sometimes spreading or drooping, all linear-cylindric, densely many-flowered, 1.5–5 cm. long, 5–9 mm. in diameter: scales lanceolate, acute or short-awned, prominently nerved, shorter than the perigynia: perigynia greenish-brown, ovoid, somewhat inflated, 3–4 mm. long, strongly several-nerved, papillose, each tipped by a long minutely 2-toothed or obliquely cut beak. — N. Rather rare, in moist woods. — *Sandstones and shales*. — Spr. and sum.

58. *C. stricta* Lam. Leaves rarely overtopping the culm; blades very rough-margined, 2–4 mm. wide: basal sheaths prominently filamentose: culms slender, stiff, in dense clumps, sharply 3-angled, very rough above, 3–11 dm. tall: lower bract similar to the leaves: staminate spikes solitary or sometimes 2, stalked: pistillate spikes 2–5, linear-cylindric, often staminate at the top, densely flowered, or loose at the base, 1.5–5 cm. long, 2–4 mm. thick, sessile or the lower stalked: scales dark, with green margins and midvein, oblong or lanceolate, appressed: stigmas 2: perigynia ovate-elliptic, acute, faintly few-nerved, 2.5 mm. long, minutely beaked, the orifice entire or nearly so. — Common, in swamps. — Spr.

59. *C. torta* Boott. Leaf-blades about 4 mm. wide; sheaths not filamentose: culms stout at base, smooth or slightly scabrous above, 4–10 dm. long, short-stoloniferous: lower bract commonly foliaceous: staminate spike usually one, stalked: pistillate spikes 3–5, erect, spreading or drooping, linear, 2–7.5 cm. long, about 4 mm. in diameter, often loosely flowered toward the base: scales ovate-oblong, dark with green midvein, shorter and mostly narrower than the perigynia: stigmas 2: perigynia oblong or narrowly ovate, green, nerveless, narrowed and more or less twisted above when dry, 2–3 mm. long. — Rather rare, creek-beds. — Sum.

60. *C. gynandra* Schwein. Similar to the following species in habit. Leaves glabrous, the sheaths finely roughened, not glaucous; blades 4–12 mm. wide: pistillate spikes 2–10 cm. long, narrowly cylindric: scales lanceolate, tapering into awn, rough, ascending, strongly 3-ribbed, 2–4 times as long as the perigynia: perigynia oblong or elliptic, faintly few-nerved or nerveless, com-

pressed, little inflated, 3-4 mm. long, and about $\frac{1}{2}$ as broad, each tapering to an acute entire orifice.—W. S. Rather rare, in low grounds.—*Sandstones and shales, schists.*—Sum.

61. *C. crinita* Lam. Culms 3-angled, 5-13 dm. tall: leaves not glaucous; sheaths smooth; blades rough-margined, 3-10 mm. wide, the lowest very short and sheathing: staminate spikes 1 or 2, stalked: pistillate spikes 2-6, narrowly cylindrical, 2-11 cm. long, 6-12 mm. in diameter, stalked, drooping: scales green, abruptly contracted into a rough awn, spreading, 2-6 times as long as the perigynia: stigmas 2: perigynia broadly obovoid, obtuse, 2-3.5 mm. long, 1-2 mm. thick, nerveless, inflated, the walls thin, each abruptly tipped by a short entire beak.—Rather common, in wet places.—Sum.

62. *C. Buxbaumii* Wahl. Culms slender, stiff, sharp-angled, rough above, 3-9 dm. tall: leaves rough; basal sheaths strongly filamentose; blades erect, 2-4 mm. wide: spikes 2-7, oblong or cylindrical, erect, all sessile and close together, or the lowest sometimes distant and short-stalked, 8-40 mm. long, about 8 mm. in diameter, the terminal one staminate at the base or rarely throughout: scales ovate, awn-tipped, black or dark-brown with a green midvein, longer than the perigynia: perigynia elliptic or obovate, flat, ascending, 3-4 mm. long, light-green, faintly few-nerved, beakless, the apex minutely 2-toothed.—M. S. Rather rare, in swamps.—*Limestones, schists, serpentine.*—Spr. and sum.

63. *C. Shortiana* Dewey. Culms slender, rough above, 3-10 dm. tall, usually overtopped by the upper leaves: leaves roughish; blades elongate, 4-8 mm. wide: bracts short, narrow, rarely much exceeding the spikes: spikes 3-7, linear-cylindrical, densely many-flowered, 1-3 cm. long, 4-5 mm. in diameter, erect, the lower stalked, uppermost staminate at base: stigmas 3: perigynia dark-brown, compressed, 2-edged, orbicular or obovoid, nerveless, 2 mm. long, ridged at apex, each abruptly minutely beaked, equalling or shorter than its scale, which is hyaline, scarious-margined, ovate or oblong-lanceolate, persistent, the orifice of the perigynium entire or very nearly so.—W. On moist banks near Conewago.—*Sandstones and shales.*—Spr. and sum.

64. *C. lacustris* Willd. Culms smooth, 5-10 dm. tall, purplish-tinged and filamentose at base, the lower sheaths of fertile culms not blade-bearing: leaf-blades elongate, 5-12 mm. wide, usually exceeding the culm: staminate spikes 1-5, linear: pistillate spikes 2-5, cylindrical, 3-10 cm. long, about 10 mm. in diameter, the upper erect, sessile or nearly so, the lower stalked: scales lanceolate or oblanceolate, long aristate or acute, purplish-tinged, the lower longer, the upper equalling or shorter than the perigynia: perigynia narrowly ovoid, 6 mm. long, 2.5 mm. wide, firm, scarcely inflated, strongly nerved, ascending, each tapering into a short 2-toothed beak, the teeth usually erect. [*C. riparia* authors.]—S. Rare, in swamps.—*Schists.*—Sum.

65. *C. vestita* Willd. Strongly stoloniferous. Culms strict and slender, 4-8 dm. tall, rough above: leaves not overtopping the culm; blades 3-5 mm. wide: bracts similar, but narrower, short, rough: staminate spike usually solitary, sessile or short-stalked: pistillate spikes 1-5, oblong, 1-2 cm. long, 6-8 mm. in diameter, erect, commonly staminate at the summit, sessile, or the lower ones short-stalked: perigynia ovoid, densely pubescent, less than 2 mm. in diameter, prominently few-ribbed, each tapering gradually into a short conic somewhat 2-toothed beak, white-hyaline at orifice, slightly shorter than or equalling the ovate, mostly acute, membranous scales.—E. S. Rare, in swamps.—*Schists, quartzite.*—Sum.

66. *C. lanuginosa* Michx. Culms slender, but usually rather stouter than those of *C. lasiocarpa*, sharp-angled and rough above. Leaves and the lower bracts elongate; blades not involute, 2-4 mm. wide, sometimes overtopping the culms: staminate spikes 1-3, long-stalked, sometimes pistillate at the base: pistillate spikes 1-3, usually distant, sessile or the lower slender-stalked, cylindrical, 5-7 mm. in diameter: scales acuminate or aristate.—M. S. Rather rare, in swamps.—*Limestones, schists, serpentine.*—Sum.

67. *C. lasiocarpa* Ehrh. Culms very slender, erect, smooth, obtusely angled, 5-9 dm. long. Leaf-blades very narrow, involute, 2 mm. wide or less, rough-margined, not overtopping the culm; lower bracts similar to the leaves, upper bracts filiform: staminate spikes 1-3, commonly 2, stalked: pistillate spikes 1-3, cylindric, 1-2.5 cm. long, about 6 mm. in diameter, erect, sessile or the lower distant and short-peduncled: scales ovate, membranous, acute or short-awned, shorter than or equalling the perigynia: perigynia green, ascending, oval-ovoid, densely pubescent, faintly nerved, about 2 mm. in diameter, each tapering into a short 2-toothed beak. [*C. filiformis* authors. Not L.] — M. Rare, in swamps. — *Limestones*. — Sum.

68. *C. trichocarpa* Muhl. Culms usually 6-8 dm. tall, smooth below, very rough above: leaf-blades elongate, rough-margined, 3-6 mm. wide: staminate spikes 2-6, long-stalked: pistillate spikes cylindric, densely flowered except at the base, 2-10 cm. long, 1-1.6 cm. in diameter, the upper sessile or nearly so and erect, the lower slender-stalked: scales hyaline, acute to aristate: stigmas 3: perigynia ovoid, pubescent in our form, many-ribbed, 8-10 mm. long, 3-4 mm. wide, each tapering into a long conspicuously 2-toothed beak, the teeth somewhat spreading. — M. Rare, in wet meadows near Lancaster. — *Limestones*. — Sum.

69. *C. folliculata* L. Yellow or yellowish. Culms erect or reclining, 4-10 dm. long: leaf-blades 4-16 mm. wide: pistillate spikes 2-5, usually distant, all except the uppermost slender-stalked, the lower often nodding: bracts commonly overtopping the spikes: stigmas 3: perigynia lanceolate, slightly inflated, rather prominently many-nerved, 12-16 mm. long, about 3 mm. in diameter near the base, each tapering from below the middle into a slender 2-toothed beak, longer than the awned scarios-margined persistent scale, the teeth nearly erect. — Rather rare, in swamps. — Sum.

70. *C. monile* Tuckerm. Culms 4-9 dm. tall, not spongy at base, acutely angled and very rough above: leaves and bracts narrow and elongate; blades 3-6 mm. wide: staminate spikes 1-4, usually 2 or 3, slender-stalked: pistillate spikes 1-3, 2.5-25 cm. long, 7 mm. wide, cylindric: stigmas 3: perigynia inflated, broadly ovoid, 5-8 mm. long, 8-10-nerved, each abruptly contracted into a slender 2-toothed smooth beak, longer than the scale. — S. Rare, in swamps. — *Schists*. — Sum.

71. *C. bullata* Schk. Culms slender, 3-9 dm. high, roughish above: leaves and bracts very narrow and elongate; blades rarely more than 4 mm. wide, rough-margined: staminate spikes mostly 2, long-stalked: pistillate spikes 1-3, light-green, oblong or oblong-cylindric, many-flowered, 2-5 cm. long, 9-18 mm. in diameter: stigmas 3: perigynia much inflated, ovoid, 5-8 mm. long, each abruptly contracted into a slender rough 2-toothed beak, dull or shining, strongly nerved, longer than the acuminate to obtusish scale. — S. Rare, in swamps. — Spr.

72. *C. lurida* Wahl. Culms slender, 2-9 dm. tall: leaves elongate, rough; blades 4-7 mm. wide: staminate spike short- or long-stalked: pistillate spikes 1-4, mostly oblong-cylindric, 2-6 cm. long, 14-20 mm. in diameter, the upper sessile, the lower peduncled: perigynia inflated, ovoid, each tapering into a long slender beak, ascending or the lower spreading, 6-9 mm. long, thin, yellowish-green, conspicuously ribbed, longer than the rough-awned scale. [*C. tentaculata* Muhl.] — Common, in swamps. — Sum.

73. *C. hystricina* Muhl. Culms 3-8 dm. tall: leaf-blades 3-8 mm. wide: staminate spike slender-stalked: pistillate spikes 1-4, oblong-cylindric, dense, 1-6 cm. long, 10-14 mm. in diameter, the lower slender-stalked and drooping: stigmas 3: perigynia ascending, somewhat inflated, ovoid-conic, 5-7 mm. long, strongly 15-20-nerved, each tapering into a slender 2-toothed beak, equalling or the upper longer than the narrow rough-awned scales. — Common, in swamps. — Sum.

74. *C. comosa* Boott. Culms commonly stout, 3-15 dm. tall: leaf-blades 6-14 mm. wide: staminate spikes short-stalked: pistillate spikes 2-6, all spreading or drooping, 3-7 cm. long, bristly, 12-14 mm. in diameter: scales mostly shorter than the perigynia, rough-awned: stigmas 3: perigynia lanceolate, little inflated, strongly reflexed when mature, each tapering into a slender prominently 2-toothed beak, the teeth subulate and recurved-spreading. — Susquehanna valley. Rare, in wet places. — Sum.

75. *C. Frankii* Kunth. Culms stout, smooth, leafy, 3-7 dm. tall: leaves roughish; blades and similar bracts elongate, overtopping culm, 3-8 mm. wide: staminate spike usually small and inconspicuous: pistillate spikes 3-6, exceedingly dense, cylindric, erect, 1-4 dm. long, about 8 mm. in diameter, the upper nearly or quite sessile, the lower slender-stalked: scales linear-subulate, longer than the perigynia: stigmas 3: perigynia green, slightly inflated, 4 mm. long, 2 mm. in diameter, few-nerved, obovate with a depressed summit from which arises the subulate 2-toothed beak. — Rather common, in swamps and meadows. — Sum. and fall.

76. *C. squarrosa* L. Culms slender, rough above on the angles, 6-9 dm. tall: leaf-blades elongate, 3-6 mm. wide, rough-margined: spikes 1-3, erect, stalked, oval, exceedingly dense, 1.5-3 cm. long, 1-2 cm. in diameter, the upper one club-shaped, staminate at the base or sometimes for $\frac{1}{2}$ its length or more: stigmas 3: perigynia yellowish-green, becoming tawny, the lower reflexed, somewhat inflated but firm, obovate, about 3 mm. in diameter, few-nerved, each truncately contracted into a subulate minutely 2-toothed beak, twice as long as the lanceolate-acuminate or awn-tipped scale. — Rather rare, in wet places. — Sum.

77. *C. intumescens* Rudge. Deep-green. Culms slender, 4-9 dm. high: leaf-blades elongate, roughish, 2.5-7 mm. wide: bracts similar, overtopping the culm: staminate spike mostly long-stalked: pistillate spikes 1-3, sessile or short-stalked, globose or nearly so: scales narrowly lanceolate, acuminate or aristate, about $\frac{1}{2}$ as long as the perigynia: stigmas 3: style straight: perigynia 1-12, spreading or the upper erect, 10-20 mm. long, much inflated, about 5 mm. in diameter above the base, many-nerved, each tapering into a subulate 2-toothed beak, the teeth somewhat spreading. — Rather rare, in swamps. — Sum.

78. *C. Asa-Grayi* Bailey. Deep-green. Culms 5-9 dm. tall: leaf-blades elongate, dark-green, 5-9 mm. wide: bracts similar to the upper leaves, usually much overtopping the culm: staminate spike mostly long-stalked: pistillate spikes 1 or 2, dense, about 2.5 cm. in diameter, 6-30-flowered: scales ovate or lanceolate, obtuse or slightly cuspidate, scarios, about $\frac{1}{2}$ as long as the perigynia: stigmas 3: style straight: perigynia ovoid, glabrous or hispidulous, much inflated, many-nerved, about 7 mm. in diameter, each tapering to a sharp 2-toothed beak. [*C. Grayi* Carey.] — M. S. Rare, on wet banks. — *Sandstones and shales, schists.* — Sum.

79. *C. lupulina* Muhl. Culms stout, 3-12 dm. tall: leaf-blades elongate, nodulose, 5-16 mm. wide, the upper ones, and the similar bracts much overtopping the culm: staminate spikes solitary or rarely several: pistillate spikes 2-5, densely many-flowered, oblong, 2.5-7.5 cm. long, 2.5 cm. or more in diameter: scales acuminate or aristate, $\frac{1}{2}$ as long as the perigynia: stigmas 3: style abruptly bent: perigynia ascending, much inflated, many-nerved, 10-20 mm. long, 4-7 mm. in diameter above the base, each tapering from below the middle into a subulate 2-toothed beak. — Rather common, in swamps. — Sum.

Order ARALES.

Perennial, frequently bog or aquatic herbs; in *Lemnaceae*, mere floating thalloid bodies. Leaves mainly basal. Flowers complete or incom-

plete, borne on a spadix accompanied by a spathe, or in *Lemnaceae* 1 or few in a pouch in the plant-body. Perianth inconspicuous or wanting. Fruit baccate or utricular.

Plants normal, with the flowers on a spadix, this sometimes subtended by or partly enclosed in a spathe. FAM. 1. ARACEAE.

Plants reduced to small floating thalloid structures, with one or few flowers. FAM. 2. LEMNACEAE.

FAMILY 1. ARACEAE. ARUM FAMILY.

Fleshy mostly acaulescent plants. Leaves with simple or divided blades. Flowers perfect, monoecious, or dioecious. Perianth of 4-6 scale-like members, or wanting. Androecium of 4-10 stamens. Gynoecium of 1 carpel, or of several united carpels. Fruit a berry or a utricle.

Flowers monoecious or dioecious: perianth wanting.

Leaf-blades palmately divided: spathe involute below, hooded above: spadix included, terete or obscurely angled. 1. ARISAEMA.

Leaf-blades pedately divided: spathe convolute throughout: spadix exserted, more or less flattened or 2-edged. 2. MURICAUDA.

Flowers perfect: perianth of several scale-like members.

Spadix surrounded by a spathe. 3. SPATHYEMA.

Spadix naked, merely subtended by a spathe.

Spadix terminating the club-shaped scape. 4. ORONTIUM.

Spadix borne somewhat laterally on the leaf-like scape. 5. ACORUS.

1. ARISAEMA Mart. Herbs of swamps or woods, with corms. Leaf-blades palmate, 3-5-divided. Scape permanently erect. Spadix clavate or cylindric, the fertile portion partially flower-bearing. Spathe cornucopia-like. Fruits red. — Spr. and sum. — JACK-IN-THE-PULPIT. INDIAN-TURNIP.

Hood of the spathe brown with light stripes: naked portion of the spadix clavate: fruits 8-12 mm. in diameter. 1. *A. triphyllum*.

Hood of the spathe black or red-brown: naked portion of the spadix cylindric: fruits 4-5 mm. in diameter. 2. *A. pusillum*.

1. A. triphyllum (L.) Torr. Plants mostly over 4 dm. tall: leaf-segments 8-30 cm. long; blades dull, rather abruptly short-acuminate: spathe-blade short-acuminate, often striped with purple or brown and green within: fruits 8-12 mm. thick. — Common, in swamps and on moist hillsides.

2. A. pusillum (Peck) Nash. Plants mostly less than 3 dm. tall: leaf-segments 5-12 cm. long: spathe-blade short-acuminate, red-brown or almost black within: fruits 4-5 mm. thick. — E. S. Rather rare, in swamps. — *Quartzite, schists*.

2. MURICAUDA Small. Herbs with corms: leaf-blades pedate, 5-17-divided. Scapes permanently erect. Spadix whip-like, the fertile portion covered with flowers. Stamens 4. Spathe wholly convolute. Fruits red.

1. M. Dracontium (L.) Small. Leaf-segments cuneate to oblanceolate, 1-3 dm. long: spathe 3-10 cm. long: fruits 6-8 mm. thick. — Common in low alluvial grounds. — Spr. — GREEN-DRAGON. DRAGON-ROOT.

3. SPATHYEMA Raf. Coarse swamp herbs with cordate leaf-blades, the petioles, and the scapes partially underground. Spadix oblong or globular, enclosed in the thick cochleate, colored spathe, the scape rigid. Flowers perfect. Perianth of 4 hooded members. Fruits immersed in the spadix.

1. S. foetida (L.) Raf. Plant garlic-scented, glabrous: leaf-blades 2-5 dm. long, often 3 dm. broad: scapes erect, mainly subterranean: spathe preceding the leaves, 8-15 cm. long, beaked, mottled: fruit-head persistent, 9-15 cm. in

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diameter, the berries green. — Common, in swamps and low meadows. — Spr. — SKUNK-CABBAGE.

4. **ORONTIUM** L. Swamp herbs. Leaves with relatively narrow blades. Spadix terminal, elongate, subtended by the thin spathe, the scape pliable, soon weak. Flowers perfect. Perianth of 4-6 scale-like members (6 below, 4 above). Fruits not immersed.

1. **O. aquaticum** L. Rootstock deeply buried. Leaf-blades oblong or elliptic, 1-3 dm. long: spadix golden-yellow, 2-6 cm. long. — Rather rare, in swamps, ponds or streams. — Spr. — GOLDEN-CLUB. BOG-TORCHES. FIRE-LEAF.

5. **ACORUS** L. Swamp or meadow herbs with aromatic rootstocks. Leaves with linear blades. Spadix lateral, elongate, at the base of the linear spathe. Flowers perfect. Perianth of 6 concave members. Fruits crowded.

1. **A. Calamus** L. Rootstock horizontal: leaves 5-20 dm. tall: scape resembling the leaves: spathe erect: spadix yellowish, 3-8 cm. long. — Common, in low grounds and swamps. — Spr. and sum. — CALAMUS. SWEET-FLAG.

FAMILY 2. LEMNACEAE. DUCKWEED FAMILY.

Floating herbs, consisting chiefly of very small, often minute, fleshy structures, sometimes with 1 or several roots. Propagative pouches 1 or 2 in each body. Flowers monoecious, one or two staminate and one pistillate in a propagative pouch. Staminate flowers consist of 1 stamen. Pistillate flowers consist of 1 carpel. Fruit a utricle.

Root solitary, without a fibro-vascular bundle: plant-body inconspicuously nerved.

1. LEMNA.

Roots several, each with a fibro-vascular bundle: plant-body conspicuously nerved.

2. SPIRODELA.

1. **LEMNA** L. Plant-body disk-like, inconspicuously nerved. Anther-sacs opening transversely. Utricle somewhat flattened, often ribbed. — Sum. — DUCKWEED.

Plants growing in large submerged masses; bodies long-stipitate.

1. *L. trisulca*.

Plants floating, more or less detached; bodies sessile.

2. *L. minor*.

1. **L. trisulca** L. Root-sheath acute: plant-bodies both submerged and aerial, often falcate, 5-10 mm. long, acute: aerial plants smaller than the submerged and short-stalked, cavernous; submerged plants with twisted stipes. — M. Rare, in ponds. — Limestones.

2. **L. minor** L. Root-sheath obtuse: plant-bodies elliptic, obovate, or suborbicular, 2-4 mm. long, mostly 3-nerved, commonly keeled on the back and papillose on the midrib: seeds 12-15-ribbed. — Susquehanna valley. Rather rare, in ponds.

2. **SPIRODELA** Schleid. Plant-body disk-like, conspicuously several-nerved. Anther-sacs opening lengthwise. Utricle lenticular, with winged margins.

1. **S. polyrhiza** (L.) Schleid. Plants mostly sterile and perennial. Roots 4-16: plant-body obovate or suborbicular, 2.5-8 mm. long, 5-15-nerved: seeds smooth. — N. M. Rather common, in ponds and along streams. — Sandstones and shales, limestones. — Sum.

Order XYRIDALES.

Terrestrial, commonly bog herbs, or epiphytes. Leaves often basal: blades prevailingly narrow. Inflorescence usually not a spadix, but often with a spathe-like bract or a spathe. Flowers mostly complete. Corolla regular or nearly so (except in some genera of *Commelinaceae* and *Pontederiaceae*). Gynoecium compound, superior or rarely inferior. Fruit a capsule or utricle, or baccate. Seed with mealy endosperm.

Inflorescence without a spathe: ovary 1-celled, with parietal placentae.

Fam. 1. XYRIDACEAE.

Inflorescence with a spathe: ovary mostly 3-celled.

Calyx and corolla of very different members: stamens free.

Fam. 2. COMMELINACEAE.

Calyx and corolla of quite similar members and partially united: stamens partially adnate to the perianth.

Fam. 3. PONTEDERIACEAE.

FAMILY 1. XYRIDACEAE. YELLOW-EYED GRASS FAMILY.

Leaves basal: blades thickish. Flowers perfect, in a compact terminal spike. Sepals 3, the two lateral firm, keeled and often appendaged, persistent, the third larger, deciduous. Petals 3, fugacious. Androecium of 3 stamens usually alternating with 3 staminodia: anthers linear. Gynoecium 3-carpellary. Fruit a capsule.

1. **XYRIS** [Gronov.] L. Rigid herbs of bogs, swamps, and pinelands. Leaves not forked at the tip, imbricate at the base of the scape. Flowers aggregated in a spike with closely imbricate scale-like bracts. Corolla yellow or white. Anthers narrow, the sacs opening lengthwise. — Sum. — YELLOW-EYED GRASS.

Lateral sepals wingless, ciliate.

1. *X. flexuosa*.

Lateral sepals winged, the wing incised or eroded above the middle.

2. *X. caroliniana*.

1. **X. flexuosa** Muhl. Leaves narrowly linear, 5–30 cm. long, acute, straight or spirally twisted: scapes 2–6 dm. tall, more or less spirally twisted, nearly terete below, 2-edged above, smooth: spikes oval or subglobose, 5–10 mm. long: lateral sepals margined, 4–5 mm. long; keel ciliate and bearded at the apex. — S. Frequent in swamps. — *Serpentine*.

2. **X. caroliniana** Walt. Leaves linear, attenuate, smooth, the longer fully $\frac{1}{2}$ as long as the scape: scapes 1–6 dm. tall, flattened and 2 edged above, the edges smooth: spikes oval or ovoid, 6–9 mm. long, obtuse; bracts loosely imbricate in few series and splitting in age: lateral sepals 4–5 mm. long: wing narrower than the sepal-body incised-toothed or eroded beyond the middle. — S. Rare, in swamps. — *Schists*.

FAMILY 2. COMMELINACEAE. SPIDERWORT FAMILY.

Annual, or ours perennial, caulescent, succulent herbs. Leaves alternate, sheathing at the base. Flowers perfect, the mostly umbel-like cymes involucrate. Calyx of 3 persistent herbaceous sepals. Corolla of 3 equal or unequal delicate petals. Androecium of 5–6 stamens, sometimes 2 or 3, mere staminodia. Gynoecium 2- or 3-carpellary. Styles united. Fruit a loculicidal 2- or 3-valved capsule.

Petals alike in shape: polliniferous stamens 6, or rarely 5.

1. TRADESCANTIA.

Petals unequal in size and shape: polliniferous stamens 3, or rarely 2.

2. COMMELINA.

1. **TRADESCANTIA** [Rupp.] L. Plants mostly erect. Leaf-blades usually relatively long and narrow. Cymes in involucre of 1-3 leaf-like bracts. Petals nearly equal. Capsules sessile.

1. **T. virginiana** L. Stems 2-4 dm. tall, green; leaf-blades mostly 2-7 dm. long, nearly flat; bracts usually much shorter than the leaves; pedicels 2.5-5.6 cm. long, villous; sepals 12-18 mm. long, villous, thin in age; petals blue; capsule 5-7 mm. long.—Frequent in moist soil, commonly on the banks of streams.—Spr.—**SPIDERWORT.**

2. **COMMELINA** [Plum.] L. Plants mostly spreading. Leaf-blades relatively short. Cymes borne in a specialized folded involucre. Perianth irregular. Corolla blue. Stamens 3 or rarely 2. Capsules hidden in the spathe.—Sum.—**DAY-FLOWER. DEW-FLOWER.**

Spathes not united at the base.

1. *C. communis*.

Spathes united at the base.

Each cavity of the ovary with 2 ovules.

2. *C. virginica*.

Ventral cavities of the ovary with 2 ovules; dorsal cavity with 1 ovule.

3. *C. hirtella*.

1. **C. communis** L. Stem or branches 3-10 dm. long; leaf-blades lanceolate or oblong-lanceolate, 4-12 cm. long, acute or acuminate; spathes 2-4 cm. long, mainly about twice as long as wide; capsules 6-7 mm. long. In waste grounds and about gardens; becoming a nuisance in some places.—Nat. of the tropics.

2. **C. virginica** L. Stem or branches 3-9 dm. long; leaf-blades lanceolate, sometimes narrowly so, 3-10 cm. long, mostly acuminate; spathes 2-3 cm. long, acuminate; capsules 4-5 mm. long.—Lower Susquehanna valley. Frequent, on open banks.—*Schists.*

3. **C. hirtella** Vahl. Stem 2-12 dm. tall, simple or sparingly branched; leaf-blades lanceolate or oblong-lanceolate, 10-20 cm. long, often scabrous; spathes usually clustered, triangular or ovate-triangular, 2-2.5 cm. long, acute; capsules 7-8 mm. long.—Lower Susquehanna valley. In rich mud along the river shore.—*Schists.*

FAMILY 3. PONTEDERIACEAE. PICKEREL-WEED FAMILY.

Bog or aquatic herbs with rootstocks. Leaves alternate: blades dilated, narrow, or mere phyllodia. Flowers 1 or several from a bract-like spathe. Calyx and corolla of rather similar partially united members. Androecium of 3-6 stamens: filaments unequally adnate to the perianth-tube. Gynoecium 3-carpellary but sometimes with a 1-celled ovary. Fruit a 1-seeded utricle or a many-seeded capsule.

Stamens 3: flowers few; perianth salverform.

Stamens equal; anthers narrow, erect; leaf-blades narrow.

1. **ZOSTERELLA.**

Stamens unequal; anthers broad, versatile; leaf-blades broad.

2. **HETERANTHERA.**

Stamens 6; flowers many; perianth 2-lipped.

3. **PONTEDERIA.**

1. **ZOSTERELLA** Small. Aquatic plants with regularly leafy stems. Spadix 1-flowered. Perianth yellow, regular, the lobes narrow, nearly equal. Stamens 3, equal; anthers narrow, erect. Ovary 3-celled; style conspicuously swollen under the stigma. Ovules numerous. Capsule many-seeded.

1. **Z. dubia** (Jacq.) Small. Stem and branches elongate; leaf-blades mainly 4-11 cm. long; perianth-lobes linear, 8-12 mm. long; capsules 4-6 mm. long.—Susquehanna and tributaries. Rather rare, in still shallow water.—Sum.—**WATER STAR-GRASS.**

2. HETERANTHERA R. & P. Plants of muddy places, with rootstocks from which arise short branches bearing a cluster of leaves and a peduncle with a bract. Spadix 1-few-flowered. Perianth white or blue, the calyx-lobes narrower than the corolla-lobes. Stamens 3, unequal, 1 of them with a longer filament and a larger anther than the others: anthers versatile. Ovary 3-celled: styles barely if at all thickened under the stigma. Ovules numerous. Capsule many-seeded.

1. H. reniformis R. & P. Leaf-blades reniform or orbicular-reniform, 1.5-6 cm. broad; spadix 2-5-flowered; perianth white or blue; tube 7-10 mm. long; capsules mostly 1 cm. long. — Susquehanna valley. Common, in shallow places in the river. — Sum. — MUD-PLANTAIN.

3. PONTERDERIA L. Bog herbs. Leaf-blades narrow or broad, on tapering petioles. Spadix many-flowered. Perianth 2-lipped, the lobes nearly equal. Anthers versatile. Ovary 1-celled. Seed solitary.

1. P. cordata L. Leaves with tapering petioles and deltoid to ovate blades 10-20 cm. long; perianth bright-blue or white; tube 7-10 mm. long; limb 3-5 mm. broad, the lobes shorter than the tube, the upper one with 2 yellow spots. — Susquehanna valley. Common, in shallow water. — Sum. — PICKEREL-WEED.

Order LILIALES.

Relatively fleshy, grass- or sedge-like herbs, rarely vines or trees. Leaves various, mostly with flat blades, sometimes scale-like or terete. Flowers perfect, polygamous, or dioecious, complete, regular or in few cases irregular. Perianth of 3 or 6 members, or rarely of 4, these more or less readily distinguished into calyx and corolla, sometimes partially united. Gynoecium of 3, or rarely 2, united carpels. Ovary superior or nearly so. Fruit various, commonly a capsule or a berry, sometimes berry-like.

Styles present, distinct or united: stigmas terminal.

Styles distinct: capsule septicial and rarely also loculicidal.

Fam. 1. MELANTHACEAE.

Styles united, often very short or obsolete during anthesis: capsule primarily loculicidal.

Sepals or petals chaffy.

Fam. 2. JUNCACEAE.

Sepals and petals not chaffy.

Herbs with bulbs, corms or rootstocks.

Plants with bulbs or corms.

Flowers in umbels, at first included in and later subtended by a scarious involucre.

Fam. 3. ALLIACEAE.

Flowers solitary or racemose without an involucre.

Fam. 4. LILIACEAE.

Plants with elongate rootstocks.

Fam. 5. CONVALLARIACEAE.

Shrubby plants with woody caudices, or trees.

Fam. 6. DRACAENACEAE.

Styles wanting: stigmas introrse, sometimes elongate.

Flowers perfect: bracts whorled.

Fam. 7. TRILLIACEAE.

Flowers dioecious: bracts alternate.

Fam. 8. SMILACACEAE.

FAMILY 1. MELANTHACEAE. BUNCH-FLOWER FAMILY.

Perennial herbs with long or short rootstocks. Leaves alternate, sometimes all basal: blades flat or plicate. Flowers borne in a terminal simple or branched inflorescence, or solitary. Perianth of 3 sepals and

3 petals. Androecium of 6, or rarely 9–12 stamens. Gynoecium 3-carpellary: styles distinct. Fruit capsular, septicial and rarely also loculicidal.

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| Plants with dioecious flowers: anthers oblong or ovoid. | 1. CHAMÆLIRIUM. |
| Plants with perfect or polygamo-monoecious flowers: anthers cordate or reniform. | |
| Sepals and petals glandless. | |
| Inflorescence racemose: flowers perfect. | 2. CHROSPERMA. |
| Inflorescence paniculate: flowers polygamo-monoecious. | |
| Ovary wholly superior: styles slender: petals obtuse. | 3. VERATRUM. |
| Ovary inferior at the base: styles very short and stout: petals acuminate. | 4. STENANTHIUM. |
| Sepals and petals with glands at or near the base. | 5. MELANTHIUM. |

1. **CHAMÆLIRIUM** Willd. Fleishy caulescent herbs. Leaves relatively few, the cauline much narrower than the basal. Flowers dioecious, in a bracted spike or raceme. Sepals and petals clavate-spatulate, those of the staminate flowers much longer than those of the pistillate, all 1-nerved. Ovules 6–12 in each cavity.

1. **C. luteum** (L.) A. Gray. Stem 2–12 dm. tall, simple: basal leaves spreading; blades spatulate to oblong-spatulate, 5–20 cm. long: staminate perianth white; pistillate green: capsules 7–10 mm. long. — Common in moist thickets. — *Schists.* — Sum. — BLAZING-STAR. DEVIL'S-BIT.

2. **CHROSPERMA** Raf. Stout caulescent herbs. Leaves many at the base of the stem, few and small above; blades elongate, flat. Flowers perfect in a thick raceme. Sepals and petals white, glandless. Carpels united below the middle. Capsule with 3 spreading lobes.

1. **C. muscaetoxicum** (Walt.) Kuntze. Stem 3–14 dm. tall, sparingly leafy: leaf-blades linear: raceme 5–15 cm. long, about $\frac{1}{2}$ as thick: sepals oval or sub-orbicular, 3–3.5 mm. long: petals oblong, 4–5 mm. long: capsules broader than high, the carpels turgid, 4–6 mm. long. — N. S. Not common, in thickets and woods. — *Sandstones and shales, schists.* — Sum. — CROW-POISON.

3. **VERATRUM** [Tourn.] L. Coarse herbs. Leaves mainly cauline; blades broad, plicate. Flowers polygamous or monoecious, paniculate, the panicle-branches pubescent. Sepals and petals glandless, greenish, yellow, brown, or purple, the latter larger than the former. Capsule narrow. Seeds winged.

1. **V. viride** Ait. Stem 6–25 dm. tall: leaf-blades oval, or narrower on the upper part of the stem: panicle-branches ascending: sepals and petals yellowish-green: petals 11–14 mm. long. — N. S. Common, in swamps. — *Sandstones and shales, schists.* — Spr. — INDIAN-POKE. AMERICAN WHITE-HELLEBORE.

4. **STENANTHIUM** Kunth. Graceful caulescent herbs. Leaves mainly basal: blades elongate, channeled. Flowers polygamous or monoecious, paniculate, the panicle-branches glabrous. Sepals and petals white or green, glandless. Seeds angled.

1. **S. robustum** S. Wats. Stem 10–20 dm. tall, stout: blades of the lower leaves over 10 mm. wide: panicle plume-like: petals of the pistillate flowers 7–8 mm. long: capsules fully 10 mm. long, erect. — Extreme S. Rare, in swamps near Pleasant Grove and New Texas. — *Serpentine.* — Sum.

5. **MELANTHIUM** L. Coarse caulescent herbs. Leaves mainly basal: blades linear or slightly dilated. Flowers monoecious or polygamous, paniculate, the panicle-branches pubescent. Sepals and petals white, cream-colored, or greenish, each with 2 glands above the claw. Seeds winged. — Sum. — BUNCH-FLOWER.

Blades of the sepals and petals oblong, entire, the filaments adnate to the base of the claws: leaf-blades linear or nearly so. 1. *M. virginicum*.
 Blades of the sepals and petals suborbicular or reniform, undulate to crisped, the filaments adnate the whole length of the claws: leaf-blades manifestly broadest above the middle. 2. *M. latifolium*.

1. *M. virginicum* L. Stem 7-17 dm. tall: leaf-blades linear, attenuate: panicle narrow, 1-5 dm. long: perianth greenish-yellow: sepals and petals with claws about $\frac{1}{2}$ as long as the blades. — N. S. Rather common, in moist woods. — *Sandstones and shales, schists*.

2. *M. latifolium* Desv. Stem 5-12 dm. tall: leaf-blades broadened above the middle, acute or acuminate: panicle 2-6 dm. long: perianth whitish: sepals and petals with claws nearly as long as the blades. — S. Rare, in woods. — *Serpentine*.

FAMILY 2. JUNCACEAE. RUSH FAMILY.

Perennial or sometimes annual herbs, usually grass-like in habit. Leaves with flat blades, or terete. Flowers scattered along the inflorescence-branches, or in dense heads. Calyx of 3 chaffy sepals. Corolla of 3 petals nearly or quite similar to the sepals. Androecium of 3 or 6, or rarely 4 or 5 stamens. Gynoecium 3-carpellary. Ovary 1-3-celled. Fruit a loculicidal capsule, or opening irregularly. Seeds sometimes appendaged.

Leaf-sheaths open: capsule 1- or 3-celled with axial or parietal placentae: seeds many. 1. JUNCUS.
 Leaf-sheaths closed: capsules 1-celled with basal placentae: seeds 3. 2. JUNCOIDES.

1. **JUNCUS** [Tourn.] L. Glabrous or merely scabrous herbs. Leaves terete or with flat but thick blades. Bracts subtending the flowers, mostly entire. — Sum. — RUSH.

Lower bract of the inflorescence terete, not markedly channeled, erect, appearing like a continuation of the scape, the inflorescence thus appearing lateral. I. EFFUSI.

Lower bract of the inflorescence not appearing like a continuation of the scape, the inflorescence therefore usually appearing terminal.

Leaf-blades with their flat surface facing the stem, or terete or channeled, not provided with node-like septa.

Flowers bracteolate, borne singly on the inflorescence-branches, or sometimes clustered, but never capitate. II. BUFONII.

Flowers not bracteolate, capitate on the inflorescence-branches. III. MARGINATI.

Leaf-blades either terete and not flattened, or flattened or compressed, with the flat surfaces not facing the stem, hollow and provided with septa.

Stamens 6, one facing each sepal and each petal. IV. ARTICULATI.

Stamens 3, one facing each sepal. V. ACUMINATI.

I. EFFUSI.

Sepals and petals green or straw-colored: stamens 3; anthers as long as the filaments.

1. *J. effusi*.

Sepals and petals chestnut-brown on either side of the midrib: stamens 6; anthers longer than the filaments.

2. *J. balticus*.

II. BUFONII.

Annual plants.

3. *J. bufonius*.

Perennial plants.

Auricles of the leaf-sheaths membranous or scarious, whitish.

Primary bracts shorter than the inflorescence: leaf-auricles membranous, rarely if at all prolonged beyond the insertion.

4. *J. secundus*.

Primary bracts longer than the inflorescence: leaf-auricles scarious, markedly prolonged beyond the insertion.

5. *J. tenuis*.

Auricles of the leaf-sheaths cartilaginous, yellow or yellow-brown.

6. *J. Dudzeyi*.

III. MARGINATI.

Plants erect: inflorescence commonly 5-15, usually 5-10-flowered.

7. *J. marginatus*.

IV. ARTICULATI.

Plants with globose heads: sepals shorter than the petals: capsules subulate.

8. *J. nodosus*.

V. ACUMINATI.

Capsules subulate.

9. *J. scirpoides*.

Capsules oblong to ovoid.

Seeds tapering at both ends and caudate.

Petals less than 3 mm. long: heads 2-7-flowered: capsule usually much longer than the petals.

10. *J. brachycephalus*.

Petals 3 mm. long or more: heads many-flowered: capsule about as long as the petals.

11. *J. canadensis*.

Seeds abruptly narrowed at both ends and merely apiculate.

Sepals and petals 2.5-3.5 mm. long: capsule ovoid-lanceolate in outline, broadly acute and mucronate, about as long as the perianth.

12. *J. acuminatus*.

Sepals and petals 2-2.5 mm. long: capsule linear-lanceolate in outline, obtuse and merely apiculate, exceeding the perianth.

13. *J. debilis*.

1. *J. effusus* L. Scapes 5-12 dm. tall, striate near the top: leaf-blades obsolete, or mere acicular rudiments: inflorescence open: flowers perfect: mature perianth 2.5-3 mm. long: sepals and petals lanceolate: capsules obovoid, readily dehiscent, rounded at the apex. — Common, in swamps.

2. *J. balticus* Willd. Scapes 2-11 dm. tall: leaves mere bladeless sheaths: panicle mostly narrow: flowers perfect: sepals lanceolate, 3-4 mm. long: petals similar to the sepals but slightly shorter: capsules 3.5-4 mm. long, about equaling the sepals, beaked. — M. Rare, in the Dillerville swamp. — *Limestones*.

3. *J. bufonius* L. Stems mostly less than 2 dm. tall: leaf-blades flat, or involute on small plants: panicle diffuse: sepals oblong-lanceolate, 4-6 mm. long, acuminate: petals linear-oblong, obtuse, shorter than the sepals: stamens less than $\frac{1}{2}$ as long as the perianth: capsules oblong. — Rather rare, on roadsides.

4. *J. secundus* Beauv. Scapes 1-4 dm. tall: flowers permanently approximate: sepals becoming 3.5 mm. long: petals green, longer than the sepals, about as long as the capsule. — S. Rare, in swamps and on muddy banks. — *Schists*.

5. *J. tenuis* Willd. Scapes 2-9 dm. tall: auricles of the leaf-sheath scarious: sepals lanceolate, 3-4 mm. long, acuminate: petals slightly broader than the sepals, much longer than the ovoid or obovoid capsule: anthers much shorter than the filaments. — Common, in swamps and low grounds.

6. *J. Dudleyi* Wiegand. Scapes 3-10 dm. tall: auricles of the leaf-sheaths cartilaginous: sepals 4-5 mm. long, lanceolate, becoming very firm: petals shorter than the sepals, acuminate, slightly longer than the oval capsule: stamens 6; anthers shorter than the filaments. — N. Rare, on hillsides near Mt. Hope. — *Sandstones and shales*.

7. *J. marginatus* Rostk. Stems 1.5-5 dm. tall, somewhat bulbous at the base: blades of the basal leaves 1-3 mm. wide: heads relatively large, commonly 5-15 together: sepals ovate to ovate-lanceolate, 2.5-3 mm. long, acute: petals obovate or oblong-obovate, obtuse, slightly longer than the sepals, slightly longer than the obovoid capsule: stamens 3. — S. Rare, in moist grounds. — *Schists*.

8. *J. nodosus* L. Stems 1-6 dm. tall, borne singly on the rootstock: cauline leaves 2-4; blades slender, conspicuously septate: sepals lanceolate-subulate, 3-3.5 mm. long: petals longer than the sepals, acuminate: capsules manifestly surpassing the perianth, short-beaked. — M. Rare, in the Dillerville swamp. — *Limestones*.

9. *J. scirpoides* Lam. Stems 2-7 dm. tall: leaf-blades terete, 2-3 mm. thick, the septa complete: sepals subulate-lanceolate, 2.5-3.5 mm. long: petals slightly

shorter than the sepals: capsule slender, exceeding the perianth. — Lower Susquehanna valley. Rather rare, on river banks and sandy islands. — *Schists*.

10. **J. brachycephalus** Engelm. Stem 2-9 dm. tall: leaf-blades terete, 2 mm. thick or less: heads scattered or rarely solitary: sepals oblong-lanceolate, 2-2.5 mm. long, acute: petals about $\frac{1}{4}$ longer than the sepals: capsules oblong, stout, longer than the petals. — M. Rare, in the Dillerville swamp. — *Limestones*.

11. **J. canadensis** J. Gay. Stems 3-12 dm. tall: heads many-flowered, rather crowded: sepals lanceolate, 3-3.5 mm. long: petals longer than the sepals, attenuate, nearly as long as the stout capsule: capsules narrowly conic: seeds long-tailed at each end. — N. Rather rare, in low grounds. — *Sandstones and shales*.

12. **J. acuminatus** Michx. Stems 2-8 dm. tall: heads generally 5-12-flowered: sepals lanceolate-subulate, 2.5-3.5 mm. long: petals slightly shorter than the sepals: capsules about equalling the sepals, ovoid: seeds acute at both ends. — Rather common, in moist soil.

13. **J. debilis** A. Gray. Stems 2-4 dm. tall: heads generally 2-6-flowered: sepals narrowly lanceolate, 2-2.5 mm. long: petals nearly equalling the sepals: capsules oblong, exceeding the sepals and petals. — N. Rare, in moist soil. — *Sandstones and shales*.

2. **JUNCOIDES** Adans. Pubescent herbs. Leaf-blades flat and relatively thin, or sometimes involute. Bracts subtending the flowers usually lacerate or denticulate. — Spr. — **WOOD-RUSH**.

Peduncles or pedicels terminated by one or few flowers.
 Peduncles or pedicels terminated by a spike-like cluster.

1. *J. Carolinac.*
 2. *J. campestre.*

1. **J. Carolinae** (S. Wats.) Kuntze. Plants 1-3 dm. tall: leaf-blades flat, 3-9 mm. wide, ciliate, and webbed on both surfaces, gland-like at the blunt tip: flowers solitary or 2 together: sepals, and petals, 3.5-4 mm. long, lanceolate: anthers longer than the filaments: capsule ovoid, surpassing the perianth. — M. Rare, on shaded banks of creeks. — *Limestones*.

2. **J. campestre** (L.) Kuntze. Plants 1-5 dm. tall: leaves webbed throughout: sepals, and petals, lanceolate or ovate-lanceolate, 3.5-4 mm. long: capsule shorter than the perianth. — Common, in woods and thickets.

FAMILY 3. **ALLIACEAE**. ONION FAMILY.

Perennial herbs with coated bulbs or corms. Leaves basal or mainly so: blades typically narrow. Flowers in a terminal umbel subtended by a scarious involuere at the top of the simple scape or stem. Perianth of 3 sepals and 3 petals, persistent. Androecium of 6 stamens. Gynoecium 3-carpellary. Ovary superior. Styles united. Fruit a loculicidal capsule. Ovules 2 in each ovary-cavity: scape, or stem, accompanied by leaves.

Ovules 1 in each ovary-cavity: scape not accompanied by leaves.

1. **ALLIUM**.
 2. **VALIBALLIUM**.

1. **ALLIUM** [Tourn.] L. Alliaceous herbs. Leaf-blades narrow, sometimes hollow or keeled. Perianth white or variously colored. Stamens with nearly equal filaments or alternately appendaged. — Sum. — **ONION**. **GARLIC**.

Umbels nodding: plants acaulescent.
 Umbels erect: plants caulescent.

1. *A. cernuum*.

Bulbs membranous-coated: filaments dilated and the alternate ones appendaged.

2. *A. vineale*.

Bulbs fibrous-coated: filaments merely dilated at the base.

3. *A. canadense*.

1. **A. cernuum** Roth. Scapes 2-6 dm. tall, 2-edged: umbel nodding; pedicels becoming 2-3 cm. long: sepals acute: petals oval, rounded or erose at the apex,

4.5–6 mm. long: capsules 4–5 mm. long. — Rather common, on banks and dry hillsides. — WILD-ONION.

2. *A. vineale* L. Stems 3–9 dm. tall: leaves terete: umbel erect, the flowers wholly or partially replaced with bulblets: perianth green, pink, or purple: sepals mainly ovate, 4–5 mm. long: petals slightly longer than the sepals: filaments opposite the petals with 2 lateral appendages. — Common, in old fields. — FIELD-GARLIC.

3. *A. canadense* L. Stems 2–6 dm. tall: umbel erect, with most of the flowers replaced with bulblets: perianth pink or white: sepals oblong to oblong-lanceolate, 4–5 mm. long: petals lanceolate to oblong-lanceolate, slightly longer than the sepals, acute or acutish at the apex: filaments alternately longer and shorter. — Rather rare, in thickets and meadows. — WILD-GARLIC.

2. **VALIDALLIUM** Small. Alliaceous herbs. Leaf-blades dilated. Perianth white or pale. Stamens unequal, the filaments alternately subulate and lanceolate.

1. *V. tricoccum* (Ait.) Small. Leaves vernal; blades oblong to oblong-elliptic, 1–3 dm. long: scapes 1–4 dm. tall: umbel erect: perianth white: sepals oblong, 5–7 mm. long, obtuse: petals oval, longer than the sepals, somewhat shorter than the filaments: capsule about 6 mm. broad. — Lower Susquehanna valley. In rich woods on islands. — *Schists.* — Sum. — WILD-LEEK.

FAMILY 4. LILIACEAE. LILY FAMILY.

Perennial mainly caulescent herbs. Leaves alternate to whorled, sometimes all basal: blades entire or essentially so. Flowers solitary or variously clustered. Calyx of 3 sepals. Corolla of 3 petals, together with the sepals sometimes partially united into a tube. Androecium of 6 stamens, the anthers distinct. Gynoecium of 3 united carpels. Fruit a loculicidal capsule.

Sepals, and petals, distinct.

Anthers not introrse: plants with scaly or solid bulbs.

Anthers versatile: seeds flat.

Anthers erect: seeds globose.

Anthers introrse: plants with coated bulbs.

Sepals, and petals, more or less united.

Perianth globular to urceolate, with tooth-like lobes.

Perianth funnellform, with spreading or recurved lobes.

1. LILIUM.

2. ERYTHRONIUM.

3. ORNITHOGALUM.

4. MUSCARI.

5. HEMEROCALLIS.

1. **LILIUM** L. Tall caulescent herbs with scaly bulbs. Leaf-blades flat, relatively short. Perianth showy, the sepals, and petals, distinct. Filaments slightly adnate to the sepals and petals: anthers versatile. — Sum. — LILY.

Flower, or flowers, erect: sepals and petals narrowed into claws.

1. *L. philadelphicum.*

Flower, or flowers, horizontal or nodding: sepals and petals without claws.

Sepals and petals with spreading tips: leaf-blades finely

roughened on the edges and nerves beneath.

Sepals and petals with recurved tips: leaf-blades smooth.

2. *L. canadense.*

3. *L. superbum.*

1. *L. philadelphicum* L. Stems 3–9 dm. tall: leaves mainly whorled; blades narrowly elliptic to linear, 3–10 cm. long: sepals 5–6 cm. long, with oblong, elliptic, or oval blades: petals with broader blades than the sepals or sometimes ovate: capsules 2–4 cm. long. — Common, in thickets.

2. *L. canadense* L. Stems 6–15 dm. tall: leaves mainly whorled; blades lanceolate to oblong or elliptic-lanceolate, 5–15 cm. long, acute or acuminate, roughened on the margins and the veins beneath: flowers usually few: sepals and petals red or yellowish, often variegated, usually spotted, 4.5–7.5 cm. long, the

upper portion spreading: capsules 3-5 cm. long. — Rather rare, in wet thickets and meadows.

3. *L. superbum* L. Stems 8-25 dm. tall; leaves mainly whorled; blades elliptic, elliptic-lanceolate, or nearly linear, 5-15 cm. long, acuminate, smooth; flowers usually many; sepals and petals orange, red, or orange-yellow, usually purple-spotted, 6-10 cm. long, recurved from below the middle; capsules 3-5 cm. long. — S. Not very common, in low grounds. — *Schists*.

2. *ERYTHRONIUM* L. Low herbs with deeply buried corms and subterranean stems. Leaves generally 2; blades dilated. Perianth white or colored, the sepals and petals distinct. Filaments nearly free; anthers erect. — Spr. — **DOG'S-TOOTH VIOLET.**

Styles united to above the middle, topped by 3 spreading or recurved stigmas: perianth white, pink or purplish within. 1. *E. albidum*.
Styles wholly united: stigma terminal: perianth yellow within. 2. *E. americanum*.

1. *E. albidum* Nutt. Leaf-blades oblong to elliptic, 5-15 cm. long, often mottled; scape 1-3 dm. tall; sepals and petals white, pink, or purplish, curved; stigmas spreading or recurved; capsule 1-2 cm. long. — Lower Susquehanna valley. Rare, in moist soil. — *Schists*.

2. *E. americanum* Ker. Leaf-blades oblong to elliptic, 10-15 cm. long, commonly mottled; scape 1-3 dm. tall; sepals and petals green or greenish without, yellow within or rarely partly red, 3-3.5 cm. long, recurved; stigmas erect; capsule 1-1.5 cm. long. — Common, on moist banks.

3. *ORNITHOGALUM* [Tourn.] L. Scapose succulent herbs with coated bulbs. Leaf-blades narrow, elongate. Corymb or raceme bracted. Sepals and petals white or greenish without, nearly equal. Filaments flattened. Anthers versatile. Style shorter than the ovary. Ovules several or numerous in each carpel. — Spr.

Inflorescence corymbose: filaments unappendaged. 1. *O. umbellatum*.
Inflorescence racemose: filaments appendaged. 2. *O. nutans*.

1. *O. umbellatum* L. Scapes 1-3.5 dm. tall; leaf-blades usually paler-green near the midrib, 2-5 cm. wide; flowers erect; sepals and petals oblong to oblong-lanceolate, 10-20 mm. long; filaments subulate to subulate-lanceolate; anthers oblong. — Common, in fields and woods. Nat. of Eu. — **STAR-OF-BETHLEHEM.**

2. *O. nutans* L. Scapes 3-6 dm. tall; leaf-blades evenly green, 6-11 mm. wide; flowers nodding; sepals and petals lanceolate to oblong-lanceolate, 27-35 mm. long; filaments broadly winged and toothed near the anthers; anthers linear. — N. M. Rare, in fields. Nat. of Eu.

4. *MUSCARI* [Tourn.] Mill. Scapose succulent herbs with coated bulbs. Leaf-blades elongate, channeled. Racemes dense, inconspicuously bracted. Perianth globular to urceolate, commonly deep-blue. Filaments adnate to the perianth-tube up to near the anthers. Anthers nearly as wide as long. Ovules 2 in each carpel. Capsules 3-angled or 3-winged. — Spr. — **GRAPE-HYACINTH.**

Perianth oblong-urceolate: anthers borne alternately high and low on the perianth. 1. *M. botryoides*.
Perianth globular: anthers borne evenly on the perianth. 2. *M. racemosum*.

1. *M. botryoides* (L.) Mill. Plants 8-25 cm. tall; leaves erect; blades mostly 6-8 mm. wide; perianth mostly 2.5-4 mm. long; lobes as long as wide, about equal; style shorter than the ovary. — Rather common, about gardens and in meadows. Nat. of Eu.

2. *M. racemosum* (L.) Mill. Plants 11-28 cm. tall; leaves recurved; blades mostly 2-4 mm. wide; perianth 4.5-5.5 mm. long; lobes broader than long, un-

equal; style about as long as the ovary. — Occasional, in meadows and about gardens. Nat. of Eu.

5. **HEMEROCALLIS** L. Acaulescent herbs, with thickened coated bulbs. Leaf-blades elongate-linear. Perianth yellow or orange, funnellform, the lobes broad, longer than the tube. Filaments adnate to the perianth-tube.

1. **H. fulva** L. Plants 1-2 m. tall; leaf-blades mostly 1.5-2 cm. wide; perianth mainly tawny-orange; tube about 3 cm. long; corolla-lobes 8-10 cm. long, red near the center, orange near the tips, the margins involute, crisped; capsules obovoid, 4-6 cm. long. — Common, in meadows and on roadsides. Nat. of Eu. — Sum. — DAY-LILY.

FAMILY 5. **CONVALLARIACEAE.** LILY-OF-THE-VALLEY FAMILY.

Perennial herbs, with rootstocks. Leaves alternate, sometimes all basal, sometimes scale-like. Flowers in a terminal cluster, raceme, or panicle, or axillary. Calyx of 2 or 3 sepals. Corolla of 2 or 3 petals, together with the sepals sometimes partially united. Androeceium of 4 or 6 stamens. Gynoeceium of 2 or 3 united carpels. Fruit a berry or rarely a tardily dehiscent capsule.

Sepals and petals distinct or essentially so.

Flowers axillary; leaves scale-like; branchlets proliferous.
Flowers terminal, sometimes apparently axillary; leaves, or most of them, not scale-like; plants not proliferously branched.

Flowers in a terminal raceme or panicle; perianth white or whitish.

Sepals and petals 3 each; stamens 6; gynoeceium 3-carpellary.

Sepals and petals 2 each; stamens 4; gynoeceium 2-carpellary.

Flowers solitary in the axils; perianth yellow or yellowish.

Sepals and petals with ridges on either side of a deep nectary; capsule obovoid or turbinate, 3-lobed.

Sepals and petals without ridges or nectary; capsule elliptic or oval, 3-winged.

Sepals and petals partially united into a tube.

1. **ASPARAGUS.**

2. **VAGNERA.**

3. **UNIFOLIUM.**

4. **UVULARIA.**

5. **OAKESIELLA.**

6. **POLYGONATUM.**

1. **ASPARAGUS** [Tourn.] L. Caulescent herbs, the branches plume-like on account of the minute branchlets clustered in the axils of the scales. Leaves scale-like. Flowers mainly solitary in the axils, nodding. Berry nodding.

1. **A. officinalis** L. Stem at first scaly and succulent, becoming slender and firmer, 4-20 dm. tall; sepals and petals 4-7 mm. long, linear or nearly so, the latter broader than the former; berries red, 6-8 mm. in diameter. — Rather common, in fence-rows and about gardens. Nat. of Eu. — Spr. and sum. — **ASPARAGUS.**

2. **VAGNERA** Adans. Herbs with simple stems. Leaves several. Flowers in a terminal raceme or panicle. Sepals and petals of a linear, lanceolate, or oblong type. Filaments dilated or inflated. Stigma obscurely 3-lobed or nearly entire. Ovules 2 in each ovary-cavity. Berries spreading. — Sum. — **WILD-SPIKENARD.**

Inflorescence paniculate; sepals and petals linear.

Inflorescence racemose; sepals and petals oblong to lanceolate.

1. **V. racemosa.**

2. **V. stellata.**

1. **V. racemosa** (L.) Morong. Stems 3-9 dm. tall; leaf-blades oblong, oblong-lanceolate, or elliptic, 5-20 cm. long, sessile; panicle 3-10 cm. long, many-flowered; sepals and petals white, 1.5-2 mm. long; berries globular, 4-6 mm. long, red, or spotted with purple. — Common, in woods and thickets.

2. **V. stellata** (L.) Morong. Stems 2-5 dm. tall; leaves minutely pubescent; blades ovate, elliptic, or oblong-lanceolate, 7-14 cm. long; sepals about 4 mm. long; petals 5-5.5 mm. long; berries 7-10 mm. in diameter, green with black stripes or black. — Lower Susquehanna valley. In woods, chiefly on islands in the river.

3. **UNIFOLIUM** Adans. Herbs with simple stems. Leaves few. Flowers in a terminal raceme. Filaments filiform or subulate. Stigmas 2. Ovules 2 in each ovary-cavity. Berries spreading.

1. **U. canadense** (Desv.) Greene. Stem 5-15 cm. tall; leaves 2 or 3; blades ovate to lanceolate, 2-8 cm. long, truncate or subcordate at the base; sepals and petals 2.5-3.5 mm. long; berries globular, about 4 mm. in diameter, red-speckled. — Rather common, in moist woods. — Spr. — TWO-LEAVED SOLOMON'S SEAL.

4. **UVULARIA** L. Herbs with terete forking stems. Leaf-blades perfoliate, membranous, smooth-margined. Sepals and petals acuminate. Anthers longer than the filaments. Ovary nearly globular. Seeds about $\frac{1}{2}$ covered with the thin aril.

1. **U. perfoliata** L. Stem 1-8 dm. tall; leaf-blades oblong or oval, or slightly broadened upward, 3-6 cm. long; pedicels 5-25 mm. long; anther-connectives acute; capsules about 1 cm. long. — Common, in rich woods. — Spr. — BELLWORT.

5. **OAKESIELLA** Small. Herbs with angled forking stems. Leaf-blades sessile, leathery, scabrous-margined. Sepals and petals blunt. Anthers longer than the filaments. Ovary oblong. Seeds with a swollen spongy raphe.

1. **O. sessilifolia** (L.) Small. Stem 1-4 dm. tall; leaf-blades elliptic to oblong, 3-8 cm. long, thin; sepals and petals 1.5-2 cm. long, nearly linear; capsules oval 1.5-2.3 cm. long. Common, in moist woods and on banks. — Spr. — BELLWORT.

6. **POLYGONATUM** [Tourn.] Mill. Herbs with jointed rootstocks and simple stems. Leaves spreading; blades sessile. Flowers 1 or few terminating axillary peduncles, drooping. Perianth white or greenish; lobes erect or nearly so. Filaments adnate to the middle of the perianth-tube or above it. Berries globular, blue or nearly black. Seeds flattened. — Spr. — SOLOMON'S-SEAL.

Filaments rough, adnate to the perianth-tube for about $\frac{3}{4}$ its length.

Filaments smooth, adnate to the perianth-tube for about $\frac{1}{2}$ its length.

1. *P. biflorum*.

2. *P. commutatum*.

1. **P. biflorum** (Walt.) Ell. Stems 2-9 dm. tall; leaf-blades oval, oblong, or oblong-lanceolate, 4-10 cm. long, pubescent beneath; peduncles commonly 2-flowered; perianth 8-12 mm. long; berries 6-8 mm. in diameter. — Common, in moist woods and on banks.

2. **P. commutatum** (R. & S.) Dietr. Stems 3-25 dm. tall; leaf-blades oblong, oblong-lanceolate, oval, or oval-ovate, 5-15 cm. long, glabrous; peduncles usually more than 2-flowered; perianth 10-20 mm. long; berries 8-12 mm. in diameter. — S. Rather common, in rich soil, especially near streams. — *Schists*.

FAMILY 6. DRACAENACEAE. YUCCA FAMILY.

Shrubby plants or trees, with woody, generally copiously leafy, caudices. Leaves alternate; blades narrow, firm or rigid, sometimes filiferous. Flowers in racemes or panicles terminating scape-like stems.

Calyx of 3 generally white or pale sepals. Corolla of 3 petals nearly similar to the sepals. Androecium of 6 stamens. Gynoecium superior, of 3 united carpels. Style stout, sometimes obsolete during anthesis. Fruit a primarily loculicidal capsule, sometimes indehiscent or baccate.

1. **YUCCA** [Rupp.] L. Caudex commonly leafy throughout. Flowers perfect, relatively large, in panicles or racemes. Sepals and petals several-nerved, deciduous. Ovules numerous. Capsule dehiscent, or baccate. Seeds black.

1. **Y. filamentosa** L. Caudex short: leaves firm, 3-6 dm. long, stiffly erect or spreading, with curly fibers: panicle-branches usually glabrous: capsules 5-6 cm. long: seed lustrous, about 7 mm. long.—M. Rare, on banks of the Little Chiquisalunga Creek. Escaped from gardens. Nat. southward.—Sum.—BEAR-GRASS. ADAM'S-NEEDLE.

FAMILY 7. TRILLIACEAE. TRILLIUM FAMILY.

Perennial herbs with rootstocks. Leaves in a whorl on the stem, or basal and wanting on the mature plant: blades broad. Bracts leaf-like in a whorl at the top of the scape or peduncle. Flowers perfect, solitary or in a terminal cluster. Calyx of 3 sepals. Corolla of 3 petals more or less different from the sepals. Androecium of 6 stamens. Gynoecium of 3 united carpels. Stigmas 3. Ovules several in each ovary-cavity. Fruit baccate.

Flowers several in an umbel-like cluster: sepals and petals nearly alike: flowering stem with a whorl of leaves and a whorl of bracts. 1. MEDEOLA.
Flowers solitary: sepals and petals very different: flowering stem (scape) with only a whorl of leaf-like bracts. 2. TRILLIUM.

1. **MEDEOLA** [Gronov.] L. Cauliscent herbs, with long brittle rootstocks. Leaves and bracts with thinnish blades. Pedicels slender, more or less declined. Anthers shorter than the filaments.

1. **M. virginica** L. Stem 2-9 dm. tall: leaves 4-10; blades elliptic, spatulate, or obovate, 5-15 cm. long: bracts smaller than the leaves: sepals and petals greenish, 9-11 cm. long: berries spheroidal, 8-15 mm. thick, dark-purple.—Common, in moist woods.—Spr.—INDIAN CUCUMBER-ROOT.

2. **TRILLIUM** L. Scapose herbs with firm corn-like rootstocks. Leaves and bracts with thick blades. Pedicels stout, or solitary flower sessile. Anthers longer than the filaments.—Spr.—WAKE-ROBIN. BIRTHROOT.

Stigmas stout, tapering, the tips recurved: anthers stout: petals less than 4 cm. long: berry ovoid.

Stamens overtopping the stigmas; filaments mostly less than $\frac{1}{2}$ as long as the anthers.

Stamens overtopped by the stigmas; filaments mostly over $\frac{1}{2}$ as long as the anthers.

Stigmas slender, of equal diameter throughout, mostly erect or spreading: anthers slender: petals over 4 cm. long: berry subglobose.

1. *T. erectum*.

2. *T. cernuum*.

3. *T. grandiflorum*.

1. **T. erectum** L. Scape 3-6 dm. tall: bracts 8-18 cm. long; blades rhombic, often broader than long: pedicel 3-10 cm. long, erect or nearly so: sepals oblong or lanceolate, 2-3.5 cm. long: petals lanceolate or ovate-lanceolate, brown-purple or nearly white: anthers 5-9 mm. long: berry purple or nearly black.—Common, in rich woods along the river and creeks.

2. **T. cernuum** L. Scape 2-6 dm. tall: bracts 6-12 cm. long; blades sometimes decidedly wider than long: petals white, broadly ovate: anthers 8-10 mm. long: berry purple.—Frequent, in rich woods along the river and creeks.

3. **T. grandiflorum** (Michx.) Salisb. Scape 2-5 dm. tall; bracts 6-14 cm. long; blades oval or rhombic-oval, acuminate; pedicel 5-8 cm. long, erect or nearly so; sepals lanceolate, 2.5-5 cm. long, acute; petals oblanceolate or obovate-lanceolate, white or pink, or later rose, crisped; berry erect, 2-2.5 cm. thick. — S. Abundant, in rich woods near Haines. — *Schists*.

FAMILY 8. **SMILACACEAE.** SMILAX FAMILY.

Perennial armed or unarmed vines. Leaves alternate: blades several-ribbed and netted-veined, commonly persistent: petiole usually bearing a pair of appendages. Flowers dioecious, in axillary peduncled umbels. Perianth regular, usually green, that of the staminate flowers larger than that of the pistillate.

Stems herbaceous, annual, unarmed: ovules 2 in each ovary-cavity. 1. NEMEXIA.
Stems woody, perennial, prickly: ovule solitary in each ovary-cavity. 2. SMILAX.

1. **NEMEXIA** Raf. Leaf-blades membranous. Flowers carrion-scented. — Spr. — CARRION-FLOWER.

Leaf-blades glabrous beneath: sepals of the staminate flowers oblong or linear.

1. *N. herbacea*.

Leaf-blades pubescent beneath: sepals of the staminate flowers ovate or obovate.

2. *N. pulverulenta*.

1. **N. herbacea** (L.) Small. Stems elongate: leaf-blades ovate, triangular-lanceolate or lanceolate, 4-8 cm. long, short-acuminate, 7-9-nerved, rounded or truncate at the base: mature pistillate peduncles long and slender, mostly longer than the leaves: pedicels slender: staminate perianth 7-8 mm. wide: sepals oblong or linear, acutish: petals linear or nearly so: berries 6-8 mm. in diameter. — Common, in thickets.

2. **N. pulverulenta** (Michx.) Small. Stems elongate, stout: leaf-blades ovate to elliptic-ovate, 8-15 cm. long, short-acuminate, usually 9-nerved, cordate at the base: mature pistillate peduncles relatively short and stout, shorter than the leaves: pedicels stout: staminate perianth 9-11 mm. wide: sepals ovate or obovate: berries 8-10 mm. in diameter. — S. Rather rare, in thickets.

2. **SMILAX** [Tourn.] L. Leaf-blades leathery. Flowers not carrion-scented, often fragrant. — Spr. — GREEN-BRIER. CAT-BRIER. HORSE-BRIER.

Peduncles of the pistillate plants much longer than the subtending petioles: sepals and petals of the pistillate flowers mostly over 3 mm. long.

Leaf-blades glaucous beneath: fruit-bearing pedicels slightly shorter than the peduncles: berries glaucous.

1. *S. glauca*.

Leaf-blades green on both sides: fruit-bearing pedicels much shorter than the peduncles: berries not glaucous.

2. *S. hispida*.

Peduncles of the pistillate plants shorter than the petioles or barely surpassing them: sepals and petals of the pistillate flowers mostly less than 3 mm. long.

3. *S. rotundifolia*.

1. **S. glauca** Walt. Leaf-blades broadly ovate, 3-9 cm. long, thickish, rounded or cordate at the base: pedicels 6-12 mm. long: sepals and petals of the staminate flowers 5-6 mm. long: anthers as long as the filaments or longer: berries 6-8 mm. in diameter, glaucous. — Common, in thickets.

2. **S. hispida** Muhl. Leaf-blades broadly ovate to elliptic-ovate, 5-15 cm. long, thinish, rough-edged, obtuse or subcordate at the base, or sometimes cuneately narrowed to the petiole: pedicels 4-8 mm. long: sepals and petals greenish-yellow, those of the staminate flowers 4-5 mm. long: berries about 6 mm. in diameter, bluish-black. — M. Rather rare, in thickets along creeks. — *Limestones*.

3. **S. rotundifolia** L. Leaf-blades broadly ovate to orbicular-ovate, 3-8 cm. long, or those of vigorous shoots suborbicular and much larger, abruptly pointed,

thick, smooth-edged: sepals and petals light-green, those of the staminate flowers 6-7 mm. long: berries bluish-black, 6-7 mm. in diameter, glaucous.—Common, in woods and thickets.

Order AMARYLLIDALES.

Perennial herbs or vines. Leaves with narrow or dilated blades. Flowers perfect or dioecious, complete. Perianth of 3 sepals and 3 petals, these distinct or partially united. Androecium of 3 or 6 stamens. Gynoecium mostly 3-carpellary, the ovary wholly or partially inferior.

Stamens 6.

Upright herbs: flowers perfect.

Twining vines: flowers dioecious.

Stamens 3.

Fam. 1. LEUCOJACAEAE.

Fam. 2. TAMACEAE.

Fam. 3. IXIACEAE.

FAMILY 1. LEUCOJACAEAE. AMARYLLIS FAMILY.

Herbs, commonly succulent, with rootstocks, bulbs, or corms. Leaves alternate, wholly or mainly basal. Flowers perfect, the perianth sometimes with a crown. Calyx of 3 sepals. Corolla of 3 petals, together with the sepals partially united into a tube. Androecium of 6 stamens, the filaments sometimes united into a crown. Gynoecium of 3 united carpels. Ovary inferior or half-inferior. Styles united. Ovules numerous.

Plants with corms or short rootstocks: perianth without a crown.

Ovary, and capsule, half-inferior: capsule loculicidal.

Ovary, and capsule, wholly inferior: capsule circumscissile.

Plants with coated corms: perianth with a crown.

1. ALETRIS.

2. HYPOXIS.

3. NARCISSUS.

1. **ALETRIS** L. Herbs with thick rootstocks and scape-like stems. Basal leaves spreading. Flowers in an interrupted spike or raceme. Perianth white to yellow, campanulate, cylindric, or obovoid, granular: lobes much shorter than the tube. Filaments adnate to the middle of the perianth or above it.

1. **A. farinosa** L. Stem 3-12 cm. tall: blades of the basal leaves narrowly oblong or elliptic, or elongate and broadly linear, 5-30 cm. long: perianth white or cream-colored, 7-10 mm. long; lobes ovate: style elongate: capsules ovoid, slender-beaked.—S. Rather rare, on dry banks.—*Schists* near *serpentine*.—Sum.—COLIC-ROOT. STAR-GRASS.

2. **HYPOXIS** L. Acaulescent herbs with corm-like rootstocks. Leaves with elongate-linear or nearly filiform blades. Scapes slender, sometimes tufted. Flowers solitary or clustered. Perianth mainly yellow. Filaments adnate to the base of the perianth.

1. **H. hirsuta** (L.) Coville. Leaf-blades linear, mostly less than 4 mm. wide, sparingly hirsute, prominently 1-nerved: perianth-lobes oblong to elliptic, 6-7 mm. long, yellow within: capsules 4-5 mm. long.—N. S. Frequent, in dry often sandy soil.—*Shales and sandstones, schists*.—Sum.—STAR-GRASS.

3. **NARCISSUS** [Tourn.] L. Acaulescent herbs with coated corms. Leaves erect or nearly so: blades elongate-linear. Scape terminated by a single flower, or by a cluster, the flowers horizontal or nodding. Perianth white or variously colored: tube short, produced at the base of the lobes into a cup-like or funnel-form crown: lobes mostly more or less spreading.

1. **N. Pseudo-Narcissus** L. Plants 2-5 dm. tall: leaves erect; blades linear, flat, nearly as tall as the scape: calyx-lobes and corolla-lobes oblong to ovate,

2.5-3.5 cm. long, pale-yellow: crown campanulate, deep-yellow, mostly longer than the perianth-lobes, the toothed edge more or less spreading: anthers much shorter than the filaments: capsules obovoid, mostly 1.5-2 cm. long. — Rare, locally naturalized. Nat. of Eu. — Spr. — DAFFODIL.

FAMILY 2. TAMACEAE. YAM FAMILY.

Perennial vines with rootstocks. Leaves often opposite, or whorled near the base of the stem: blades ribbed and netted-veined. Flowers monoecious or dioecious, or rarely perfect, in axillary clusters. Calyx of 3 sepals. Corolla of 3 petals resembling the sepals. Androecium of 3-6 stamens, imperfect in pistillate flowers. Gynoecium of 3 united carpels, imperfect in staminate flowers. Ovary inferior. Styles 3. Ovules 1 or 2 in each cavity of the ovary. Fruit a 3-winged, 3-valved capsule, or baccate.

1. **DIOSCOREA** [Plum.] L. Upper leaves alternate: blades mainly cordate. Flowers rather inconspicuous. Sepals and petals mainly green or whitish, those of the pistillate flowers persistent. — Early sum. — WILD YAM-ROOT.

Lower leaves typically alternate; blades green or pale-pubescent beneath: pistillate racemes many-fruited. 1. *D. villosa*.
Lower leaves whorled in 4's to 7's; blades glaucous beneath: pistillate racemes few-fruited. 2. *D. glauca*.

1. **D. villosa** L. Rootstocks slender, elongate, rarely forked, with few more slender lateral branches: lower petioles glabrous or sparingly pubescent at the apex: leaf-blades broadly ovate or orbicular-ovate, mostly 6-13 cm. long, more or less pubescent beneath or sometimes glabrous: pistillate racemes many-flowered: fruits numerous, suborbicular, varying to orbicular-obovate or obreniform, 2 cm. long or less. — Occasional, in moist thickets and woods.

2. **D. glauca** Muhl. Rootstocks stout, over 1 cm. thick, often forked and with many short stout lateral branches: lower petioles densely pubescent at the apex: leaf-blades ovate to orbicular-ovate, or rarely ovate-lanceolate, sometimes undulate, glaucous and usually finely pubescent beneath: staminate sepals oval: pistillate racemes few-flowered: fruits few, suborbicular to broadly obovate or obreniform, 2-3.5 cm. long. — Frequent, in thickets and rich woods.

FAMILY 3. IXIACEAE. IRIS FAMILY.

Perennial, mostly caulescent herbs with short or long rootstocks. Leaves equitant, mostly elongate. Flowers perfect, mostly regular, arising from spathe-like bracts. Calyx of 3 sepals. Corolla similar to the calyx or of 3 very different members. Androecium of 3 stamens, the filaments partially adnate to the perianth. Gynoecium of 3 united carpels. Ovary inferior. Styles entire or divided, sometimes petal-like. Ovules few or numerous. Fruit a loculicidal 3-valved capsule.

Styles alternate with the stamens.

Filaments distinct: seeds drupe-like.

Filaments wholly or partially united: seeds dry.

Styles opposite or arching over the stamens.

1. **GEMMINGIA**.

2. **SISYRINCHIUM**.

3. **IRIS**.

1. **GEMMINGIA** Fabr. Caulescent herbs with horizontal rootstocks. Leaf-blades folded. Flowers in corymbose cymes. Sepals and petals pink or reddish, nearly equal, distinct or nearly so, persistent and coiled on the capsule.

1. **G. chinensis** (L.) Kuntze. Stem 3-13 dm. tall: leaf-blades with the faces united above the middle: sepals and petals oblong to elliptic, 2.5-3.5 cm. long:

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capsules 2-2.5 cm. long: seeds black, shining. — Rather common, on dry hills and roadsides, and in fence-rows. Nat. of Asia. — Sum. — BLACKBERRY-LILY.

2. **SISYRINCHIUM** L. Scapose herbs with rootstocks. Leaf-blades flat. Flowers in 1 or more clusters arising from usually 2 bracts (spathe). Sepals and petals blue, white, or yellow, nearly equal, distinct, deciduous. — Sum. — BLUE-EYED GRASS.

Scape simple and terminated by the sessile or nearly sessile spathe or spathes.

Scape branched or bearing 2 or more terminal peduncles. 1. *S. angustifolium*.
2. *S. graminoides*.

1. **S. angustifolium** Mill. Plants tufted, 1-4 dm. tall or more, glaucous. Leaf-blades 1-3 mm. wide, usually serrulate roughened: scapes twice as long as the leaves, about as wide, wing-margined: spathes mostly green, sometimes purplish, the outer bract 2-6 cm. long, clasping for 2-6 mm. at its base, much larger than the inner one: pedicels stiff and nearly erect: perianth violet-blue, 10-12 mm. long: staminal column 4-6 mm. high: capsules 4-6 mm. high, oblong-globose: seeds dark-brown, 1-1.5 mm. long, obovoid-oblong, with shallow pits, or nearly smooth. — M. Rather common, in fields and grassy thickets. — *Lime-stones*.

2. **S. graminoides** Bicknell. Plants often not tufted, 1.5-6 dm. high, bright-green, turning dark when dry. Leaves thin and grass-like, $\frac{1}{2}$ - $\frac{3}{4}$ the height of the scape; blades 1.5-6 mm. wide, the edges like those of the scape minutely serrulate: scapes thin, wing-flattened, as broad as the leaf-blades, mostly forking into two peduncles 5-20 cm. long, subtended by a conspicuous bract: spathes green, flat, the subequal or unequal bracts acute or acuminate, 15-20 mm. long, the interior scales much shorter: perianth blue, 10 mm. long: capsules thin-walled, subglobose, 3-6 mm. high, on slender spreading pedicels: seeds numerous, about 1 mm. in diameter, globose, pitted. — Common, on grassy banks.

3. **IRIS** [Tourn.] L. Herbs with long rootstocks. Leaf-blades narrow. Flowers often solitary, usually not long-stalked. Sepals and petals usually showy, united below, the sepals recurved, the petals usually smaller and erect or nearly so. — FLAG.

Matted herbs, the flower-stems less than 1 dm. tall, covered with leaves: outer and inner perianth-lobes nearly equal. 1. *I. verna*.

Upright herbs, the flower-stems usually over 3 dm. tall: outer perianth-lobes larger than the inner.

Stem terete: leaf-blades less than 1 cm. wide: capsule sharply angled. 2. *I. prismatica*.

Stem with 1 angle: leaf-blades mostly over 1 cm. wide: capsule obscurely angled. 3. *I. versicolor*.

1. **I. verna** L. Leaf-blades narrowly linear, elongating in age, mostly 5-7 mm. wide: flowers violet-scented: perianth violet-blue or rarely white; tube barely as long as the bracts, about as long as the lobes: capsule 12-15 mm. long. — S. Rare, on roadside banks near Wakefield. — *Schists*. — Sum.

2. **I. prismatica** Pursh. Stem 3-9 dm. tall: leaf-blades less than 1 cm. wide: flowers long-pedicelled: perianth blue, variegated mainly with white, the outer lobes spatulate, about 4 cm. long: capsule 2.5-4 cm. long, acute-angled. — S. Not common, in swamps near the *serpentine barrens*. — Spr.

3. **I. versicolor** L. Stem 8-10 dm. tall: leaf-blades mostly over 1 cm. wide: flowers short-pedicelled: perianth blue or lilac, variegated with white or yellow, or purple, the outer lobes spatulate to ovate-spatulate, 7-9 cm. long: capsule 3-4 cm. long, obscurely angled. — Common in swamps. — Spr. and sum.

Order ORCHIDALES.

Terrestrial or epiphytic herbs. Leaves usually fleshy, sometimes scale-like. Flowers mostly perfect and complete, very irregular. Calyx of 3 sepals. Corolla of 3 petals. Gynoecium compound. Ovary inferior. Seeds numerous. Endosperm wanting.

FAMILY I. **ORCHIDACEAE.** ORCHID FAMILY.

Perennial mostly succulent herbs. Leaves basal or cauline, often sheathing at the base. Sepals 3, one median, two lateral. Petals 3, one median and often greatly specialized ("lip"), two lateral ("petals"). Androecium of 1 or more stamens adnate to the style, the 2-8 pollinia waxy or powdery. Gynoecium of 3 united carpels, the ovary twisted. Fruit capsular.

Anthers 2; lip a large inflated sac.

Plants caulescent: leaves several: lip with a rounded opening: sterile stamen glabrous: stigma broadest at the base.

1. CYPRIPEDIUM.

Plants acaulescent: leaves 2, basal: lip with a fissure down the front: sterile stamen glandular-pubescent: stigma broadest at the apex.

2. FISSIPES.

Anther 1; lip various.

Pollinia developing caudicles at the base of the anther which are connected with the glands of the rostellum: filament very short and broad: anther persistent.

Stigma flat, unappendaged.

Glands of the stigma enclosed in a pouch.

3. GALEORCHIS.

Glands of the stigma naked, not enclosed in a pouch.

Glands covered with a thin membrane which is deciduous with them.

4. COELOGLOSSUM.

Glands without a membrane.

Valves of the anther not enclosing the glands below: lip not tubercled.

Lip entire or shallowly lobed.

5. LYSIAS.

Lip cut-toothed or fringed.

6. BLEPHARIGLOTTIS.

Valves of the anther enclosing the glands below by the infolding of the margins: lip with a median tubercle.

7. PERULARIA.
8. GYMNADENIOPSIS.

Stigma appendaged.

Pollinia without appendages: filaments mostly thin and brittle, the anther therefore usually deciduous.

Flowering branch terminating the main axis of the plant.

Leaves convolute in the bud.

Anther rounded or very blunt, usually much exceeding the rostellum.

Lip free, spurless or with a short spur.

Plants scapose: leaves mere broad basal scales: bracts whorled: lip prominently 3-lobed.

9. ISOTRIA.

Plants caulescent: leaves solitary or several: bracts not whorled: lip entire, toothed or shallowly lobed.

Flowers typically solitary, terminal: lip crested, sessile.

10. POGONIA.

Flowers axillary, racemose: lip not crested, clawed.

11. TRIPHORA.

Lip adnate to the base of the elongate column, gibbous at the base.

Anther as long as the rostellum and lying upon it, rarely with a long tip and thus exceeding the rostellum.

Pollinia not in distinct masses: petals narrow: lip not saccate.

13. IBIDIUM.

Pollinia in several distinct masses: petals broad: lip saccate.

14. PERAMIMUM.

Leaves duplicate in the bud.

Leaf-blades not plaited in the bud.

- Stem leafy: column with a distinct foot: petals much narrower than the sepals.
 Scape sheathed only near the base: lip prominently lobed: anther upright. 15. MALAXIS.
 Scape sheathed to near the middle: lip not prominently lobed: anther inclined. 16. LIPARIS.
 Stem scaly: petals as broad as the sepals or nearly so: column without a distinct foot. 17. CORALLORRHIZA.
 Leaf-blades plaited in the bud: column broadly winged above. 18. LIMODORUM.
 Flowering branch terminating a side branch of the plant. 19. APLECTRUM.

1. **CYPRIPEDIUM** L. Caulescent herbs with fibrous roots. Leaves several: blades plaited. Lip a horizontal sac. Stamens appressed, the free tips directed forward. — Spr. — LADIES'-SLIPPER. MOCCASIN-FLOWER.

- Lip white: blade of the sterile stamen of a lanceolate type. 1. *C. candidum*.
 Lip yellow: blade of the sterile stamen of an ovate type, varying to oblong-ovate, triangular-ovate or ovate-lanceolate.
 Sterile stamen with a triangular-ovate blade less than 1 cm. long, obtuse: lip pale-yellow: flowers fragrant. 2. *C. parviflorum*.
 Sterile stamen with an oblong-ovate or ovate-lanceolate blade over 1 cm. long, acute: lip golden-yellow: flowers not fragrant. 3. *C. pubescens*.

1. **C. candidum** Muhl. Stem 1.5–3 dm. tall: leaf-blades narrowly ovate, oblong, or elliptic, 6–13 cm. long: median sepal lanceolate to ovate-lanceolate, 2.5–3 cm. long, greenish and purple-spotted: petals colored like the sepals but longer and narrower: lip white, except for purple stripes within, 1.5–2 cm. long. — Occasional, in swamps and low woods.

2. **C. parviflorum** Salisb. Stem 3–5 dm. tall: leaf-blades elliptic to oval, 6–12 cm. long: sepals lanceolate to oblong-lanceolate, 2.5–3.5 cm. long: petals longer and narrower than the sepals: lip 2–3 cm. long: capsule-body 2–2.5 cm. long. — Rather rare, in moist thickets and woods.

3. **C. pubescens** Willd. Stem 3–7 dm. tall: leaf-blades oblong or elliptic, 9–15 cm. long: sepals ovate-lanceolate or oblong-ovate: petals linear or attenuate, longer than the sepals: lip 3.5–5 cm. long: capsule-body 3.5–4 cm. long. — Rather common, in woods.

2. **FISSIPES** Small. Acaulescent herbs with fibrous roots. Leaves mostly 2: blades plaited. Lip a drooping sac. Stamens spreading, the free tips at right angles to the column.

1. **F. acaulis** (Ait.) Small. Leaves 1–3 dm. long; blades oblong, elliptic, or oval: scape 1–5 dm. tall: sepals oblong to lanceolate, 3–4 cm. long: petals narrower and longer than the sepals: lip pink or rarely white, obovoid, 4–6 cm. long: capsule 3.5–4 cm. long. — Common, in woods. — Spr. — MOCCASIN-FLOWER.

3. **GALEORCHIS** Rydb. Acaulescent fleshy herbs with tuberous roots. Flowers in a spike. Perianth ringent. Sepals and petals converging. Lip broad, spurred. Stigmas hollow, the glands enclosed in a pouch.

1. **G. spectabilis** (L.) Rydb. Leaves usually 2; blades oblong-elliptic, elliptic, or oval, 7–14 cm. long: scape 1–3 dm. tall, the spike 3–12-flowered: perianth violet-purple or white: lip 10–13 mm. long, slightly shorter than the spur: capsules 2–2.5 cm. long. — Rather common, in woods and on shaded banks. — Spr. — SHOWY-ORCHIS.

4. **COELOGLOSSUM** Hartman. Caulescent herbs with biennial branched tubers, the stem leafy. Flowers relatively small, in a terminal spike. Peri-

anth green or greenish. Sepals and petals converging, the petals much narrower than the sepals. Lip narrow, 2-3-lobed at the apex, the spur much shorter than the lip.

1. **C. bracteatum** (Willd.) Parl. Stem 2-6 dm. tall: leaf-blades oblong-ovate to oblong-elliptic or oblong-lanceolate, 10-15 cm. long: bracts surpassing the flowers: sepals ovate to ovate-lanceolate, 5-6 mm. long: petals nearly linear or linear-filiform: lip narrow, 6-8 mm. long: capsules 8-10 mm. long. — N. W. Rare, in damp soil. *Sandstones and shales, quartzite.* — Spr. and sum.

5. **LYSIAS** Salisb. Caulescent herbs, the stem scape-like, scaly. Flowers in a spike or a raceme. Perianth white or greenish. Sepals spreading, relatively broad, the lateral ones longer and narrower than the median one. Petals much smaller than the sepals, entire or erose. Lip narrow, entire, the spur longer than the lip. Anthers with diverging sacs whose beak-like bases project forward.

1. **L. orbiculata** (Pursh) Rydb. Stem 3-9 dm. tall: basal leaves 2, flat on the ground; blades orbicular to oval, 1-3 dm. long: sepals greenish-white, the median one suborbicular or reniform, 5-6 mm. long, the lateral ones ovate, 8-10 mm. long: petals reflexed, 7-8 mm. long: lip nearly linear, 12-15 mm. long, obtuse, the spur 2.5-4 cm. long: capsules about 1.5 cm. long. — S. Very rare, in damp woods near Wakefield, not far from the station for *Trientalis*. — *Schists.* — Sum. — ROUND-LEAVED ORCHIS.

6. **BLEPHARIGLOTTIS** Raf. Caulescent herbs, the stem leafy. Flowers in a terminal spike. Perianth white, yellow, orange, purple, or violet-purple. Sepals spreading or reflexed. Petals toothed or lacerate, or rarely entire. Lip fringed, or 3-lobed, the lobes toothed or laciniate. Spur often longer than the lip. Anthers with widely separate sacs, their narrow beak-like beases supported on the arms of the stigma, projecting forward and upward. — Sum. — FRINGED-ORCHIS. SHOWY-ORCHIS.

Petals fringed at the apex: lip not 3-lobed.

Petals entire, crenulate or merely erose: lip 3-lobed.

Petals entire, linear: lip with narrow lobes.

Petals crenulate or erose, dilated upward: lip with dilated lobes.

Lobes of the lip fimbriate or fringed: petal-blade toothed on the sides.

Lip 7-10 mm. long: lateral sepals 5-6 mm. long: petals 5-7 mm. long.

Lip 14-20 mm. long: lateral sepals 9-11 mm. long: petals 9-12 mm. long.

Lobes of the lip incised or erose: petal-blade erose at the tip or entire.

1. *B. ciliaris.*

2. *B. lacera.*

3. *B. psycodes.*

4. *B. grandiflora.*

5. *B. pcramoena.*

1. **B. ciliaris** (L.) Rydb. Stem 5-8 dm. tall: leaf-blades oblong to lanceolate, 8-20 cm. long: perianth yellow or yellow-orange: lateral sepals orbicular-ovate to orbicular-obovate, 6-8 mm. long: petals linear, oblong-linear or spatulate, 5-7 mm. long, sharply toothed at the apex: lip ovate in outline, copiously fringed; spur 15-25 mm. long. — S. Occasional, in swamps. — *Schists.*

2. **B. lacera** (Michx.) Rydb. Stem 3-9 dm. tall: leaf-blades oblong to lanceolate, 8-20 cm. long: perianth greenish-yellow: lateral sepals ovate to orbicular-ovate, 5-6 mm. long: petals linear, 5.5-6 mm. long, entire: lip 12-15 mm. long, each narrow lobe terminating in a fringe of several processes; spur 14-16 mm. long. — S. Not common, in swamps and low grounds. — *Schists.*

3. **B. psycodes** (L.) Rydb. Stem 3-10 dm. tall: leaf-blades oval, elliptic, or oblong-lanceolate, 5-25 cm. long: perianth lilac: lateral sepals ovate, 5-7 mm. long: petals with broad claws: lip with a spur 13-16 mm. long. — S. Rare, in wet meadows. — *Schists.*

4. **B. grandiflora** (Bigel.) Rydb. Stem 3–15 dm. tall: leaf-blades oblong-ovovate or oblong to lanceolate, 8–30 cm. long: perianth lilac-purple: lateral sepals ovate, 9–11 mm. long: petals with narrow claws: lip with a spur 20–30 mm. long. — S. Rare, in rich woods. — *Schists*.

5. **B. peramoena** (A. Gray) Rydb. Stem 3–9 dm. tall: leaf-blades oblong to lanceolate, 8–20 cm. long: perianth violet-purple: lateral sepals broadly ovate to suborbicular, 7–10 mm. long: petals as long as the sepals or nearly so, spatulate, or the body orbicular-obovate, entire or erose: lip 14–18 mm. long, the lobes cuneate or flabellate, incised or erose; spur 20–25 mm. long. — S. Rare, in swamps. — *Schists*.

7. **PERULARIA** Lindl. Caulescent herbs with thick fibrous roots, the stem leafy. Flowers relatively small, in a terminal spike. Perianth yellowish or greenish. Sepals and petals spreading, all relatively broad. Lip lanceolate to ovate or suborbicular, usually with a lobe on each side near the base, and a median tubercle, the spur longer than the blade. Anthers with horizontal valves opening upward, dilated at the base, thus forming a cavity enclosing the orbicular gland.

1. **P. flava** (L.) Farwell. Stem 3–6 dm. tall: leaf-blades elliptic, oblong, or lanceolate, 0.7–3 dm. long: bracts often shorter than the very small flowers: sepals and petals 3 mm. long: lip suborbicular or broadly oval in outline, 3.5–4 mm. long: spur about $\frac{1}{2}$ as long as the ovary. — S. Common, in swamps. — *Schists*. — Sum.

8. **GYMNADENIOPSIS** Rydb. Caulescent herbs. Flowers in a terminal spike. Perianth white, greenish, pink, or orange-yellow. Sepals distinct, the lateral ones slightly inequilateral. Petals mostly smaller than the sepals, undulate, sinuate-lobed or erose. Lip entire, 3-lobed at the apex, or crenulate or erose. Anthers with parallel approximate sacs, and naked contiguous glands. Stigma with 2 or 3 appendages at the beak.

1. **G. clavellata** (Michx.) Rydb. Stems 1–5 dm. tall, rather naked above: leaves scale-like except 1 or 2 near the middle of the stem or below it; blades oblong to oblong-lanceolate, 5–12 cm. long: perianth whitish or greenish: lateral sepals ovate to oval, 2–3.5 mm. long: petals 3–4 mm. long, sinuately 3-lobed: lip slightly dilated upward, 3–5 mm. long; spur clavate. — N. S. Common, in wet thickets and swamps. — *Sandstones and shales, schists*. — Sum.

9. **ISOTRIA** Raf. Scapose herbs with elongate roots. Leaves reduced to scales at the base of the scape. Scape topped by a whorl of spreading leaf-like bracts. Flowers solitary or 2 together. Perianth purple or greenish. Sepals nearly equal, much longer than the petals. Petals broader than the sepals. Lip 3-lobed at the apex, sessile, crested along the middle. Capsule erect.

1. **I. verticillata** (Willd.) Raf. Scapes 2–4.5 dm. tall: blades of the whorled bracts mainly elliptic to oval or obovate, 2.5–8 cm. long: lateral sepals narrowly linear, 30–50 mm. long or longer: petals linear, 15–20 mm. long: lip-body 10–15 mm. long, terminating in 2 lateral lobes and a middle broad lobe: capsule 2–3 mm. long. — E. S. Common, in rich woods. — *Schists*. — Spr.

10. **POGONIA** Juss. Caulescent herbs with cord-like roots. Leaves mostly solitary or 2 on the stem. Flowers solitary or 3 together. Perianth mainly pink, rose, or lilac. Sepals nearly equal, slightly longer than the petals. Petals broader than the sepals. Lip fringed or crisped near the apex, crested, not lobed. Capsule erect.

1. *P. ophioglossoides* (L.) Ker. Stem 2-5 dm. tall; blades of the cauline leaves oblong-lanceolate to elliptic, 3-8 cm. long; lateral sepals linear-elliptic or narrowly oblong, 16-20 mm. long, acute; petals elliptic or oblong-cuneate, 14-16 mm. long, obtuse; lip longer than the petals, blunt at the rounded fringed apex. — E. S. Rare, in swamps. — *Schists.* — Sum.

11. **TRIPHORA** Nutt. Caulescent herbs, with fleshy tubers. Leaves several, with relatively broad blades. Flowers several, axillary to leaf-like bracts. Perianth mainly purple. Sepals nearly equal, about as long as the petals. Petals about as broad as the sepals, but narrower at the base. Lip dilated above the claw, 3-lobed, crestless. Capsules drooping.

1. *T. trianthophora* (Sw.) Rydb. Stem 5-30 cm. tall; leaf-blades suborbicular to ovate, 5-20 mm. long; flowers nodding; lateral sepals linear-oblong to linear-elliptic, 13-15 mm. long; lip 12-14 mm. long, the claw shorter than the blade; capsules 10-14 mm. long. — W. Rare, in rich woods near Shenk's Ferry. — *Limestones.* — Sum. — **NODDING-CAP.**

12. **ARETHUSA** [Gronov.] L. Scapose herbs with corms. Leaves mere elongate sheathing scales, or the upper one sometimes with a narrow blade. Flower usually solitary at the top of the scape. Perianth mainly rose-purple. Lateral sepals slightly curved. Petals similar to the lateral sepals but shorter. Lip dilated, recurved, crested. Capsule erect.

1. *A. bulbosa* L. Leaf with a linear blade 10-15 cm. long; scape 1-3 dm. tall; lateral sepals broadly linear to narrowly oblong, 35-43 mm. long, acute; lip 25-30 mm. long, with 2 shallow lateral lobes and a larger middle lobe, toothed or fringed at the apex; capsule 20-25 mm. long. — E. S. Rare, in swamps, near Beartown and Smithville. — *Schists, quartzite.* — Spr.

13. **IBIDIUM** Salisb. Caulescent herbs. Leaves various, the basal and lower cauline with narrow blades, the upper cauline leaves mere sheathing scales. Flowers in a terminal spiral spike. Perianth pale. Median sepal and petals coherent; lateral sepals erect. Lip erect, or spreading at the tip, bearing 2 basal callosities, the lower portion folded around the very short column. Stigma with a 2-forked beak. — **LADIES'-TRESSES.**

Flowers merely alternate, apparently secund from the spiral twisting of the rachis.

Stem scaly; leaves basal; blades short, broad, fugaceous.

Root solitary; lip white, of an ovate type, erose-cripsed from below the middle to the apex. 1. *I. Beckii.*

Roots clustered; lip green, except the crisped margin, of an oblong type, wavy-cripsed at the apex. 2. *I. gracile.*

Stem leafy below; blades of the leaves narrow, elongate, persistent.

Lip of an ovate type, dilated at the base, pubescent without. 3. *I. vernalis.*

Lip of an oblong type, not dilated, glabrous without. 4. *I. praecox.*

Flowers 3-several-ranked, the rachis not conspicuously twisted.

Lip of an ovate type, the callosities prominent, usually curved; plants usually fall-flowering. 5. *I. cernuum.*

Lip of a quadrate type, the callosities imperfect, mostly in the edge of the lip-base; plants usually vernal-flowering. 6. *I. plantaginicum.*

1. *I. Beckii* (Lindl.) House. Stem 1-3 dm. tall, from a single root; blades of the basal leaves ovate or oblong, 1-3 cm. long, early decaying; perianth white; lateral sepals broadly lanceolate, about 3 mm. long; petals broadly spatulate or oblong-spatulate; lip ovate to orbicular-ovate, 2.5-3 mm. long, the callosities directed backward. — Occasional, in dry or sandy soil. — Sum. and fall.

2. *I. gracile* (Bigel.) House. Stem 2-6 dm. tall, from a cluster of roots; blades of the basal leaves oblong, elliptic, or ovate-lanceolate, 1.5-5 cm. long, early

decaying: perianth green and white: lateral sepals lanceolate, 4-4.5 mm. long: petals linear: lip oblong, 4-4.5 mm. long, the callosities directed sideways.— Common, on roadsides, banks, and open hillsides.— Sum.

3. **I. vernale** (Engelm. & Gray) House. Stem 1.5-5.5 dm. tall: blades of the lower cauline leaves elongate, linear, sometimes broadly so, 7-15 cm. long: perianth mostly yellowish: lateral sepals lanceolate, 6-10 mm. long: petals linear or linear-oblong: lip ovate, 6-8 mm. long, the callosities incurved.— Occasional, in sandy or gravelly soil.— Sum. and fall.

4. **I. praecox** (Walt.) House. Stem 2-8 dm. tall: blades of the lower cauline leaves elongate, linear or nearly so, 5-30 cm. long: perianth white: lateral sepals lanceolate or linear-lanceolate, 5-7 mm. long: petals linear: lip oblong, 5-7 mm. long, the callosities straight.— S. Occasional, in wet grassy meadows.— *Schists*.— Sum.

5. **I. cernuum** (L.) House. Stem 2-7 dm. tall: blades of the lower cauline leaves linear to narrowly oblong, oblong-lanceolate or sometimes linear-oblongate, 8-30 cm. long: perianth white or yellowish: lateral sepals lanceolate, 9-10 mm. long: lip ovate or oblong-ovate, mostly 8-11 mm. long, the callosities incurved.— Common, in wet places and damp thickets.— Sum. and fall.

6. **I. plantagineum** (Raf.) House. Stem 1-4 dm. tall: blades of the lower cauline leaves broadly linear to oblong, 5-15 cm. long: perianth mainly white: lateral sepals narrowly lanceolate, 5-6 mm. long: petals linear, about as long as the sepals: lip quadrate-oblong, 5-5.5 mm. long, the slender callosities rather spreading.— M. S. Rare, in meadows and along streams.— *Limestones, schists*.— Spr. and sum.

14. **PERAMIUM** Salisb. Caulescent herbs with scape-like stems. Leaves various, those near the base of the stem with dilated blades, those higher up mere sheathing scales. Flowers in a spike. Perianth very inequilateral. Lip sessile, sac-like, with a small blade and a large saccate base.

1. **P. pubescens** (Willd.) MacM. Plant 1.5-5 dm. tall: blades of the lower cauline leaves oblong, elliptic, or ovate, 2-5 cm. long: lateral sepals about 5 mm. long: petals about as long as the sepals, obtuse: lip 4 mm. long, the edge undulate.— Occasional, in woods.— Sum.— RATTLESNAKE-PLANTAIN.

15. **MALAXIS** L. Scapose herbs with corms. Leaves mainly elongate sheaths, the upper one bearing a dilated blade at the top. Flowers in a terminal raceme. Perianth white or greenish. Lateral sepals slightly inequilateral. Petals linear-filiform or filiform, shorter than the sepals. Lip broad, cordate at the base, sometimes lobed at the apex.

1. **M. unifolia** Michx. Leaves mostly solitary; blades oblong, ovate, or oval, 2-6 cm. long: scape 1-3 dm. tall: raceme stout: lateral sepals ovate or oblong-ovate, 1-1.5 mm. long, obtuse: lip about 2.5 mm. long, the 2 lateral lobes much longer than the middle one: capsule 5-6 mm. long.— S. Not very common, in rich woods.— *Schists*.— Sum.— ADDER'S-MOUTH.

16. **LIPARIS** L. C. Rich. Scapose green herbs with corms. Leaves 2 or more at the base of the scape with wide blades, accompanied by several scales. Flowers in a terminal raceme. Perianth greenish. Lateral sepals narrow, nearly equilateral. Petals elongate-linear or filiform, longer than the sepals. Lip free, dilated, undulate or erose, sometimes with tubercles at the base.— Spr.— TWAYBLADE.

Lip with an undulate blade 2.5-3.5 mm. wide: petals narrowly linear.

Lip with an erose blade 12-13 mm. wide: petals linear-filiform.

1. *L. Loeslii*.

2. *L. lilifolia*.

1. **L. Loeselii** (L.) L. C. Rich. Leaf-blades elliptic to elliptic-lanceolate, 5–17 cm. long; scape 0.5–2 dm. tall; lateral sepals lanceolate, about 4 mm. long; petals 6–7 mm. long; lip about 4 mm. long, the blade suborbicular, abruptly pointed; capsules oblong, 10–14 mm. long. — S. E. Rare, in ravines. — *Schists*.

2. **L. liliifolia** (L.) L. C. Rich. Leaf-blades ovate, oval, or oblong-ovate, 5–15 cm. long; scape 1–3 dm. tall; lateral sepals linear-lanceolate or nearly linear, about 11 mm. long; petals 11–13 mm. long; lip 11–13 mm. long, the blade obovate-cuneate to suborbicular, erose, abruptly pointed; capsules clavate-oblong, 12–18 mm. long. — N. S. Common, on wet banks and in woods. — *Sandstones and shales, schists*.

17. **CORALLORRHIZA** [Haller] R. Br. Caulescent succulent purplish, brownish, or reddish herbs with coral-like rootstocks. Leaves reduced to scales. Flowers in a terminal raceme. Perianth variously colored. Lateral sepals slightly inequilateral, often curved. Petals rather smaller than the sepals, somewhat narrowed at the base. Lip dilated, the blade undulate or lobed. — **CORAL-ROOT.**

Lip not lobed, often erose or crisped.

Lip short-clawed or clawless, the blade short-tipped; column narrowly winged.

Lip long-clawed, the blade notched; column broadly winged. 1. *C. odontorhiza*.
2. *C. Wisteriana*.

Lip 3-lobed, the lateral lobes spreading or directed forward.

Lip shallowly 3-lobed; spur obsolete.

Lip deeply 3-lobed; spur prominent.

3. *C. Corallorrhiza*.
4. *C. maculata*.

1. **C. odontorhiza** (Willd.) Nutt. Stem 1–3 dm. tall; raceme 4–10 cm. long; lateral sepals linear or nearly so, 3–4 mm. long; lip 4–4.5 mm. long, the blade obovate or oval-obovate, with erose-crisped margins and an abrupt acute tip; capsules 6–7 mm. long. — S. Common, in rich woods. — *Schists*. — Fall.

2. **C. Wisteriana** Conrad. Stem 2–3.5 dm. tall; raceme 3–10 cm. long; lateral sepals linear to linear-lanceolate, 6–8 mm. long; petals oblong-spatulate; lip 8–10 mm. long, the blade broadly oval to broadly obovate, notched at the apex; capsules 9–11 mm. long. — M. Rare, in woods. — *Quartzite*. — Spr.

3. **C. Corallorrhiza** (L.) Karst. Stem 1–3 dm. tall; raceme 2–10 cm. long; lateral sepals linear-spatulate, 3–4 mm. long; petals mostly spatulate; lip 3–4 mm. long, the blade with 2 shallow lateral lobes below the middle and an ovate middle lobe; capsules 8–10 mm. long. — M. S. Rare, in woods. — *Limestones, schists*. — Spr.

4. **C. maculata** Raf. Stem 2–5 dm. tall; raceme 5–20 cm. long; lateral sepals linear to linear-oblong, 6–9 mm. long; petals oblong to oblong-spatulate; lip 6–8 mm. long, the blade with 2 prominent lateral lobes. — N. S. Not very common, in rich woods. — *Sandstones and shales, schists*. — Fall.

18. **LIMODORUM** L. Scapose herbs with corms. Leaves few, consisting of several sheathing scales, and one with an elongate blade. Flowers in a terminal raceme-like spike. Perianth mainly purple, pink-purple, or white. Lateral sepals inequilateral, shorter than the median one. Petals nearly equilateral, somewhat narrowed at the base. Lip with 2 minute lateral lobes and a dilated often stalked middle lobe, bearded with clavate hairs.

1. **L. tuberosum** L. Leaf-blade narrowly linear to narrowly oblong, 1–4 dm. long; scape 2–9 dm. tall; perianth pink-purple; lateral sepals half-orbicular, 15–17 mm. long, acute; petals 16–18 mm. long, the blades oblong to lanceolate; middle lobe of the lip mostly less than 10 mm. wide, flabellate, nearly truncate; column-wings rhombic. — S. Rare, in swamps. — *Schists*. — Sum. — **GRASS-PINK.**

19. **APLECTRUM** Nutt. Caulescent herbs with a chain of corms. Leaf solitary terminating the corm, decaying before the lateral scaly stem arises. Flowers few in a terminal raceme. Perianth brownish-yellow mixed with purple. Lateral sepals narrow, slightly curved. Petals slightly longer than the sepals. Lip dilated, 3-lobed, 3-ridged above the claw, spurless. Capsules drooping.

1. **A. hyemale** (Muhl.) Torr. Leaf autumnal, or slightly earlier; blade elliptic, 4-20 cm. long: flower-stem vernal, 2-6 dm. tall: lateral sepals linear-spatulate, 10-13 mm. long: petals spatulate: lip 11-12 mm. long, the blade with 2 oblong-ovate lateral lobes and a suborbicular crenulate middle lobe: capsules 2-2.5 cm. long. — Not common, in rich woods. — Spr. — ADAM-AND-EVE. PUTTY-ROOT.

SUBCLASS 2. DICOTYLEDONES.

Stems consisting of pith, wood, and bark (endogenous in rare cases). Early leaves opposite.

Series 1. CHORIPETALAE.

Petals separate and distinct from each other, or wanting.

Order PIPERALES.

Herbs of wet or moist places, usually with rootstocks, or shrubs or trees. Leaves with simple blades. Flowers perfect or unisexual. Perianth wanting. Androecium of several stamens. Gynoecium of 1, or of several distinct or united carpels. Fruit baccate, drupaceous, capsular, or nut-like.

FAMILY 1. SAURURACEAE. LIZARD'S-TAIL FAMILY.

Herbs with rootstocks. Leaves alternate, sometimes basal. Flowers spicate or racemose. Androecium of 3-9 stamens. Gynoecium of 3 or 4 distinct or nearly distinct carpels. Stigmas simple. Fruit capsular.

1. **SAURURUS** [Plum.] L. Marsh herbs. Leaf-blades membranous, cordate. Raceme with a drooping tip, the bractlets adnate to the pedicels or to the ovaries. Carpels 3 or 4. Mature carpels veiny, opening introrsely.

1. **S. cernuus** L. Stems 3-12 dm. tall: leaf-blades ovate to ovate-lanceolate, 8-15 cm. long, acuminate, petioled: racemes 1-2 dm. long: filaments clavate, about 4 mm. long: fruit depressed, the carpels about 2 mm. high. — Common, in streams. — Sum. — LIZARD'S-TAIL.

Order SALICALES.

Shrubs or trees. Leaves alternate: blades simple, entire or toothed. Flowers dioecious, in aments, the staminate consisting of an androecium of 2 or more stamens, the pistillate consisting of a gynoecium of 2 or 4 united carpels. Ovules numerous. Fruit capsular.

FAMILY 1. SALICACEAE. WILLOW FAMILY.

Shrubs or trees, with soft wood. Leaf-blades very narrow to very broad. Aments erect or drooping, the bracts mostly ciliate or toothed. Capsules narrowed to the apex. Seeds usually with a tuft of hairs.

Bracts incised: disk cup-like: stamens usually 10 or more, rarely 6-8: stigmas elongate and expanded: winter buds with several scales. 1. *POPULUS*.
 Bracts entire: disk merely 1 or more axillary glands: stamens less than 10: stigmas short, not expanded: winter buds with 1 scale each. 2. *SALIX*.

1. *POPULUS* [Tourn.] L. Trees, the buds with several scales. Leaf-blades palmately veined, relatively long-petioled. Stamens more than 10, or rarely 6 or 8: anthers purple or red. Ovary sessile. Stigmas dilated. — Spr. — POPLAR. COTTONWOOD.

Petioles much flattened laterally.

Leaf-blades ovate or suborbicular: capsules conic, slender: scales pubescent. 1. *P. grandidentata*.

Leaf-blades deltoid or somewhat reniform: capsules ovoid to subglobose, thick: scales glabrous.

Stamens 6-8: branches erect. 2. *P. italica*.

Stamens 50 or more: branches spreading. 3. *P. deltoides*.

Petioles terete or channeled.

Leaf-blades glabrous or nearly so when mature, not lobed 4. *P. candicans*.

Leaf-blades persistently white-tomentose beneath, 3-5 lobed. 5. *P. alba*.

1. *P. grandidentata* Michx. Tree becoming 25 m. tall, the bark fissured: leaf-blades ovate, 6-10 cm. long, sinuate-dentate: middle lobe of the ament-bracts much shorter than the body: capsules 4-7 mm. long. — N. S. Rather rare, in woods. — *Sandstones and shales, schists*.

2. *P. italica* Moench. Tree with a fastigiata top, commonly 25 m. tall: leaf-blades deltoid or subrhomboid, crenate or crenate-serrate: staminate aments 2-5 cm. long: stamens 6-8: capsules 6-8 mm. long [*P. dilatata* Ait.]. — S. Not common, on roadsides and along streams. Nat. of Eu. — LOMBARDY-POPLAR.

3. *P. deltoides* Marsh. Tree becoming 45 m. tall, the top not fastigiata: leaf-blades ovate to deltoid, acute or acuminate, serrate or crenate-serrate: staminate aments 8-12 cm. long: stamens numerous: capsules 8-10 cm. long. — N. M. Rare, on roadsides and in fields. Nat. southward and westward. — NECKLACE-POPLAR.

4. *P. candicans* Ait. Tree sometimes 30 m. tall, the bark ridged: leaf-blades broadly ovate, 6-15 cm. long, acuminate, crenate: staminate aments with incised bracts: pistillate aments elongate, the flowers short-pedicelled: capsules ovoid, 8-11 mm. long. — M. Rather rare, on roadsides and in fields. Nat. of Eu. — BALM-OF-GILEAD.

5. *P. alba* L. Tree becoming 35 m. tall, the bark pale, becoming rough: leaf-blades ovate to suborbicular, 5-10 cm. long, white-tomentose beneath: staminate aments 3-5 cm. long, the anthers purple: pistillate aments about twice as long as the staminate: capsules conic. — N. M. Rather common, on roadsides and in waste places. Nat. of Eu. — WHITE-POPLAR. SILVER-LEAVED POPLAR.

2. *SALIX* [Tourn.] L. Shrubs or trees, the buds with a single scale. Leaf-blades pinnately veined, relatively short-petioled. Stamens 2, or rarely 1-7: anthers yellow or reddish. Ovary stipitate: stigmas not dilated. — Spr. — WILLOW.

Capsules glabrous, at least at maturity.

Stamens 3-7: filaments pubescent at the base: bracts yellow, caducous.

Pedicels 3-5 times as long as the glands.

Stipules and petioles glandless.

Stipules and petioles prominently glandular.

Pedicels about twice as long as the glands.

Stamens 2.

Filaments pubescent at the base: bracts caducous.

Pedicels 1-3 mm. long at maturity.

Styles wanting: leaves with linear or linear-lanceolate blades.

1. *S. nigra*.

2. *S. lucida*.

3. *S. fragilis*.

7. *S. interior*.

- Styles manifest, but short: leaves with lanceolate blades
 Pedicels less than 1 mm. long at maturity: stigmas sessile.
 Branches erect or spreading: leaf-blades lanceolate.
 Branches drooping: leaf-blades linear-lanceolate.
 Filaments glabrous: bracts persistent.
 Capsules variously pubescent.
 Filaments distinct.
 Capsules markedly pedicelled.
 Leaf-blades not densely pubescent beneath at maturity.
 Leaf-blades linear or linear-lanceolate.
 Filaments pubescent: capsules glabrate.
 Filaments glabrous: capsules permanently pubescent.
 Leaf-blades oblong, elliptic or ovate-lanceolate.
 Leaf-blades densely white-pubescent beneath.
 Leaves with the blades white-tomentose beneath.
 Mature pistillate aments 2-3 cm. long: leaf-blades 5-10 cm. long.
 Mature pistillate aments about 1 cm. long: leaf-blades 2-5 cm. long.
 Leaves with the blades silvery-silky beneath.
 Capsules subsessile.
 Filaments united.
3. *S. fragilis*.
 4. *S. alba*.
 5. *S. babylonica*.
 6. *S. cordata*.
 7. *S. interior*.
 8. *S. petiolaris*.
 9. *S. discolor*.
 10. *S. humilis*.
 11. *S. tristis*.
 12. *S. sericea*.
 13. *S. viminalis*.
 14. *S. purpurea*.

1. *S. nigra* Marsh. Tree becoming 40 m. tall, the twigs brown: leaf-blades narrowly lanceolate, 6-12 cm. long, acute at both ends, or acuminate at the apex, pale beneath: staminate aments with finely pubescent, blunt bracts: capsules 4 or 5 times as long as the pedicels. — Common, in low grounds and along streams. — BLACK-WILLOW.

2. *S. lucida* Muhl. Shrub, or tree becoming 6 m. tall, the twigs yellowish-brown: leaf-blades lanceolate to ovate-lanceolate or ovate, 6-12 cm. long, acuminate: staminate aments 2-5 cm. long, stout: capsules ovoid, 4.5-6.5 mm. long. — Lower Susquehanna valley. Rather rare, in moist soil. — *Schists*. — SHINING-WILLOW.

3. *S. fragilis* L. Tree becoming 25 m. tall, the twigs brown: leaf-blades lanceolate, 8-15 cm. long, glabrous, more or less glaucous beneath: capsules long-conic, 4.5-5 mm. long. — Common, in low grounds and moist soil. Nat. of Eu.

4. *S. alba* L. Tree becoming 30 m. tall, the twigs olive-green or yellow (blue or bluish in *S. alba coerulea*): leaf-blades often pale, lanceolate, 5-12 cm. long, more or less silky (glabrous, and twigs brilliant-yellow, in *S. alba vitellina*): capsules ovoid, 3-5 mm. long. — Frequent, along streams, and about dwellings. Nat. of Eu. — WHITE-WILLOW.

5. *S. babylonica* L. Tree becoming 20 m. tall, the twigs greenish: leaf-blades narrowly lanceolate, 8-12 cm. long, acuminate at the apex, tapering at the base: capsules turgid, 2-3 mm. long or smaller. — Frequent, about dwellings, and along streams. Nat. of Eu. — WEEPING-WILLOW.

6. *S. cordata* Muhl. Shrub becoming 5 m. tall, the twigs mostly brown or gray-brown: leaf-blades mainly oblong-lanceolate, 7-9 cm. long, green beneath: staminate aments about 2 cm. long: pistillate aments 3-6 cm. long: capsules ovoid. — Frequent, along streams.

7. *S. interior* Rowlee. Shrub, or tree becoming 9 m. tall, the twigs brown to green: leaf-blades mainly linear-lanceolate, mostly 6-10 cm. long, remotely toothed, glabrous or nearly so: staminate aments 6-10 cm. long, with ovate to obovate bracts: capsules conic or ovoid-conic. — Susquehanna valley. Common, on the river shore and islands. — *Schists*. — SAND-BAR WILLOW.

8. *S. petiolaris* J. E. Smith. Shrub becoming 4 m. tall, the twigs purplish: leaf-blades lanceolate, 4-9 cm. long, acuminate at both ends, serrulate: staminate aments slender, mostly less than 2 cm. long: capsules ovoid-oblong below the beak, 4-6 mm. long, about twice as long as the pedicels. — N. M. Rather common, in swamps and wet lands. — *Sandstones and shales, limestones*.

9. *S. discolor* Muhl. Shrub, or small tree 7 m. tall, the twigs purple or grayish: leaf-blades oblong, elliptic or ovate-lanceolate, 5-10 cm. long, mostly acute at both ends or obtuse at the base, glaucous beneath: staminate aments stout, mostly over 2 cm. long: capsules conic, 5-10 mm. long, much longer than the pedicels. — M. S. Rather rare, in swamps. — *Limestones, schists.* — GLAUCOUS-WILLOW.

10. *S. humilis* Marsh. Shrub becoming 2.5 m. tall, the twigs purplish or grayish: leaf-blades narrowly elliptic to oblanceolate, 6-10 cm. long, entire or denticulate, whitish beneath: staminate aments over 1 cm. long: capsules 7-8 mm. long. — Common, in low grounds and on banks. — PRAIRIE-WILLOW.

11. *S. tristis* Ait. Shrub usually less than 1 m. tall, the twigs mostly grayish: leaf-blades oblanceolate to linear-oblong, 2-5 cm. long, undulate, hoary on both sides: staminate aments less than 1 cm. long: capsules 5-6 mm. long. — S. Frequent, in open woods and thickets. — *Schists.* — DWARF GRAY-WILLOW.

12. *S. sericea* Marsh. Shrub, the twigs purplish, silky: leaf-blades lanceolate, often narrowly so, 5-10 cm. long, acuminate: staminate aments 1.5-2 cm. long: capsules ovoid-oblong, about 4 mm. long, silky. — M. Frequent, in swamps. — *Limestones.* — SILKY-WILLOW.

13. *S. viminalis* L. Shrub, or small tree, the twigs green or pale-brown: leaf-blades lanceolate to linear-lanceolate, 6-15 cm. long, attenuate, lustrous-pubescent beneath: staminate aments 2.5-3.5 cm. long: capsules elongate-conic, 6-8 mm. long, puberulent. — M. S. Frequent, in low grounds near house yards. Nat. of Eu. — OSIER.

14. *S. purpurea* L. Shrub, or tree becoming 4 m. tall, the twigs brownish: leaf-blades oblong to oblanceolate or spatulate, 4-7 cm. long, serrulate near the apex, pale beneath: staminate aments about 2 cm. long: anthers pale, turning black: capsules densely tomentose, ovoid-conic, about 5 mm. long. — M. Rather rare, in swamps. Nat. of Eu. — PURPLE-WILLOW.

Order MYRICALES.

Shrubs or small trees, usually aromatic. Leaves alternate: blades simple, sometimes toothed or pinnatifid. Flowers dioecious or monoecious, the staminate in long aments, each flower consisting of an androeceium of 2-8 stamens, the pistillate in short aments, each flower consisting of a gynoeceium of 2 united carpels on a bract subtended by 2 bractlets and surrounded by 2-8 scales. Stigmas 2. Ovule solitary. Fruit a nut, the epicarp often waxy.

FAMILY 1. MYRICACEAE. BAYBERRY FAMILY.

Shrubs or trees. Leaves resinous-dotted. Aments scaly-bracted. Perianth wanting. Ovary 1-celled. Nut short and thick.

Leaf-blades pinnatifid; stipules present: scales surrounding the ovary 8, subulate, conspicuous. 1. *COMPTONIA.*

Leaf-blades entire or toothed; stipules wanting: scales surrounding the ovary 2-4, very short, inconspicuous. 2. *CEROTHAMNUS.*

1. *COMPTONIA* Banks. Monoecious shrubs. Leaf-blades pinnatifid. Pistillate aments bristly. Fruit not drupe-like, surrounded by a bur-like involuere.

1. *C. peregrina* (L.) Coulter. Shrub 3-10 dm. tall: leaf-blades linear-oblong to linear-lanceolate, 4-11 cm. long, the segments obtuse: staminate aments 1-3 cm. long, the bracts 3-4 mm. long: pistillate aments bur-like: nut ovoid, 5 mm. long, shining. — N. S. Common, in thickets and on roadsides. — *Sandstones and shales, schists.* — Spr. — SWEET-FERN.

2. **CEROTHAMNUS** Tidestrom. Dioecious shrubs. Leaf-blades entire or merely toothed. Pistillate aments not bristly. Fruit globose, drupe-like, with a fleshy waxy epicarp.

1. **C. carolinensis** (Mill.) Tidestrom. Shrub 1-3 m. tall; leaf-blades elliptic, oblong, oblanceolate, or obovate, 2-10 cm. long, shallowly toothed toward the apex; staminate aments 1-1.5 cm. long; nuts 4-5 mm. in diameter. — M. Rare, in the Dillerville swamp. — *Limestones*. — Spr. — BAYBERRY. WAX-MYRTLE. MYRTLE.

Order JUGLANDALES.

Aromatic trees. Leaves alternate, exstipulate: blades pinnate. Flowers monoecious, the pistillate in lateral aments on the twigs of the preceding year, with a 2-6-lobed calyx bearing several rows of stamens, or the calyx obsolete. Pistillate flowers terminal, consisting of an involucre incompletely 2-4-celled gynoeceium: calyx partially adnate to the gynoeceium. Fruit drupe-like, the nut enclosed in an indehiscent or dehiscent husk. Seed oily.

FAMILY 1. JUGLANDACEAE. WALNUT FAMILY.

Aromatic trees with hard wood. Leaves with unequally pinnate blades. Staminate aments solitary or clustered. Involucre of the fruit dry or juicy.

Staminate aments stout, simple, sessile or short-stalked: husk indehiscent: nut sculptured 1. JUGLANS.
Staminate aments slender, branched, long-stalked: husk dehiscent: nut not sculptured 2 HICORIA.

1. **JUGLANS** L. Bark furrowed. Pith in plates. Leaflets conduplicate in veneration. Staminate aments simple: anther-connective conspicuous. — Spr. — WALNUT.

Anther-connective a round tip: fruit elongate, viscid-pubescent: nut 4-angled.

Anther-connective crown-like: fruit round, glabrous: nut not angled. 1. *J. cinerea*.
2. *J. nigra*.

1. **J. cinerea** L. Tree becoming 30 m. tall, the heart-wood pale: leaflets 11-17; blades lanceolate to oblong-lanceolate or oblong, 6-12 cm. long: staminate aments 6-15 cm. long; fruits 8-12 cm. long, usually acute: nut 2-celled below the middle, the ridges thin and brittle. — Common, in woods and on rocky hillsides. — BUTTERNUT. WHITE-WALNUT.

2. **J. nigra** L. Tree becoming 50 m. tall, the heart-wood dark-brown: leaflets 15-23; blades ovate to ovate-lanceolate, 8-10 cm. long, rounded or subcordate at the base: staminate aments 5-10 cm. long; fruits 5-8 cm. in diameter: nut 4-celled below the middle, sculptured, the ridges thick, firm. — Common, in rich soil. — BLACK-WALNUT.

2. **HICORIA** Raf. Bark close or scaly. Pith solid. Leaflets involute in veneration. Staminate aments branched. Anther-connective inconspicuous. — Spr. — HICKORY.

Bud-scales valvate: lateral leaflets mostly falcate.

Bud-scales imbricate: lateral leaflets not falcate.

Middle lobe of the staminate calyx much longer than the lateral: husk of the fruit freely splitting to the base.

Bark close, but rough: foliage scurfy or pubescent.

Bark shaggy, separating in long plates: foliage glabrous or puberulent.

1. *H. cordiformis*.

2. *H. alba*.

- Leaflets 7-9: nuts pointed at both ends. 3. *H. laciniosa*.
 Leaflets 3-5: nuts rounded or notched at the base. 4. *H. ovata*.
 Middle lobe of the staminate calyx usually about equal to
 the lateral: husk of the fruit not freely splitting to
 the base.
 Bark shaggy: fruit mostly subglobose: nut thin-shelled: 5. *H. microcarpa*.
 seed sweet.
 Bark close: fruit mostly obovoid: nut thick-shelled: 6. *H. glabra*.
 seed bitter.

1. *H. cordiformis* (Wang.) Britton. Tree becoming 30 m. tall, the close bark with shallow furrows and flat ridges: leaflets 5-9; blades of the lateral ones lanceolate or oblong-lanceolate, 8-15 em. long, falcate: staminate aments slender, 7-13 em. long: fruits subglobose, 2.5-3 em. long, slightly 6-ridged, the thin husk tardily 4-valved: nut smooth, thin-walled, the seed bitter. — Common, in low grounds. — BITTER-NUT. SWAMP-HICKORY.

2. *H. alba* (L.) Britton. Tree becoming 30 m. tall, the bark with flat ridges: leaflets 7-9; blades of the lateral ones oblong to oblong-lanceolate, 8-15 em. long: staminate aments stout, 10-15 em. long: fruits globose-obovoid, 4-6 em. in diameter, the husk very thick: nut angled, thick-shelled, the seed sweet — Common, in woods. — MOCKER-NUT. WHITE-HEART HICKORY.

3. *H. laciniosa* (Michx.) Sarg. Tree becoming 40 m. tall, the bark separating in narrow plates: leaflets 7-9, or rarely 5; blades of the lateral ones oblong or oblong-lanceolate, 10-20 em. long: staminate aments stoutish, 9-20 em. long: fruits broadly oblong or oblong-obovoid, 5-8 em. long, the husk very thick: nut broadly oblong, thick-shelled, the seed sweet. — M. Rare, along the Conestoga Creek, near Lancaster. (Not recently collected.) — *Limestones*. — KING-NUT.

4. *H. ovata* (Mill.) Britton. Tree becoming 40 m. tall, the bark separating in large plates: leaflets 5, or rarely 7; blades of the lateral ones oval to oblong-lanceolate, 10-15 em. long: staminate aments stout, 6-12 em. long: fruits subglobose, 3-5 em. thick, the husk thick; nut slightly angled, thin-shelled, the seed sweet. — Not very common, except along the river, and creeks. — SHELL-BARK. SHAG-BARK HICKORY.

5. *H. microcarpa* (Nutt.) Britton. Tree becoming 25 m. tall, the bark separating in thin plates: leaflets 5-7; blades of the lateral ones oval, oblong, or ovate-lanceolate, 6-14 em. long: staminate aments slender, 7-14 em. long: fruits subglobose, 2-2.5 em. thick, the husk thin: nut barely angled, thin-shelled, the seed sweet. — Common, in woods.

6. *H. glabra* (Mill.) Britton. Tree becoming 60 m. tall, the close bark in flat ridges: leaflets mostly 3-7, the blades of the lateral ones oblong or oblong-lanceolate, 7-15 em. long, acuminate, green beneath, glabrous: staminate aments 6-10 em. long: fruits subglobose, obovoid or pyriform, 3.5-5 em. long: the husk thinnish: nut angled, thick-shelled, the seed astringent. — N. M. Common, in woods. — *Sandstones and shales, limestones*. — PIG-NUT.

Order FAGALES.

Shrubs or trees. Leaves alternate: blades simple. Flowers monoecious or rarely dioecious, at least the staminate borne in aments, the pistillate sometimes with an involucre which becomes a bur or cup in fruit. Calyx usually present. Corolla wanting. Fruit a nut or rarely a samara.

Staminate and pistillate flowers in aments: fruit never with a bur or cup.

Staminate flowers solitary in the axil of each bract, without a calyx: pistillate flowers with a calyx. Fam. 1. CORYLACEAE.

Staminate flowers 2-3 together in the axil of each bract, each with a calyx: pistillate flowers without a calyx. Fam. 2. BETULACEAE.

Staminate flowers in aments: pistillate often solitary, the involucre becoming a bur or cup. Fam. 3. FAGACEAE.

FAMILY 1. **CORYLACEAE.** HAZEL-NUT FAMILY.

Shrubs or trees, the wood close-grained. Leaves deciduous: blades mostly doubly-toothed. Staminate aments drooping, with each bract subtending one flower, the calyx wanting. Pistillate aments not drooping, each bract bearing 2 or 3 pistils, the involucre of a bract and 2 scales. Fruit consisting of one or more accrescent bracts each subtending or inclosing 1-3 nuts.

Staminate flowers without bractlets: pistillate flowers numerous, in elongate aments: nuts small, subtended by or inclosed in a bract: stamens many.

Fruiting bracts flat, 3-lobed, the terminal lobe toothed.

Fruiting bracts bladder-like.

2. *OSTRYA*.

Staminate flowers with bractlets: pistillate flowers few, in heads:

nuts large, in leaf-like involucre: stamens few.

3. *CORYLUS*.

1. **CARPINUS** [Tourn.] L. Trees or shrubs, the bark smooth. Staminate aments solitary, the bracts acute, ciliate. Pistillate aments with 3-lobed bracts at maturity.

1. **C. caroliniana** Walt. Shrub, or tree becoming 13 m. tall, the bark blue-gray: leaf-blades oblong, varying mainly to ovate or ovate-lanceolate, 3-14 cm. long, glabrous above: staminate aments 2-5 cm. long: mature bracts of the pistillate aments hastate, 2-3 cm. long: nuts 5-6 mm. long. — Common, generally in rocky places near streams. — Spr. — BLUE-BEECH.

2. **OSTRYA** [Mich.] Scop. Shrubs or trees, the bark scaly. Staminate aments clustered, the bracts blunt, not ciliate. Pistillate aments with lobeless bracts.

1. **O. virginiana** (Mill.) Willd. Shrub, or tree becoming 18 m. tall, the bark rough: leaf-blades mainly oblong, elliptic or oval, 3-13 cm. long, slightly pubescent, or glabrate above: staminate aments 3-8 cm. long: mature bracts of the pistillate aments oblong to ovate, 1.5-2 cm. long: nuts 6-7 mm. long. — Not common, usually in rocky woods. — Spr. — LEVER-WOOD. HOP-HORNBEAN. IRON-WOOD.

3. **CORYLUS** [Tourn.] L. Shrubs or trees, the bark smoothish. Staminate aments with acuminate bracts. Pistillate aments with foliaceous bractlets at maturity, these are dilated, or sometimes formed into a beaked involucre. — Spr. — HAZEL-NUT.

Mature bractlets distinct, leaf-like, incised.

1. *C. americana*.

Mature bractlets united, prolonged into a narrow beak.

2. *C. rostrata*.

1. **C. americana** Walt. Shrub 1-4 m. tall: leaf-blades thickish, oval or sub-orbicular, varying to ovate or obovate, 5-15 cm. long: staminate aments 6-10 cm. long, the bracts broadly oval or nearly so, acuminate: each bractlet of the pistillate aments becoming foliaceous and lobed. — Common, in thickets.

2. **C. rostrata** Ait. Shrub 1-2 m. tall: leaf-blades thinnish, oblong or oval, varying to obovate, 4-12 cm. long, coarsely serrate and sharply serrulate: staminate aments 2-5 cm. long, the bracts rhomboid-obovate, apiculate: each bractlet of the pistillate aments developing a beaked tubular involucre. — N. S. Rather rare, in stony soil, especially on banks of streams. — *Sandstones and shales, schists*. — BEAKED-HAZELNUT.

FAMILY 2. **BETULACEAE.** BIRCH FAMILY.

Shrubs or trees, the wood close-grained. Leaves deciduous: blades with 2-several series of teeth. Staminate aments drooping, with each bract

subtending 2 or 3 flowers, the calyx present. Pistillate aments seldom drooping, the bracts membranous or thickened and woody, each bearing 2 or 3 pistils, the calyx wanting. Fruit a cone-like aggregate of the accrescent bracts each of which subtends a nut.

Stamens 2: bracts of the mature pistillate aments membranous, 3-lobed deciduous with the nuts.

Stamens 4 (3-6): bracts of the mature pistillate aments thickened and woody, persistent.

1. BETULA [Tourn.] L. Shrubs or trees, the bark often aromatic. Staminate flowers with 2 stamens, the anther-sacs separated. Bracts of the pistillate aments 3-lobed, thin and appressed or ascending at maturity. — Spr. — BIRCH.

Fruiting aments peduncled: samaras wider than long.

Bark brown: leaf-blades shining above: mature pistillate bracts with 2 short broad divergent lateral lobes: nut with triangular-obovate or cuneate wings.

Bark yellowish or silvery: leaf-blades dull above: mature pistillate bracts with 2 ascending lateral lobes: nut with orbicular-obovate wings.

1. *B. nigra*.

2. *B. lenta*.

3. *B. allegheniensis*.

1. B. nigra L. Tree becoming 30 m. tall, the younger bark silvery or yellow: leaf-blades rhombic-ovate, 3-6 cm. long, broadly cuneate at the base, more or less tomentose beneath except in age: staminate aments with suborbicular bracts: mature pistillate aments 3-4 cm. long, less than 1 cm. thick, the bracts 6-7 mm. long, tomentulose: wings of the fruit reniform, ciliate. Common, along streams. — RIVER-BIRCH. RED-BIRCH.

2. B. lenta L. Tree becoming 25 m. tall, the bark brown: leaf-blades ovate, oblong-ovate, or oblong-lanceolate, 4-12 cm. long, rounded or cordate at the base, silky on the nerves beneath: staminate aments with ovate bracts: mature pistillate aments 1.5-3 cm. long, over 1 cm. thick, the bracts 5-6 mm. long and quite or nearly as wide, usually glabrous: wings of the fruit triangular-obovate or cuneate, not ciliate. — Common, in woods and on hillsides. — SWEET-BIRCH. CHERRY-BIRCH. BLACK-BIRCH.

3. B. allegheniensis Britton. Tree becoming 30 m. tall, the bark yellowish or silvery: leaf-blades ovate to oblong-ovate, 5-10 cm. long, rounded or cordate at the base, pubescent on the nerves beneath: staminate aments with ovate or oval-ovate bracts: mature pistillate aments 1.5-2.5 cm. long, very stout, the bracts 7-9 mm. long, quite or fully as wide, ciliate: wings of the fruit orbicular-obovate. — Susquehanna valley and tributary streams and in neighboring ravines; also in the Welsh mountains. — *Schists, quartzite*. — SOUTHERN YELLOW-BIRCH.

2. ALNUS [Tourn.] L. Shrubs or trees, the bark astringent. Staminate flowers with 3-6 stamens, the anther-sacs connected. Bracts of the pistillate aments not lobed or obscurely so, woody and spreading at maturity.

1. A. rugosa (Du Roi) Spreng. Shrub, or tree becoming 13 m. tall: leaf-blades thickish, obovate or oval, 4-10 cm. long: mature pistillate aments 1.5-2 cm. long, the bracts 3-lobed: nuts 1.5 mm. long, sharp-margined. — Common, in low woods and thickets. — Winter and Spr. — ALDER. SMOOTH-ALDER.

FAMILY 3. FAGACEAE. BEECH FAMILY.

Shrubs or trees, the wood usually coarse-grained. Leaves sometimes persistent: blades simple, entire, toothed, or lobed. Staminate aments elongate or globular, the calyx of 4-7 partially united sepals. Pistillate

flowers solitary or several together, each subtended by a bristly involucre, the sepals thick. Fruit a bur-like or cup-like involucre, enclosing or subtending 1 or more nuts.

Staminate aments globose, drooping on slender bracted peduncles: nuts 3-angled or 3-winged. 1. FAGUS.

Staminate aments elongate, slender.

Staminate aments erect or ascending: nuts 1-3, included in a very spiny involucre. 2. CASTANEA.

Staminate aments drooping: nut seated in an involucre of imbricate scales. 3. QUERCUS.

1. **FAGUS** [Tourn.] L. Shrubs or trees, with close-grained wood. Leaf-blades toothed. Staminate aments globular, pendulous: calyx 4-7-lobed: stamens 8-16. Pistillate flowers 2-4 together: calyx 4-5-lobed. Staminodia wanting. Ovary 3-celled: stigmas 3, filiform. Mature involucre with fleshy spines, enclosing the nuts. Nuts 2-4, 3-angled or 3-winged.

1. **F. grandifolia** Ehrh. Tree becoming 40 m. tall, the bark smooth, pale: leaf-blades ovate or oblong-ovate, 5-14 cm. long: staminate aments 1-1.5 cm. in diameter, long-peduncled: ripe involucre ovoid, 1.5-2 cm. long, short-peduncled: nut ovoid, narrowly winged, edible. — Common, in woods. — Spr. — BEECH.

2. **CASTANEA** [Tourn.] Hill. Shrubs or trees, with porous wood. Leaf-blades toothed, the teeth slender-tipped. Staminate aments elongate, spreading: calyx 6-lobed: stamens 10-20, the filaments greatly elongate. Pistillate flowers several: calyx 6-lobed. Staminodia present. Ovary imperfectly 6-celled: stigmas 6, slender. Mature spiny involucre, including the nuts. Nuts 2 or 3, or sometimes solitary. — Sun.

Leaf-blades glabrous at maturity: nuts usually 3 in an involucre, flattened.

Leaf-blades permanently pubescent beneath: nuts usually solitary, not flattened. 1. *C. dentata*.
2. *C. pumila*.

1. **C. dentata** (Marsh.) Borkh. Tree becoming 30 m. tall, the bark furrowed: leaf-blades narrowly elliptic, elliptic-lanceolate, or oblong-lanceolate, 10-30 cm. long, acuminate at the apex, glabrous: neck of the hypanthium longer than the body: ripe involucre 5-10 cm. in diameter: nuts mostly 2, 3 or 5 together, 2-2.5 cm. long. — Common, in woods and on hillsides. — CHESTNUT.

2. **C. pumila** (L.) Mill. Shrub, or tree becoming 16 m. tall, the bark smooth: leaf-blades oblong to obovate, 7-14 mm. long, acute or rounded at the apex, white-tomentose beneath: neck of the hypanthium shorter than the body: ripe involucre 3-4 cm. in diameter: nuts usually solitary, 1-1.5 cm. long. — S. Not very common, on dry hills. Grows abundantly only in a few stations on the *schist* hills. — CHINQUAPIN.

3. **QUERCUS** [Tourn.] L. Shrubs or trees, with coarse-grained wood. Leaf-blades entire, toothed, or lobed. Staminate aments drooping: calyx 4-7-lobed: stamens 6-12, the filaments relatively short. Pistillate flowers solitary or several: ovary usually 3-celled: stigmas 3, dilated. Mature scaly involucre saucer-like or cup-like, subtending the nut, or rarely enclosing it. — Spr. — OAK.

Leaf-blades, or their lobes, bristle-tipped: styles elongate: nuts often pubescent within.

Leaf-blades entire, not dilated at the apex. 1. *Q. Phellos*.

Leaf-blades dilated at the apex or pinnately lobed or pinnatifid.

Leaf-blades broadened upward, 3-lobed near the apex. 2. *Q. marylandica*.

Leaf-blades pinnatifid or pinnately lobed.

Leaf-blades green and glabrous on both sides.

Cup of the acorn saucer-shaped.

- Cup less than 18 mm. wide: lobes of the leaf-blades much longer than the width of the body.
- Cup over 18 mm. wide: lobes of the leaf-blades about as long as the width of the body.
- Cup of the acorn turbinate or hemispheric.
- Leaf-blades pubescent beneath.
- Cup of the acorn turbinate: leaf-blades brown- or rusty-pubescent beneath.
- Cup of the acorn saucer-shaped: leaf-blades gray- or white-pubescent beneath.
- Leaf-blades, or their teeth or lobes, without bristles (except on shoots): nuts often glabrous within.
- Leaf-blades toothed or shallowly lobed.
- Acorns sessile.
- Shrub or small tree: leaf-blades mostly broadest above the middle.
- Tall tree: leaf-blades mostly broadest below the middle.
- Acorns peduncled.
- Peduncles shorter than the petioles, or about equaling them.
- Peduncles much longer than the petioles.
- Leaf-blades prominently or deeply lobed.
- Mature leaf-blades more or less pubescent beneath: cup fully $\frac{1}{2}$ as long as the nut.
- Upper scales of the cup awned forming a fringe around the nut.
- Upper scales of the cup not awned.
- Mature leaf-blades glabrous and pale or glaucous beneath: cup shallow.
3. *Q. palustris*.
4. *Q. rubra*.
5. *Q. coccinea*.
6. *Q. velutina*.
7. *Q. nana*.
8. *Q. prinoides*.
9. *Q. Muhlenbergii*.
10. *Q. Prinus*.
11. *Q. bicolor*.
12. *Q. macrocarpa*.
13. *Q. stellata*.
14. *Q. alba*.

1. **Q. Phellos** L. Tree becoming 25 m. tall; leaves sometimes partly persistent; blades linear-oblong or narrowly elliptic to lanceolate or oblanceolate, 4-10 cm. long, shining and glabrous at maturity, entire; acorns sessile or nearly so; cup saucer-shaped, 10-15 mm. wide; nut subglobose, often depressed or globose-ovoid, about 1 cm. long. — S. Rare, on dry hills. — *Schists*. — WILLOW-OAK.

2. **Q. marylandica** Muench. Tree becoming 20 m. tall, the bark very rough; leaf-blades broadly or narrowly obovate in outline, 8-17 cm. long, 3-5-lobed or with a single dilated terminal lobe, brownish-pubescent beneath; acorns sessile or short-stalked; cup depressed-hemispheric, 15-20 mm. wide; nut subglobose or ovoid, 10-20 mm. long. — S. Very common, on dry hills. — *Serpentine, schists*. — BLACK-JACK. BARREN-OAK.

3. **Q. palustris** Du Roi. Tree becoming 6 m. tall, the lower branches reflexed; leaf-blades broadly oval, varying to ovate or obovate in outline, 6-15 cm. long, merely pubescent in the vein-axils beneath, deeply pinnatifid, the lobes oblong, lanceolate, or triangular; acorns short-stalked; cup saucer-shaped, 12-15 mm. wide; nut subglobose, 10-15 mm. long. — Common, mostly in moist woods. — SWAMP SPANISH-OAK. PIN-OAK.

4. **Q. rubra** L. Tree becoming 50 m. tall, the lower branches spreading; leaf-blades oval, varying from ovate to obovate in outline, 10-20 cm. long, with tufts of hairs in the vein-axils beneath, pinnately 5-7-lobed, the lobes ascending, the sinuses rounded; acorns short-stalked; cup saucer-shaped, 25-35 mm. wide; nut ovoid, 25-30 mm. long. — Common, in woods. — RED-OAK.

5. **Q. coccinea** Wang. Tree becoming 50 m. tall; leaf-blades oval, varying to oblong or obovate in outline, 10-20 cm. long, glabrous, except the tufted vein-axils beneath, pinnately 5-7-lobed, the lobes usually toothed; acorn sessile or short-stalked; cup turbinate, 15-20 mm. wide, more or less constricted at the base; nut ovoid or oblong-ovoid, mostly 10-20 mm. long. — Common, in dry soil. — SCARLET-OAK.

6. **Q. velutina** Lam. Tree becoming 50 m. tall; leaf-blades oval or obovate in outline, 10-30 cm. long, usually rusty-pubescent beneath, pinnately lobed, the lobes coarsely bristle-toothed; acorn sessile or nearly so; cup turbinate or hemispheric-turbinate, 20-25 mm. wide; nut globose-oblong or ovoid, 15-25 mm. long. — Common, in woods. — BLACK-OAK. YELLOW-BARKED OAK. QUERCITRON.

7. *Q. nana* (Marsh.) Sarg. Shrub rather intricately branched, or tree becoming 7 m. tall: leaf-blades obovate or oval in outline, 6–12 cm. long, with white or pale-gray tomentum beneath, pinnatifid into 3–5 triangular or deltoid lobes: acorns short-stalked or nearly sessile; cup saucer-shaped (or shallow-turbinate), 14–18 mm. wide; nut ovoid-globose or depressed, 10–15 mm. long.—S. Common, on dry hills.—*Schists, serpentine*.—BEAR-OAK. BLACK SCRUB-OAK.
8. *Q. prinoides* Willd. Shrub, or tree becoming 6 m. tall: leaf-blades obovate or oblanceolate, or rarely nearly oblong, 5–15 cm. long, coarsely toothed, cuneate or rarely rounded at the base, finely gray-tomentose beneath: acorns sessile or nearly so; cup hemispheric, 13–18 mm. wide; nut oblong-ovoid, 15–25 mm. long.—S. Not very common, dry hills.—*Schists*.—SCRUB CHESTNUT-OAK.
9. *Q. Muhlenbergii* Engelm. Tree becoming 50 m. tall, the bark scaly: leaf-blades lanceolate to oblong-lanceolate, 5–20 cm. long, coarsely serrate, with usually somewhat flaring teeth, minutely pubescent beneath or glabrate: acorns sessile or nearly so; cup hemispheric, about 15 mm. wide; nut ovoid, about 15 mm. long.—CHESTNUT-OAK. YELLOW-OAK.
10. *Q. Prinus* L. Tree becoming 30 m. tall, the bark close: leaf-blades oblong to oval, varying to broadest slightly above or below the middle, 15–20 cm. long, coarsely crenate-serrate, gray-tomentulose beneath: acorns short-peduncled; cup hemispheric, 12–35 mm. wide; nut ovoid or oblong-ovoid, 25–35 mm. long.—Common, in dry rocky woods.—CHESTNUT-OAK.
11. *Q. bicolor* Willd. Tree sometimes becoming 36 m. tall: leaf-blades obovate to oblong-obovate, 5–20 cm. long, coarsely toothed or shallowly lobed, usually cuneate at the base, densely white-tomentose beneath: acorns long-stalked; cup saucer-shaped or depressed-hemispheric, 20–25 mm. wide, with some of the bracts prolonged; nut oblong or oblong-ovoid, 20–25 mm. long or slightly longer.—S. Common, in low grounds.—*Schists*.—SWAMP WHITE-OAK.
12. *Q. macrocarpa* Michx. Tree becoming 55 m. tall: leaf-blades obovate to spatulate in outline, 10–30 cm. long, finely tomentose beneath the pinnate lobes, spreading, the terminal lobe largest and usually coarsely crenate: acorns long-stalked; cup deep-hemispheric or globular, 20–40 mm. wide, the upper scales with filiform tips; nuts subglobose or broadly oblong, 30–50 mm. long.—Susquehanna valley and tributary streams. Rare, on shaded banks.—OVER-CUP-OAK. MOSSY-CUP OAK. BUR-OAK.
13. *Q. stellata* Wang. Tree becoming 30 m. tall: leaf-blades broadly obovate in outline, 10–20 cm. long, finely tomentose beneath with gray or yellowish hairs, pinnatifid into usually broad diverging lobes: acorns often clustered; cup hemispheric and contracted at the base, 15–20 mm. wide; nut ovoid, 15–20 mm. long.—S. Common, in dry soil.—*Schists, serpentine*.—POST-OAK. IRON-OAK.
14. *Q. alba* L. Tree becoming 45 m. tall: leaf-blades obovate in outline, 10–20 cm. long, glaucous and finally glabrous beneath, pinnatifid into 3–9, usually 7, ascending narrow lobes: acorns short-stalked; cup saucer-shaped or shallow-hemispheric, woody-tuberculate, 15–20 mm. wide; nut oblong-ovoid, 15–25 mm. long.—Common, in woods.—WHITE-OAK.

Order URTICALES.

Shrubs or trees, or herbs. Leaves alternate, or in the case of herbs often opposite: blades simple, entire, toothed, or divided. Flowers various, not in aments. Calyx present. Corolla wanting. Androecium often of as many stamens as there are sepals. Gynoecium of a single carpel or of 2 united carpels. Fruit an achene, a samara, a drupe, or a syncarp.

Fruit an achene, the achenes sometimes in the accrescent sepals and forming a syncarp.

Flowers not on a receptacle: fruit not syncarp:
sepals neither thick and juicy nor enveloping
achenes.

Style or stigma 1: the latter sometimes tufted:
ovule erect: filaments inflexed in the bud.

Styles or stigmas 2: ovule pendulous: filaments
erect in the bud.

Flowers on the outside or inside of a receptacle:
fruits syncarp or syconiums: sepals accrescent, en-
veloping the achenes.

Fruit a samara or a drupe, sometimes nut-like.

Fam. 1. URTICACEAE.

Fam. 2. CANNABINACEAE.

Fam. 3. ARTOCARPACEAE.

Fam. 4. ULMACEAE.

FAMILY 1. URTICACEAE. NETTLE FAMILY.

Herbs or shrubby plants, often with stinging hairs. Leaf-blades entire, toothed, or rarely lobed. Flowers dioecious, monoecious, or polygamous, cymose. Calyx of 2-5 distinct or partially united sepals. Androecium of 2-5 stamens. Gynoecium a single carpel. Fruit an achene.

Sepals of the pistillate flowers distinct or slightly united, not investing the achene.

Stigma subulate, not tufted: ovary, and achene, oblique.

Stigma tufted: ovary, and achene, equilateral.

Flowers not involucrate.

Pistillate flowers with 4 sepals: staminodia wanting.

Pistillate flowers with 3 sepals: staminodia present.

Flowers involucrate.

Sepals of the pistillate flowers united, the tube wholly investing the achene.

1. URTICASTRUM.

2. URTICA.

3. ADICEA.

4. PARIETARIA.

5. BOEDMERIA.

1. URTICASTRUM Fabr. Perennial herbs with stinging hairs. Leaves alternate: blades toothed. Pistillate flowers with a calyx of 5 sepals and an oblique ovary.

1. U. divaricatum (L.) Kuntze. Stem 2-12 cm. tall: leaf-blades ovate, oblong, or elliptic, 5-20 cm. long, long-petioled: panicles spreading, the lower staminate, the upper pistillate: sepals oblong, or broader in the pistillate flowers: achene oblique, about 3 mm. in diameter, exserted. — Common, in thickets and in woods. — Sum. — WOOD-NETTLE.

2. URTICA [Tourn.] L. Annual or perennial often coarse herbs with stinging hairs. Leaves opposite: blades toothed or incised-lobed. Pistillate flowers with a calyx of 4 sepals and an equilateral ovary. — Sum. — NETTLE.

Stems sparingly bristly: petioles fully $\frac{1}{2}$ as long as the width of the leaf-blades.

Stems densely bristly: petioles less than $\frac{1}{2}$ as long as the width of the leaf-blades.

1. *U. gracilis*.

2. *U. dioica*.

1. U. gracilis Ait. Stem 6-28 dm. tall: leaf-blades lanceolate, occasionally broadly so, 6-15 cm. long, acuminate, serrate: sepals hispidulous: achenes fully 1 mm. long. — Rather rare, in fence-rows and on river banks.

2. U. dioica L. Stem 6-13 dm. tall: leaf-blades ovate to ovate-lanceolate, 3-12 cm. long, prominently incised-serrate, cordate, sometimes deeply so: sepals soft-hispidulous: achenes fully 1 mm. long. — Rather common, in waste places and on roadsides. Nat. of Eu. — STINGING-NETTLE.

3. ADICEA Raf. Annual or perennial erect succulent herbs. Leaves mainly opposite: blades toothed, 3-ribbed. Flowers dioecious. Sepals of the pistillate flowers 3, equal, slightly broader at the apex, not enclosing the achene, each accompanied by a staminodium. Stigma tufted.

1. A. pumila (L.) Raf. Stem 1-7 dm. tall, very watery: leaf-blades ovate to elliptic, 3-10 cm. long, coarsely crenate-serrate, long-petioled: sepals lanceo-

late: achenes ovoid, about 2 mm. long. — Common, in moist shaded places. — Sum. — CLEARWEED. RICHWEED.

4. **PARIETARIA** [Tourn.] L. Annual or perennial flimsy succulent herbs. Leaves alternate: blades entire. Flowers polygamous, in clustered involucrate axillary cymes, the involucre of 2-6 more or less united bracts. Stigma tufted.

1. **P. pennsylvanica** Muhl. Stems 1-4 dm. long, finely pubescent, simple or branched: leaf-blades lanceolate to elliptic or sometimes broader, 1-6 cm. long, acute or acuminate at the base: sepals acute: achenes oval, fully 1 mm. long. — S. Rather common, on dry banks. — *Schists.* — Sum. — PELLITORY.

5. **BOEHMERIA** Jacq. Perennial herbs. Leaves opposite: blades toothed, often 3-ribbed. Flowers monoecious, in clusters on branches, the pistillate with 4 united sepals surrounding the ovary. Stigma elongate. Achene included in the horseshoe-like accrescent calyx. — Sum. and fall. — FALSE-NETTLE.

Staminate calyx about 3 mm. wide: sepals acute: leaf-blades leathery, finely serrate: petioles much shorter than the blades. 1. *B. scabra.*
Staminate calyx about 2 mm. wide: sepals obtuse: leaf-blades relatively thin, coarsely serrate: petioles as long as the blades or little shorter. 2. *B. cylindrica.*

1. **B. scabra** (Porter) Small. Stems 2-12 dm. tall, typically rough-pubescent: leaf-blades firm, ovate to elliptic-ovate, or the lower ones orbicular to reniform, 2-5 cm. long, or rarely larger, short-petioled: flower-clusters mostly contiguous: inflorescence-branches short: achenes mostly about 1.5 mm. wide. — S. Rather common, in moist grounds and swamps. — *Schists.*

2. **B. cylindrica** (L.) Willd. Stems 2-13 dm. tall, typically smooth and glabrous: leaf-blades pliable, ovate to lanceolate, 3-12 cm. long, long-petioled: flower-clusters mostly separate: inflorescence-branches elongate: achenes mostly about 1 mm. wide. — N. M. Rather common, in moist soil. — *Sandstones and shales, limestones.*

FAMILY 2. CANNABINACEAE. HEMP FAMILY.

Annual or perennial, often coarsely pubescent herbs. Leaves opposite or sometimes alternate: blades toothed, lobed, or divided. Flowers dioecious, the pistillate in bracted spikes, with an entire perianth, and a gynoeceium of 2 united carpels, the ovary 1-celled. Fruit an achene.

Stem twining: leaf-blades usually 3-lobed: fruit a drooping cone with thin imbricate bracts. 1. **HUMULUS.**
Stems erect: leaf-blades 3-7-parted: fruit spicate on stiff branches. 2. **CANNABIS.**

1. **HUMULUS** L. Perennial vines. Leaves opposite: blades serrate or lobed. Pistillate flowers 2 together in ament-like drooping spikes which become cone-like at maturity.

1. **H. Lupulus** L. Stem and branches pubescent with recurved hairs: leaf-blades orbicular or ovate in outline, 3-15 cm. in diameter, 3-6-lobed and serrate, or merely serrate: mature pistillate spikes 3-8 cm. long, ovoid to cylindrical: achenes subglobose, 2-3 mm. in diameter. — Rather common, in thickets and fence-rows. Nat. of Eurasia. — Sum. — HOP.

2. **CANNABIS** [Tourn.] L. Annual coarse herbs. Leaves opposite or alternate: blades digitately divided. Pistillate flowers solitary, in the axils of leaf-like bracts, disposed in elongate spikes at maturity.

1. *C. sativa* L. Stem 1-4 m. tall, rough-pubescent, the inner bark tough: leaf-blades 4-15 cm. long, the divisions 5-11, linear or linear-lanceolate, serrate, acuminate: mature pistillate spikes leafy-bracted: achenes oval, 4-5 mm. long. — Rather common, in moist places and fence-rows. Nat. of As. — Sum. — HEMP.

FAMILY 3. **ARTOCARPACEAE.** MULBERRY FAMILY.

Shrubs or trees, the sap milky. Leaves mostly alternate: blades equilateral, entire, toothed, or lobed. Flowers monoecious or dioecious, in ament-like spikes or enclosed in a receptacle, the staminate with 3 or 4 stamens, the pistillate with a calyx of 3-5 sepals which greatly enlarge and subtend or envelope the achene: gynoeceium of 1 or of 2 united carpels: styles or stigmas 1 or 2. Fruit a syncarp or syconium.

Stigmas 2, short: pistillate spikes cylindric.

1. MORUS.

Stigmas solitary, elongate: pistillate spikes globose.

2. PAPHYRIUS.

1. **MORUS** [Tourn.] L. Shrubs or trees, with scaly bark. Leaves deciduous: blades commonly serrate, sometimes lobed. Staminate flowers in cylindric spikes: sepals 4, the lateral ones larger than the others: stigmas 2, short. Fruit cylindric, the achenes included in the calyx. — Spr. — MULBERRY.

Fruits white or pinkish: leaf-blades glabrous and sparingly pubescent about the veins beneath.

1. *M. alba*.

Fruits deep-red or purplish: leaf-blades soft-pubescent beneath.

2. *M. rubra*.

1. **M. alba** L. Tree 5-12 m. tall, with sparingly pubescent twigs: leaf-blades blades ovate to oval or oval-ovate, 6-20 cm. long, softly pubescent beneath: staminate spikes 1-2 cm. long: fruit subglobose to oval-oblong, 1-2 cm. long, white or pinkish. — Common, on roadsides and in thickets. Nat. of Eu. — WHITE-MULBERRY.

2. **M. rubra** L. Tree becoming 20 m. tall, with early glabrous twigs: leaf-blades ovate to oval or oval-ovate, 6-20 cm. long, softly pubescent beneath: staminate spikes 4-8 cm. long: fruit cylindric, 3-6 cm. long, deep-red or purplish. — Common, in fields and woods. — RED-MULBERRY.

2. **PAPHYRIUS** Lam. Trees with smooth bark. Leaves deciduous: blades serrate, often lobed. Staminate flowers in cylindric spikes, with 4 sepals and 4 stamens. Pistillate spikes globose: calyx 4-lobed: stigma 1, elongate. Fruit globular, each achene protruding from the persistent calyx.

1. **P. papyrifera** (L.) Kuntze. Tree, resembling the red-mulberry, sometimes 15 m. tall, with hirsute-tomentose twigs: leaf-blades ovate, 8-16 cm. long: fruits globular, 2-3 cm. in diameter, the protruding achenes reddish or orange. — M. N. Frequent, on roadsides and about dwellings. — Nat. of As. — Spr. — PAPER-MULBERRY.

FAMILY 4. **ULMACEAE.** ELM FAMILY.

Shrubs or trees, the sap watery. Leaves alternate: blades inequilateral, commonly toothed. Flowers perfect, polygamous, or monoecious, variously disposed. Calyx of 4 or 5, or rarely 3-9, partially united sepals. Androeceium of usually as many stamens as there are sepals. Gynoeceium of 2 united carpels. Fruit a samara or a drupe, or nut-like.

Fruit a samara: anthers extrorse: embryo straight.

1. ULMUS.

Fruit a drupe: anthers introrse: embryo with conduplicate cotyledons.

2. CELTIS.

1. **ULMUS** [Tourn.] L. Shrubs or trees, with furrowed bark and sometimes winged branches. Leaves deciduous: blades toothed. Calyx campanulate. Ovary sessile or nearly so, smooth, but sometimes pubescent. Samara orbicular to oblong. — Spr. — ELM.

Samaras notched: buds acute: leaf-blades glabrous and nearly smooth above, sparingly pubescent beneath: flowering pedicels longer than the calyx.

Samaras rounded: buds rounded: leaf-blades very scabrous-pubescent: flowering pedicels shorter than the calyx. 1. *U. americana*.
2. *U. fulva*.

1. **U. americana** L. Tree becoming 40 m. tall, the twigs typically fine-pubescent: leaf-blades oval to ovate, 5–10 cm. long, sometimes slightly rough above: flower-clusters lax, the pedicels long: calyx shallowly lobed: samara oval or obovate, 10–20 mm. long, the wings long-ciliate, narrowed at the base. — Common, on roadsides and along streams. — WHITE-ELM. AMERICAN-ELM.

2. **U. fulva** Michx. Tree becoming 25 m. tall, the twigs densely pubescent, the inner bark mucilaginous: leaf-blades ovate, oval, or obovate, 8–19 cm. long, very rough-pubescent on both sides: flower-clusters dense, the pedicels short: samara suborbicular, 14–17 mm. in diameter, finely pubescent, the wings ciliate, broad at the base. — Common, in rich woods and along streams. — SLIPPERY-ELM. RED-ELM.

2. **CELTIS** [Tourn.] L. Unarmed shrubs or trees, the bark often warty. Leaves deciduous: blades entire or toothed, very inequilateral. Calyx rotate, the lobes much longer than the tube. Stigmas 2, entire. Drupe subglobose. — Spr. — HACKBERRY. NETTLE-TREE. SUGARBERRY.

Twigs glabrous: leaf-blades smooth or nearly so above. 1. *C. occidentalis*.
Twigs pubescent: leaf-blades very rough above. 2. *C. crassifolia*.

1. **C. occidentalis** L. Tree becoming 40 m. tall, the twigs glabrous: leaf-blades ovate or rarely oblong-ovate, 5–15 cm. long, smooth or nearly so above: drupes globose or subglobose, 7–10 mm. in diameter, orange, purple or nearly black. — Rather common, especially on the river hills, and along creeks.

2. **C. crassifolia** Lam. Tree similar to *C. occidentalis* in habit: leaf-blades ovate, firm, 3–12 cm. long, scabrous above: drupes oval to subglobose, 7–10 mm. in diameter, red-purple or nearly black. — M. Occasional, in rich soil. — *Limestones, quartzite*.

Order POLYGONALES.

Herbs, shrubs, trees, or vines. Leaves alternate, or sometimes opposite or whorled, mostly entire: stipules present, usually as a sheath. Flowers perfect, monoecious, dioecious, or polygamous, variously disposed. Hypanthium long or short. Calyx of 2–5 sepals, which sometimes develop keels or wings. Corolla wanting. Androecium of 2–9 stamens. Gynoecium of 2 or 3 united carpels, the ovary superior. Ovule orthotropous. Fruit an achene.

FAMILY 1. POLYGONACEAE. BUCKWHEAT FAMILY.

Plants various in habit. Leaves with manifest, usually sheathing, stipules, and inflorescence not involucrete, or the stipules obsolete and the inflorescence involucrete.

Stigmas tufted.
Stigmas not tufted.

1. RUMEX.

- Leaf-blades jointed at the base: ocreae 2-lobed, becoming lacerate: filaments, at least the inner, dilated. 2. POLYGONUM.
- Leaf-blades not jointed at the base: ocreae various, not 2-lobed: filaments slender.
- Ocreae cylindric, truncate.
- Sepals 4: calyx curved: stamens 4 or 5. 3. TOVARA.
- Sepals 5: if fewer, the stamens more than 5: calyx not curved. 4. PERSICARIA.
- Ocreae oblique, more or less open on the side facing the leaf.
- Herbs various in habit, not vines: sepals neither keeled or winged.
- Racemes collected into terminal corymbs: embryo dividing the endosperm by an S-shaped curve: plants smooth. 5. FAGOPYRUM.
- Racemes not in terminal corymbs: embryo slender, at one side of the endosperm: plants prickly-armed. 6. TRACALON.
- Vines with twining stems: outer sepals winged or keeled. 7. TINNARIA.

1. **RUMEX** L. Annual or perennial fleshy herbs. Leaves alternate, with brittle ocreae. Flowers in panicles, perfect, polygamous, or dioecious, the hypanthium-base conspicuously jointed to the pedicel. Sepals green, 6, unchanged or the 3 inner developing wings, one or all of which usually bear a callosity. Stamens 6. Stigmas peltate, tufted. Achene exerted or included, smooth or granular, usually more or less margined. — DOCK.

- Calyx unchanged in fruit: achenes exerted, granular. 1. *R. Acetosella*.
- Calyx accrescent, the inner sepals developing into wings: achenes included, smooth.
- Sepal-wings entire, more or less undulate. 2. *R. altissimus*.
- Only one of the 3 sepal-wings bearing callosities. 3. *R. crispus*.
- All of the 3 sepal-wings bearing callosities. 4. *R. obtusifolius*.
- Sepal-wings fringed with spiny teeth.

1. **R. Acetosella** L. Plants glabrous, 1–6 dm. tall: blades of the lower leaves 2.5–15 cm. long, hastate, the auricles entire or toothed: sepals green, 1 mm. long: achenes ovoid, 3-angled, about 1.5 mm. long. — Common, in fields and dry soil. — Spr. and fall. — FIELD-SORREL. SHEEP-SORREL. Often a pernicious weed.

2. **R. altissimus** Wood. Plants 6–12 dm. tall, the panicle-branches densely flowered: lower stem-leaves 1–3 dm. long; blades lanceolate to oblong-lanceolate, scarcely crisped: sepal-wings triangular-ovate, 4–5 mm. long, longer than wide, scarcely cordate: achenes about 3 mm. long. — Lower Susquehanna valley. Frequent, on river banks. — *Schists*. — Spr. — PALE-DOCK. PEACH-LEAVED DOCK.

3. **R. crispus** L. Plants 3–11 dm. tall, the panicle-branches rather closely flowered: lower stem-leaves 1.5–3 dm. long; blades oblong to oblong-lanceolate, much crisped: flower-clusters contiguous: sepal-wings ovate to orbicular-ovate, 4–5 mm. long: achenes fully 2 mm. long. — Common, in fields and waste places. Nat. of Eu. — Sum. — CURLED-DOCK.

4. **R. obtusifolius** L. Plants 6–12 dm. tall, the panicle-branches nearly erect: lower stem-leaves 3–5.5 dm. long; blades oblong to broadly oblong-lanceolate, deeply cordate, somewhat crisped: flower-clusters mostly contiguous, not leafy bracted: sepal-wings ovate-hastate, 4.5–5.5 mm. long, with 3–5 teeth: achenes fully 2 mm. long. — Common, in fields and waste places. Nat. of Eu. — Sum. — BITTER-DOCK. Often a troublesome weed.

2. **POLYGONUM** [Tourn.] L. Annual or perennial, erect or prostrate herbs. Leaves alternate, jointed near the top of the ultimately lacerate ocreae. Flowers in axillary clusters which are sometimes aggregated near the ends of the branches. Sepals green to pink or white, the outer ones sometimes corrugated in age. Stamens 3–8, often 5–6. Stigmas 3. Achene 3-angled. — Sum. — KNOTWEED. DOORWEED. KNOTGRASS.

Flower-clusters separate, scattered more or less throughout the plant.

Sepals with white, pink, or purplish margins: plants mainly prostrate, pale, bright- or bluish-green. 1. *P. neglectum*.

Sepals with yellowish-green margins: plants mainly diffuse, yellowish-green. 2. *P. erectum*.

Flower-clusters approximate on the branches, forming long, raceme-like panicles: plants erect. 3. *P. tenue*.

1. **P. neglectum** Besser. Plants bright- or bluish-green, the branches ultimately prostrate or procumbent, 1-6 dm. long: leaf-blades thin, narrowly elliptic, elliptic-lanceolate, or linear, less than 2 cm. long, acute or acuminate: ocreae very thin: sepals about 1.5 mm. long: achenes about 2 mm. long.—Common, about dwellings, and on roadsides and in waste places. Nat. of Eu.

2. **P. erectum** L. Plants yellowish-green, the branches spreading or decumbent, 1-12 dm. long: leaf-blades much larger than in the preceding species, mainly 2-6 cm. long, oblong, elliptic, oval, or somewhat broadened upward: ocreae rather scordid: sepals about 3 mm. long, often corrugated in age: achenes 2.5-3 mm. long, dull.—Common, about dwellings, in waste places and on moist banks.

3. **P. tenue** Michx. Plants 1-4 dm. tall, the branches wiry: leaf-blades linear to linear-lanceolate, 0.5-3 cm. long, each with 2 lateral impressions on either side of the midrib: flowers short-pedicelled: sepals becoming 2.5-3 mm. long: achenes ovoid, 2.5-3 mm. long.—Common, in dry places or rocky soil.

3. **TOVARA** Adans. Annual erect herbs. Leaves alternate, not jointed at the fringed ocreae. Flowers in lax remote clusters borne on virgate branches. Sepals more or less colored, 4, the 2 lateral ones overlapping the others. Stamens 4, and alternating with the sepals, or 5, the fifth one opposite the lower sepal: filaments slender. Stigmas 2. Achene lenticular.

1. **T. virginiana** (L.) Adans. Stem strigose, 3-14 dm. tall, virgately branched or simple: leaf-blades ovate to ovate-lanceolate, 3-16 cm. long: sepals ovate to rhombic-ovate, 3-3.5 mm. long: styles longer than the ovary: achenes 3.5-4 mm. long, ovoid or ovoid-oblong, invested in the nodding calyx.—Common, on shaded banks and in thickets.—Sum.

4. **PERSICARIA** [Tourn.] Adans. Annual or perennial, erect or spreading herbs. Leaves alternate, not jointed at the cylindric naked or fringed ocreae: blades narrowed at the base. Flowers borne in spike-like panicles. Sepals white or colored, 5, neither winged nor keeled. Stamens 4-8: filaments slender. Stigmas 2 or sometimes 3. Achenes lenticular or 3-angled, included.—Sum.

Raceme usually solitary and terminal: plants mainly aquatic.

Leaf-blades more or less acuminate at the apex, pubescent: panicles long and slender. 1. *P. Muhlenbergii*.

Leaf-blades obtuse or merely acute at the apex, glabrous: panicles short and stout. 2. *P. amphibia*.

Racemes several or numerous: plants mostly terrestrial.

Ocreae naked or fringed, not spreading at the top: cotyledons accumbent.

Ocreae truncate and naked at maturity.

Racemes erect: achenes orbicular or wider than long. 3. *P. pennsylvanica*.

Racemes drooping or with drooping tips: achenes broadly oblong or ovoid. 4. *P. lapathifolia*.

Ocreae fringed with bristles.

Panicles short, stout, compact. 5. *P. Persicaria*.

Panicles slender, elongate, lax or interrupted.

Calyx not glandular-punctate. 6. *P. hydropticroides*.

Calyx glandular-punctate.

Panicles erect: achenes smooth, shining. 7. *P. punctata*.

Panicles drooping: achenes granular, dull. 8. *P. Hydropiper*.

Ocreae with spreading fringed tops: cotyledons incumbent. 9. *P. orientalis*.

1. *P. Muhlenbergii* (S. Wats.) Small. Perennial, generally strigose, creeping: leaf-blades lanceolate to oblong-lanceolate, 5-20 cm. long, rounded or cordate at the base: ocreae ciliate: panicles compact, 3-10 cm. long: ocreolae ciliate and pubescent: sepals rose-colored, not punctate, about 4 mm. long: achenes 2.5-3 mm. long. — Common, on muddy shores.

2. *P. amphibia* (L.) S. F. Gray. Perennial, glabrous, at least when mature, floating: leaf-blades oblong, elliptic, or elliptic-lanceolate, 4-10 cm. long, rounded or narrowed at the base: ocreae ciliate: panicle dense, mostly 1.5-2.5 cm. long: ocreolae ciliate and glabrous, or inconspicuously pubescent: sepals bright rose-colored, not punctate: achenes lenticular, orbicular-oblong, about 3 mm. long. — Susquehanna river. Rare, in still water.

3. *P. pennsylvanica* (L.) Small. Annual, the upper branches finely glandular-pubescent: leaf-blades lanceolate, 4-22 cm. long: ocreae ciliate: panicles stout, erect: ocreolae ciliate or nearly so: sepals pink or light-purple, not punctate: style short: achenes flat-lenticular, 3-3.5 mm. high, shining, short-beaked. — Common, in waste places, on roadsides and in cultivated grounds.

4. *P. lapathifolia* (L.) S. F. Gray. Annual, glabrous or nearly so: leaf-blades lanceolate, sometimes narrowly so, 5-20 cm. long: ocreae ciliate: panicles slender, nodding: ocreolae ciliate: sepals whitish to rose-colored, finely punctate: achenes flat-lenticular, about 2 mm. long. — S. Common, especially in the Susquehanna valley. Nat. of Eu.

5. *P. Persicaria* (L.) Small. Annual, glabrous or partially pubescent: leaf-blades lanceolate to linear-lanceolate, 2-18 cm. long, often with a central blotch: ocreae fringed: panicles stout: ocreolae ciliate: sepals pink, purple, green, or reddish, not punctate: achenes turgid-lenticular or 3-angled, 2-2.5 mm. long. — Common, in cultivated grounds and waste places, and on roadsides. Nat. of Eu. — LADY'S-THUMB.

6. *P. hydropiperoides* (Michx.) Small. Perennial, strigillose in parts: leaf-blades lanceolate, varying to oblong-lanceolate or linear-lanceolate, 4-13 cm. long: ocreae long-fringed, sparingly strigose: panicles slender, erect: ocreolae short-fringed: sepals deep-pink or greenish, not punctate: achenes 3-angled, 2-2.5 mm. long, shining. — Common, in waste places and swamps. — MILD WATER-PEPPER.

7. *P. punctata* (Ell.) Small. Annual or perennial, usually glabrous: leaf-blades lanceolate to oblong-lanceolate, 2-16 cm. long: ocreae long-fringed: panicles linear, mostly continuous during anthesis: ocreolae fringed: sepals whitish or green, punctate: achenes 3-angled or turgid-lenticular, about 2.5 mm. long, shining. — Common, in swamps and low grounds. — WATER SMART-WEED.

8. *P. Hydropiper* (L.) Opiz. Annual, glabrous or nearly so: leaf-blades narrowly ovate to oblong-lanceolate or lanceolate, 1.5-9 cm. long: ocreae fringed: panicles slender, nodding: ocreolae short-fringed: sepals greenish, punctate: achenes turgid-lenticular or 3-angled, dull, about 3 mm. long. — Common, in moist soil and on wet banks. — WATER-PEPPER. COMMON-SMARTWEED.

9. *P. orientalis* (L.) Vilm. Annual, tall, more or less hispid: leaf-blades ovate to broadly oblong, 6-25 cm. long: ocreae spreading and ciliate at the top: panicles stout, nodding: ocreolae ciliate: sepals dark rose-colored, not punctate: achenes lenticular, orbicular, about 3 mm. long. — Occasional, on roadsides and about dwellings. Nat. of As. — PRINCE'S-FEATHER.

5. **FAGOPYRUM** [Tourn.] Gaertn. Annual erect smooth herbs, the stems terete. Leaves alternate, not jointed at the oblique ocreae: blades hastate or cordate at the base. Flowers borne in branching raceme-like panicles.

Sepals white, 5, unchanged at maturity. Stamens 5-8: filaments filiform. Stigmas 3. Achene 3-angled, exserted.

1. **F. Fagopyrum** (L.) Karst. Stem 1-9 dm. tall, slightly pubescent about the nodes: leaf-blades hastate, 2.5-8 cm. long: panicles persistently flowering: sepals becoming 2.5-3 mm. long: achenes 5-6 mm. long. — Occasional, in fields and on roadsides. Nat. of Eu. — Sum. — BUCKWHEAT.

6. **TRACAULON** Raf. Annual or perennial, prickly-armed, reclining-climbing herbs. Leaves alternate, not jointed at the oblique ocreae. Flowers borne in spike-like or capitate panicles. Sepals often slightly colored, 5 or 4, neither keeled nor winged. Stamens 5-8: filaments slender. Stigmas 2 or 3. Achene lenticular or 3-angled, included. — Sum. — TEAR-THUMB.

Leaf-blades sagittate: achenes 3-angled.

1. *T. sagittatum*.

Leaf-blades hastate: achenes lenticular.

2. *T. arifolium*.

1. **T. sagittatum** (L.) Small. Leaf-blades lanceolate to oblong, 1-12 cm. long, the basal lobes acute: ocreolae 3-5 mm. long: sepals becoming 4 mm. long: stamens 8: achenes 3-3.5 mm. long. — Common, in wet places and meadows.

2. **T. arifolium** (L.) Raf. Leaf-blades hastate, 2-18 cm. long, the basal lobes spreading, acuminate: ocreolae about 2 mm. long: sepals becoming 4 mm. long: stamens 6: achenes 4 mm. long. — Common, in wet thickets and meadows.

7. **TINIARIA** Reichenb. Annual or perennial, unarmed twining vines. Leaves alternate, not jointed at the oblique ocreae. Flowers borne in branching raceme-like panicles or in axillary clusters. Sepals white or yellowish, 5, the outer ones keeled or winged at maturity. Stamens 8: filaments slender. Stigmas 3. Achenes 3-angled, included. — Sum. and fall.

Outer sepals keeled at maturity: achene granular and dull. 1. *T. Convolvulus*.

Outer sepals developing conspicuous wings: achene smooth and shining.

Sepal-wings not incised: achenes over 3.5 mm. long.

2. *T. scandens*.

Sepal-wings incised: achenes less than 3.5 mm. long.

3. *T. cristatum*.

1. **T. Convolvulus** (L.) Webb. & Moq. Stem and branches trailing or twining, green or purple-tinged: leaf-blades ovate to ovate-sagittate, or those of the upper ones sagittate, 1.5-6 cm. long: ocreae rough-edged: sepals mealy-granular, the outer becoming longer than the inner: achenes about 3.5 mm. long. — Common, in moist places and fields. Nat. of Eu. — BLACK-BINDWEED.

2. **T. scandens** (L.) Small. Stem and branches twining, purplish: leaf-blades ovate to oblong-ovate, 4-12 cm. long: ocreae with rough ridges: mature hypanthium and calyx 12-15 mm. long: achenes 4-4.5 mm. long. — Common, in thickets and fence-pows. — HEDGE-BUCKWHEAT. FALSE-BUCKWHEAT.

3. **T. cristatum** (Engelm. & Gray) Small. Stem and branches twining, green or purplish: leaf-blades ovate to triangular, 1-6 cm. long: mature hypanthium and calyx 6.5-7.5 mm. long: achenes 3 mm. long. — Lower Susquehanna valley. Rather common, on river banks.

Order CHENOPODIALES.

Herbs, often partially woody, or shrubs, or trees. Leaves alternate or opposite, occasionally scale-like. Flowers mostly perfect, sometimes monoecious or dioecious. Calyx usually present, the sepals mainly separate. Corolla wanting, or present and of minute or large petals. Androeium of 1-several stamens. Gynoeium a single carpel or of several united

carpels, the ovary mostly superior. Fruit an achene, a utricle, a capsule, or a berry, or sometimes an anthocarp.

Fruit a utricle, achene, or berry, sometimes an anthocarp, not valvate, or merely circumscissile.

Fruit utricular, the carpels not whorled.

Bracts not scarious: stipules wanting.

Bracts, or stipules, scarious.

Stipules wanting: sepals scarious.

Stipules present: sepals herbaceous or scarious-margined.

Fruit baccate, the carpels whorled.

Fruit a capsule dehiscant by apical or longitudinal valves.

Ovary several-celled: corolla wanting.

Ovary 1-celled: corolla mostly present.

Sepals 2: leaves mostly alternate.

Sepals 4 or 5: leaves mostly opposite.

Sepals distinct: ovary sessile: petals not clawed.

Sepals united: ovary stipitate: petals clawed.

Fam. 1. CHENOPODIACEAE.

Fam. 2. AMARANTHACEAE.

Fam. 3. CORRIGIOLACEAE.

Fam. 4. PHYTOLACCACEAE.

Fam. 5. TETRAGONIACEAE.

Fam. 6. PORTULACACEAE.

Fam. 7. ALSINACEAE.

Fam. 8. CARYOPHYLLACEAE.

FAMILY 1. **CHENOPODIACEAE.** GOOSEFOOT FAMILY.

Herbs or woody plants. Leaves alternate or opposite: blades simple. Flowers perfect, polygamous, monoecious, or dioecious, mostly in elongate spikes or panicles. Calyx of 1-5 persistent sepals. Corolla wanting. Androecium of as many stamens as there are sepals. Gynoecium of 2 or more united carpels. Ovary 1-celled. Fruit a utricle, sometimes achene-like.

Flowers perfect: calyx always present.

Sepals hooded, usually keeled at maturity: embryo forming a circle: mealy plants, odorless or heavy scented.

Sepals flat or merely concave: embryo not forming a circle: glandular plants, aromatic.

Flowers dioecious or monoecious: calyx wanting in the pistillate flowers.

1. CHENOPODIUM.

2. AMBRINA.

3. ATRIPLEX.

1. CHENOPODIUM [Tourn.] L. Odorless or heavy-scented non-glandular herbs, ours annuals. Leaves alternate: blades entire to coarsely toothed, often mealy-coated. Sepals hooded. Anther-sacs commonly separate. Ovary often depressed. — GOOSEFOOT. PIGWEED.

Seed horizontal.

Seed and pericarp firmly attached together.

Flowering branches longer than the accompanying leaves: mature sepals keeled.

Leaf-blades coarsely shallow-toothed or entire, gradually narrowed at the base.

Inflorescence dense: mature calyx 2.5-3 mm. broad: utricle fully 1.5 mm. wide: leaf-blades decidedly mealy beneath.

Inflorescence lax: mature calyx 2-2.5 mm. wide: utricle less than 1.5 mm. wide: leaf-blades scarcely, if at all, mealy.

Leaf-blades sinuately deep-toothed, with the teeth salient, rounded or cordate at the base.

Flowering branches shorter than the accompanying leaves: mature sepals not keeled.

Seed and pericarp easily separable from one another.

Seed vertical.

1. *C. album*.

2. *C. lanceolatum*.

3. *C. hybridum*.

4. *C. murale*.

5. *C. Boscianum*.

6. *C. glaucum*.

1. C. album L. Plants stout, pale-green, copiously mealy, 6-30 dm. tall: leaf-blades ovate and somewhat rhombic to broadly lanceolate, coarsely toothed, 2-8 cm. long: inflorescence compact, the flower-clusters mostly contiguous, becoming 6-8 mm. thick: seeds about 1.5 mm. wide. — Common, in waste places, and cultivated grounds. Nat. of Eu. — Sum. and fall. — LAMB'S-QUARTERS.

2. **C. lanceolatum** Muhl. Plants slender, 5-20 dm. tall, bright-green, slightly mealy: leaf-blades lanceolate to linear-lanceolate, or ovate on the lower part of the stem, 2-5 cm. long, shallowly toothed or entire: inflorescence more open than in *C. album*, and mature flower-clusters somewhat smaller: seeds slightly over 1 mm. wide.—Rather common, in cultivated grounds and waste places.—Sum. and fall.

3. **C. hybridum** L. Plants bright-green, 5-13 dm. tall: leaf-blades ovate to ovate-hastate, 5-16 cm. long, sinuately 3-9-toothed: inflorescence rather lax, the flower-clusters contiguous or ultimately separate: seeds fully 1.5 mm. wide.—S. In woods, on island at Peach Bottom.—*Schists.*—Sum.—MAPLE-LEAVED GOOSEFOOT.

4. **C. murale** L. Plants deep-green, somewhat mealy, 1-6 dm. tall: leaf-blades rhombic-ovate, 2-8 cm. long, coarsely, sharply and irregularly toothed: panicles terminal and lateral, the small flower-clusters numerous and close: seeds barely 1.5 mm. wide.—M. S. Rather common, in waste places. Nat. of Eu.—Sum.

5. **C. Boscianum** Moq. Plants light-green, often minutely mealy when young, 3-9 dm. tall: leaf-blades ovate, oblong-ovate, or lanceolate, 1-4 cm. long, thin, the lower ones often sinuate: panicle-branches very slender, spreading, the flower-clusters scattered, relatively small: seeds 1.5 mm. wide.—S. Rather common, in woods and thickets.—*Schists.*—Sum.

6. **C. glaucum** L. Plants mealy-glaucous, 0.5-3 dm. tall: leaf-blades spatulate to oblong, broadly linear or ovate in outline, mostly 1-5 cm. long, sinuate-dentate, green or yellow-green above, whitish beneath: inflorescence compact, the flower-clusters at first inconspicuous in the leaf-axils, ultimately elongate and more conspicuous: seeds less than 1 mm. wide.—Rather rare, in waste places and on roadsides. Nat. of Eu.—Sum.—OAK-LEAVED GOOSEFOOT.

2. **AMBRINA** Spach. Aromatic glandular herbs. Leaves alternate: blades mainly toothed, pinnatifid or pinnately lobed, not mealy. Sepals flat or concave. Anther-sacs commonly contiguous. Ovary often elongate.—Sum.

Flowers not glomerate: leaf-blades pinnately lobed: calyx glandular-pubescent.

1. *A. Botrys.*

Flowers glomerate: leaf-blades repand-toothed or entire: calyx glabrous.

2. *A. ambrosioides.*

1. **A. Botrys** (L.) Moq. Stem 1-6 dm. tall, the branches erect or spreading: leaf-blades oblong to ovate, 1-5 cm. long, the lobes entire or toothed: panicle-branches cymose: utricles partially enclosed: seeds less than 1 mm. wide.—Susquehanna valley. Frequent, on the river shore. Nat. of Eu.—JERUSALEM-OAK. FEATHER-GERANIUM.

2. **A. ambrosioides** (L.) Spach. Stem 5-8 dm. tall, the branches sometimes decumbent: leaf-blades oblong to oblong-lanceolate or ovate-lanceolate, those of the stem-leaves 3-15 cm. long, undulate to repand-dentate: panicle-branches spike-like: utricles wholly enclosed: seeds 0.7-0.8 mm. wide.—Common, in waste places. Nat. of trop. Am.—MEXICAN-TEA. WORMSEED.

3. **ATRIPLEX** [Tourn.] L. Scaly herbs or shrubs. Leaves alternate or sometimes opposite: blades often angulate or toothed. Flowers monoecious or dioecious, the staminate bractless, the pistillate bracted. Calyx herbaceous. Utricle wholly or partially surrounded by the crested, tubercled, or winged accrescent bracts.

1. **A. hastata** L. Plants light-green or purplish, the stems 3-8 dm. long: leaf-blades triangular-hastate to hastate-lanceolate, 2-8 cm. long: mature bracts ovate to deltoid, 4-5 mm. long, with toothed edges and spiny faces.—M. Occasional, in waste places. Nat. of the coastal region.—Sum.—ORACHE.

FAMILY 2. **AMARANTHACEAE.** AMARANTH FAMILY.

Herbs, shrubs, or trees. Leaves alternate or opposite, exstipulate: blades entire or nearly so. Flowers perfect, polygamous, or dioecious, in spikes or panicles, with scarious or colored bracts. Calyx of 2-5 mostly distinct sepals. Corolla wanting. Androeium of 5, or fewer, distinct or monodelphous stamens. Gynoeium of 2 or more united carpels. Ovary 1-celled. Fruit a utricle or pyxidium, or rarely baccate.

1. AMARANTHUS [Tourn.] L. Herbs (ours annuals). Leaves alternate: blades entire. Flowers polygamous, monoecious, or dioecious, densely spicate or clustered, each subtended by mostly 3 bracts. Sepals 2-5. Filaments distinct. Stigmas 2 or 3, distinct. Ovule solitary. Utricle circumscissile, irregularly opening or indehiscient. Sum. and fall. — AMARANTH. PIGWEED.

Flowers, at least the upper ones, in dense terminal spikes.

Stems unarmed, without spines at the leaf-axils.

Spikes strict: sepals mostly obtuse.

Spikes drooping: sepals mostly acute.

Stems furnished with a pair of spines at each leaf-axil.

Flowers in small axillary clusters usually surpassed by the leaves. 1. *A. retroflexus*.
2. *A. hybridus*.
3. *A. spinosus*.
4. *A. graecizans*.

1. A. retroflexus L. Stems 3-30 dm. tall: leaf-blades ovate to ovate-lanceolate or lanceolate above, 5-15 cm. long: staminate calyx 3.4-3.6 mm. long: pistillate calyx 3.5-4 mm. long; sepals linear-oblong to linear-cuneate. — Common, in cultivated grounds and waste places. Nat. of trop. Am. — Fall. — GREEN-AMARANTH.

2. A. hybridus L. Stems 5-25 dm. tall, not spiny: leaf-blades ovate to ovate-lanceolate or elliptic, 3-12 cm. long: staminate calyx 1.7-1.9 mm. long: pistillate calyx 1.7-2 mm. long; sepals narrowly oblong to oblong-lanceolate. — Common, in cultivated grounds and waste places. Nat. of trop. Am. — Sum. and fall.

3. A. spinosus L. Stems 2-12 dm. tall, spiny: leaf-blades ovate or rhombic-ovate, or lanceolate, the upper 1.5-8 cm. long: staminate calyx 2-2.7 mm. long: pistillate calyx 2-2.5 mm. long; sepals broadened upward, abruptly pointed. — Frequent, in waste places on roadsides and in fields. Nat. of trop. Am. — Sum. — THORNY-AMARANTH.

4. A. graecizans L. Stems 1-6 dm. tall: leaf-blades spatulate, obovate, or oblong, 1-3 cm. long: staminate calyx 1.4-1.6 mm. long: pistillate calyx 1.8-2.2 mm. long; sepals lanceolate, long-acuminate. — Common, in cultivated grounds and fields. Nat. of trop. Am. — Sum. — TUMBLE-WEED.

FAMILY 3. **CORRIGIOLACEAE.** WHITLOW-WORT FAMILY.

Herbs, but often firm or woody at the base. Leaves opposite, stipulate: blades entire. Flowers perfect, cymose. Calyx of 4 or 5 sepals, which are sometimes awned or cuspidate at the apex. Corolla wanting. Androeium of 4 or 5 stamens borne on the margin of the minute or long hypanthium. Gynoeium mostly 2-carpellary. Ovary 1-celled. Fruit a utricle or an achene. Seed solitary.

1. ANYCHIA Michx. Annual herbs, with much-branched stems. Leaves with narrow or rather broad blades. Cymes diffuse. Sepals flattish, mucronate. — Sum. — FORKED-CHICKWEED.

Stem and branches glabrate: utricle surpassing the calyx: seed orbicular, fully 1 mm. wide. 1. *A. canadensis*.

Stem and branches pubescent: utricle usually as long as the calyx: seed oval, less than 1 mm. wide. 2. *A. polygonoides*.

1. *A. canadensis* (L.) B.S.P. Stems 0.5–4 dm. tall, forked above: leaf-blades thin, oblong to elliptic, 0.5–2 cm. long, typically obtuse: sepals oblong to narrowly ovate, becoming 1 mm. long.—Common, in dry open places and on partially shaded hillsides.

2. *A. polygonoides* Raf. Stems 0.5–3 dm. tall, often diffusely forked throughout: leaf-blades thick, typically acute: sepals ovate, often broadly so, becoming 1.5 mm. long.—Common, in dry open places and on rocky hills.

FAMILY 4. PHYTOLACCACEAE. POKEWEED FAMILY.

Herbs, shrubs, or trees. Leaves alternate: blades entire, rather fleshy. Flowers perfect or dioecious, in racemes or panicles. Calyx of 4 or 5 sepals. Corolla wanting. Androecium of 4–8 stamens, or more, borne below the ovary. Gynoecium 1–many-carpellary. Fruit baccate.

1. **PHYTOLACCA** [Tourn.] L. Relatively large or stout plants. Flowers paniculate, the panicles often raceme-like. Sepals broad, spreading under the compound fruit.

1. *P. americana* L. Plants 1–3 m. tall, the branches green, magenta, or purple: leaf-blades mainly ovate-lanceolate to ovate, 9–30 cm. long: calyx 5–6 mm. wide: berries 7–10 mm. wide, their length less than the length of their stalks: seeds about 3 mm. long.—Common, in waste places and cultivated grounds.—Spr.–fall.—POKE. INKBERRY. SCOKE. PIGEON-BERRY.

FAMILY 5. TETRAGONIACEAE. CARPET-WEED FAMILY.

Herbs, firm or succulent, or partially woody plants. Leaves alternate or opposite, sometimes apparently whorled. Flowers perfect, polygamous, or unisexual, regular or nearly so. Calyx of 4 or 5 sepals. Corolla wanting (in our species). Androecium of 4 or 5 hypogynous or perigynous stamens, or sometimes fewer, or more numerous. Gynoecium of 2–several united carpels. Ovary superior or partly inferior. Fruit a capsule or pyxis, or baccate or nut-like.

1. **MOLLUGO** L. Annual slender herbs. Leaves alternate, sometimes apparently whorled: blades narrow. Sepals 5, hyaline-margined, glabrous. Stamens 3–5. Styles 5, short.

1. *M. verticillata* L. Branches slender, prostrate, 4–30 cm. long: stem-leaves 1–3 cm. long: blades spatulate: sepals oblong, becoming 2.5–3 mm. long: filaments 2.5–3 mm. long: capsules oblong, 3.5–4 mm. long.—Common, in waste places and cultivated grounds.—Spr.–fall.—INDIAN-CHICKWEED.

FAMILY 6. PORTULACACEAE. PURSLANE FAMILY.

Herbs, mostly fleshy or succulent, or partially woody. Leaves alternate or opposite: blades entire. Flowers perfect, regular. Calyx of 2 sepals. Corolla of 4 or 5, or rarely more, fugacious petals. Androecium of as many stamens as there are petals, or fewer or more. Gynoecium of 3 or more united carpels. Ovary superior or inferior, 1-celled. Fruit a capsule or pyxis.

Ovary and capsule superior: capsule 3-valved.

Sepals deciduous: stamens more numerous than the sepals, or petals: capsules many-seeded. 1. TALINUM.

Sepals persistent: stamens as many as the sepals, or petals: capsules few-seeded. 2. CLAYTONIA.

Ovary and capsule wholly or partly inferior: capsule circumscissile. 3. PORTULACA.

1. **TALINUM** Adans. Perennial sometimes partially woody herbs, the stem and branches mostly terminating in wiry peduncles. Leaves terete or flat. Flowers erect. Sepals 2, deciduous. Petals 5 or more. Style elongate. Ovules many on a stalked placenta.

1. **T. teretifolium** Pursh. Plant 1-2.5 dm. tall: leaf-blades 2-6 cm. long, narrow: bracts conspicuously prolonged backward: corolla blue or purplish, 2-3 cm. wide: stamens 15-30: capsules 4-5 mm. in diameter. — S. Frequent, on *serpentine* hills. — Sum.

2. **CLAYTONIA** [Gronov.] L. Perennial or annual fleshy herbs, the weak stems often arising from tuber-like corms. Leaves flat. Flowers spreading or nodding. Sepals 2, persistent. Petals 5. Style elongate. Ovules few, on a sessile placenta.

1. **C. virginica** L. Plants 5-25 cm. tall: leaf-blades narrowly linear, sometimes very narrow, 6-14 cm. long: sepals becoming 4-7 mm. long: petals 9-13 mm. long: seeds about 2.5 mm. wide. — Common, in woods. — Spr. — SPRING-BEAUTY.

3. **PORTULACA** [Tourn.] L. Annual or perennial succulent herbs. Leaves flat or terete. Flowers erect. Sepals 2, deciduous. Petals 4-6. Style short; stigmas 3-8, slender. Ovules many on a basal placenta. — PORTULACA.

1. **P. oleracea** L. Plants prostrate: leaf-blades cuneate to obovate, 1-3 cm. long, rounded at the apex: petals yellow, 4-8 mm. long, notched: capsules 5-9 mm. long. — Common, in cultivated grounds and waste places. — Spr.-fall. — PURSLANE. PUSSLEY.

FAMILY 7. ALSINACEAE. CHICKWEED FAMILY.

Herbs, sometimes woody at the base. Leaves opposite: blades entire. Flowers mostly perfect. Calyx of 4 or 5 persistent, distinct sepals. Corolla of 4 or 5 clawless petals, or wanting. Androecium of twice as many stamens as sepals, or fewer. Gynoecium of 2-5 united carpels. Ovary superior. Fruit a capsule subtended by the calyx.

Stipules present.

Stipules wanting.

Petals entire, toothed, or slightly notched.

Stigmas as many as the sepals.

Stigmas fewer than sepals.

Petals toothed: flowers in umbel-like cymes.

Petals entire or emarginate: flowers in dichotomous or capitate cymes or solitary.

Capsules opening by as many valves as there are stigmas.

Capsules opening by twice as many valves as there are stigmas.

Seeds not strophiolate: capsule many-seeded.

Seeds strophiolate: capsule few-seeded.

Petals 2-cleft or 2-parted.

Capsules relatively short, ovoid or oblong.

Capsules relatively long, cylindrical.

1. TISSA.

2. SAGINA.

3. HOLOSTEUM.

4. ALSINOPSIS.

5. ARENARIA.

6. MOERHINGIA.

7. ALSINE.

8. CERASTIUM.

1. **TISSA** Adans. Annual, biennial, or perennial, diffuse herbs. Leaf-blades narrow. Flowers in raceme-like cymes. Sepals 5, persistent. Petals 5, or fewer, entire, or wanting. Stamens 2-10. Stigmas slender.

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1. **T. rubra** (L.) Britton. Plants more or less branched at the base, the branches often depressed, 3–12 cm. long, finely glandular-pubescent above: leaf-blades linear, 5–22 mm. long, flat: sepals linear to linear-lanceolate, becoming 3 mm. long: petals red, ovate or rhombic, mostly shorter than the sepals: capsules about as long as the calyx. — M. Rather rare, in waste places and fields. Nat. of Eu. — Sum. — SAND-SPURRY.

2. **SAGINA** L. Annual or perennial diminutive herbs. Leaf-blades subulate to filiform. Flowers axillary. Sepals 4 or 5, persistent. Petals 4 or 5, about as large as the sepals, or wanting. Stamens 5, or sometimes 3–10. Stigmas short. Capsule longer than the sepals.

1. **S. decumbens** (Ell.) T. & G. Plants 2–10 cm. tall, very slender: leaf-blades linear-subulate, 2–8 mm. long: pedicels erect, very slender: sepals ovate or oval, about 1.5 mm. long: petals wanting or rudimentary: capsules oblong-ovoid, about twice as long as the calyx. — Rare, on hillsides, near Safe Harbor. — *Schists.* — Sum. — PEARLWORT.

3. **HOLOSTEUM** [Dill.] L. Annual tender herbs. Leaf-blades flat. Flowers in umbel-like cymes. Sepals 5, persistent. Petals 5, emarginate or toothed. Stamens 5, or 3. Stigmas slender. Capsule narrow, partly enclosed in the calyx.

1. **H. umbellatum** L. Plants 8–40 cm. tall: leaf-blades oblong or oblanceolate below, to oblong or lanceolate above, 1–3 cm. long: sepals lanceolate, 4–5 mm. long: petals 5.5–6.5 mm. long, toothed: capsules 5–6 mm. long. — M. S. Common, in fields, woods, and waste places. Nat. of Eu. — Spr. — JAGGED-CHICKWEED.

4. **ALSINOPSIS** Small. Annual or perennial herbs. Leaf-blades subulate or sometimes flat, but narrow. Flowers in cymes. Sepals 5, often fleshy. Petals 5, entire or emarginate. Stamens usually 10. Stigmas typically 3, slender. Capsule with as many valves as stigmas.

1. **A. stricta** (Michx.) Small. Stems 1–3 dm. tall: leaf-blades linear-subulate, 5–10 mm. long: sepals ovate, about 2.5 mm. long: petals about thrice as long as the sepals: capsules nearly twice as long as the sepals. — M. Rare, on rocky hillsides and cliffs. — *Limestones.* — Sum. — SANDWORT.

5. **ARENARIA** L. Annual or perennial herbs. Leaf-blades flat, broad or sometimes narrow. Flowers axillary or cymose. Sepals 5, firm, often ribbed. Petals 5, entire or notched, or wanting. Stamens typically 10. Stigmas 3, or rarely 2–5. Capsules with twice as many valves as stigmas.

1. **A. serpyllifolia** L. Plants 1–4 dm. tall, diffuse: leaf-blades ovate to broadly elliptic, 2–6 mm. long, minutely ciliate: sepals lanceolate, 3–4 mm. long: petals oblong-ovate to elliptic, about 2 mm. long: capsules about 3 mm. long. — Common, in dry places and woods. Nat. of Eu. — Spr. — SANDWORT.

6. **MOEHRINGIA** L. Perennial herbs. Leaves few: blades flat, usually broad and relatively large. Flowers few, the axillary stalks elongate. Sepals 4 or 5, herbaceous, not ribbed. Petals 4 or 5, broad or narrow, longer than the sepals or shorter. Stamens 8 or 10. Styles mostly 3, elongate. Capsule fully as long as the calyx or shorter, few-seeded.

1. **M. lateriflora** (L.) Fenzl. Plants reclining or diffuse, 1–3 dm. tall, the stem and branches slender: leaf-blades thin, oblong to oval, 1–2.5 cm. long, obtuse, ciliate: sepals oblong to oval, about 2 mm. long: petals twice as long as the sepals, short-clawed: capsules ovoid, about twice as long as the calyx. — M. Rare, chiefly in the Dillerville swamp, Lancaster. — *Limestones.* — Sum.

7. ALSINE L. Annual or perennial weak herbs. Leaf-blades succulent. Flowers cymose or axillary. Sepals 5 or 4, ribless. Petals 5 or 4, 2-cleft or 2-parted, rarely wanting. Stamens 10 or fewer. Stigmas 3-5, slender. Capsule barely exceeding the sepals, with twice as many valves as stigmas. — CHICKWEED. STARWORT. SWITCHWORT.

Leaf-blades broad, or relatively so, ovate, oblong, elliptic, or lanceolate, not attenuate; cymes not lax and open.

Stem, branches, and peduncles pubescent: lower leaves with petioles.

Corolla shorter than the calyx: stamens less than 8: capsule exceeding the calyx. 1. *A. media*.

Corolla longer than the calyx: stamens 10: capsule shorter than the calyx. 2. *A. pubera*.

Stem, branches, and peduncles glabrous: lower leaves without petioles. 3. *A. uliginosa*.

Leaf-blades narrow, narrowly linear-lanceolate to almost linear, attenuate: cymes conspicuously lax and open. 4. *A. longifolia*.

1. **A. media** L. Stems 1-3 dm. long, often growing in mats: leaf-blades ovate, 0.5-2 cm. long: sepals oblong-lanceolate, 3-4 mm. long, soft-tipped: petals shorter than the sepals: capsules 4-5 mm. long, longer than the calyx. — Common, in cultivated grounds and woods. Nat. of Eu. All year.

2. **A. pubera** (Michx.) Britton. Stems 1-3 dm. tall, finely pubescent: leaf-blades ovate, oblong, or elliptic, 14 cm. long, or those on the sterile branches 5-10 cm. long: sepals ovate to broadly oblong-lanceolate, 5-7 mm. long: petals longer than the sepals: capsules 3-4 mm. long, shorter than the calyx. — S. Frequent, in rich mould on river hills. — *Schists*. — Spr.

3. **A. uliginosa** (Murr.) Britton. Stems 1-4 dm. long, weak, often matted, mostly simple: leaf-blades oblong to lanceolate, 1.5-2.5 cm. long: sepals lanceolate to oblong-lanceolate, 2.5-3 mm. long: petals usually shorter than the sepals: capsules 3-4 mm. long, longer than calyx. — S. Not common, on wet banks and in spring-runs, especially along the Susquehanna, and the Octoraro Creek. — *Schists*. — Spr.

4. **A. longifolia** (Muhl.) Britton. Stems 1.5-4.5 dm. long, glabrous or nearly so: leaf-blades narrowly linear-lanceolate, 1.5-7 cm. long: sepals lanceolate, about 3 mm. long, acute, firm-tipped: petals as long as the sepals or somewhat longer: capsules 5-6 mm. long, longer than the calyx. — Common, in wet places or swamps. — Spr.

8. CERASTIUM L. Annual or perennial herbs. Leaf-blades herbaceous. Flowers cymose. Sepals 5, or 4, ribless. Petals 5, or 4, notched or 2-cleft, or rarely wanting. Stamens 10 or fewer. Stigmas 5 or 4, stout. Capsule much exceeding the calyx. — MOUSE-EAR CHICKWEED.

Corolla shorter than the calyx or slightly longer.

Bracts scarious or scarious-margined.

Plants annual: capsules nearly straight, less than 8 mm. long.

1. *C. semidecandrum*.

Plants perennial: capsules curved upward, over 8 mm. long.

2. *C. vulgatum*.

Bracts herbaceous.

Cymes glomerate, the pedicels very short: capsule about twice as long as the calyx or less.

3. *C. viscosum*.

Cymes lax, the pedicels very long: capsule fully twice as long as the calyx.

4. *C. longipedunculatum*.

Corolla twice as long as the calyx or nearly so.

Capsule less than twice as long as the calyx: blades of the cauline leaves linear to linear-lanceolate.

5. *C. arvense*.

Capsule over twice the length of the calyx: blades of the cauline leaves narrowly lanceolate to oblong.

6. *C. vclutinum*.

1. **C. semidecandrum** L. Plants 5-15 cm. tall, viscid-villous: blades of the upper leaves obovate or elliptic, 5-10 mm. long: sepals lanceolate, 3-3.5 mm.

long, acuminate: petals oblong, about as long as the sepals: capsules 5-7 mm. long.—S. Common, in dry pastures.—*Schists, serpentine*.—Sum.

2. *C. vulgatum* L. Plants 8-50 cm. tall, pubescent and somewhat clammy: blades of the upper leaves oblong, narrowly elliptic or ovate, 5-35 mm. long: sepals lanceolate, 5-6 mm. long, obtuse: petals narrowly obovate: capsules 9-11 mm. long.—Common, in pastures and fields.—Sum.

3. *C. viscosum* L. Plants 8-40 cm. tall, viscid-villous: blades of the upper leaves oval or obovate, 8-25 mm. long: sepals oblong-lanceolate, 3-4 mm. long, acute: petals elliptic-oblong, shorter than the sepals or slightly longer: capsules 7-9 mm. long.—Common, in meadows and moist soil.—Spr.

4. *C. longipedunculatum* Muhl. Plants 8-50 cm. tall, clammy-villous: blades of the upper leaves oblong, linear-oblong, or lanceolate, 9-60 mm. long: sepals oblong or oblong-lanceolate, 4-5 mm. long, acute: petals oblong or linear-oblong, somewhat longer than the sepals, or wanting: capsules 9-13 mm. long.—M. S. Common, in moist thickets and woods.—*Limestones, schists*.—Spr.

5. *C. arvense* L. Plants 9-40 cm. tall, soft-pubescent: blades of the upper leaves linear-lanceolate to linear, 25-30 mm. long: sepals oblong-lanceolate, 4-5 mm. long, acutish: petals cuneate, scarcely twice as long as the sepals: capsules 8-10 mm. long, less than twice the length of the mature calyx.—Common, in dry stony places and on cliffs.—Spr.

6. *C. velutinum* Raf. Plants 15-40 cm. tall, copiously soft-pubescent, or becoming glabrous in age: blades of the upper leaves mostly narrowly lanceolate to oblong, 2.5-4 cm. long, flat: sepals oblong to ovate-oblong, 4.5-5.5 mm. long, obtuse: petals broadly cuneate, about twice as long as the sepals: capsules 12-14 mm. long, fully twice as long as the mature calyx.—Susquehanna valley and S. Frequent or common, on rocks or in stony soil.—Spr. and sum.

FAMILY 8. **CARYOPHYLLACEAE.** PINK FAMILY.

Herbs with stems usually swollen at the nodes. Leaves opposite: blades often with connate bases. Flowers perfect, polygamous, or rarely dioecious. Calyx of 4 or 5 partially united sepals. Corolla of 4 or 5 distinct petals, the claws in the calyx-tube, the blades often appendaged at the base. Androecium of usually 8 or 10 distinct stamens. Gynoecium of 2-5 united carpels. Ovary often stalked. Fruit a capsule opening by apical valves.

Calyx-tube with 5 ribs, nerved or nerveless: styles 2.

Petals unappendaged: calyx with bractlets at the base.

Petal appendaged at the base of the blade: calyx without bractlets.

Calyx tube with at least twice as many ribs as lobes: styles 3 or more.

Styles 3 or rarely 4.

Styles 5.

Calyx-lobes relatively small, short: petals alternate with the styles: blades appendaged.

Calyx-lobes foliaceous, elongate: petals opposite to the styles: blades unappendaged.

1. DIANTHUS.

2. SAPONARIA.

3. SILENE.

4. LYCHNIS.

5. AGROSTEMMA.

1. **DIANTHUS** L. Perennial or rarely annual herbs. Leaf-blades usually narrow. Flowers perfect, sessile. Calyx narrow: tube equally striate. Petals 5: blades narrow. Ovary elongate. Capsule narrow, sessile.

1. *D. Armeria* L. Stem 2-8 dm. tall, minutely pubescent: blades of the cauline leaves linear, 3-8 cm. long: calyx pubescent, 19-22 mm. long: lobes lanceolate, acuminate: petal-blades oblong to cuneate, 5-6.5 mm. long, mainly pink, toothed: capsules 13-15 mm. long.—Rather common, on roadsides and in fields.—Nat. of Eu.—Sum.—PINK. DEPTFORD-PINK.

2. **SAPONARIA** L. Annual or perennial herbs. Leaf-blades often broad. Flowers pedicelled. Calyx narrow: tube terete. Petals 5; blades narrow. Ovary elongate. Capsule-bodies cylindrical or oblong, short-stipitate.

1. **S. officinalis** L. Stems 3-9 dm. long, often decumbent: leaf-blades elliptic to lanceolate, 3-11 cm. long; calyx 20-25 mm. long; lobes triangular to lanceolate: petal-blades cuneate, 15-18 mm. long, entire, pink or white; capsule-bodies 12-20 mm. long. — Common, in waste places and on roadsides. Nat. of Eu. — Spr. — SOAPWORT. BOUNCING-BET.

3. **SILENE** L. Annual or perennial herbs. Leaf-blades various, commonly narrow. Flowers mostly pedicelled. Calyx narrow or becoming inflated: tube 10-many-nerved. Petals 5; blades often toothed at the apex. Ovary somewhat elongate. Capsule-body much longer than thick. — CAMPION. CATCHFLY.

Annual or biennial plants.

Foliage pubescent: stem viscid.

Foliage glabrous, sometimes glutinous about the nodes of the stem.

Inflorescence paniculate: mature calyx ovoid.

Inflorescence corymbose: mature calyx clavate.

1. *S. noctiflora*.

2. *S. antirrhina*.

3. *S. Armeria*.

Perennial plants.

Calyx inflated.

Leaves in whorls of 4's: petals laciniately cleft; appendages wanting.

Leaves opposite: petals 2-cleft; appendages present.

Calyx merely filled with the capsule.

Inflorescence not leafy-bracted: calyx ultimately globular.

Inflorescence leafy-bracted: calyx ultimately long.

4. *S. stellata*.

5. *S. alba*.

6. *S. latifolia*.

7. *S. caroliniana*.

1. **S. noctiflora** L. Stem 2-8 dm. tall, closely pubescent: leaf-blades spatulate to elliptic, oblong, or lanceolate, 2-8 cm. long; calyx-tube prominently ribbed, ultimately 12-15 mm. long; petal-blades 9-11 mm. long, white or nearly so: capsules 15-20 mm. long. — S. Rare, on roadsides, near Rawlinsville and Pleasant Grove. Nat. of Eu. — Sum.

2. **S. antirrhina** L. Stem 2-8 dm. tall, with glutinous patches near the nodes: leaf-blades linear to linear-oblong, or the lower ones elliptic, 2-8 cm. long; calyx-tube 5.5-7.5 mm. long, ultimately ovoid or oval: petals white or pink; blades cuneate to linear, 6-8 mm. long; capsules 6-8 mm. long, not stipitate. — Common, in waste places and cultivated grounds. — Sum. — SLEEPY-CATCHFLY.

3. **S. Armeria** L. Stem 2-7 dm. tall, glaucous: leaf-blades spatulate to oblong, lanceolate, or ovate, 2-9 cm. long; flower-clusters compact; calyx-tube ultimately 15-19 mm. long, clavate; lobes ovate, very short: petals rose-pink or white; blades cuneate to obovate, 5-8 mm. long; capsules long-stipitate, the body 7-8 mm. long, oblong to cylindrical. — S. Rather rare, in fields. Nat. of Eu. — Sum. — SWEET-WILLIAM CATCHFLY.

4. **S. stellata** (L.) Ait. f. Stem 3-12 dm. tall, usually minutely pubescent: leaf-blades ovate to lanceolate, 4-12 cm. long; calyx becoming 10-16 mm. long; lobes about $\frac{1}{3}$ as long as the tube; petals white, 1.5-2 cm. long; blades laciniate; capsule-body subglobose to ovoid-globose, 6-8 mm. long. — Common, in thickets and on wooded hillsides. — Sum. — STARRY-CAMPION.

5. **S. alba** Muhl. Stem 3-8 dm. tall, sometimes minutely pubescent: leaf-blades lanceolate to linear-lanceolate or slightly broadest above the middle, 4-15 mm. long; calyx becoming 14-16 mm. long; lobes about $\frac{1}{4}$ as long as the tube; petals white, 2-2.5 cm. long; blades cleft: capsule-body oblong to ovoid, 9-11 mm. long. — S. Rare, on river shores and on islands. — *Schists*. — Spr. and sum.

6. *S. latifolia* (Mill.) Britten & Rendle. Stem 1.5–5 dm. tall, glaucous: leaf-blades oblong-spatulate to oblong, ovate-lanceolate, or lanceolate, 2–8 cm. long: flower-clusters lax: calyx becoming 13–17 mm. long, ultimately distended, conspicuously veined; lobes broad, $\frac{1}{2}$ – $\frac{3}{4}$ as long as the tube: petals white, 14–18 mm. long; blades cuneate, cleft: capsule-body ovoid, 10–13 mm. long, short-stipitate. — S. Common, in fields. Nat. of Eu. — Sum. — **BLADDER-CAMPION.**

7. *S. caroliniana* Walt. Stem 1–2.5 dm. tall, closely pubescent: leaf-blades spatulate to linear-ob lanceolate, or the upper ones lanceolate, 3–12 cm. long: calyx becoming 2–2.5 cm. long, ultimately distended; lobes ovate, very short: petals white or pink; blades 12–15 mm. long, entire: capsule-body oblong to ovoid, 9–11 mm. long. — S. Not very common, on rocky hillsides and wooded slopes. — *Schists.* — Spr. — **WILD-PINK.**

4. **LYCHNIS** [Tourn.] L. Annual or perennial herbs similar to *Silene* in habit. Flowers pedicelled and mostly erect. Calyx becoming more or less inflated, 10-nerved. Petals 5: blades entire, cleft, or lacinate, generally appendaged. Ovary more or less elongate. Capsule as long as thick or longer. — **CAMPION.**

Corolla white or pink: calyx-lobes acuminate: capsule conic-ovoid. 1. *L. alba.*
Corolla red: calyx-lobes acute: capsule globose. 2. *L. dioica.*

1. **L. alba** Mill. Plants 1 m. tall or less, the stem usually branched throughout, fine-pubescent: leaf-blades spatulate to oblong, oval, or lanceolate, 3–8 cm. long: calyx becoming 14–21 mm. long; lobes triangular to ovate, $\frac{1}{2}$ – $\frac{3}{4}$ as long as the tube: petals white or rarely pink; blades reniform to broadly cuneate: capsules conic-ovoid, the opening narrow. — S. Rare, in fields. Nat. of Eu. — Sum. — **WHITE-CAMPION.**

2. **L. dioica** L. Plants mostly 3–8 dm. tall, the stem often branched at the base, with soft spreading hairs: leaf-blades oval, oblong, oblong-lanceolate, or ovate, 2.5–9 cm. long: calyx becoming 15–19 mm. long; lobes lanceolate to triangular-lanceolate, about $\frac{1}{2}$ as long as the tube: petals red or rarely white; blades cuneate: capsules globose, the opening wide. — S. Rather rare, in fields and on roadsides. Nat. of Eu. — Sum. — **RED-CAMPION.**

5. **AGROSTEMMA** L. Annual coarse herbs. Leaf-blades very narrow. Flowers long-peduncled. Calyx becoming swollen: tube 10-ribbed. Petals 5: blades broad, unappendaged. Ovary about as thick as long. Capsule slightly elongate.

1. **A. Githago** L. Stems 2–9 dm. tall, appressed-pubescent: leaf-blades linear, 4–12 cm. long: calyx becoming 5–6 cm. long; lobes linear, acuminate, longer than the copiously pubescent tube: petals 30–35 mm. long; blades cuneate to obovate, purple or magenta: capsules 18–22 mm. long. — Common, in grain fields and on roadsides. Nat. of Eu. — Sum. — **CORNCOCKLE. CORN-ROSE.**

Order RANALES.

Herbs, shrubs, or trees. Leaves mostly without stipules, with entire, toothed, or dissected blades, in aquatics often various on the same plant. Flowers perfect, monoecious, or dioecious. Calyx and corolla of distinct sepals and petals. Gynoecium of 1 or several distinct or united carpels. Ovary superior. Fruit various.

Stamens usually numerous, the anther-sacs opening by slits.

Land plants, except in *Ceratophyllaceae* and some *Ranunculacac*: leaf-blades not pettate.

- Flowers perfect or monoecious, if dioecious on neither vines nor herbs: with simple leaves.
- Plants with minute axillary monoecious flowers: anthers with horn-like appendages. Fam. 1. CERATOPHYLLACEAE.
- Plants with perfect or rarely dioecious flowers: anthers not with horn-like appendages. Carpels one or more, distinct at least at maturity.
- Sepals 3-15: petals about as many: plants if shrubby not with pulpy fruit: endosperm even. Fam. 2. RANUNCULACEAE.
- Sepals 3: petals 6: fruit pulpy: endosperm channeled. Fam. 3. ANNONACEAE.
- Carpels more or less coherent or united into cone-like structures, or immersed in the pulpy receptacle.
- Sepals valvate. Fam. 3. ANNONACEAE.
- Sepals imbricate. Fam. 4. MAGNOLIACEAE.
- Flowers dioecious: vines with simple leaves. Fam. 5. MENISPERMACEAE.
- Water plants: emersed or floating leaves with petalate blades.
- Carpels several and distinct. Fam. 6. CABBAGEACEAE.
- Carpels united into compound pistil. Fam. 7. NYMPHAEACEAE.
- Stamens few and definite, the anther-sacs opening by hinged valves except in *Podophyllum*. Fam. 8. PODOPHYLLACEAE.

FAMILY 1. **CERATOPHYLLACEAE.** HORNWORT FAMILY.

Annual aquatic herbs. Leaves whorled: blades cleft or finely dissected. Calyx of 6-12 narrow toothed or cleft sepals. Corolla wanting. Androecium of 10-24 stamens with short filaments. Gynoecium 1-carpellary: stigma subulate. Fruit an achene, sometimes spine-armed.

1. **CERATOPHYLLUM** L. Submerged plants with sessile leaf-blades, the divisions mostly thrice forked.

1. **C. demersum** L. Stems 3-12 dm. long: leaves rather rigid; blades 1-2-times forking; sepals oblong to ovate-oblong, erose; stamens slightly exerted: style and stigma exerted; achenes 5 mm. long.—Susquehanna valley. Rare, in shallow water.—Sum.—HORNWORT.

FAMILY 2. **RANUNCULACEAE.** CROWFOOT FAMILY.

Herbs or woody vines. Leaves alternate (opposite in *Clematideae*): blades simple or compound. Calyx of 3-5 distinct, imbricate sepals (valvate in *Clematideae*). Corolla of about as many petals as there are sepals, occasionally more, or wanting. Androecium of several or many hypogynous stamens. Gynoecium of 1, several, or many distinct carpels. Fruit an achene or a follicle, or baccate.

Fruit a follicle or a berry: carpels with several ovules, or with only 1 or 2 ovules in *Hydrastis*.

Flowers regular.

Leaf-blades palmately nerved or palmately compound.

Fruit baccate: sepals inconspicuous, fugaceous.

Fruit follicular: sepals conspicuous, persistent during anthesis.

* Leaf-blades pinnately or ternately compound or decomposed.

Petals without spurs, or wanting.

Fruit dry follicles: racemes elongate.

Fruit berry-like follicles: racemes short.

Petals prolonged backward into hollow spurs.

Flowers irregular, the posterior sepal, and posterior petals, spurred.

Fruit an achene: carpels with a single ovule each.

Flowers, or their pedicels or peduncles, subtended by involucre.

Involucre close under the calyx: bracts entire.

1. HYDRASTIS.

2. CALTHA.

3. CIMICIFUGA.

4. ACTAEA.

5. AQUILEGIA.

6. DELPHINIUM.

7. HEPATICA.

- Involucre remote from the calyx, bracts toothed, divided or compound.
 Styles subulate: leaf-segments sessile. 8. ANEMONE.
 Styles wanting: leaflets stalked. 9. SYNDESMON.
 Flowers not subtended by involucre.
 Leaves alternate, sometimes all basal: sepals imbricate.
 Leaf-blades entire, toothed, palmately lobed or dissected.
 Achenes transversely wrinkled: petals white. 10. BATRACHIUM.
 Achenes not transversely wrinkled: petals yellow, at least without. 11. RANUNCULUS.
 Leaf-blades ternately decomposed. 12. THALICTRUM.
 Leaves opposite: sepals petal-like, valvate.
 Petals wanting: peduncles many-flowered. 13. CLEMATIS.
 Petals present (in our species), smaller than the sepals: peduncles 1-flowered. 14. ATRAGENE.

1. **HYDRASTIS** Ellis. Perennial herbs. Leaf-blades palmately lobed. Flowers solitary. Sepals 3, fugaceous. Petals wanting. Filaments clavate, white. Carpels several, 2-ovuled, in fruit forming a head of berries.

1. **H. canadensis** L. Plants pubescent, mostly 2-4 dm. tall; blade of the cauline leaf becoming 8-24 cm. wide: bract leaf-like: sepals ovate: fruit-head 14-16 mm. thick; berries 5-6 mm. long, crimson. — Rather rare, in rich woods and thickets. — Spr. — ORANGE-ROOT. GOLDEN-SEAL.

2. **CALTHA** [Rupp.] L. Perennial herbs. Leaf-blades entire or toothed. Flowers few or solitary. Sepals few, yellow, pink, or white, deciduous. Petals wanting. Filaments filiform. Carpels few or many, several-ovuled, in fruit forming a whorl of leathery green foliicles.

1. **C. palustris** L. Plants glabrous, 2-6 dm. tall: blades of the cauline leaves similar to those of the basal but smaller, reniform to orbicular-reniform, 4-9 cm. wide: sepals yellow, oblong to oval-orbicular, 1.5-2 cm. long: foliicles 10-12 mm. long. — Rather common, in swamps and low meadows. — Spr. — MARSH-MARIGOLD.

3. **CIMICIFUGA** L. Perennial herbs. Leaf-blades decomposed. Flowers numerous, in long racemes. Sepals 2-5, deciduous. Petals 1-8, clawed, notched at the apex. Stamens numerous: filaments filiform. Carpels few or solitary, many-ovuled, becoming dry foliicles.

1. **C. racemosa** (L.) Nutt. Plants 10-25 dm. tall: terminal leaflets 3-lobed, 4-16 cm. wide: foliicles puberulent and often pubescent, the beak recurved. — Common, in woods and thickets. — Sum. — BLACK-SNAKEROOT. BUGBANE. BLACK-COHOSH.

4. **ACTAEA** L. Perennial herbs. Leaf-blades ternately compound. Flowers rather many, in short racemes. Sepals 3-5, deciduous. Petals 4-10, clawed, not notched. Stamens numerous: filaments filiform. Carpel solitary, many-ovuled, becoming a baccate follicle.

1. **A. alba** (L.) Mill. Plants 4-11 dm. tall: terminal leaflets mostly longer than wide and scarcely lobed, cuneate or rounded at the base: foliicles white, about as thick as long, on spreading red stout pedicels: seed about 4 mm. long. — S. Rather rare, in rocky woods along the Susquehanna. — *Schists.* — Spr. — BANEERRY.

5. **AQUILEGIA** [Tourn.] L. Perennial herbs. Leaf-blades ternately compound, the segments broad. Flowers mostly drooping. Sepals 5, equal, petal-like. Petals cornucopia-like. Stamens numerous, the inner ones staminodia. Carpels 5, sessile, many-ovuled, in fruit forming a head of foliicles.

1. **A. canadensis** L. Plants 2-6 dm. tall: leaflets, or their divisions, cuneate: sepals ovate, scarlet without, 10-14 mm. long: spurs scarlet without, 2.5-3 cm. long, the ends swollen: follicle-bodies mainly 15-20 mm. long. — Common, in woods and on rocky banks. — Spr. — COLUMBINE.

6. **DELPHINIUM** [Tourn.] L. Annual or perennial erect herbs. Leaf-blades palmately lobed or dissected, the segments narrow. Flowers spreading. Sepals 5, the posterior one spurred. Petals 2 or 4, the 2 posterior ones spurred. Filaments dilated below. Carpels few or solitary, sessile, many-ovuled, becoming dry follicles.

1. **D. Ajacis** L. Plants 1 m. tall or less, branched: leaf-blades with short and diverging segments: sepals blue, with suborbicular to reniform or broadly ovate blades: posterior petals 10-12 mm. long, excluding the spur: follicle-bodies 13-20 mm. long, pubescent, stout-tipped. — M. Rather common, in fields and waste places. Nat. of Eu. — Sum. — LARKSPUR.

7. **HEPATICICA** [Rupp.] Hill. Perennial scapose tufted herbs. Leaf-blades 3-lobed, persistent. Flowers solitary on each scape, subtended by a calyx-like involucre. Sepals several, petal-like. Petals wanting. Achene-cluster seated in the involucre.

1. **H. Hepatica** (L.) Karst. Leaf-blades becoming 6-8 cm. wide, the middle lobe typically reniform: bracts of the involucre ovate to oblong, obtuse: sepals blue, purple or white, 7-12 mm. long: achene-bodies ovoid-oblong or oblong, about 3 mm. long. — Common, in rocky woods and thickets. (Eurasia.) — Spr. — HEPATICA. LIVER-LEAF.

8. **ANEMONE** [Tourn.] L. Perennial scapose herbs with rootstocks. Leaf-blades lobed, divided, or dissected, not persistent. Flowers subtended by a foliaceous involucre. Sepals 4-20, petal-like. Petals wanting. Filaments filiform. Achene-cluster long-peduncled. — ANEMONE.

Fruit-head elongate: achenes densely long-woolly: sepals greenish.

Fruit-head globular: achenes glabrate or finely pubescent:	1. <i>A. virginiana</i> .
sepals white.	
Achenes numerous: bodies broadly winged, suborbicular:	
bracts of the involucre sessile.	2. <i>A. canadensis</i> .
Achenes few: bodies wingless, oblong: bracts of the involucre petioled.	3. <i>A. quinquefolia</i> .

1. **A. virginiana** L. Plants 5-10 dm. tall: leaf-blades 3-parted, the divisions sharply lobed, incised and toothed: bracts of the involucre similar to the leaves: sepals greenish, mostly 8-13 mm. long, concave: head of fruit oblong. — Common, in thickets and woods. — Sum.

2. **A. canadensis** L. Plants 2-7 dm. tall: leaf-blades 5-lobed, the divisions incised and sharply toothed: bracts of the involucre similar to the leaves: sepals white, 12-18 mm. long: head of fruit globular, 1.5-2 cm. in diameter: achenes 7-8 mm. long, 4-5 mm. wide. — M. Rare, in low meadows. — *Limestone*. — Sum.

3. **A. quinquefolia** L. Plants 1-2.5 dm. tall: leaf-divisions mainly lobed or parted: bracts of the involucre similar to the leaves: sepals white, mainly 1-1.5 cm. long: head of fruit globular, 1 cm. in diameter or less: achenes slightly less than 4 mm. long, about 1.5 mm. wide. — Common, in moist places and woods. — Spr. — WOOD-ANEMONE.

9. **SYNDESMON** Hoffmg. Perennial scapose herbs with tuberous roots. Leaf-blades 2-3-ternate. Flowers in an umbellate cluster, the involucre foli-

aceous. Sepals 5-10, petal-like. Petals wanting. Filaments clavate. Achene-cluster peduncled.

1. *S. thalictroides* (L.) Hoffmg. Plants 1-2.5 dm. tall: leaflets 1-2.5 cm. long, mostly 3-lobed: sepals 5-10, white or pinkish, 9-15 mm. long: achenes 4-6 mm. long, or sometimes longer, ribbed. — Common, in moist places and thickets. — Spr. and sum. — RUE-ANEMONE. WILD-ROSE.

10. **BATRACHIUM** S. F. Gray. Perennial aquatic or ditch herbs. Leaf-blades dissected or palmately lobed, the segments often narrow. Flowers on peduncles opposite the leaves. Sepals 5. Petals usually 5, mainly white, each claw with a pit. Stamens several-many. Achenes oblique, compressed, transverse-wrinkled, often nearly or quite beakless.

1. *B. trichophyllum* (Chaix) Bosch. Leaves flaccid, 3-5 cm. long, the segments mostly 10-15 mm. long; stipules short and broad, pubescent: petals 5-8 mm. long: head of achenes 4-5 mm. in diameter. — N. Rare, in springs and spring-runs. — *Limstones*. (Eurasia). — Sum. — WHITE WATER-CROWFOOT.

11. **RANUNCULUS** [Tourn.] L. Annual or perennial herbs. Leaf-blades entire, lobed, or divided. Flowers solitary or variously disposed. Sepals mostly 5, deciduous. Petals as many as the sepals or more, or rarely fewer, each with a pit near the base. Carpels several or numerous. Achenes generally flattened, smooth, papillose, or echinate. — BUTTERCUP. CROWFOOT.

Mud plants: leaves with entire or shallowly toothed blades.

Achenes minutely beaked: stems trailing.

Achenes subulate-beaked: stems erect or ascending.

Terrestrial plants: leaves with all or some of the blades lobed or divided.

Basal leaves with all or some of the blades crenate.

Basal leaves with cordate blades: foliage glabrous or nearly so: receptacle pubescent.

Basal leaves with truncate or cuneately narrowed blades: foliage pubescent: receptacle glabrous.

Basal leaves with all blades lobed or divided.

Foliage glabrous: stem hollow: flowers relatively small.

Foliage more or less pubescent: stem not hollow: flowers relatively large.

Beak of the achene hooked.

Beak of the achene straight or slightly curved.

Achenes with beaks less than $\frac{1}{2}$ as long as the achene-bodies.

Petals about as long as the sepals: head of fruit oblong or cylindrical.

Petals much longer than the sepals: head of fruit subglobose.

Stems spreading and creeping, stoloniferous.

Stems erect, not stoloniferous.

Sepals spreading.

Sepals reflexed.

Achenes with beaks over $\frac{1}{2}$ as long as the achene-bodies, the beaks sometimes partially deciduous.

Plants stoloniferous: foliage glabrous or nearly so.

Plants not stoloniferous: foliage copiously pubescent, except sometimes in age.

Stems with silky or appressed pubescence: achene not thick-margined: filaments dilated upward.

Stems with spreading pubescence: achene thick-margined: filaments not dilated upward.

1. *R. reptans*.

2. *R. obtusiusculus*.

3. *R. abortivus*.

4. *R. micranthus*.

5. *R. sceleratus*.

6. *R. recurvatus*.

7. *R. pennsylvanicus*.

8. *R. repens*.

9. *R. acris*.

10. *R. bulbosus*.

11. *R. septentrionalis*.

12. *R. fascicularis*.

13. *R. hispidus*.

1. *R. reptans* L. Stems slender, creeping, 0.5–1.5 dm. long: leaf-blades spatulate, oblong, or linear, 0.5–2.5 cm. long, entire or nearly so: petals 4–7, 3–4 mm. long: head of fruit globose or depressed, 3–3.5 mm. in diameter: achene-body turgid, about 1.5 mm. long, the minute beak persistent. — Susquehanna valley. Rather rare, in moist sand. — Spr. and sum. — CREEPING-SPEARWORT.
2. *R. obtusiusculus* Raf. Stems stout, glabrous, 3–12 dm. long: leaf-blades linear to lanceolate, 8–15 cm. long, denticulate or entire: petals 5–7, 5–8 mm. long: head of fruit globose or nearly so, 4.5–6 mm. thick, or longer: achene-body orbicular-obovoid, about 2 mm. long, the subulate deciduous beak horizontal. — N. M. Rare, in wet soil. — *Sandstones and shales, limestones.* — Sum. — WATER-PLANTAIN SPEARWORT.
3. *R. abortivus* L. Stems 1.5–6 dm. tall, glabrous or nearly so: blades of the lower leaves reniform to suborbicular, 2–4 cm. wide, mostly crenate: petals pale-yellow, 2–3 mm. long: head of fruit oblong to cylindrical: achene-body fully 1.5 mm. long, very minutely beaked. — Common, in moist ground and thickets. — Spr. — SMALL-FLOWERED CROWFOOT.
4. *R. micranthus* Nutt. Stems typically more slender than in *R. abortivus*, pubescent: blades of the lower leaves cuneate to ovate, 1–3 cm. long, mostly crenate-lobed or parted: petals light-yellow, 2–3 mm. long: head of fruit oblong to ovoid-oblong: achene-body barely 1.5 mm. long, minutely short-beaked. — Lower Susquehanna valley. Common, in woods and on rocky hillsides. — *Schists.* — Spr.
5. *R. sceleratus* L. Stems stout, 1.5–6 dm. tall, glabrous or nearly so: leaf-blades thick, the divisions cuneate, lobed: sepals ovate to suborbicular: petals bright-yellow, 3–5 mm. long: head of fruit cylindrical to oblong, the receptacle glabrous or sparingly pubescent: achene-body fully 1 mm. long, minutely beaked, thick-margined, the faces uneven. — Common, in wet places and swamps. — Spr. — CELERY-LEAVED BUTTERCUP. DITCH-CROWFOOT.
6. *R. recurvatus* Poir. Stem slender, 1.5–7 dm. tall, hirsute: leaf-blades thinnish, the divisions rhombic to ovate, toothed and sometimes also lobed: sepals mainly lanceolate: petals pale-yellow, 3–5 mm. long: head of fruit globular, the receptacle hispid: achene-body fully 2 mm. long, long-beaked, thin-margined, the faces granular. — Common, in rich woods and swamps. — Spr. — HOOKED-BUTTERCUP.
7. *R. pennsylvanicus* L. f. Stems erect, 3–7 dm. tall, hispid: leaf-blades thinnish, the divisions relatively narrow, irregularly sharp-toothed: petals pale-yellow, 2–4.5 mm. long: head of fruit cylindrical to oblong: achene-body about 2 mm. long, prominently beaked. — Susquehanna valley. Rather rare, in low grounds along the river. — Spr. and sum. — BRISTLY-BUTTERCUP.
8. *R. repens* L. Stems creeping, 1–8 dm. long, hirsute or glabrate: leaf-blades thickish, the divisions broad, coarsely toothed or lobed: petals bright-yellow, 10–13 mm. long: head of fruit globose: achene-body 3 mm. long, minutely beaked, narrow-margined. — S. Not common, in fields. Nat. of Eu. — Spr. — CREEPING-BUTTERCUP.
9. *R. acris* L. Stems 2–11 dm. tall, loosely pubescent: leaf-blades mostly 3-divided, the divisions broad, sharp-toothed, the middle division not stalked: petals bright-yellow, about 1 cm. long: head of fruit globose: achene-body about 3 mm. long, obscurely margined, minutely fine-beaked. — N. M. Rare, in fields and on roadsides. Nat. of Eu. — Spr. and sum. — MEADOW-BUTTERCUP.
10. *R. bulbosus* L. Stems 1.5–5 dm. tall, rather appressed-pubescent: leaf-blades thick, the divisions broad, blunt-toothed: petals bright-yellow, 7–11 mm. long: head of fruit globose: achene-body about 3 mm. long, prominently margined, minutely stout-beaked. — Common, on roadsides and in fields. Nat. of Eu. — Spr. — BULBOUS-BUTTERCUP.

11. *R. septentrionalis* Poir. Stems 3-12 dm. long, glabrous or pubescent: leaf-blades thickish, the divisions incised-toothed and often lobed: petals bright-yellow, 10-14 mm. long: head of fruit globose to oval: achene-body 4-5 mm. long, wide-margined, the slender beak shorter than the body. — Common, in low grounds and swamps. — Spr. — SWAMP-BUTTERCUP.

12. *R. fascicularis* Muhl. Stems 1-3 dm. tall, densely silky: leaf-blades thick, those of the lower leaves with typically cuneate-flabellate lobed or parted divisions: petals 8-14 mm. long: head of fruit globose: achene-body 2.5-3 mm. long, slightly margined, the beak as long, slender. — Common, in woods and thickets. — Spr. — EARLY-CROWFOOT.

13. *R. hispidus* Michx. Stems 2-6 dm. tall, hirsute or villose-hirsute: leaf-blades pubescent, those of the lower leaves generally 3-parted, the divisions suborbicular to cuneate, incised, lobed, or sometimes parted: petals 9-16 mm. long: head of fruit globose to oval: achene-body 2.5-3 mm. long, slightly margined, the beak about $\frac{1}{2}$ as long as the body. — Common, in woods and thickets. — Spr.

12. **THALICTRUM** [Tourn.] L. Perennial herbs. Leaf-blades ternately decomposed. Flowers perfect, polygamous, or dioecious, often numerous. Sepals 4-5. Petals wanting. Stamens numerous, conspicuous. Carpels commonly few. Achenes ribbed or nerved, sometimes stipitate. — MEADOW-RUE.

Stamens drooping: filaments filiform; anthers linear: achenes ribbed, sessile.

1. *T. dioicum*.

Stamens spreading: filaments spatulate; anthers oblong: achenes

ridged, short-stipitate.

2. *T. polygamum*.

1. *T. dioicum* L. Plants 3-6 dm. tall: cauline-leaves with long petioles; blades of the leaflets thin, the terminal ones 1.5-3 cm. wide, lobed: carpels sessile: achene-bodies 3-4 mm. long, abruptly beaked, blunt-ribbed. — Common, on rocky hillsides. — Spr. — EARLY MEADOW-RUE.

2. *T. polygamum* Muhl. Plants 9-30 dm. tall: cauline leaves sessile; blades of the leaflets thinnish, prominently lobed, green beneath, the terminal one mainly 1.5-4 cm. wide: achene-body 4-5.5 mm. long, gradually beaked, sharp-ridged. — Common, in swamps and low meadows. — Sum. — TALL MEADOW-RUE.

13. **CLEMATIS** L. Perennial vines. Leaf-blades 3-several-foliolate. Flowers dioecious or polygamo-dioecious, in broad paniculate cymes. Sepals relatively small, but petaloid, without a border, thin, spreading, white or pale. Petals wanting. Stamens spreading: anthers short, blunt. Carpels several. Achenes with silky or plumose styles.

1. *C. virginiana* L. Plants sparingly pubescent or glabrate: leaves mainly 3-foliolate: sepals whitish, thin, 8-12 mm. long: achene-bodies 4-5 mm. long, very inequilateral. — Common, in thickets and along streams. — Sum. — VIRGIN'S-BOWER.

14. **ATRAGENE** L. Perennial vines. Leaf-blades several-foliolate. Flowers solitary on axillary branches. Sepals mostly 4, thin, petal-like, large, veiny. Petals small, spatulate. Stamens numerous, erect, the outer more or less petal-like; anthers oval. Carpels several. Achenes with long plumose styles.

1. *A. americana* Sims. Stems purple, trailing or diffuse: leaflets ovate to ovate-lanceolate, 2.5-9 cm. long, mostly toothed or somewhat lobed: sepals purplish-blue, 3-5 cm. long: petals 8-13 mm. long: achene-bodies 3-4 mm. wide, with style-tips 3-4 cm. long. — Rare, on rocky hillsides and in rocky woods. — Spr. — BELL-RUE.

FAMILY 3. **ANNONACEAE.** CUSTARD-APPLE FAMILY.

Shrubs or trees. Leaves alternate: blades entire. Flowers perfect, monoecious, or dioecious. Calyx of 3, or 2, sepals. Corolla of mostly 6 petals much larger than the sepals, those of the inner series smaller than those of the outer, or wanting. Androecium of many stamens, the anthers terminating in a blunt glandular appendage. Gynoecium of few or many distinct carpels. Fruit a simple or aggregate berry.

1. **ASIMINA** Adans. Ill-scented plants. Leaves mostly deciduous: blades broadened upward. Petals 6, much larger than the sepals, spreading, becoming purple. Carpels few: style subulate. Fruits drooping.

1. **A. triloba** (L.) Dunal. A shrub or tree 3-12 m. tall: leaf-blades cuneate to obovate-cuneate or oblong-cuneate, or rarely obovate, 10-30 cm. long: pedicels 10-20 mm. long in anthesis: inner petals less than 20 mm. long: seeds 20-25 mm. long. — Rather common, on river and creek banks. — Spr. — PAPAWE.

FAMILY 4. **MAGNOLIACEAE.** MAGNOLIA FAMILY.

Shrubs, trees, or vines. Leaves alternate, sometimes apparently whorled: blades entire, toothed, or whorled. Flowers perfect or monoecious. Calyx of 3 petaloid sepals or rarely more. Corolla of 5 imbricate petals as large as the sepals or larger, or more. Androecium of many stamens or rarely of few. Gynoecium of several or many distinct carpels. Fruit a cone of accrescent carpels which become baccate or follicular, or samara-like.

Leaves not lobed, sometimes merely auricled at the base: mature carpels dehiscent berries.

Leaves 4-lobed: mature carpels samara-like, indehiscent.

1. **MAGNOLIA.**
2. **LIRIODENDRON.**

1. **MAGNOLIA** L. Shrubs or trees. Leaves deciduous or persistent: blades entire or auricled at the base. Flowers perfect, white. Sepals and petals about equal in size.

Leaves alternate: blades small: fruit-cones oval, ovoid or globular.

Leaves approximate at the tips of the branches: blades large: fruit-cones oblong.

1. *M. virginiana.*
2. *M. tripetala.*

1. **M. virginiana** L. A shrub, or tree becoming 25 m. tall, the twigs silky: leaf-blades oblong, elliptic, or oval, 5-15 cm. long: flowers white, globose-campanulate, 3-8 cm. wide: petals elliptic, oblong, oval, or obovate: fruit oval or ovoid, 3-5 cm. long: seeds 8-10 mm. long. — E. S. Rare, in swamps. — *Schists.* — Spr. — SWEET-BAY. LAUREL-MAGNOLIA.

2. **M. tripetala** L. A tree becoming 14 m. tall, the twigs glabrous: leaf-blades elliptic-oblanccolate or obovate-oblanccolate, 20-70 cm. long: flowers creamy-white, unpleasantly scented: petals oblong-oblanccolate, 11-16 cm. long: fruit oblong, 8-12 cm. long: seeds about 1 cm. long. — Lower Susquehanna valley. Rare, in ravines. — *Schists.* — Spr. — UMBRELLA-TREE.

2. **LIRIODENDRON** L. Trees. Leaves deciduous: blades lobed. Flowers perfect, greenish-yellow. Sepals 3, reflexed. Petals 6, broader than the sepals, erect. Fruit a cone of appressed samara-like carpels.

1. **L. Tulipifera** L. Tree becoming 60 m. tall, the bark with flat ridges: leaf-blades 6-20 cm. wide, 4-lobed, truncate or notched at the apex: flowers cam-

panulate: sepals oblong to oblong-obovate, 4-5 cm. long: petals oblong, oval, or suborbicular, greenish-yellow and often tinged with orange: fruit conic, 5-7 cm. long, erect, the carpels 3-4 cm. long, indehiscent. — Common, in woods and on banks. — Sum. — TULIP-TREE. WHITE-WOOD. YELLOW-POPLAR.

FAMILY 5. **MENISPERMACEAE.** MOONSEED FAMILY.

Perennial vines. Leaves alternate: blades entire or lobed, sometimes peltate. Flowers polygamous or dioecious, in racemose or paniculate cymes. Calyx of 6 sepals, or fewer or more. Corolla of 4-6, or more, petals smaller than the sepals, or wanting. Androecium of 6-12 stamens, or more. Gynoecium of 3-6 distinct carpels, or more. Fruit a berry-like drupe.

1. **MENISPERMUM** [Tourn.] L. Vines, with rather large entire or shallow-lobed leaf-blades. Sepals 4-8. Petals 4-8, with involute sides. Filaments clavate. Gynoecium stipitate. Stigmas flabellate. Seed cochleate.

1. **M. canadense** L. Stems finely pubescent: leaf-blades 5-20 cm. wide, peltate near the base: flowers greenish-white: sepals oblong or oval, 1.5-2 mm. long: petals with somewhat flabellate blades: drupes bluish-black, about 1 cm. in diameter. — Common, in thickets and fence-rows. — Sum. — MOONSEED.

FAMILY 6. **CABOMBACEAE.** WATER-SHIELD FAMILY.

Aquatic caulescent plants, often mucilage-coated. Leaves alternate or opposite: blades of the submerged ones mostly dissected, those of the floating leaves entire and peltate. Flowers perfect. Calyx and corolla of 3 or 4 sepals or petals each, the latter not larger than the former. Androecium of 3-18 stamens.

1. **BRASENIA** Schreb. Stout herbs. Blades of all the leaves entire. Petals narrower than the sepals. Stamens mostly longer than the carpels: filaments filiform.

1. **B. Schreberi** Gmel. Stems, and other submerged parts, mucilage-coated: leaf-blades oval, elliptic, or oblong, 5-12 cm. long: sepals and petals linear or linear-lanceolate, 1-1.5 cm. long, dull-purple: mature carpels 5-8 mm. long, the beak angled. — Lower Susquehanna valley. Rather rare, in ponds and still water. — Sum. — WATER-SHIELD.

FAMILY 7. **NYMPHAEACEAE.** WATER-LILY FAMILY.

Aquatic, acaulescent plants, with rootstocks. Leaves with erect or floating blades. Flower terminating a long scape. Calyx of 4-6 sepals. Corolla of numerous petals passing into the stamens.

Petals small, filament-like: stamens hypogynous.

1. NYMPHAEAE.

Petals as large as the sepals: stamens epigynous.

2. CASTALIA.

1. **NYMPHAEA** [Tourn.] L. Plants with erect leaves and yellow flowers. Leaf-blades not peltate, with a sinus at the base. Sepals 5 or 6, concave, converging. Petals 10-20, erect, somewhat resembling the filaments. Stamens consisting of 2 narrow anther-sacs on the face of a flat filament. Stigmas united into a disk with radiating stigmatic lines. — SPLATTER-DOCK. YELLOW POND-LILY.

Stigma 12-24-rayed: capsule over 3 cm. long.
 Stigma 7-9-rayed: capsule less than 2 cm. long.

1. *N. advena*.
 2. *N. microphylla*.

1. **N. advena** Soland. Plants stout: blades of the emersed leaves suborbicular to ovate or oblong-ovate, 1-2.5 dm. long, the sinus open; submersed leaves few or usually wanting; sepals 6, obovate to oval, yellow, and usually tinged with green or brown; petals shorter than the sepals; stigmatic disk yellow, 12-24-rayed; fruits 3.5-5 cm. long, without a neck.—Common, in ponds and still water.—Spr. and sum.

2. **N. microphylla** Pers. Plants slender: blades of the emersed leaves oval to oval-elliptic, 0.4-1 dm. long, the sinus narrow; submersed leaves present and usually numerous; sepals 5, obovate to oval, yellow or green-tinged; petals shorter than the sepals and narrower; stigmatic disk red, 7-10-rayed; fruits 1.5-2 cm. long, with a neck.—Susquehanna valley. Rather rare, in shallow water.—Sum.

2. **CASTALIA** Salisb. Plants with floating leaves and white, pink, blue, or yellow flowers. Leaf-blades peltate and cleft at the base. Sepals mostly 4, spreading. Petals numerous, spreading, the outer ones about as large as the sepals. Stamens consisting of narrow anthers terminating slender filaments.

1. **C. odorata** (Dryand.) Woodv. & Wood. Leaf-blades suborbicular to oval, 0.5-1.5 cm. long, inconspicuously venose-reticulate beneath, the edges flat; flowers fragrant: calyx 7-15 cm. wide; petals white or pink; anthers of the outer stamens 12-14 mm. long; berries 2.5-3 cm. in diameter.—Common, especially in the Susquehanna River and its tributaries.—Sum.—WATER-LILY.

FAMILY 9. **PODOPHYLLACEAE.** MAY-APPLE FAMILY.

Perennial herbs. Leaves alternate, sometimes all basal: blades simple or ternately compound. Flowers perfect, of 4 or 6 sepals. Corolla of 6 or 9 petals resembling the sepals except in *Caulophyllum*. Androecium of 6-18 stamens, the anthers opening by valves, except in *Podophyllum*.

Stamens 12-18; anthers opening lengthwise: seeds numerous, enclosed.

Stamens 6; anthers opening by hinged valves: seeds 2, naked. 1. **PODOPHYLLUM.**
 2. **CAULOPHYLLUM.**

1. **PODOPHYLLUM** L. Large herbs, with elongate rootstocks. Leaves 2 at the top of the flowering stem: blades peltate, many-lobed. Flower nodding. Sepals 6, fugaceous. Petals 6-9. Stamens 12-18. Fruits nodding.

1. **P. peltatum** L. Plants 2-4 dm. tall: leaf-blades suborbicular, 1-3 dm. in diameter, 7-9-lobed; pedicel 2-4 cm. long; petals white, 6-9, obovate, 2.5-4 cm. long, wax-like; berry somewhat oblique, 4-5 cm. long.—Common, in rich soil, especially in woods.—Spr.—MAY-APPLE. MANDRAKE.

2. **CAULOPHYLLUM** Michx. Large herbs, with thick rootstocks. Leaf high up on the flowering stem, ternately compound. Flowers in a raceme-like cyme. Sepals 6, accompanied by 3 or 4 bractlets. Petals 6, gland-like, dilated. Stamens 6: anthers shorter than the filaments. Fruits erect.

1. **C. thalictroides** (L.) Michx. Plants 3-9 dm. tall: leaflets 2-3-lobed at the apex, 4-10 cm. long; panicle 4-10 cm. long; sepals greenish or purplish, 3-6 mm. long; petals about 2 mm. long; seeds about 1 cm. in diameter.—Common, in rich soil in woods and along streams.—Spr.—BLUE-COHOSH. PAPPOOSE-ROOT.

Order PAPAVERALES.

Herbs, shrubs, trees, or vines. Leaves with entire, toothed, or dissected, or compound blades. Flowers perfect. Calyx of distinct or nearly distinct sepals. Corolla of distinct or nearly distinct petals, or wanting. Androecium of few or many hypogynous stamens.

Sepals 2 or very rarely 3 or 4: endosperm present.

Flowers regular: stamens 8 or numerous: juice usually milky or colored.

Fam. 1. PAPAVERACEAE.

Flowers irregular: stamens 6: juice usually watery.

Fam. 2. FUMARIACEAE.

Sepals 4-8: endosperm wanting.

Capsules 2-celled: stamens 6, tetradynamous.

Fam. 3. BRASSICACEAE.

Capsules 1-celled: stamens when 6 not tetradynamous.

Fam. 4. CAPPARIDACEAE.

FAMILY 1. PAPAVERACEAE. POPPY FAMILY.

Herbs or rarely woody plants, the sap colored. Leaves alternate or opposite: blades entire, toothed, or divided. Flowers perfect, regular. Calyx of 2 or rarely 3 caducous sepals. Corolla of 4, 8, or 12, or rarely more, deciduous petals. Androecium usually of many distinct stamens. Gynoeceum 2-several-carpellary. Fruit a capsule.

Acaulescent herbs: petals 8-12, not crumpled in the bud: stigmas over the valves of the capsule. 1. SANGUINARIA.

Caulescent herbs: petals 4-6, mostly crumpled: stigmas over the placenta.

Capsule splitting to the base. 2. CHELIDONIUM.

Capsule dehiscent at the top or only to the middle.

Leaf-blades unarmed: stigma disk-like. 3. PAPAVER.

Leaf-blades spiny-toothed: stigma radiate. 4. ARGEMONE.

1. **SANGUINARIA** [Dill.] L. Perennial herbs with red rootstocks. Leaves basal: blades palmately lobed. Flowers solitary. Sepals 2, glabrous. Petals 8-12, narrow, white. Gynoeceum 2-carpellary, glabrous.

1. **S. canadensis** L. Plants 8-30 cm. tall, glabrous: leaf-blades orbicular to reniform in outline, 6-25 cm. wide, 5-9-lobed: scapes finally over-topped by the leaves: petals oblong, elliptic or rarely broader, 2-3 cm. long: capsule fusiform, 3-5 cm. long. — Common, in woods and thickets. — Spr. — BLOOD-ROOT.

2. **CHELIDONIUM** [Tourn.] L. Biennial or perennial herbs. Leaves cauline: blades pinnately dissected. Flowers numerous. Sepals 2. Petals 4, relatively long and narrow, yellow. Gynoeceum slender, 2-carpellary. Stigmas 2. Capsule elongate.

1. **C. majus** L. Plants 2-7 dm. tall: leaf-blades 1-3 dm. long, the segments with lobes or teeth: petals suborbicular, 8-13 mm. long: capsules slender, 3-5 cm. long. — Common, on roadsides and in fence rows. — Nat. of Eu. — Spr. and sum. — CELANDINE.

3. **PAPAVER** [Tourn.] L. Annual or perennial herbs. Leaves sometimes mainly basal: blades mostly pinnately lobed. Flowers few or solitary, the buds drooping. Sepals 2, or rarely 3. Petals 4, or rarely 6, broad. Gynoeceum several-carpellary, the ovary with 4-20 septiform placenta. Stigma crown-like or disk-like. Capsule long, short or depressed. — POPPY.

Plants pubescent, mostly hirsute: leaf-blades pinnately divided, narrowed at the base: capsules elongate, or longer than thick.

Capsules oblong-clavate: pedicels appressed-pubescent, at least above.

1. *P. dubium*.

Capsules turbinate-obovate: pedicels bristly-pubescent. 2. *P. Rhoeas*.
 Plants glaucous: leaf-blades lobed, clasping at the base: cap-
 sules subglobose or depressed. 3. *P. somniferum*.

1. *P. dubium* L. Plants 2-7 dm. tall: leaf-divisions entire, or sparingly toothed or incised: sepals hirsute: petals scarlet, 2.5-3.5 cm. long: filaments filiform: capsules 1.5-2 cm. long. — Common, in fields and on roadsides. Nat. of Eu. — Spr. and sum. — SMOOTH-FRUITED POPPY.

2. *P. Rhoeas* L. Plants 2.5-5 dm. tall: leaf-divisions lobed, much toothed or incised, acute or acutish: sepals hirsute, mostly 11-16 mm. long: petals scarlet, dark near the base, almost reniform: 2.5-5 cm. long: filaments filiform: capsules 8-10 mm. long. — S. Occasional, in fields. Nat. of Eu. — Spr. and sum. — FIELD-POPPY. CORN-POPPY.

3. *P. somniferum* L. Plants 3-10 dm. tall: leaf-blades 6-20 dm. long, the lobes toothed: sepals glabrous: petals white to purple, 2.5-5 cm. long: filaments clavate: capsules subglobose or depressed, 2-3 cm. long. — M. Rare, in fields and waste places. Nat. of Eu. — Sum. — OPIUM-POPPY. GARDEN-POPPY.

4. **ARGEMONE** L. Annual or biennial herbs. Leaves cauline: blades incised-pinnatifid. Flowers few, the buds erect. Sepals 2 or 3, hooded or horned. Petals 4 or 6, broad. Gynoecium 4-6-carpellary, the ovary with 4-6 nerviform placentae. Stigma 4-lobed. Capsule elongate.

1. *A. mexicana* L. Plants glaucous, 3-9 dm. tall, more or less spiny: leaves 10-25 cm. long; blades runcinate-pinnatifid, blotched, spiny-toothed and commonly spiny along the midrib, sessile and clasping: flowers sessile or nearly so: sepals acuminate and bristle-tipped: corolla yellow, 3-7 cm. broad: capsules oblong, 2.5-3 cm. long, spine-armed. — S. Rare, on roadsides. Nat. of trop. Am. — Sum. — PRICKLY-POPPY.

FAMILY 2. FUMARIACEAE. FUMITORY FAMILY.

Herbs, sometimes vines, the sap watery. Leaves alternate: blades dissected. Flowers perfect, irregular. Calyx of 2 scale-like sepals. Corolla of 4 petals, sometimes persistent, the outer with spreading tips and one or both of them saccate or spurred at the base, the inner 2 smaller, thickened at the tip and enclosing the stigma. Androecium of 6 diadelphous stamens, the middle anther of each group 2-celled, the lateral ones 1-celled. Gynoecium 2-carpellary. Fruit a silique, capsule or a nutlet.

Each of the two outer petals spurred at the base.

Petals permanently united and enclosing the capsule: seeds crestless: vines.

1. *ADLUMIA*.

Petals lightly united, deciduous: seeds mostly crested: acaulescent herbs.

2. *BICUCULLA*.

One of the 2 outer petals spurred at the base.

Ovules several or many: fruit an elongate capsule: seeds with crests or arils.

3. *CAPNOIDES*.

Ovule solitary: fruit a globose nutlet: seed crestless.

4. *FUMARIA*.

1. **ADLUMIA** Raf. Biennial or perennial tender vines. Leaf-blades with broad segments. Flowers mostly in panicle-like cymes, white or pink. Sepals 2, toothed. Stamens 6, monadelphous below, the 3 filaments of each group united to near the anthers. Capsule included.

1. *A. fungosa* (Ait.) Greene. Leaf-blades decompose, the ultimate divisions entire or lobed, 3-10 mm. long: corolla 15-18 mm. long: petals pink or whitish, the inner with suborbicular blades about 1.5 mm. broad: capsules slender,

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1.5-2 cm. long. — S. Rare, in woods along creeks. — *Schists*. — Sum. — ALLEGHENY-VINE. CLIMBING-FUMITORY.

2. **BICUCULLA** Adans. Perennial herbs, with granular or tuberous rootstocks. Leaf-blades with narrow segments. Flowers in racemes or panicles, mostly white to deep-pink. Sepals 2, entire. Stamens 6, somewhat diadelphous at the base. Capsule not included. — Spr.

Rootstocks with yellow tubers: spurs rounded: inner petals conspicuously crested.

1. *B. canadensis*.

Rootstocks without tubers: spurs spreading: inner petals minutely crested.

2. *B. Cucullaria*.

1. **B. canadensis** (Goldie) Millsp. Plants 2-3 dm. tall: leaf-blades dissected into linear or nearly linear segments: racemes usually overtopping the leaves: corolla greenish-white or purplish-tinged, the spurs much shorter than the upper portion of the petals: capsule-body 11-15 mm. long, abruptly narrowed at both ends. — Susquehanna valley. Rather common, in rich woods. — *Quartzites, schists*. — SQUIRREL-CORN.

2. **B. Cucullaria** (L.) Millsp. Plants 1-3 dm. tall: leaf-blades similar to those of *B. canadensis*: racemes usually overtopped by the leaves: corolla white or pale-pink, the spurs about as long as the other portion of the petals: capsule-body 10-13 mm. long, gradually narrowed at both ends. — Common, in rich woods. — DUTCHMAN'S-BREECHES.

3. **CAPNOIDES** Adans. Annual or biennial caulescent herbs. Leaf-blades with toothed segments. Flowers racemose, yellow, pink, or white. Sepals 2, usually toothed. Stamens 6, diadelphous. Ovary elongate, several-ovuled: style persistent. Capsule often torulose. — Spr.

Corolla pink or purple, except the yellow tip: plants erect.

1. *C. sempervirens*.

Corolla yellow: plants diffuse.

2. *C. flavulum*.

1. **C. sempervirens** (L.) Borck. Plants 3-12 dm. tall, the branches ascending: leaf-segments obovate to cuneate: corolla 14-16 mm. long, the spur rounded, the inner petals about 15 mm. long, the blades about $\frac{1}{3}$ as long as the claws: capsules 3-4 cm. long. — Not very common, in rocky places near streams.

2. **C. flavulum** (Raf.) Kuntze. Plants 1-5 dm. tall, the branches spreading, leaf-segments narrow, acute: corolla yellow, 10-11.5 mm. long, the smaller outer petals prominently crested: capsules 1.5-2.5 cm. long, somewhat torulose. — Common, in rich soil especially near the Susquehanna River.

4. **FUMARIA** [Tourn.] L. Annual herbs. Leaf-blades with small segments. Flowers racemose, white or pink. Sepals 2, scale-like. Stamens 6, diadelphous. Ovary scarcely longer than thick, 1-ovuled: style deciduous. Nutlet globular.

1. **F. officinalis** L. Stem and branches 2-10 dm. long: leaf-segments linear or nearly so: racemes 2-10 cm. long: pedicels 2-4 mm. long: corolla purplish or flesh-colored, and crimson at the tip, 6-8 mm. long: nutlets 2-2.5 mm. in diameter, emarginate at the apex. — Rather rare, in fields and on roadsides. Nat. of Eu. — Spr. — FUMITORY.

FAMILY 3. BRASSICACEAE. MUSTARD FAMILY.

Herbs or partially woody plants, the sap watery. Leaves alternate: blades entire, toothed, or dissected. Flowers perfect, in spikes or racemes. Calyx of 4 mostly erect or appressed sepals. Corolla of 4 usually clawed

petals, or wanting. Androecium of 6 stamens with 1 pair shorter than the others, or rarely of 2 or 4 stamens. Gynoecium of 2 united carpels. Stigma depressed or 2-lobed. Fruit capsular, elongate (siliqua) or short (silicle), flat, terete or angled.

- Pods flattened or compressed contrary to the narrow partition.
 Pods cuculate, wingless.
 Pods scale-like, winged or margined, at least at the apex.
 Seeds solitary in each cavity of the pod.
 Seeds several in each cavity of the pod.
 Pods neither compressed nor flattened contrary to the partition, terete or prismatic, or flattened or compressed parallel to the partition.
 Pods terete or prismatic.
 Pods regularly dehiscent.
 Length of pod less than twice the width.
 Seeds flat: plants pubescent with mostly branched hairs.
 Seeds turgid: plants pubescent with simple hairs or glabrous.
 Corolla yellow: plants perennial by rootstocks.
 Corolla white: plants perennial by long pungent roots.
 Length of pod over twice the width.
 Pods merely tipped by the short style or style wanting, not beaked.
 Pods terete or nearly so.
 Seeds in 2 rows in each cavity of the pod.
 Corolla yellow: leaf-blades toothed or pinnatifid.
 Corolla white: leaf-blades pinnately divided.
 Seeds in 1 row in each cavity of the pod.
 Leaf-blades pinnatifid or coarsely toothed.
 Anthers ovoid: pods slender and tapering to the apex, appressed to the rachis.
 Anthers oblong-sagittate: pods very slender but not tapering to the apex, widely spreading.
 Leaf-blades entire or slightly toothed.
 Pods 4-sided or 4-angled.
 Corolla white.
 Corolla yellow.
 Seeds flat: leaf-blades pinnatifid.
 Seeds plump: leaf-blades entire or toothed.
 Pods markedly beaked.
 Pod-beak conic, terete, the pod-body relatively long.
 Pod-beak flat, 2-edged, the pod-body relatively short.
 Pod-valves 3-nerved; beak long.
 Pod-valves 1-nerved; beak short.
 Pods indehiscent.
 Pods flattened or compressed parallel to the broad partition
 Pods suborbicular or ovoid.
 Corolla yellow: sepals persistent: pods broad above and notched.
 Corolla white: sepals deciduous: pods narrowed above, not notched.
 Pods oblong to narrowly linear.
 Valves of the pods nerveless.
 Seeds in 2 rows in each cavity.
 Seeds in 1 row in each cavity.
 Cauliscent plants with alternate leaves: embryo with equal cotyledons.
 Scapose plants with 2-4 leaf-like bracts subtending the peduncle: embryo with unequal cotyledons.
 Valves of the pods nerved.
 Pods oval, oblong, or broadly linear.
 Pods narrowly linear to linear-filiform.
1. BURSA.
 2. LEPIDIUM.
 3. THLASPI.
 4. CAMELINA.
 5. RADICULA.
 6. ARMORACIA.
 7. SISYMBRIUM.
 8. ERYSIMUM.
 9. NORTA.
 10. HESPERIS.
 11. ARABIDOPSIS.
 12. BARBAREA.
 13. CHEIRINIA.
 14. BRASSICA.
 15. SINAPIS.
 16. ERUCA.
 17. RAPHANUS.
 18. ALYSSUM.
 19. KONIGA.
 20. DRABA.
 21. CARDAMINE.
 22. DENTARIA.
 20. DRABA.
 23. ARABIS.

1. **BURSA** Weber. Annual herbs. Leaves sometimes mainly basal: blades entire to pinnatifid. Racemes terminal. Sepals 4, spreading. Petals 4, much longer than the sepals. Ovules and seeds many in each carpel. Pods euneate.

1. **B. Bursa-pastoris** (L.) Britton. Stems 3-9 dm. tall: basal leaves 3-15 cm. long; blades mainly pinnately lobed or pinnatifid; blades of the stem-leaves auricled at the base: pedicels 10-15 mm. long: sepals 1.5-1.7 mm. long: petals white, spatulate, 2-2.3 mm. long: pods 5-8 mm. long. — Common, in fields and waste places. Nat. of Eu. — Spr.-fall. — SHEPHERD'S-PURSE.

2. **LEPIDIUM** [Tourn.] L. Annual, biennial, or perennial herbs. Leaf-blades entire to pinnatifid. Racemes terminal. Sepals 4, spreading. Petals 4, longer than the sepals or wanting. Stamens usually fewer than 6. Ovule, and seed, 1 in each carpel. Pods suborbicular to oblong. — Spr. and sum.

Blades of the cauline leaves sagittate-clasping: pods winged. 1. *L. campestre*.
Blades of the cauline leaves tapering at the base: pods wingless, margined. 2. *L. virginicum*.

1. **L. campestre** (L.) R. Br. Plants 1-4 dm. tall, softly fine-pubescent: blades of the lower leaves spatulate to oblanceolate, those of the upper leaves sagittate, clasping, shallowly toothed: pedicels downy: sepals oblong to oblong-ovate, about 1.5 mm. long: petals white, spatulate, 2-2.5 mm. long: pods ovoid, 4.5-5.5 mm. long, winged above the base, minutely pubescent. — Rather common, in fields and on roadsides. Nat. of Eu. — COW-CRESS. FIELD-CRESS.

2. **L. virginicum** L. Stems 2-9 dm. tall, puberulent: blades of the cauline leaves narrow, sharply toothed or incised: pedicels spreading, 3-4 mm. long at maturity: sepals oblong, about 1 mm. long: petals slightly larger than the sepals: pods 3-4 mm. long. — Common, in waste places and fields. — PEPPER-GRASS.

3. **THLASPI** [Tourn.] L. Annual or perennial erect or depressed caulescent herbs. Leaf-blades entire or toothed, those of the upper leaves auriculate-clasping. Racemes inconspicuously bracted or bractless, elongating. Sepals rather broad. Petals white or purplish, longer than the sepals, equal or nearly so. Filaments stout: anthers short. Pods orbicular, obovate or euneate, winged, notched at the apex.

1. **T. arvense** L. Annual, 1-5 dm. tall, glabrous: blades of the lower cauline leaves of a spatulate type, those of the upper cauline leaves sagittate, 1.5-5 cm. long, toothed: sepals oblong or oblong-ovate, 2-2.5 mm. long: petals white, euneate to spatulate, 2.5-3 mm. long: pods suborbicular to orbicular-obovate, 1-1.5 cm. broad, broadly winged. — M. S. Not common, in waste places and on roadsides. Nat. of Eu. — Spr. and sum. — PENNY-CRESS.

4. **CAMELINA** Crantz. Annual herbs. Leaf-blades entire or toothed, or pinnatifid at the base of the stem, sometimes clasping. Racemes elongate. Sepals 4, rather broad. Petals 4, narrow, yellowish or greenish. Stamens 6: anthers ovoid. Style columnar. Ovules few or many. Pods turgid, margined. Seeds marginless. — Spr. — FALSE-FLAX.

Stem manifestly pubescent: pods rounded at the apex, 4-5 mm. wide. 1. *C. microcarpa*.
Stem glabrous or nearly so: pods truncate or notched at the apex, 6-8 mm. wide. 2. *C. sativa*.

1. **C. microcarpa** Andr. Plants pubescent, at least below, 5-8 dm. tall: blades of the upper cauline leaves lanceolate, 1.5-7 cm. long, sagittate-auriculate at the base: pods narrowly obovoid, 4-5 mm. wide: seeds fully 1 mm. long. — S. Rather common, in fields. Nat. of Eu.

2. *C. sativa* (L.) Crantz. Plants glabrous or nearly so, 3-9 dm. tall: leaves nearly similar to those of *C. microcarpa*: pods broadly obovoid, 6-7 mm. wide: seeds fully 2 mm. long. — M. Rather rare, on banks and roadsides. Nat. of Eu.

5. **RADICULA** [Dill.] Hill. Annual, biennial, or perennial herbs. Leaf-blades toothed, lobed, or dissected. Racemes often branched. Sepals 4, broad or narrow. Petals 4, yellow, often scarcely longer than the sepals. Stamens 1-6: anthers ovoid to globose. Style very short. Pods short or elongate. Seeds turgid. — WATER-CRESS. STURSHUM.

Annual or perennial from fibrous roots: petals mostly shorter than the sepals.

Pods subglobose or oval, shorter than the pedicels: stem pubescent. 1. *R. hispida*.

Pods linear or narrowly oblong, as long as the pedicels or longer: stem glabrous or nearly so. 2. *R. palustris*.

Perennial by creeping or horizontal stems: petals mostly surpassing the sepals. 3. *R. sylvestris*.

1. *R. hispida* (Desv.) Heller. Stems hirsute or hispid, 3-12 dm. tall: leaf-blades oblanceolate, elliptic, or oblong, pinnatifid or rarely only toothed, 2-18 cm. long: ovary globular: pods 2-3 mm. long. — Common, in sandy soil, especially along streams. — Sum.

2. *R. palustris* (L.) Moench. Stems glabrous or minutely pubescent, 2-10 dm. tall: leaf-blades oblanceolate to oblong or linear-oblong, pinnatifid, or toothed or repand above, 2-20 cm. long: ovary oblong: pods 5-8 mm. long. — Frequent, in low grounds and meadows. Apparently nat. of Eu. — Spr. and sum. — MARSH-CRESS.

3. *R. sylvestris* (L.) Druce. Stems ascending or decumbent, 2-7 dm. long: leaf-blades often ovate or oblong, 4-15 cm. long, pinnately divided, the segments distant, entire or toothed: sepals becoming 2-2.5 mm. long: filaments scarcely longer than the anthers: pods slender, 8-15 mm. long, short-beaked. — Common, especially along streams. Nat. of Eu. — Spr. and sum. — YELLOW-CRESS.

6. **ARMORACIA** Gaertn. Perennial erect herbs with long pungent roots. Leaf-blades coarsely toothed or sometimes pinnatifid. Racemes stiff, with slender pedicels. Sepals rather broad. Petals white, much exceeding the sepals. Stamens 4 or 6: anthers ovoid. Ovary obovoid: style short-columnar: stigma capitate. Pod short and stout.

1. *A. Armoracia* (L.) Britton. Stems erect: leaf-blades various, those of the basal leaves oblong to oblong-lanceolate, mostly 15-40 cm. long, irregularly crenate, unequally cordate or truncate at the base; those of the cauline leaves smaller and more coarsely toothed or incised: petals white, obovate, 6-8 mm. long: pods 5-7 mm. long, straight. [*Koripa Armoracia* (L.) A. Hitchc.] — Common, on roadsides and in thickets. Nat. of Eu. — Spr. — HORSERADISH.

7. **SISYMBRIUM** [Tourn.] L. Perennial diffuse aquatic herbs with creeping stems. Leaf-blades pinnately divided. Racemes lax. Sepals broad. Petals 4, white, much exceeding the sepals. Stamens mostly 6: anthers ovoid. Ovary narrow: style very stout: stigma discoid. Pod elongate, linear.

1. *S. Nasturtium-aquaticum* L. Stems diffuse or floating, 1-6 dm. long: leaf-blades unequally pinnate, 2-15 cm. long, the segments irregular: petals white, 3-4 mm. long: pods linear, 10-25 mm. long, curved. [*Koripa Nasturtium* (L.) Rusby.] — Common, in springs and slow streams. Nat. of Eu. — Spr.-fall. — WATER-CRESS.

8. **ERYSIMUM** [Tourn.] L. Annual or perennial herbs. Leaf-blades entire, lobed or pinnatifid. Racemes elongating, strict. Sepals 4, rather nar-

row, nearly equal. Petals 4, slightly larger than the sepals, yellow, spatulate. Stamens 6; anthers ovoid. Ovary narrow: style very short or obsolete: stigma 2-lobed. Pod elongate. Seeds marginless.

1. **E. officinale** L. Stems 3-12 dm. tall, the branches spreading: leaf-blades 2-20 cm. long, runcinate-pinnatifid, the segments irregular, entire, toothed, or lobed: sepals 1.5-2 mm. long: petals yellow, spatulate: pods slender 10-16 mm. long, slender-beaked. [*Sisymbrium officinale* (L.) Scop.] — Common, in waste places and on roadsides. Nat. of Eu. — Spr. — HEDGE-MUSTARD.

9. **NORTA** Adans. Biennial, tall, sometimes diffusely branched, herbs. Leaf-blades toothed or pinnatifid. Racemes lax, becoming very lax in age, the pedicels short and stout. Sepals rather narrow, spreading. Petals yellow, exceeding the sepals. Stamens 6; anthers oblong-sagittate. Ovary narrow: style very short: stigma 2-lobed. Pod slender, much-elongate, spreading.

1. **N. altissima** (L.) Britton. Stems 1.5 m. tall or less, the branches spreading, often divaricate: leaf-blades mostly 1-2 dm. long, deeply 1-2-pinnatifid, the segments narrow, entire or toothed: sepals 4-5 mm. long: petals pale-yellow, spatulate: pods very slender, elongate-linear, 6-10 cm. long, stout-beaked. [*Sisymbrium altissimum* L.] — Frequent, in fields and waste places. Nat. of Eu. — Sum. — TUMBLE-MUSTARD.

10. **HESPERIS** [Tourne.] L. Biennial or perennial herbs. Leaf-blades entire, toothed, or rarely pinnatifid. Racemes or panicles elongate. Sepals 4, broad. Petals 4, white or purple, with broad blades. Stamens 6: anthers oblong. Style very short or obsolete. Pod elongate. Seeds marginless.

1. **H. matronalis** L. Stems 3-12 dm. tall, roughish-pubescent: leaves 2-15 cm. long; blades of the lower ones elliptic-oblancoate, those of the upper oblong or ovate-lanceolate, denticulate or rarely slightly pinnatifid: sepals becoming 6-8 mm. long: petals 19-22 mm. long, the broadly obovate blades about as long as the claws: pods 5-10 cm. long. — Rather common, in fields and on roadsides. Nat. of Eu. — Spr. — ROCKET. DAME'S-VIOLET.

11. **ARABIDOPSIS** Schur. Annual or perennial herbs. Leaf-blades entire, toothed, or pinnatifid. Racemes elongate. Sepals 4, narrow. Petals 4, spatulate, white. Stamens 6: anthers ovoid. Style short. Pod elongate. Seeds oblong, marginless.

1. **A. Thaliana** (L.) Britton. Plants 0.3-5 dm. tall, mainly branched throughout, pubescent near the base: blades of the basal leaves oblong, elliptic, or oblanceolate, 1.5-4.5 cm. long, entire or shallowly toothed: sepals 1-1.5 mm. long: petals about twice as long as the sepals: pods linear-filiform, 10-15 mm. long. [*Stenophragma Thaliana* (L.) Celak.] — Common, in waste places and rocky woods. Nat. of Eu. — Spr. — MOUSE-EAR CRESS. WALL-CRESS.

12. **BARBAREA** R. Br. Biennial or perennial herbs. Leaf-blades lyrate-pinnatifid. Racemes or panicles often dense. Sepals 4, unequal. Petals 4, yellow, spatulate. Stamens 6: anthers oblong to ovoid. Style columnar: stigma not dilated. Pod elongate. Seeds marginless. — SCURVY-GRASS. WINTER-CRESS. ROCKET.

Capsules slender-pedicelled, obtusely 4-angled: leaf-segments 3-9.

Capsules spreading or ascending: corolla bright-yellow.

Capsules erect and appressed: corolla pale-yellow.

Capsules stout-pedicelled, acutely 4-angled: leaf-segments 9-17.

1. *B. Barbarea*.

2. *B. stricta*.

3. *B. verna*.

1. **B. Barbarea** (L.) MacM. Plants 2-9 dm. tall: leaves 5-15 cm. long, or shorter above; blades of the lower ones pinnatifid, those of the upper ones

toothed or incised: sepals mostly 3-3.5 mm. long: petals 5-5.5 mm. long: pods 2-2.5 cm. long, slender-beaked. — Common, on roadsides and in fields. Nat. of Eu. — Spr. and sum.

2. *B. stricta* Andr. Plants similar to those of *B. Barbarca* in habit and foliage: sepals mostly 4-4.5 mm. long: petals 5.5-6.5 mm. long: pods 2-2.5 cm. long, short-beaked. — Rather common, on roadsides and in fields. Nat. of Eu. — Spr.

3. *B. verna* (Mill.) Asch. Plants 1-6 dm. tall: leaves 2-15 cm. long; blades pinnatifid, the segments toothed: sepals 3-3.5 mm. long: petals about twice as long as the sepals: pods 3.5-8 cm. long. — S. Susquehanna valley. Rather common, on roadsides and in waste places. Nat. of Eu. — Spr.

13. **CHEIRINIA** Link. Annual or biennial herbs. Leaf-blades entire, toothed, or lobed. Sepals 4, nearly equal. Petals 4, yellow, with broad blades. Stamens 6; anthers oblong to sagittate. Style very short: stigma depressed. Pod elongate. Seeds marginless.

1. *C. cheiranthoides* (L.) Link. Stems 1-7 dm. tall, strigillose: leaf-blades oblong to lanceolate or linear, 2-10 cm. long, entire, or obscurely toothed: sepals 2-2.5 mm. long: petals with obovate blades about as long as the claws: filaments 3-4 mm. long: pods stout-beaked. [*Erysimum cheiranthoides* L.] — Frequent, in sandy soil, especially near streams. — Sum. — WORMSEED-MUSTARD.

14. **BRASSICA** [Tourn.] L. Annual, biennial, or perennial herbs. Leaf-blades lobed or pinnatifid, or those of the upper leaves entire. Sepals 4, rather narrow. Petals 4, yellow or white, the blades broad. Stamens 6: anthers sagittate. Style columnar: stigma depressed or 2-lobed. Pod elongate, sometimes angled, the beak conic. Seeds thick, marginless. — MUSTARD.

Upper leaf-blades merely sessile: petal-blades abruptly narrowed into slender claws.

1. *B. nigra*.

Upper leaf-blades clasping: petal-blades gradually narrowed into broad blades.

2. *B. campestris*.

1. *B. nigra* (L.) Koch. Stems 1-2 m. tall, sometimes sparingly pubescent, widely branched: leaves 5-20 cm. long; blades of the lower ones lyrate-pinnatifid, the terminal segment the largest: sepals becoming 4.5-5 mm. long: petals 7-9 mm. long: pods 10-16 mm. long. — Common, in waste places and fields. Nat. of Eu. — Spr. and sum. — BLACK-MUSTARD.

2. *B. campestris* L. Stems 3-6 dm. tall, glabrous and glaucous: leaves 9-30 cm. long, or shorter above; blades lyrate-pinnatifid: sepals becoming 4-5 mm. long: petals 8-12 mm. long: pods 30-70 mm. long. — Common, in fields and on roadsides. Nat. of Eu. — Spr. — TURNIP.

15. **SINAPIS** L. Annual or biennial herbs. Leaf-blades lobed or pinnatifid. Sepals 4, herbaceous. Petals 4, mostly yellow, the blades broad. Stamens 6: anthers narrowly oblong. Style columnar: stigma depressed. Pod elongate, the beak sword-like. Seeds thick, marginless.

1. *S. arvensis* L. Stems 3-6 dm. tall, hispid: leaves 4-17 cm. long; blades of the lower ones coarsely toothed or lyrate-pinnatifid: sepals becoming 5-6 mm. long: petals 5.8-8.5 mm. long, the suborbicular or obovate blades abruptly contracted into the slender claws: pods 21-24 mm. long. — Frequent, in fields and waste places. Nat. of Eu. — Spr.-fall. — CHARLOCK.

16. **ERUCA** L. Herbs resembling *Brassica* and *Sinapis*. Leaf-blades pinnatifid or some of them merely toothed, not clasping. Racemes narrow:

pedicels ascending. Sepals narrow, erect. Petals with spreading dilated veiny blades. Anthers sagittate. Ovary short. Style short, but longer than the ovary. Pod short, turgid, the beak flat, shorter than the body.

1. **E. Eruca** (L.) Britton. Plants 2-7 dm. tall, the stem usually branched, sparingly pubescent: leaf-blades various, those of the lower leaves shallowly toothed or pinnatifid, those of the upper leaves usually pinnatifid, the segments toothed: pedicels stout, 2-4 mm. long: sepals linear-lanceolate, 13-15 mm. long, glabrous: petals dirty-yellow, spatulate, 1.5-2 cm. long, veiny: pods erect, slender-fusiform, 2-3 cm. long, the beak much shorter than the body. [*E. sativa* Mill.]—S. Occasional, in fields. Nat. of Eu.—Spr. and sum.

17. **RAPHANUS** [Tourn.] L. Annual or mostly biennial herbs. Leaf-blades lyrate-pinnatifid, or those of the upper ones merely toothed. Sepals 4, narrow. Petals 4, yellow, pink, or white, the blades cuneate or obovate. Stamens 6: anthers narrow. Style columnar: stigma depressed or globular. Pod elongate, beaked. Seeds subglobose.

1. **R. sativus** L. Plants 3-11 dm. tall, usually with scattered hairs: leaves finely pubescent; blades spatulate to obovate in outline, pinnatifid or pinnately parted, the terminal lobe very large and irregularly toothed: flowers rather short-pedicelled: sepals oblong to linear, 6-7 mm. long, bearded at the apex: petals pink or white, spatulate, 11-14 mm. long: pods turgid, the body mostly 2.5-3.5 cm. long, beaked.—Frequent, in fields and on roadsides. Nat. of Eu.—Spr.—RADISH.

18. **ALYSSUM** [Tourn.] L. Annual or perennial, sometimes partially woody, plants. Leaf-blades entire or toothed. Racemes elongating. Sepals 4, rather broad, slightly unequal. Petals 4, yellow, spatulate to oblong, somewhat longer than the sepals. Stamens 6: filaments narrow: anthers short, often globose or ovoid. Style short, columnar: stigma scarcely dilated. Pod short, often as wide as long. Seeds 2 or 4, wingless.

1. **A. alyssoides** L. Annual, 1-3 dm. tall, hoary: the stem often branched at the base: leaf-blades spatulate to linear-spatulate: sepals oblong or ovate-oblong, 2-2.5 mm. long: petals pale-yellow, spatulate, 3-3.5 mm. long: pods suborbicular, 3-4 mm. in diameter, sharp-margined.—S. Rare, in fields. Introduced with clover seed. Nat. of Eu.—Sum.—YELLOW-ALYSSUM.

19. **KONIGA** Adans. Annual or perennial, often diffuse herbs, or shrubby plants. Leaf-blades entire. Sepals 4, herbaceous. Petals 4, white, with broad blades. Stamens 6: anthers ovoid. Style slender: stigma depressed. Pod ovate to subglobose. Seed solitary.

1. **K. maritima** (L.) R. Br. Stems usually diffuse, minutely pubescent: leaves 1-5 cm. long; blades of the cauline ones oblanceolate to linear or linear-lanceolate: flowers fragrant: sepals becoming 1.5-2 mm. long: petals 3-4 mm. long, the suborbicular blades longer than the claws: pods 2-3 mm. long, short-beaked.—M. Rather frequent, in waste places. Nat. of Eu.—Spr.-fall.—SWEET-ALYSSUM.

20. **DRABA** [Dill.] L. Annual or perennial, often small herbs. Leaf-blades entire or toothed. Sepals 4, rather broad. Petals 4, white or yellow, or rarely pink or purple, or wanting. Stamens 6: anthers ovoid. Style columnar or very short: stigma depressed. Pod oval to linear, sometimes twisted. Seeds several.—Spr.

Petals cuneate; blades 2-cleft; pods long-pedicelled, elliptic to oblong-elliptic.

Petals not cuneate; blades entire; pods short-pedicelled, linear. 1. *D. verna*.
2. *D. caroliniana*.

1. *D. verna* L. Plants 2-16 cm. tall, acaulescent; leaf-blades spatulate to narrowly oblong, 5-15 mm. long, entire, or toothed near the apex, sparingly pubescent; scapes glabrous; sepals becoming 1.5-2 mm. long; petals cuneate, nearly twice as long as the sepals; pods elliptic to oblong-elliptic or rarely oval, 4-9 mm. long. — Common, on dry banks and in fields. Nat. of Eu. — WHITLOW-GRASS.

2. *D. caroliniana* Walt. Plants 4-10 cm. tall, often short-stemmed; leaf-blades obovate, spatulate, oblong, or suborbicular, 5-15 mm. long, entire or shallowly few-toothed, closely pubescent; scapes pubescent, at least below; sepals becoming 2-2.5 mm. long, glabrous; petals 3-4 mm. long, with cuneate or oval blades; ovary glabrous; pods linear, 7-18 mm. long. — M. Rare, on rocks near Lancaster. — *Limestones*.

21. **CARDAMINE** [Tourn.] L. Annual or perennial herbs with erect or creeping stems. Leaves alternate; blades entire to pinnately dissected. Sepals 4, much shorter than the petals. Petals 4, white, pink, or purple. Style very short. Pod elongate. — Spr. — BITTER-CRESS.

Leaf-blades entire or undulate.

Leaf-blades, at least those of cauline leaves, pinnately divided.

Corolla 3 mm. wide or narrower.

Corolla 4 mm. wide or broader.

Sepals about 1 mm. long; segments of the cauline leaves linear.

Sepals about 2 mm. long; segments of the cauline leaves oblong or broader.

1. *C. bulbosa*.

2. *C. parviflora*.

3. *C. arenicola*.

4. *C. pennsylvanica*.

1. *C. bulbosa* (Schreb.) B. S. P. Plants 1-5 dm. tall, with tuber-like bases; cauline-leaves 3-8 cm. long; blades oval, oblong, ovate, or lanceolate; sepals becoming 3-3.5 mm. long; petals broadly cuneate, 7-12 mm. long; pods mostly 2-2.5 cm. long. — Common, in swamps and low woods. — SPRING-CRESS.

2. *C. parviflora* L. Plants with slender stems 0.5-3 dm. tall; cauline leaves 1.5-6 cm. long; blades pinnately divided, the several lateral segments narrow, but broadened upward; sepals becoming 1-1.5 mm. long; petals slightly longer than the sepals; pods 1.5-2.5 cm. long. — S. Frequent, on dry banks along the Susquehanna River. — *Schists*.

3. *C. arenicola* Britton. Plants 1-3 dm. tall; cauline leaves 1-4 cm. long; blades pinnately divided, the lateral segments linear or linear-oblong, mainly entire; sepals becoming about 1 mm. long; petals about twice as long as the sepals, mostly cuneate; pods linear, about 2 cm. long. — S. Rare, in spring-runs and moist sandy soil. — *Schists*.

4. *C. pennsylvanica* Muhl. Plants 2-10 dm. tall, glabrous or nearly so; cauline leaves 4-8 cm. long; blades pinnately divided, the lateral segments very broad or narrow, undulate, toothed, or lobed; sepals becoming about 2 mm. long; petals somewhat longer than the sepals, mostly spatulate; pods linear-filiform, 2-2.5 mm. long. — Common, in wet places and meadows.

22. **DENTARIA** [Tourn.] L. Perennial scapose herbs with horizontal rootstocks. Leaves basal; blades palmately cleft or divided. Scapes simple, each bearing 2 or 3 bracts with blades similar to the basal leaves. Sepals 4, much shorter than the petals. Petals 4, white or purple, relatively large. Stamens 6; anthers oblong to lanceolate. Style slender. Pod elongate.

1. *D. laciniata* Muhl. Rootstock jointed; scapes 1-3.5 dm. tall; bracts 3; segments with linear-lanceolate or oblong coarsely serrate or incised blades:

sepals narrow, 5-6 mm. long: petals oblong-spatulate, 12-15 mm. long: pods 3-5 cm. long, slender-beaked. — Common, on moist banks and in woods. — Spr. — TOOTHWORT.

23. ARABIS L. Annual or perennial herbs. Leaf-blades entire, toothed, or pinnatifid. Sepals 4, erect, broad or narrow. Petals 4, white, pink, purple, or yellowish, as long as the sepals or much longer. Stamens 6: anthers ovoid to oblong. Style very short or obsolete: pod elongate. — Spr. and sum. — ROCK-CRESS.

Basal leaves with pinnatifid blades: petals broad.

1. *A. lyrata*.

Basal leaves with toothed blades: petals narrow.

Capsules erect or nearly so, sometimes appressed.

Seeds marginless: petals less than 4 mm. long: pods very short-pedicelled

2. *A. dentata*.

Seeds margined: petals over 6 mm. long: pods long-pedicelled.

Corollas over 7 mm. broad: capsules not appressed: style 1 mm. long.

3. *A. patens*.

Corollas less than 7 mm. broad: capsules appressed: stigma sessile.

4. *A. hirsuta*.

Capsules recurved.

Outer sepals narrow, linear: plants glabrous, glaucous: pods 1-2 mm. wide.

5. *A. laevigata*.

Outer sepals broad, ovate to oblong-ovate: plants pubescent, at least below: pods 2.5-3.5 mm. wide.

6. *A. canadensis*.

1. *A. lyrata* L. Stems 1-4 dm. tall, mostly pubescent near the base: blades of the cauline leaves linear-spatulate to linear, entire or nearly so: sepals becoming 2.5-3 mm. long: petals white, 6-8 mm. long, narrowly obovate: pods narrowly linear, 2-3 cm. long. — Common, on rocks and rocky hillsides.

2. *A. dentata* T. & G. Stems 2-6 dm. tall, stellate-pubescent: blades of the cauline leaves 2-8 cm. long, spatulate to cuneate or oblong, irregularly finely dentate, clasping: sepals becoming 2-2.5 mm. long: petals 3-4 mm. long, spatulate: pods linear, 2-2.5 cm. long. — Lower Susquehanna valley. Occasional, in woods. *Schists*. — Spr.

3. *A. patens* Sulliv. Stems 3-7 dm. tall, pubescent with simple or branched hairs: blades of the cauline leaves oblanceolate or cuneate to lanceolate or ovate, 1-6 cm. long, mostly coarsely serrate, sessile: sepals becoming 4-5 mm. long: petals 6-8 mm. long, narrowly cuneate: pods narrowly linear, 2.5-4 cm. long. — Lower Susquehanna valley. Frequent, especially on Mountain island at Peach Bottom. — *Schists*.

4. *A. hirsuta* (L.) Scop. Stems 3-8 dm. tall, usually sparingly hirsute: blades of the cauline leaves oblanceolate to oblong or lanceolate, 1-6 cm. long, nearly entire or dentate, auricled-clasping: sepals becoming 3 mm. long: petals about twice as long as the sepals, spatulate: pods narrowly linear, 2.5-4 cm. long. — M. Frequent, on creek banks. — *Limestones*.

5. *A. laevigata* (Muhl.) Poir. Stems 3-10 dm. tall, glabrous: blades of the cauline leaves oblong to lanceolate or linear, 3-15 cm. long, entire or coarsely toothed, clasping: sepals glabrous, becoming 4-5 mm. long: petals 6-10 mm. long, spatulate: pods very narrowly linear, 6-10 cm. long, thick: seeds oblong, narrowly winged. — Common, in woods and on rocky banks.

6. *A. canadensis* L. Stems 2-9 dm. tall, often sparingly pubescent: blades of the cauline leaves oblanceolate to oblong or lanceolate, 3-12 cm. long, remotely toothed or nearly entire, not clasping: sepals pubescent, becoming 4 mm. long: petals 6-8 mm. long, oblong to oblong-spatulate: pods scythe-shaped, flat, 5-10 cm. long: seeds ovate or orbicular, broadly winged. — Common, in woods and thickets.

FAMILY 4. **CAPPARIDACEAE.** CAPER FAMILY.

Herbs, shrubs, trees, or vines. Leaves alternate or rarely opposite: blades simple or compound. Flowers perfect, in racemes or cymes, or solitary. Calyx of 4 or 5 sepals. Corolla of 4 or 5, often unequal, petals. Receptacle often produced into a gland. Androecium of 4-6 stamens or more. Gynoecium of 2 united carpels. Ovary often stipitate. Fruit capsular, sometimes baccate. Seeds conduplicate.

1. **POLANISIA** Raf. Herbs. Leaf-blades simple or 3-foliolate. Sepals 4, spreading. Petals 4, white or pink, somewhat unequal, long-clawed, the posterior pair before a short gland. Stamens 12-32: anthers oval to ovoid. Ovary sessile or nearly so: style slender. Capsule linear or linear-oblong.

1. **P. graveolens** Raf. Plants 1-8 dm. tall: leaflets 1.5-3.5 cm. long; blades elliptic, oblong, or obovate: lower bracts 3-foliolate: sepals oblong, about 3 mm. long: petals 4-5 mm. long: blades suborbicular: capsules linear-oblong, 3-5 cm. long. — Common, in fields, and on roadsides and river shores. — Sum. — CLAMMY-WEED.

Order **SARRACENIALES.**

Insectivorous, usually scapose herbs, with viscid-fluid secreting tissues. Leaves alternate, various, filiform, or with dilated, sometimes sensitive blades, or hollow. Flowers usually perfect and regular. Calyx of distinct sepals. Corolla of distinct petals. Androecium of few or many stamens. Gynoecium of 2-5 united carpels. Ovary 1-celled, with 3-5 parietal or basal placentae, or 3-5-celled. Fruit capsular. Endosperm fleshy.

Ovary 1-celled, with a basal placenta or parietal placentae, not surmounted by a peltate disk: leaves with filiform or dilated blades. Fam. 1. DROSERACEAE.
Ovary 3-5-celled with central placentae, surmounted by a peltate disk: leaves with hollow blades. Fam. 2. SARRACENIACEAE.

FAMILY 1. **DROSERACEAE.** SUNDEW FAMILY.

Annual, biennial, or perennial, glandular-pubescent herbs. Leaves circinate in the bud, merely filiform or with broad blades. Flowers spicate or racemose. Calyx of 4-8 persistent sepals. Corolla of 4-8 petals. Androecium of 4-8, usually 5, distinct stamens. Capsule loculicidally 3-5-valved.

1. **DROSERA** L. Biennial or perennial (ours) scapose herbs. Leaves clustered. Scape nodding at the apex. — SUNDEW.

Leaf-blades broad, suborbicular or broader than long: seed-coat lax.

Leaf-blades narrow, spatulate: seed-coat close.

1. *D. rotundifolia*.
2. *D. intermedia*.

1. **D. rotundifolia** L. Plants 5-30 cm. tall: leaf-blades suborbicular or reniform: scape glabrous: sepals becoming 5-6 mm. long: corolla 5-6 mm. wide: capsules slightly exceeding the sepals: seeds fusiform, 1.5 mm. long. — S. Rather rare, in moist sandy soil. — *Schists.* — Sum.

2. **D. intermedia** Hayne. Plants 5-20 dm. tall: leaves 2-6 cm. long; blades linear-spatulate, with long glabrous petioles: sepals becoming 5-5.5 mm. long: corolla white, 10-12 mm. wide: capsules scarcely as long as the sepals: seeds oblong-cylindric, about 0.8 mm. long. — S. Rare, in swamps and moist sandy soil. — *Schists.* — Sum.

FAMILY 2. **SARRACENIACEAE.** PITCHER-PLANT FAMILY.

Perennial bog herbs, living to some extent on decaying organic matter which has fallen into the tubular or pitcher-like leaves. Flowers perfect, nodding. Calyx of 5 persistent sepals, accompanied by 3 bracts. Corolla of 5 deciduous petals. Androecium of numerous stamens. Gynoecium of 5 united carpels. Fruit a 5-valved capsule.

1. **SARRACENIA** [Tourn.] L. Acaulescent, green, yellow, or purple, or variegated plants. Leaves basal, erect or decumbent, with a ventral ridge and a terminal hood. Flowers on erect scapes. Stigmas hooked, under the angles of the umbrella-like expansion of the style. PITCHER-PLANT. TRUMPET-LEAF.

1. **S. purpurea** L. Leaves 1-2 dm. long, ascending, green and often variegated with purple; tube inflated, with a broad wing; hood reniform, often notched at the apex; scapes 2-4 dm. tall; sepals ovate, about 3 cm. long; petals fiddle-shaped, 4-5 cm. long, purple; style-disk 3-4 cm. wide; capsule about 1.5 cm. wide.—E. Rare, in sphagnum swamps.—*Schists.*—Sum.—SIDE-SADDLE FLOWER.

Order **ROSALES.**

Herbs, shrubs, or trees, or rarely aquatic plants, or vines. Leaves with simple or compound blades. Flowers mostly perfect. Calyx and corolla present and sometimes irregular, or the latter occasionally, or both rarely, wanting. Androecium of few or many stamens. Gynoecium of 1-several distinct or united carpels. Fruit various.

Aquatic alga-like fleshy herbs, with spathe-like involucre: perianth wanting.

Fam. 1. **PODOSTEMACEAE.**

Terrestrial or swamp plants, without spathe-like involucre: perianth present, except in *Liquidambar*.

Endosperm present, usually copious and fleshy: stipules mostly wanting.

Herbs.

Carpels as many as the sepals: stamens as many as the sepals or twice as many.

Plants succulent: carpels distinct or united at the base, opening lengthwise.

Fam. 2. **SEDACEAE.**

Plants not succulent: carpels united to the middle, circumsessile.

Fam. 3. **PENTHORACEAE.**

Carpels fewer than the sepals.

Fam. 4. **SAXIFRAGACEAE.**

Shrubs or trees.

Leaves opposite.

Fam. 5. **HYDRANGEACEAE.**

Leaves alternate.

Fruit a 2-celled capsule.

Fam. 6. **HAMAMELIDACEAE.**

Fruit a 1-celled berry.

Fam. 7. **GROSSULARIACEAE.**

Endosperm wanting or scant (copious in *Opulaster*, **ROSACEAE**): stipules mostly present.

Flowers monoecious, in dense capitate clusters.

Fam. 8. **PLATANACEAE.**

Flowers perfect, or if monoecious or dioecious not in capitate clusters.

Flowers regular.

Carpels several or numerous, or if solitary becoming an achene.

Carpels distinct, rarely adnate to the hypanthium: fruit achenes or follicles.

Fam. 9. **ROSACEAE.**

Carpels united, enclosed by the hypanthium and adnate to it: fruit a pome.

Fam. 10. **MALACEAE.**

Carpel solitary, not becoming an achene.

Ovary with 2 ovules: leaf-blades simple: fruit a drupe.

Fam. 11. **AMYGDALACEAE.**

Ovary with several ovules: leaf-blades 2-3-pinnate: fruit a legume.

Fam. 12. **CASSIACEAE.**

Flowers irregular (nearly or quite regular in *Gleditsia* of the **CASSIACEAE**).

Upper petal enclosed by the lateral ones in the bud.

Fam. 12. **CASSIACEAE.**

Upper petal enclosing the lateral ones in the bud.

Fam. 13. **FABACEAE.**

FAMILY 1. **PODOSTEMACEAE.** RIVER-WEED FAMILY.

Aquatic herbs, adhering to the rocks, the vegetative organs resembling the thallus of an alga or a hepatic. Leaves alternate: blades lobed or decomposed. Flowers perfect, arising from a spathe. Perianth wanting, or of 3-5 scale-like or membranous sepals. Androecium of 1-many stamens. Gynoecium of 2 or 3 united carpels. Fruit capsular.

1. **PODOSTEMON** Michx. Caulescent alga-like herbs. Leaf-blades divided or dissected. Perianth obsolete. Stamens 2. Ovary 2-celled. Capsules unequally 2-valved, one valve persistent.

1. **P. Ceratophyllum** Michx. Stems less than 2 dm. long, usually few cm. long: leaves short and narrow: capsules 2.5-3 mm. long.—Susquehanna valley. Occasional, on rocks about islands. — *Schists.* — Sum. — RIVER-WEED.

FAMILY 2. **SEDACEAE.** ORPINE FAMILY.

Herbs, usually succulent, or partially woody plants. Leaves alternate, opposite, or whorled: blades thick, flat to terete. Flowers perfect or dioecious, cymose. Calyx of usually 4-6 persistent sepals. Corolla of as many petals as sepals, or wanting. Androecium of as many stamens as sepals or twice as many. Gynoecium of as many distinct or partially united carpels as there are sepals. Fruit follicular.

1. **SEDUM** [Tourn.] L. Annual or perennial herbs. Leaves alternate, or sometimes opposite or whorled: blades terete, angled, or flat. Flowers perfect, borne in often 1-sided cymes. Sepals 4 or 5, usually much longer than wide. Follicles spreading. — STONECROP.

Flowers borne in a terminal corymbose cyme.

Flowers borne in simple or branched scorpioid cymes.

Corolla white: leaves flat, not imbricate.

Corolla yellow: leaves very thick, imbricate.

1. *S. triphyllum.*

2. *S. ternatum.*

3. *S. acre.*

1. **S. triphyllum** (Haw.) S. F. Gray. Plants tufted, 3-5 dm. tall: leaf-blades obovate to oblong or ovate, 2-5 cm. long, coarsely toothed: cyme densely flowered, 2-5 cm. wide: sepals lanceolate to ovate-lanceolate, 1-2 mm. long: petals purple or reddish, oblong to ovate-oblong, 4-5 mm. long, acute: follicles 4-5 mm. long. — N. M. Occasional, on roadsides and about gardens. Nat. of Eu. Sum. — LIVE-FOR-EVER.

2. **S. ternatum** Michx. Plants matted: leaves, at least the lower ones, in 3's, distant, except in the terminal rosettes: sepals linear, 3-4 mm. long: petals oblong-lanceolate to lanceolate, 6-8 mm. long: follicles spreading, 5.5-8 mm. long, long-beaked. — Common, in damp places, often on rocks. — Spr.

3. **S. acre** L. Plants in depressed mats, yellowish-green: leaf-blades very thick, ovate, 2-5 mm. long, imbricate: sepals lanceolate to ovate-lanceolate, 2-2.5 mm. long: petals yellow, lanceolate, 5-6 mm. long: follicles spreading, 3-4 mm. long, short-beaked. — N. M. Occasional, on rocks or in stony soil. Nat. of Eu. — Sum. — MOSSY-STONECROP.

FAMILY 3. **PENTHORACEAE.** VIRGINIA-STONECROP FAMILY.

Caulescent plants. Leaves alternate: blades toothed. Flowers perfect, borne in terminal cymes. Calyx of 5 or 6 sepals. Corolla of 5 or 6, inconspicuous veinless petals, or wanting. Androecium of twice as many stamens as sepals. Gynoecium of 5 or 6 carpels united to the abruptly

contracted middle. Fruit depressed, of 5 or 6 follicles with the bodies obliquely adnate to the receptacle, each one circumscissile near the base of the free portion.

1. **PENTHORUM** [Gronov.] L. Perennial herbs with rootstocks. Flowers greenish-white or yellowish, borne along one side of the cyme-branches. Styles incurved during anthesis, recurved at maturity. Follicles stout, ascending.

1. **P. sedoides** L. Plants 1-6 dm. tall, bright-green, the stem, above, and branches angled: leaf-blades narrowly elliptic to elliptic-lanceolate or lanceolate, 3-15 cm. long, finely serrate: cyme-branches spreading: flowers contiguous: sepals ovate, about 1.5 mm. long, acute: capsules depressed, 4-5 mm. broad, each lobe tipped with the recurved style.—Rather common, in meadows and low grounds.—Sum.—DITCH-STONECROP.

FAMILY 4. **SAXIFRAGACEAE.** SAXIFRAGE FAMILY.

Herbs. Leaves alternate or sometimes opposite: blades simple or compound. Flowers perfect or polygamo-dioecious. Calyx of 5, or rarely of 4 or more, persistent sepals. Corolla of 5, or rarely of 4 or more, petals, or wanting. Androecium of as many stamens as there are sepals, or twice as many. Gynoecium of fewer carpels than there are sepals. Fruit a capsule, or follicles.

Ovary, and capsules, 2-celled: placentae axial.

Ovary, and capsules, 1-celled: placentae basal or parietal.

Corolla present: terrestrial plants.

Stamens 5: petals entire, erose or toothed.

Stamens 10: petals 3-cleft or pinnatifid.

Corolla wanting: aquatic plants.

1. **MICRANTHES.**

2. **HEUCHERA.**

3. **MITELLA.**

4. **CHRYSOSPLENIUM.**

1. **MICRANTHES** Haw. Acaulescent herbs with short caudices. Leaf-blades ovate to flabellate, or rarely cordate at the base. Petals nearly equal. Carpels slightly united below.—SAXIFRAGE.

Petals white: cymules open, often raceme-like.

Petals greenish or purple: cymules borne in corymb-like panicles.

1. *M. virginiensis.*

2. *M. pennsylvanica.*

1. **M. virginiensis** (Michx.) Small. Leaves spreading, 2-20 cm. long; blades ovate, oval or oblong: cymules becoming open, the axis often elongate: petals oblong to elliptic, 4-4.5 mm. long.—Common, in dry rocky places.—Spr.—EARLY-SAXIFRAGE.

2. **M. pennsylvanica** (L.) Haw. Leaves erect or erect-ascending, 5-35 cm. long; blades narrowly oblong or elliptic to spatulate: cymules compact, the axis short: petals narrowly lanceolate to oblong-lanceolate, 1.5-3 mm. long.—N. S. Rare, in swamps.—*Sandstones and shales, schists.*—Sum.—SWAMP-SAXIFRAGE.

2. **HEUCHERA** L. Perennial herbs with lateral flowering branches. Leaf-blades toothed and usually lobed. Flowers in paniced cymes. Sepals often unequal. Petals entire, erose or toothed. Stamens 5: filaments elongate. Styles slender. Capsules gradually narrowed into the slender elongate beaks.—Spr. and sum.—ALUM-ROOT. ROCK-GERANIUM.

Flowers essentially regular, the upper sepals sometimes slightly larger than the lower.

Petals as long as the calyx or shorter: flowering branches leafless.

Petals longer than the calyx: flowering branches leafy.

Flowers decidedly irregular, the calyx oblique, 2-tipped.

1. *H. americana.*

2. *H. Curtisii.*

3. *H. pubescens.*

1. **H. americana** L. Leaf-blades orbicular-ovate or suborbicular, 5-11 cm. wide, the lobes broad and with broad teeth: sepals much longer than the free portion of the hypanthium: petals about 1.5 mm. long, spatulate, the blades oblong or elliptic, finely toothed. — Common, on roadsides, and in woods and thickets.

2. **H. Curtisii** T. & G. Leaf-blades suborbicular, varying to ovate or reniform, sometimes hispidulous above, and ciliate, the lobes broad and with few coarse broad teeth: flowering branches glabrous below, puberulent above, leafy: petals purple or pinkish, exceeding the sepals, the blades usually rhombic, finely toothed: free portion of the mature hypanthium short. — S. Frequent, on rocky banks of the Susquehanna River. — *Schists*.

3. **H. pubescens** Pursh. Leaf-blades orbicular-ovate, glabrate in age, the lobes often ovate, with usually sharply mucronate teeth: flowering branches densely glandular-puberulent at least above: sepals together with the hypanthium 6-8 mm. long, the lower ones ovate: petals purplish, the larger ones 2.5-3 mm. long, the blades obovate, coarsely toothed: free portion of the mature hypanthium long: stamens exerted. — S. Rare, on rocky islands and banks of the Susquehanna River. — *Schists*.

3. **MITELLA** [Tourn.] L. Perennial herbs with lateral flowering branches. Leaf-blades lobed and toothed. Flowers in racemes. Sepals equal. Petals pectinately pinnatifid. Stamens 10: filaments very short. Styles very short. Capsules abruptly narrowed near the apex.

1. **M. diphylla** L. Plants 2-4 dm. tall: leaf-blades ovate to orbicular-ovate in outline, 3-5-lobed, 3-8 cm. long: sepals ovate, 1-1.5 mm. long, acute: petals 2.5-3 mm. long: capsules 2-beaked at the apex, about 3 mm. long. — Rather common, in rocky woods and on cliffs. — Spr. — MITRE-WORT. BISHOP'S-CAP.

4. **CHRYSOSPLENIUM** [Tourn.] L. Perennial (ours) semiaquatic herbs. Leaf-blades crenate or lobed. Petals wanting. Stamens mostly 4-8. Styles 2. Capsule flattened, 2-lobed, very short.

1. **C. americanum** Schwein. Plants decumbent, 2-20 cm. long: leaf-blades suborbicular to orbicular-reniform, 4-20 mm. broad: sepals 4, yellowish or purplish within: fruit about 3 mm. long. — Common, in wet places and spring-runs. — Spr. and sum. — GOLDEN-SAXIFRAGE. WATER-CARPET.

FAMILY 5. HYDRANGEACEAE. HYDRANGEA FAMILY.

Shrubs or trees, or vines. Leaves mostly opposite: blades often toothed. Flowers borne in raceme-like, corymb-like or panicle cymes. Calyx of usually 4-10 sepals surmounting the often ribbed hypanthium. Corolla of mostly 4-10 petals. Androecium of 8-many stamens. Gynoecium of 2-5, or rarely of 10, united carpels. Ovary wholly or partially inferior. Fruit capsular.

Stamens 8 or 10: sepals minute, except in sterile flowers: petals valvate.

Stamens 20-40: sepals relatively large: petals convolute. 1. HYDRANGEA. 2. PHILADELPHUS.

1. **HYDRANGEA** [Gronov.] L. Shrubs. Leaf-blades toothed or lobed. Sepals 4 or 5, minute, or petal-like in the marginal flowers. Petals valvate, small. Stamens 8-10. Styles wanting or very short. Capsule opening between the stigmas.

1. **H. arborescens** L. Shrub with sparingly pubescent branches and twigs: leaf-blades thin, ovate, oval, or elliptic: petals 1-1.5 mm. long: capsule-body 2-2.5 mm. long, broader than high. — Rather common, in rich rocky woods. — Sum. — HYDRANGEA.

2. **PHILADELPHUS** L. Shrubs. Leaves deciduous: blades entire or toothed. Sepals 4 or 5, prominent. Petals convolute, relatively large. Stamens numerous, or very rarely 15. Styles present. Capsule loculicidal.

1. **P. inodorus** L. Shrub 2-3 m. high: leaf-blades ovate, often broadly so, or oval, 3-10 cm. long, prominently 3-5-ribbed at the base: sepals ovate: corolla 3-4 cm. wide. — M. Rare, on the banks of the Little Chiquesalunga Creek. Nat. of the s. U. S. — Spr. — **MOCK-ORANGE.**

FAMILY 6. **HAMAMELIDACEAE.** WITCH-HAZEL FAMILY.

Shrubs and trees. Leaves alternate: blades mostly toothed. Flowers perfect, monoecious, or polygamous, variously clustered or spicate. Calyx of 4 or 5 sepals. Corolla of 4 or 5 narrow petals, or wanting. Androecium of 4—many stamens. Gynoecium 2- or 3-carpellary. Ovary 2- or 3-celled: styles distinct. Fruit a leathery or woody capsule, often elastically dehiscent.

1. **HAMAMELIS** L. Shrubs or trees, with perfect or polygamous flowers, which are borne 3 together on short lateral peduncles. Sepals spreading or reflexed. Stamens 4: filaments short-subulate. Capsule abruptly beaked.

1. **H. virginiana** L. Shrub or small tree: leaf-blades suborbicular, oval-elliptic, or obovate, 4-15 cm. long, coarsely crenate: petals yellow, 1-2 cm. long: capsules ovoid to subglobose, 12-15 mm. long, elastically dehiscent. — Common, in woods and thickets, and on stream-banks. — Fall. — **WITCH-HAZEL.** WITCH-ELM.

FAMILY 7. **GROSSULARIACEAE.** GOOSEBERRY FAMILY.

Shrubs, often spiny. Leaves alternate: blades usually palmately lobed or cleft. Flowers borne in racemes, which are sometimes reduced to few flowers, or to a single flower. Calyx of 5 sepals borne on the hypanthium. Corolla of 5 relatively small petals. Androecium of 5 stamens. Gynoecium of 2 partially united carpels: ovary with 2 parietal placentae: styles more or less united. Fruit a many-seeded berry.

Flower-stalk jointed beneath the ovary: berry disarticulating from the pedicel.

1. **RIBES.**

Flower-stalk not jointed beneath the ovary: berry not disarticulating from the pedicel.

2. **GROSSULARIA.**

1. **RIBES** L. Shrubs with erect stems and branches, without nodal spines. Leaf-blades palmately veined and lobed. Flowers solitary or few together, borne on stalks which are jointed beneath the ovary. Berry disarticulating from the stalk. — **CURRENT.**

1. **R. americanum** Mill. Shrub with grayish twigs: leaf-blades 2.5-7 cm. wide, finely pubescent, with 3-5 triangular or ovate lobes irregularly toothed: hypanthium usually pubescent in lines above the ovary: sepals oblong-ovate, 5-6 mm. long: petals oblong, $\frac{2}{3}$ as long as the sepals: stamens about as long as the petals: berries 6-10 mm. in diameter, black. — Common, on roadsides and in fence-rows and thickets. — Spr. — **WILD BLACK-CURRENT.**

2. **GROSSULARIA** Mill. Shrubs with irregular arching or recurved stems and branches, and with nodal spines. Leaf-blades palmately veined. Flowers in drooping racemes or panicles, borne on stalks which are jointed near the base. Berry not disarticulating from the stalk. — **GOOSEBERRY.**

1. *G. hirtella* (Michx.) Spach. Straggling shrub with pale twigs: leaf-blades 1-3 cm. in diameter, finely pubescent, the 3-5 lobes coarsely toothed: hypanthium glabrous: sepals oblong-ovate, 2.5-3.5 mm. long: petals cuneate, $\frac{3}{4}$ as long as the sepals: stamens much longer than the sepals: berries 8-10 mm. in diameter, black or purple.—M. Rather rare, in woods and thickets.—*Limestonecs.*—Spr.—SMOOTH-GOOSEBERRY.

FAMILY 8. **PLATANACEAE.** PLANE-TREE FAMILY.

Trees, with thin smooth bark. Leaves alternate: blades membranous-leathery, palmately lobed. Flowers monoecious, minute, inserted on globose receptacles, in dense pedunculate solitary, spicate, or racemose heads. Perianth obsolete. Staminate heads red: filaments nearly obsolete: anthers elongate, each surmounted by a dilated connective. Pistillate heads green: carpels 2-9, 1-celled, mingled with staminodia which are pilose at the apex, surrounded by long-jointed persistent hairs: style terminal, stigmatose to below the middle on the ventral suture. Fruit an elongate achene, surrounded by rigid hairs, with a thin leathery pericarp. crowded in dense globose heads.

1. PLATANUS [Tourn.] L. Trees, with smooth bark and stout irregular branches from which are suspended the usually numerous long-peduncled fruit-heads.—PLANE-TREE. SYCAMORE.

1. *P. occidentalis* L. Tree becoming 55 m. tall, the bark pale: leaf-blades 3-5-lobed, 10-20 cm. broad, permanently woolly on the veins beneath: fruiting heads subglobose, 2-4 cm. in diameter, drooping.—Common, in low places, usually near streams.—Spr.—BUTTON-WOOD. BUTTON-BALL.

FAMILY 9. **ROSACEAE.** ROSE FAMILY.

Herbs, shrubs, trees, or rarely vines. Leaves mostly alternate: blades simple or compound, often stipulate. Flowers perfect or rarely dioecious. Calyx of 5, or rarely 4-9, sepals borne on the edge of the hypanthium, sometimes accompanied by as many bractlets. Corolla of as many distinct petals as there are sepals, or wanting. Androecium of 1 or more series of stamens. Gynoecium of 1-many carpels. Ovary 1-celled or imperfectly 2-celled. Fruit mostly foliicles or drupelets, or achenes which are borne in the hypanthium or on the accrescent receptacle.

Fruit not enclosed in a depressed or hollow hypanthium.

Pistils few, rarely more than 5, maturing into 2-4-seeded foliicles.

Follicles opening along both sutures: seeds shining.

Follicles opening along one suture: seeds dull or granular.

Pistils alternating with the sepals: shrubs with simple leaf-blades.

Pistils opposite the sepals: herbs with 3-parted or 3-foliolate leaf-blades.

Pistils numerous or rarely few, maturing into achenes or 1-2-seeded drupelets.

Pistils ripening into drupelets crowded on a receptacle.

Receptacle flat: ovary pubescent above: drupelets

crowded with a hairy cushion.

Receptacle convex or conic: ovary glabrous: drupelets glabrous.

Pistils ripening into achenes.

Style deciduous.

Style basal.

Style lateral.

Receptacle pulpy, edible: petals white.

Receptacle neither pulpy nor edible: petals yellow.

1. OPULASTER.

2. SPIRAEA.

3. PORTERANTHUS.

4. RUBACER.

5. RUBUS.

6. DRYMOCALLIS.

7. FRAGARIA.

8. DUCHESNEA.

- Style terminal or nearly so.
 Pistils numerous: ovules pendulous: plants caulescent. 9. POTENTILLA.
 Pistils 2-6: ovules erect: plants acaulescent. 10. WALDSTEINIA.
 Style persistent on the achene.
 Pistils numerous.
 Head of achenes stipitate: sepals without bractlets. 11. STYLIPUS.
 Head of achenes sessile: sepals accompanied by bractlets. 12. GEUM.
 Pistils 5-15, at maturity resembling follicles, but indehiscent. 13. FILIPENDULA.
 Fruit consisting of several achenes enclosed in the persistent hypanthium.
 Achenes 1-4 within the dry hypanthium.
 Receptacle bearing hooked prickles: petals 5. 14. AGRIMONIA.
 Receptacle without prickles: petals wanting. 15. SANGUISORBA.
 Achenes numerous, within the fleshy hypanthium. 16. ROSA.

1. **OPULASTER** Medic. Shrubs. Leaf-blades palmately lobed. Flowers corymbose. Corolla white. Stamens numerous, without staminodia. Carpels 1-5, short-stipitate: styles filiform: stigmas depressed-capitate. Follicles inflated.

1. **O. opulifolia** (L.) Kuntze. Shrub 1-3 m. tall: leaf-blades 3-8 cm. long, acutely lobed: sepals ovate, 2.5-3.5 mm. long: follicles 8-10 mm. long, acute. — Common, in thickets near streams. — Spr. — NINEBARK.

2. **SPIRAEA** [Tourn.] L. Shrubs. Leaf-blades toothed or lobed. Flowers corymbose or paniculate. Corolla white, pink or rose. Stamens numerous, accompanied by lobe-like staminodia. Carpels usually 5, mostly stipitate: styles clavate: stigmas minute and oblique. Follicles not inflated. — SPIRAEA.

Inflorescence pyramidal: mature hypanthium campanulate or hemispheric.

Plant glabrous: follicles glabrous.

1. *S. latifolia*.

Plant pubescent: follicles tomentose.

2. *S. tomentosa*.

Inflorescence corymbose: mature hypanthium flat.

3. *S. japonica*.

1. **S. latifolia** (Ait.) Borkh. Plants 3-12 dm. tall: leaf-blades thinnish, glabrous or nearly so beneath: flowers slender-pedicelled: sepals not ciliate: petals white, 2-2.5 mm. wide: carpels and follicles glabrous, the latter 3-3.5 mm. long. — Common, in swamps and wet meadows. — Spr. and sum. — MEADOW-SWEET.

2. **S. tomentosa** L. Plants 3-15 dm. tall: leaf-blades thick, tomentose beneath: flowers stout-pedicelled: sepals ciliate: petals rose-colored, 1-1.5 mm. wide: carpels and follicles pubescent, the latter 2-2.5 mm. long. — S. Rare, in swamps. — *Schists*. — Sum. — HARDHACK. STEEPLE-BUSH.

3. **S. japonica** L. f. Plants 1-2 m. tall with finely pubescent twigs: leaf-blades oblong, elliptic, or oblong-lanceolate, 3-12 cm. long, acuminate, finely pubescent at least when young, irregularly serrate, cuneate at the base: corymbs many-flowered, round-topped: sepals deltoid, fully 1 mm. long, acute: petals pink or rose-colored, suborbicular, 1.5-2 mm. long, or rarely longer: follicles erect, about 3 mm. long, glabrous. — S. Rare, in thickets. Nat. of Japan. — Sum.

3. **PORTERANTHUS** Britton. Perennial herbs. Leaf-blades 3-parted or 3-foliolate. Flowers perfect few borne in open lax panicles. Sepals shorter than the hypanthium. Petals narrow, white or pink. Stamens numerous, in one row on the hypanthium: filaments very short. Carpels mostly 5: styles subulate. Follicles erect.

1. **P. trifoliatus** (L.) Britton. Plants 3-12 dm. tall: leaflets 3-9 cm. long; blades acuminate, sharply serrate, thin: sepals glandular-serrulate: petals

15-20 mm. long; foliicles 5-6 mm. long. — Susquehanna valley. Occasional, on wooded hillsides. — Sum. — INDIAN-PHYSIC. BOWMAN'S-ROOT.

4. **RUBACER** Rydb. Partly shrubby diffuse plants. Leaf-blades palmately lobed. Flowers corymbose or racemose. Carpels borne on a flat receptacle. Fruit depressed-hemispheric or nearly flat.

1. **R. odoratum** (L.) Rydb. Stems 1-2 m. tall, clammy-pubescent: leaf-blades 5-30 cm. wide, 3-5-lobed: sepals elongate, each with an ovate or oblong-ovate body and a slender appendage: petals rose-purple or rarely white, 1.5-2 cm. broad: fruits red, 15-20 mm. broad, insipid. — Occasional, on rocky banks in the Conestoga valley. — *Limestones*. — Sum. — FLOWERING-RASPBERRY.

5. **RUBUS** [Tourn.] L. Perennial erect or trailing herbs, or shrubs. Leaf-blades lobed or 3-7-foliolate. Flowers solitary or variously disposed. Carpels borne on a convex or conic receptacle. Fruit hemispheric to elongate. — Spr. — RASPBERRY. BLACKBERRY.

Fruit falling away from the dry receptacle: petals erect. (Raspberries).

Stems prickly, glabrous: fruit purple-black or black.

1. *R. occidentalis*.

Stems bristly, not glabrous: fruit red.

Sepals sparingly bristly with pale hairs: petals over half as long as the sepals: fruits wider than long: achenes narrow, much longer than wide.

2. *R. strigosus*.

Sepals copiously bristly with dark hairs: petals less than half as long as the sepals: fruits longer than wide: achenes broad, about as wide as long.

3. *R. phoenicolasius*.

Fruit persistent on a fleshy receptacle: petals spreading. (Blackberries).

Stems erect, ascending, or recurved.

Leaf-blades white-woolly beneath.

4. *R. cuneifolius*.

Leaf-blades not white-woolly beneath.

Branches of the inflorescence, and petioles, distinctly glandular-pubescent.

5. *R. nigrobaccus*.

Fruit broadly oval or nearly spherical, very juicy.

Fruit narrowly oblong or thimble-shaped, comparatively dry.

6. *R. allegheniensis*.

Branches of the inflorescence, and petioles, villous.

Stems strigose, or nearly glabrous, scarcely glandular.

7. *R. frondosus*.

Stems trailing, creeping, or decumbent.

Leaflets thin, membranous: leaves deciduous.

Stems merely prickly.

8. *R. procumbens*.

Inflorescence usually several-many-flowered.

Inflorescence usually 1-2-flowered.

9. *R. Bailyanus*.

Stems bristly and prickly, sometimes merely bristly.

10. *R. hispidus*.

Leaflets leathery: leaves persistent, evergreen.

1. **R. occidentalis** L. Straggling shrub, with glaucous prickly-armed branches 1-3 m. long: leaflets 3-5; blades ovate to obovate, 2-8 cm. long, acute or acuminate, incised-serrate, sometimes lobed: sepals oblong-ovate or ovate-lanceolate, 5-6 mm. long, acuminate: petals white, spatulate or cuneate-spatulate, 4-5 mm. long, obtuse: fruits hemispheric, black or purple-black, 8-12 mm. broad. — Common, on roadsides and in thickets and open woods. — BLACK-RASPBERRY. THIMBLEBERRY.

2. **R. strigosus** Michx. Branching shrub 1-2 m. tall, with more or less densely bristly foliage: leaflets 3-5; blades ovate to oblong-ovate or ovate-lanceolate, or rarely elliptic, 2-8 cm. long, acute or acuminate, slightly serrate, sometimes slightly lobed, glabrous above or nearly so, white-tomentose beneath: hypanthium bristly: sepals lanceolate, acuminate, 5-6 mm. long: petals white, cuneate or oblanceolate, about 5 mm. long, ascending, obtuse: fruits high-hemispheric, light-red, or rarely white, 8-10 mm. broad. — W. Rather rare, on the banks of the Susquehanna river. — *Sandstones and shales, limestones*. — RED-RASPBERRY.

3. **R. phoenicolasius** Maxim. Much-branched shrub, the stems 2-2.5 m. long, like the branches and petioles, with reddish or purplish gland-tipped bristly

hairs and scattered prickles: leaflets 3; blades broadly ovate or oval to sub-orbicular, 3-9 cm. long, acute or short-acuminate, crenate and usually shallowly lobed, green above, densely white-tomentulose beneath: hypanthium densely glandular-bristly: sepals linear-lanceolate, 12-16 mm. long, acuminate: petals white, rhombic-ovate or rhombic-obovate, 4-5 mm. long, erect: fruits ovoid, cherry-red, about 1 cm. broad. — Common, in thickets and fence-rows. Nat. of Japan. — Spr. — WINEBERRY.

4. *R. cuneifolius* Pursh. Much-branched shrub 0.5-1 m. tall: leaflets 3-5; blades leathery, acute or abruptly acuminate, glabrous or nearly so and rugose above, densely tomentose beneath, sharply serrate, that of the terminal one cuneate: hypanthium woolly: sepals ovate or oval, about 4 mm. long: petals white or pink, cuneate: fruits oblong, 1.5-2.5 cm. long, black or nearly so, sweet. — S. Not common, in dry soil. — *Schists, serpentine*. — SAND-BLACK-BERRY.

5. *R. nigrobaccus* Bailey. Straggling branched shrub with glandular-pilose young foliage, armed with recurved prickles, the stems 1-3 m. long: leaflets 3-5; blades thickish, ovate, oval, or obovate, 5-11 cm. long, acute or acuminate, coarsely and unequally serrate, softly pubescent, at least beneath: hypanthium glandular: sepals elliptic-lanceolate, 6-7 mm. long, acuminate: petals white or pink, 1-2 cm. long, obovate to suborbicular: fruits oval to globose-oval, 12-25 mm. long, black, juicy. — Common, in thickets and on banks.

6. *R. allegheniensis* Porter. Resembling *R. nigrobaccus*, but with more densely glandular foliage, the stems rather more slender, erect or spreading, 6-25 dm. long, copiously prickly, red or purple: leaflets 3-5; blades relatively narrow, ovate-lanceolate to ovate, elliptic, oblong, or oval: corolla 2.5-3 cm. broad: fruits cylindrical, 16-28 mm. long, much less juicy than that of related species, but of a peculiar spicy flavor. — W. Rather rare, on the rocky banks of the Susquehanna River.

7. *R. frondosus* Bigel. Erect or spreading shrub with closely pubescent foliage, armed with straight or slightly curved prickles, the stems 0.5-2 m. long. Leaflets 3 or rarely 5; blades elliptic to oval, varying to ovate or obovate, 1.5-6 cm. long, usually acute or acuminate, sharply but rather finely serrate and incised: flowers in terminal leafy-bracted racemes: petals white or pinkish, obovate to oblong-cuneate, 1-1.5 cm. long: fruits oblong-cylindric, 1-1.5 cm. long, fleshy. — Susquehanna valley. Occasional, on shaded banks.

8. *R. procumbens* Muhl. Trailing shrub with prickly-armed or nearly naked stems 1-3 m. long, the foliage thinly pubescent, the branches erect or ascending, 1-3 dm. tall: leaflets 3-7; blades elliptic-oval, suborbicular, or sometimes ovate or cuneate, 2-8 cm. long, sharply dentate-serrate and often incised, usually acute or acuminate: flowers solitary or few in loose racemes: petals white or pink, obovate or cuneate, fully 10 mm. long, rounded or retuse at the apex: fruits subglobose to oval, 2-2.5 cm. long, black, very sweet and juicy. — Common, in old fields and on open hillsides.

9. *R. Baileyanus* Britton. Prickle-armed shrub with ascending or trailing stems 3-15 dm. long, the foliage more or less pubescent or glabrate in age: leaflets 3, or sometimes solitary; blades of the leaflets elliptic to suborbicular varying to ovate or obovate, often acute or acuminate, sharply serrate or incised, commonly rounded or cordate at the base: petals white or pink, cuneate or obovate-cuneate, 1.5-2 cm. long: fruits subglobose, or oval, 1-1.5 cm. long, rather dry, black. — Occasional, in dry woods or thickets.

10. *R. hispidus* L. Slender bristly or prickly shrub with trailing stems, the branches erect or ascending, 1-3 dm. tall: leaflets mostly 3; blades rather leathery, 1-4 cm. long, usually obtuse at the apex, unequally serrate, the terminal one narrowly or broadly cuneate, the lateral ones oval or suborbicular, varying to ovate or obovate: petals white or pinkish, spatulate to cuneate-

obovate, 5-8 mm. long; fruits of few drupelets, about 1 cm. in diameter, black, sour. — Frequent, in sphagnum swamps.

6. DRYMOCALLIS Fourr. Herbs with erect stems. Leaf-blades pinnately several-foliolate, the leaflets toothed. Petals yellow or white, rounded. Stamens in 5 clusters. Carpel-body ovoid: style fusiform, basal. Achenes glabrous.

1. D. agrimonioides (Pursh) Rydb. Stems 3-10 dm. tall, glandular, villous: leaflets 1-6 cm. long; blades sharply incised-serrate: cymes dense: sepals ovate: petals white: achenes about 3 mm. long. — Lower Susquehanna valley. Rare, on dry river banks near Safe Harbor. — *Schists.* — Sum.

7. FRAGARIA [Tourn.] L. Acaulescent erect and often stoloniferous herbs. Leaf-blades pinnately 3-foliolate. Scapes several-flowered. Bractlets smaller than the sepals, entire. Petals surpassing the bractlets. — Spr. — STRAWBERRY.

Achenes borne on the surface of the accrescent receptacle: leaflets sessile or essentially so.

Leaflets thickish: fruit mainly less than 15 mm. long: plants stout: naturalized species. 1. *F. vesca*.

Leaflets thin: fruit mainly over 15 mm. long: plants slender: native species. 2. *F. americana*.

Achenes borne in pits in the accrescent receptacle: leaflets stalked. 3. *F. virginiana*.

1. F. vesca L. Rootstocks rather stout: blades of the leaflets thinnish, rhombic-obovate, mostly rounded at the apex, but often acutish, 2-10 cm. long: scape usually 1-2 dm. tall, villous: pedicels appressed-pubescent: sepals ovate to lanceolate: corolla 1-1.5 cm. wide: fruits subglobose, 1-1.5 cm. in diameter, red or whitish. — Not common, on roadsides. Nat. of Eu. — EUROPEAN WOOD-STRAWBERRY.

2. F. americana (Porter) Britton. Rootstock slender: blades of the leaflets thin, rhombic-obovate, mostly acute, 3-8 cm. long: scape 1.5 dm. tall or less, villous: pedicels somewhat appressed-pubescent: flowers similar to those of *F. vesca*, but smaller: fruits conic-ovoid, 5-7.5 mm. long, red. — N. M. Rather rare, on cliffs, hillsides and roadsides. — *Sandstones and shales, limestones.* — AMERICAN WOOD-STRAWBERRY.

3. F. virginiana Duchesne. Rootstocks stout: blades of the leaflets thick, obtuse, 3-10 cm. long: scapes 1.5-5 dm. tall: corollas mostly over 15 mm. wide: fruits hemispheric. — Common, in fields and on roadsides. — SCARLET-STRAWBERRY.

8. DUCHESNEA J. E. Smith. Caulescent creeping herbs. Leaf-blades pinnately 3-foliolate. Peduncles 1-flowered. Bractlets larger than the sepals, toothed. Petals surpassed by the bractlets.

1. D. indica (Andr.) Focke. Stem or branches elongate: leaflets ovate to obovate: sepals 6-8 mm. long: petals obovate: fruits ovoid or subglobose, 8-10 mm. in diameter: achenes red. — Not common, in fields and on roadsides. Nat. of As. — Spr. and sum. — YELLOW-STRAWBERRY. INDIAN-STRAWBERRY.

9. POTENTILLA L. Herbs or partially woody plants. Leaf-blades pinnately or digitately foliolate. Flowers in corymbose cymes or solitary. Petals white, yellow, red, or purple, notched. Receptacle hemispheric or conic. Carpels and achenes ovoid. — CINQUEFOIL. FIVE-FINGER.

Flowers axillary to the leaf-like bracts: stems ultimately creeping or spreading: perennials.

Stems silky-villous: first flowers at the second node of the stem or a succeeding node. 1. *P. canadensis*.

- Stems silky-strigillose: first flower at the first node of the stem.
 Flowers in terminal cymes: stems erect or ascending: annuals or biennials.
 Leaflets 3: upper part of the achene ribbed lengthwise.
 Leaflets 5-7: upper part of the achene smooth or reticulate.

2. *P. pumila*.3. *P. monspeliensis*.4. *P. sulphurea*.

1. *P. canadensis* L. Stem branched at the base, the branches decumbent or prostrate, 3-6 dm. long (the larger form with more appressed pubescence and larger leaflets is *P. canadensis simplex*): leaflets 5; blades obovate to cuneate-oblong, 2-4 cm. long: corolla 10-12 mm. wide, the petals about $\frac{1}{3}$ longer than the sepals. — Common, in dry fields and on roadsides. Spr. and sum.

2. *P. pumila* Poir. Stems at first erect and less than 1.5 dm. tall: leaflets 5; blades obovate, about 2 cm. long: corollas 6-10 mm. wide, the petals but little surpassing the sepals. — Common, in old fields and on rocky hillsides. — Spr. and sum.

3. *P. monspeliensis* L. Stems 3-11 dm. tall, hirsute (with fine pubescence and oblong leaflet-blades in *P. monspeliensis norvegica*): leaflets 3-5; blades obovate, serrate: sepals oblong-lanceolate: petals obovate. — Common, in fields and waste places, and on roadsides. — Spr. and sum.

4. *P. sulphurea* Lam. Stems 4-7 dm. tall, finely pubescent and with some longer hairs: leaflets mostly 5-7; blades coarsely toothed: sepals lanceolate: petals obovate, longer than the sepals. — S. Not common, in fields. Nat. of Eu. — Sum.

10. **WALDSTEINIA** Willd. Acaulescent herbs. Leaf-blades lobed or divided. Flowers in corymbose cymes. Petals yellow, rounded. Receptacle minute. Carpels and achenes obovoid.

1. *W. fragarioides* (Michx.) Tratt. Plants 0.5-3 dm. tall: leaf-blades 3-foliolate; leaflets 2-4 cm. long, the blades cuneate to obovate, crenate-lobed or incised; petals 8-10 mm. long, twice as long as the sepals: styles glabrous. — N. Rare, in damp woods. — *Sandstones and shales*. — Spr. — **BARREN-STRAWBERRY**.

11. **STYLIPUS** Raf. Perennial herbs resembling *Geum* in habit: but calyx not accompanied by a series of bractlets. Styles elongate and tapering, bent near the apex. Head of carpels, or achenes, stipitate.

1. *S. vernus* Raf. Stem and branches often decumbent: blades of the lower leaves both lobed and pinnate: sepals about 2 mm. long: petals shorter than the sepals: heads of achenes 7-9 mm. in diameter: achene-body 3 mm. long. — M. Rare, in thickets. Nat. of the Central States. — Spr.

12. **GEUM** L. Herbs. Leaf-blades mostly 3-foliolate or pinnately divided. Flowers solitary or in open cymes. Petals rounded or retuse. Receptacle sessile. Carpels numerous: style jointed, elongate. Head of carpels, or achenes, sessile. — Spr. and sum. — **AVENS**.

Corolla white, pale-yellow or cream-yellow; petals spatulate, cuneate or oblong.

Corolla white: stipules entire or nearly so.

Receptacle bristly: stem and branches glabrous or softly pilose.

Receptacle glabrous: stem and branches hirsute.

Corolla pale-yellow or cream-yellow: stipules much cleft.

Corolla deep-yellow; petals broadly obovate to suborbicular.

1. *G. canadense*.2. *G. virginianum*.3. *G. flatum*.4. *G. strictum*.

1. *G. canadense* Jacq. Stems 3-9 dm. tall: blades of the lower leaves 3-divided or pinnate: sepals about thrice as long as the bractlets: hypanthium glabrous or finely canescent: heads of achenes 8-11 mm. long: achene-body 2.5-3 mm. long. — Common, in thickets and open woods.

2. *G. virginianum* L. Similar to *G. canadense* in habit, but stouter, and petals rather smaller: hypanthium hirsute: heads of achenes 12-16 mm. long: achene-body 2.5-3 mm. long. — Rather rare, in damp thickets.

3. *G. flavum* (Porter) Bicknell. Stems 3-15 dm. tall, hirsute below: blades of the lower leaves usually pinnately divided: sepals about twice as long as the bractlets: achene-body about 3 mm. long. — Common, in thickets and open woods.

4. *G. strictum* Ait. Stems 5-16 dm. tall: blades of the lower leaves pinnately parted, sometimes lyrate, the divisions incised or pinnatifid: sepals triangular to lanceolate, fully twice as long as the narrow bractlets: hypanthium finely pubescent: petals broadly obovate or suborbicular, somewhat longer than the sepals: heads of achenes 1.5-2 cm. long: achene-body 3-3.5 mm. long. — N. Rare, in woods. — *Sandstones and shales.*

13. **FILIPENDULA** [Tourn.] Hill. Perennial caulescent herbs. Leaf-blades pinnate. Flowers numerous, borne in corymbose cymes. Sepals entire. Petals broad, white, pink, or purple. Carpels 5-15: style short: stigma capitate. Achene capsule-like.

1. *F. rubra* (Hill) B. L. Robinson. Plants 5-24 dm. tall: lower leaves 3-9 dm. tall; blades of the leaflets palmately 3-5-lobed: sepals almost half-orbicular: petals 2-3 mm. long, pink or purple; the blades suborbicular: fruits 6-7 mm. long, clavate. — S. Rather rare, in swamps. — *Schists.* — Sum. — QUEEN-OF-THE-PRAIRIE.

14. **AGRIMONIA** [Tourn.] L. Perennial, often glandular, caulescent herbs. Leaf-blades unequally and interruptedly pinnate. Flowers small, in virgate interrupted racemes. Hypanthium fluted, armed with hooked bristles. Sepals green, persistent. Petals yellow. Stamens 5-15. Filaments subulate. Style terminal. — AGRIMONY.

Lower surface of the leaves, and racemes, softly and closely pubescent.

Roots not tuberous-thickened: leaflets glandular-dotted beneath.

Fruits with spreading bristles: leaflets mostly 11-17.

Fruits with converging bristles: leaflets mostly 7-9.

Roots tuberous-thickened: leaflets not glandular-dotted beneath.

Leaflets 3-5; blade of the terminal one obovate or cuneate.

Leaflets 5-9 or rarely more; blade of the terminal one oblong to elliptic.

Lower surface of the leaves, and racemes, glabrous or with loosely spreading hairs.

Roots tuberous-thickened: fruits 2.5-3.5 mm. high, hemispheric, with few ascending bristles.

Roots not tuberous-thickened: fruits 6-12 mm. high, turbinate, with many radiating bristles.

1. *A. parviflora*.

2. *A. striata*.

3. *A. pumila*.

4. *A. mollis*.

5. *A. rostellata*.

6. *A. gryposepala*.

1. *A. parviflora* Soland. Stems shaggy-pubescent, at least below: lower leaves with 11-27 primary leaflets: sepals over 1.5 mm. long, abruptly pointed: petals 2.5-3 mm. long: mature hypanthium short-turbinate or somewhat dilated. — Common, in thickets and damp meadows. — Spr. and sum.

2. *A. striata* Michx. Stems soft-hirsute: lower leaves with 7-9 primary leaflets: sepals fully 1.5 mm. long, acute: petals 3-4 mm. long: mature hypanthium long-turbinate. — S. Not common, in thickets. — *Schists.* — Sum.

3. *A. pumila* Muhl. Stems with spreading hairs: lower leaves with 3-5 primary leaflets, the terminal one obovate to cuneate: sepals mostly obtuse: petals mostly 2.5-3 mm. long: mature hypanthium-body 4-5 mm. wide. — S. Rare, on shaded banks. — *Schists.* — Sum.

4. *A. mollis* (T. & G.) Britton. Stems loosely tomentose and somewhat vilous: lower leaves with 5-9 primary leaflets, the terminal one oblong to

elliptic: sepals mostly acute: petals mostly 2-2.5 mm. long: mature hypanthium-body about 3 mm. wide. — Occasional, in woods and on dry banks. — Sum.

5. *A. rostellata* Wallr. Stems nearly glabrous or sparingly loose-pubescent: lower leaves with 3-9, usually 5, primary leaflets: sepals acute or obtuse: corolla 4-6 mm. wide: mature hypanthium turbinate, 2.5-3 mm. long. — S. Rather common, in low thickets and fence rows. — *Schists*. — Sum.

6. *A. gryposepala* Wallr. Stems with spreading hairs: lower leaves with 5-9, usually 7, primary leaflets: sepals acuminate: corolla 8-12 mm. wide: mature hypanthium broadly turbinate, 5-6 mm. long. — Common, in thickets. — Sum.

15. **SANGUISORBA** [Rupp.] L. Perennial, or rarely annual, caulescent herbs. Leaf-blades unequally pinnate. Flowers in dense heads or spikes. Hypanthium angled, unarmed. Sepals petal-like, deciduous. Petals wanting. Filaments mostly clavate.

1. *S. canadensis* L. Plants 3-4 dm. tall: leaflets 7-15; blades oblong, ovate-oblong, or oblong-lanceolate, 1.5-8 cm. long, serrate: spikes 3-15 cm. long: sepals oval or oval-ovate, varying to oblong or euneate, about 2 mm. long, mucronate: achenes about 3 mm. long. — Not very common, in swamps. — Sum. — BURNET.

16. **ROSA** [Tourn.] L. Prickly shrubs, sometimes vine-like. Leaf-blades unequally pinnate. Flowers solitary or in corymbs, often showy. Hypanthium ureceolate. Sepals more or less foliaceous. Petals 5, broad. Stamens many. Fruits enclosed in the pulpy hypanthium. — Sum. — ROSE.

Sepals persistent and erect: stems and branches unarmed or nearly so, except the bristly shoots.

Sepals deciduous, or if persistent, spreading or recurved: stem and branches prickle-armed.

Achenes borne only on the bottom of the hypanthium: shoots bristly: prickles infrastipular.

Bases of the leaflets serrulate: prickles short and curved.

Blades of the leaflets serrate, often coarsely so: prickles straight, or if curved, elongate.

Flowers solitary or nearly so: leaflets 5-7: spines slender, straight.

Flowers corymbose: leaflets 7-9: spines stout, often curved.

Achenes borne on the sides and on the bottom of the hypanthium: shoots prickly: spines scattered.

Styles pubescent: fruits globular to oval.

Styles glabrous: fruits ovoid to flask-shaped.

1. *R. Solanderi*.

2. *R. palustris*.

3. *R. Carolina*.

4. *R. virginiana*.

5. *R. rubiginosa*.

6. *R. micrantha*.

1. *R. Solanderi* Tratt. Bushy shrub 1.5 m. tall or less, the prickles wanting or few and small: leaflets 5-7; blades thickish, oblong to oblong-lanceolate or broadest above the middle, mostly 2-3 cm. long, serrate, often slightly pubescent beneath: flowers in corymbs, or solitary: hypanthium glaucous, sometimes slightly bristly: sepals narrowly lanceolate, more or less dilated at the apex, hispid, persistent: fruits depressed, 1-2 cm. in diameter, red. [*R. blanda* Lindl. Not Ait.] — Susquehanna valley. Rare, in moist places.

2. *R. palustris* Marsh. Bushy shrub 1-3 m. tall, the prickles stout, recurved: leaflets 5-9, commonly 7; blades membranous, elliptic to elliptic-obovate or oblanceolate, 2.5-7 cm. long, acute or obtuse at the apex, serrulate, glabrous, or pubescent beneath: flowers in terminal corymbs or rarely solitary: hypanthium glandular: sepals lanceolate or linear-lanceolate, acuminate, often dilated at the apex, rarely lobed, spreading or reflexed at maturity, deciduous: fruits subglobose or depressed, 7-9 mm. in diameter, red, more or less glandular. [*R. Carolina* L. 2 ed. Sp. Pl.] — Common, in low thickets and swamps.

3. *R. Carolina* L. Bushy shrub 2-24 dm. tall, the prickles straight: leaflets 5-7, usually 5; blades rather leathery, elliptic, oval, or ovate-lanceolate, or

sometimes cuneate, 1.5-5 cm. long, acute or rarely rounded at the apex, serrate, sometimes pubescent beneath: flowers solitary, or few in corymbs: hypanthium more or less densely glandular-pubescent: sepals lanceolate, acuminate, dilated or lobed above, spreading, deciduous: corolla 4-6 cm. broad: fruits subglobose or depressed, 12-15 mm. in diameter, red. [*R. humilis* Marsh.]—Common, in fields and thickets.

4. *R. virginiana* Mill. Bushy shrub 2 m. tall, the prickles curved: leaflets 7-9, mostly 7; blades thick, oblong, elliptic, or oval, varying to ovate or obovate, mostly 2-4 cm. long, serrate, smooth and often shining above, glabrous or nearly so beneath: flowers typically corymbose: hypanthium usually bristly: sepals lanceolate, often slightly dilated at the apex, spreading, deciduous: corolla 4-6 cm. broad: fruits subglobose or obovoid, 1-1.5 cm. in diameter, red. [*R. lucida* Ehrh.]—Occasional, in low grounds.

5. *R. rubiginosa* L. Straggling aromatic shrub, the prickles recurved: leaflets 5-7; blades broad, oval, or suborbicular, sometimes varying to ovate or obovate, 1.5-3 cm. long, acute or obtuse at both ends, sharply serrate, resinous beneath: flowers solitary, or few in corymbs: hypanthium glabrous or bristly: sepals lanceolate, with an acuminate pinnatifid apex: corolla white or pink: fruits broad, oval to globular, 1-2 cm. long, deep-red, shining.—Rather common, in waste places and woods. Nat. of Eu.—SWEETBRIER. EGLANTINE.

6. *R. micrantha* J. E. Sm. Plants similar to *R. rubiginosa* in habit, but smaller in all the parts: leaflets less glandular; blades relatively narrower, often elliptic and more pointed: corollas small, 2.5 cm. wide or less, pale: fruits ovoid to flask-shaped, often bright-red.—Occasional in woods and thickets. Nat. of Eu.—SWEETBRIER.

FAMILY 10. MALACEAE. APPLE FAMILY.

Trees or shrubs. Leaves alternate: blades simple and pinnately veined or pinnately compound. Flowers perfect, regular. Hypanthium adnate to the ovary. Calyx of mostly 5 sepals. Corolla of mostly 5 petals. Androecium of numerous, or rarely few, stamens. Gynoecium of 2-5 wholly or partially united carpels, or rarely of 1 carpel. Fruit a more or less fleshy pome, being the thickened hypanthium enclosing the carpels.

Carpels papery or leathery at maturity.

Cavities of the ovary (carpels) as many as the styles.

Cymes simple: pomes relatively large.

Pomes elongate, broadened upward: flesh with grit-cells: hypanthium-orifice nearly closed by a disk.

Pomes depressed, not dilated upward; flesh without grit-cells: hypanthium-orifice open.

Cymes compound: pomes small, berry-like.

Cavities of the ovary becoming twice as many as the styles.

Carpels bony at maturity.

1. PYRUS.

2. MALUS.

3. ARONIA.

4. AMELANCHIER.

5. CRATAEGUS.

1. **PYRUS** [Tourn.] L. Leaf-blades simple, usually toothed. Cymes simple. Pome usually tapering to the base.—PEAR.

1. **P. communis** L. Tree, usually thorny: leaf-blades ovate, elliptic, or obovate, slender-petioled, 3-8 cm. long, glabrous or nearly so in age, acute or acuminate, the base usually rounded: cymes few-several-flowered: pedicels 1.8-5 cm. long: sepals about as long as the hypanthium: corolla white, about 2.5 cm. broad: pome, in the wild form, seldom over 5 cm. long, in the numerous cultivated forms often much larger.—Common, in woods and thickets, and on roadsides. Nat. of the Old World.—Spr.—COMMON-PEAR.

2. **MALUS** L. Leaf-blades simple, toothed or lobed. Cymes simple. Pome depressed at both ends.—Spr.—APPLE.

Leaf-blades glabrous, at least at maturity: sepals glabrous or nearly so without.

Leaf-blades persistently pubescent, often tomentose beneath: sepals pubescent without.

1. *M. glaucescens*.

2. *M. Malus*.

1. *M. glaucescens* Rehder. Small tree: leaf-blades sparingly pubescent beneath along the veins when young, glabrous when old, sharply serrate and often somewhat lobed, rounded or cordate at the base, 2.5–7.5 cm. long: flowers very fragrant: pedicels slender, glabrous: corolla rose-colored, 2.5–5 cm. broad: pome subglobose or depressed, 3–3.5 cm. in diameter, greenish-yellow, fragrant, very acid. — Rather rare, in thickets. — CRAB-APPLE.

2. *M. Malus* (L.) Britton. Tree with spreading branches: leaf-blades broadly ovate or oval, obtuse or abruptly pointed 2.5–7.5 cm. long, dentate or nearly entire, often woolly beneath, especially when young: pedicels generally tomentose, stout: corolla pink or white, 3.5–7.5 cm. broad: pome depressed-globose (or elongate in cultivated forms), 5–7.5 cm. in diameter. — Common, in woods and thickets, and on roadsides. — COMMON-APPLE.

3. *ARONIA* Pers. Leaf-blades simple, shallowly toothed. Cymes compound. Pome berry-like, globular to pyriform. — Spr. — CHOKEBERRY.

Cyme-branches and lower surfaces of the leaf-blades woolly: pomes red.

Cyme-branches and lower surfaces of the leaf-blades glabrous:

1. *A. arbutifolia*.

pomes black or dark-purple.

2. *A. melanocarpa*.

1. *A. arbutifolia* (L. f.) Ell. Shrub, sometimes reaching a height of 3.5 m.: leaf-blades oval, oblong, or obovate, obtuse or abruptly short-pointed, narrowed or somewhat cuneate at the base, 2.5–7.5 cm. long, serrulate-crenulate: cymes terminal, but at length overtopped by the young sterile shoots: corolla white or purplish-tinged, 8–12 mm. broad: pomes 4–6 mm. in diameter, long-persistent. — Common, in swamps and low woods.

2. *A. melanocarpa* (Michx.) Ell. Shrub resembling the preceding species, but larger, or sometimes a small tree: leaf-blades obovate or oval, obtuse, acute, or abruptly acuminate at the apex, narrowed or cuneate at the base, crenulate: flowers similar to those of the preceding species: hypanthium and pedicels nearly glabrous: pomes globose or oval, 6–8 mm. in diameter. — Common, in wet grounds and swamps.

4. *AMELANCHIER* Medic. Leaf-blades simple, toothed or rarely entire. Cymes simple. Pome berry-like, globular. — Spr. — JUNE-BERRY. SERVICE-BERRY. MAY-CHERRY.

Petals elongate (10–18 mm.): leaf-blades glabrous or nearly so: lower pedicels mostly 1.5–3 cm. long, becoming 3–5 cm. long at maturity.

1. *A. laevis*.

Petals short (7–9 mm.): leaf-blades densely white-tomentose when young, less densely pubescent in age: lower pedicels 1–2 cm. long or less, becoming 1–2 cm. long at maturity.

Leaf-blades with 8–9 pairs (average) of lateral veins: hypanthium saucer-shaped: ovary woolly on top: sepals recurved when the petals fall.

2. *A. stolonifera*.

Leaf-blades with 11–15 pairs (average) of lateral veins: hypanthium campanulate: ovary mostly glabrous on top: sepals erect when the petals fall.

3. *A. oblongifolia*.

1. *A. laevis* Wiegand. Tree becoming 13 m. tall, or sometimes a shrub: leaf-blades ovate, oval, or elliptic, 4–6 cm. long, short-acuminate at the apex, sharply serrate, mostly rounded or subcordate at the base, slender-petioled: hypanthium campanulate: sepals triangular-lanceolate or subulate, 3–4 mm. long, reflexed at the base when the petals fall: petals oblong-linear: ovary glabrous on top: pomes purple or nearly black beneath the bloom, 6–8 mm. in diameter. [*A. canadensis* of various authors.] — Common in woods and on damp slopes.

2. *A. stolonifera* Wiegand. Shrub mostly 1 m. tall or less, often growing in patches: leaf-blades oval, varying sometimes to oval or suborbicular, 2.5-5 cm. long, rounded or acutish at the apex, finely serrate, rounded or rarely subcordate at the base, slender-petioled: hypanthium saucer-shaped: sepals triangular-lanceolate, 2.5-3 mm. long, recurved from the middle when the petals fall: petals oblong-ovate: ovary woolly on top: pomes purplish-black beneath the bloom, 6-7 mm. in diameter. [*A. spicata* of various authors.]—S. Lower Susquehanna valley. Rare, on rocks or dry banks.—*Schists*.

3. *A. oblongifolia* (T. & G.) Roemer. Shrub 8 m. tall or less, often growing in clumps: leaf-blades oblong, elliptic-oblong or narrowly obovate-oblong, 3-5.5 cm. long, rounded or acutish at the apex, very finely serrate, rounded or rarely subcordate at the base; rather slender-petioled: hypanthium campanulate: sepals triangular, 1.5-2.5 mm. long, erect or irregularly spreading: petals oblong-ovate to oblanceolate or linear: ovary mostly glabrous on top: pomes nearly black beneath the bloom, 5-7 mm. in diameter. [*A. Botryapium* of various authors.]—S. Occasional, in low or rocky woods.—*Schists*.

5. **CRATAEGUS** L. Small trees or shrubs, usually armed with thorns or spines. Leaves alternate: blades simple, petioled. Flowers terminal, cymose or corymbose. Hypanthium cup-shaped or campanulate, adnate to the carpels. Sepals 5, reflexed after anthesis. Corolla white or pink. Petals 5, spreading, rounded, inserted on the margin of the disk in the throat of the hypanthium. Stamens 5-25, inserted in 1-3 rows on the edge of the hypanthium: filaments slender, incurved: anthers oblong or suborbicular, white, yellow, pink, or purple. Ovary inferior, or its summit free, composed of 1-5 carpels: styles 1-5, not united, persistent: stigmas terminal. Pome globose, pyriform, or oval, yellow, orange-red, blue, or black, containing 1-5 bony carpels, each usually 1-seeded. Seed erect, the testa membranous.—Spr.—HAW. WHITE-THORN. HAWTHORN.

Leaf-blades deeply lobed: sepals obtuse.

1. *C. Oxyacantha*.

Leaf-blades toothed and often also shallowly lobed: sepals acute or acuminate.

Sepals entire.

Sepals short: leaf-blades of a deltoid type: pomes less than 7 mm. thick.

2. *C. Phacnopyrum*.

Sepals long: leaf-blades not of a deltoid type: pomes over 7 mm. thick.

3. *C. Crus-galli*.

Sepals toothed.

Flowers few in each corymb.

Sepals shallowly toothed, not foliaceous: stamens about 10.

4. *C. coccinea*.

Sepals lacinate-toothed, foliaceous: stamens typically 20.

5. *C. tomentosa*.

Flowers many in each corymb.

Corolla about 2 cm. wide: anthers yellow: pomes red.

6. *C. rotundifolia*.

Corolla about 1.5 cm. wide: anthers red: pomes crimson.

7. *C. Holmsiana*.

1. **C. Oxyacantha** L. Tree sometimes 9 m. tall, or a shrub, the thorns short: leaf-blades ovate in outline, 1-4 cm. long, serrate and 3-15-lobed, acute, deep-green and ultimately glabrous above, paler and persistently pubescent beneath, cuneate to truncate at the base: corymbs many-flowered, the branches glabrous: sepals deltoid, 1-1.5 mm. long, entire, obtuse: corolla 13-16 mm. wide: stamens about 20; anthers pink: pomes globose or subglobose, 6-8 mm. thick, red.—Occasional, in thickets and on roadsides. Nat. of Eu.—ENGLISH-HAWTHORN.

2. **C. Phacnopyrum** (L. f.) Medic. Tree sometimes 10 m. tall, or more often a shrub with nearly erect and spreading branches, the thorns rather long: leaf-blades of a deltoid type, broadly ovate or ovate-triangular, 2-8 cm. long, acute, serrate and incised or 3-7-lobed, glabrous, truncate or cordate at the

base: corymbs many-flowered, the branches glabrous: sepals short-triangular or deltoid, entire, ciliate: corolla about 1 cm. wide: stamens about 20; anthers pink: pomes spheroidal, 4-6 mm. thick, bright-red or scarlet; nutlets 3-4 mm. long. [*C. cordata* Ait.]—Occasional, on roadsides and in thickets. Escaped from gardens and hedges. Nat. southward.—WASHINGTON-THORN.

3. *C. Crus-galli* L. Tree sometimes 9 m. tall, the thorns long, sometimes branched: leaf-blades obovate or oblanceolate, 2-5 cm. long, or longer and broader on shoots, obtuse or acute, glabrous, sharply serrate above the middle, cuneate at the base: corymbs many-flowered, the branches glabrous: sepals linear-lanceolate, 3.5-5 mm. long, entire: corolla 12-14 mm. wide: stamens about 10; anthers rose-colored or purplish: pomes oval or oblong, 8-13 mm. thick, dull-red at maturity: nutlets 8-9 mm. long.—Frequent, in thickets and woods.—COCKSPUR-THORN.

4. *C. coccinea* L. Tree usually less than 9 m. tall, or an irregular shrub, the thorns few, straight or nearly so: leaf-blades ovate, 2-7.5 cm. long, acute, serrate and shallowly mostly 5-9-lobed, often becoming rough, broadly cuneate to truncate at the base: corymbs few-flowered, the branches pubescent: sepals lanceolate, 4.5-5.5 mm. long, toothed near the apex: corolla about 2.5 cm. wide: stamens about 10; anthers light-yellow: pomes subglobose or oval, 8-10 mm. thick, reddish-brown at maturity; nutlets mostly 5-7 mm. long.—Frequent, in woods and thickets.—SCARLET-THORN.

5. *C. tomentosa* L. Tree 7 m. tall or less, or a shrub, the thorns straight: leaf-blades oval, obovate, or spatulate, or sometimes ovate, 2-5 cm. long, or longer on shoots, acute, obtuse, or rounded at the apex, serrate or serrate-dentate, sometimes also incised, permanently pubescent beneath, usually cuneate at the base: corymbs few-flowered, the branches pubescent: sepals lanceolate or linear-lanceolate, 3-4 mm. long, laciniate-toothed: corolla 10-14 mm. wide: stamens typically 20; anthers purplish: pomes subglobose, varying to oval or pyriform, 10-15 mm. thick, dull-red, or sometimes yellow-green; nutlets mostly 7-8 mm. long.—Occasional, in open woods.

6. *C. rotundifolia* Moench. Tree sometimes 9 m. tall, or a round-topped shrub, the thorns numerous, curved: leaf-blades thick, broadly ovate or orbicular-ovate, or sometimes obovate, 2.5-6 cm. long, acute, serrate and shallowly 7-9-lobed, glabrous, mostly broadly cuneate at the base: corymbs many-flowered, the branches glabrous or sparingly pubescent: sepals lanceolate, glandular-serrate, 2.5-3 mm. long: corolla about 2 cm. wide: stamens 5-10; anthers usually yellow: pomes subglobose, 9-12 mm. thick, red; nutlets 6-7 mm. long.—N. Frequent, in open wood and thickets.—*Sandstones and shales.*

7. *C. Holmesiana* Ashe. Tree mostly less than 8 m. tall, or a round-topped shrub, the thorns rather numerous, curved: leaf-blades thin, ovate or elliptic-ovate, 2.5-9 cm. long, acute or acuminate, serrate and 9-13-lobed, permanently pubescent beneath, abruptly narrowed at the base: corymbs many-flowered, the branches pubescent, or sometimes nearly glabrous: sepals lanceolate, 5-6 mm. long, glandular-serrate: corolla about 1.5 cm. wide: stamens 5-10; anthers red: pomes pyriform or nearly oval, 11-13 mm. thick, crimson; nutlets 7-9 mm. long. [*C. tenuifolia* Britton.]—S. Occasional, on hillsides and roadsides.—*Schists.*

FAMILY 11. AMYGDALACEAE. PLUM FAMILY.

Shrubs or trees, commonly with prussic acid in the tissues. Leaves alternate, with free, often early deciduous, stipules: blades simple, mostly toothed. Flowers perfect, in corymbs, cymes, racemes, or panicles, sometimes clustered. Calyx of 5 sepals, borne on the edge of the hypanthium, deciduous. Corolla of 5 petals. Androecium of many stamens. Gynoe-

cium of a single carpel, or rarely of 2 or 3 carpels. Ovary 1-celled: style entire. Fruit a drupe.

- Flowers sessile or nearly so: ovary, and drupe, pubescent; stone coarsely wrinkled and pitted. 1. AMYGDALUS.
 Flowers manifestly pedicelled: ovary, and drupe, glabrous; stone neither wrinkled nor pitted.
 Flowers in corymbs or clusters from the branches of the preceding year, before the leaves. 2. PRUNUS.
 Flowers in racemes terminating branches of the year, after the leaves. 3. PADUS.

1. **AMYGDALUS** L. Shrubs or trees. Leaves very strongly impregnated with prussic acid. Flowers sessile or short-pedicelled. Corolla mostly pink. Drupe velvety-pubescent, the stone wrinkled and pitted.—PEACH.

1. **A. Persica** L. Tree: leaf-blades narrowly elliptic to lanceolate, or rarely oblong-obovate, shining, sharply serrate: petals pink, 8–20 mm. long; drupes subglobose or oblong, 4–10 cm. long, grooved on one side, velvety.—Common, on roadsides and in woods and thickets.—Nat. of Old World.—Spr.—COMMON-PEACH.

2. **PRUNUS** [Tourn.] L. Shrubs or trees. Leaves sometimes slightly impregnated with prussic acid. Flowers in corymbs or umbel-like clusters, relatively long-pedicelled. Corolla mostly white. Drupes usually glabrous and glaucous, the stone smooth or nearly so.—Spr.—PLUM. CHERRY.

Leaves conduplicate in vernation.

Flowers small; corolla less than 13 mm. wide.

Leaf-blades narrow, cuneate or narrowed at the base, the coarse teeth not glandular in the sinuses.

Leaf-blades of an oblong-spathulate type: inflorescence umbel-like: shrub. 1. *P. cuneata*.

Leaf-blades of an oblong-lanceolate type: inflorescence corymbs: tree. 2. *P. pennsylvanica*.

Leaf-blades broad, rounded or subcordate at the base, the fine teeth glandular in the sinuses. 3. *P. Mahaleb*.

Flowers large; corolla over 17 mm. wide.

Leaves glabrous: inner scales of the flowering buds broad, not spreading: drupe sour. 4. *P. Cerasus*.

Leaves pubescent: inner scales of the flowering buds narrow, spreading: drupe sweet. 5. *P. Avium*.

Leaves convolute in vernation. 6. *P. americana*.

1. **P. cuneata** Raf. Spreading glabrous shrub 3–12 dm. tall: leaf-blades oblong, oval, or somewhat obovate, 3–8 cm. long, sometimes acute at both ends, cuneate at the base, glaucous beneath, rather coarsely serrate with appressed teeth: flowers in clusters: pedicels 1–1.5 cm. long: sepals oval or orbicular, toothed: petals 4–5 mm. long, rather slender-clawed: drupes subglobose, 8–10 mm. in diameter.—S.—Rare, in swamps.—*Schists, serpentine*.

2. **P. pennsylvanica** L. f. Small glabrous tree: leaf-blades thinish, oblong-elliptic to nearly oval or lanceolate, 8–15 cm. long, acuminate at the apex, doubly serrate: flowers in lateral clusters: pedicels slender, 1–2.5 cm. long, or 3 cm. long at maturity: sepals ovate-oblong, entire: petals 4.5–5.5 mm. long, very short-clawed: drupes globose, 4–7 mm. in diameter, red, without bloom, with thin sour flesh: stone subglobose, or slightly elongate.—E. Rare, on hillsides, near Beartown.—*Quartzite*.—WILD RED-CHERRY. BIRD-CHERRY. FIRE-CHERRY. PIGEON-CHERRY.

3. **P. Mahaleb** L. Shrub or small glabrous tree: leaf-blades ovate, 2–5.5 cm. long, abruptly pointed, finely serrate, rounded, truncate, or subcordate at the base, slightly paler green beneath than above: flowers in corymbs: pedicels 1.5–2.5 cm. long: sepals oblong, entire: petals 5–6 mm. long, not clawed: drupes globose or ovoid-globose, 7–9 mm. long, reddish-black.—M. Rare, on cliffs of the Conestoga creek above Lancaster. Nat. of Eu.—PERFUMED-CHERRY. MAHALEB.

4. *P. Cerasus* L. Small tree: leaf-blades ovate, oval-ovate, or ovate-lanceolate, 4–11 cm. long, abruptly acute or acuminate, finely serrate-dentate, glabrous, resinous when young: corolla 1.5–2.5 cm. broad: drupes nearly globose, 8–10 mm. in diameter, or larger in cultivation, sour, red or black: stone subglobose. — Rather common, in fence-rows and woods. Nat. of Eu. — SOUR-CHERRY. MORELLO-CHERRY.

5. *P. Avium* L. Large tree: leaf-blades ovate to oval or oval-ovate, 5–10 cm. long, abruptly short-acuminate, coarsely doubly serrate, pubescent beneath, sometimes only on the veins: corolla 2.5–3 cm. broad: drupes ovoid-globose, 8–10 mm. in diameter, not acid, usually sweet: stone globular. — Common, in woods, fence-rows, and thickets. Nat. of Eu. — SWEET-CHERRY. MAZZARD.

6. *P. americana* Marsh. Small somewhat spiny tree: leaf-blades elliptic to oval or oval-obovate, 4–10 cm. long, acuminate, sharply singly or doubly serrate, pubescent beneath, especially near the veins, acute or rounded at the slightly inequilateral base: petioles usually glandless: flowers 2–5 in lateral clusters: sepals entire: petals 7–10 mm. long: drupes subglobose or barely elongate, 18–25 mm. long, sometimes with slight bloom: stone ovoid or oval, flattened. — Common, in thickets and fence-rows. — WILD YELLOW-PLUM. WILD RED-PLUM.

3. **PADUS** Borekh. Shrubs or trees. Leaves deciduous, manifestly impregnated with prussic acid. Flowers in terminal racemes. Hypanthium green. Sepals relatively large. Petals rounded. Drupe with a juicy exocarp. — Spr. — WILD CHERRY.

Sepals deciduous: leaf-blades sharply serrulate.

1. *P. nana*.

Sepals persistent: leaf-blades crenate-serrulate.

2. *P. virginiana*.

1. *P. nana* (Du Roi) Roem. Shrub with diffuse branches, or small tree with spreading or drooping branches and very bitter bark: leaf-blades thinish, oval or obovate, 5–10 cm. long, sharply serrulate, usually rounded at the base, glabrous or nearly so on both sides: racemes rather lax, 8–15 cm. long: sepals reflexed, often ovate, glandular-margined: petals 3–4 mm. long: drupes globose, 8–10 mm. in diameter, red or almost black, or rarely yellow, very astringent. [*P. virginiana* Roem, not *Prunus virginiana* L.] — S. Rare, in rocky woods near the Octoraro Creek. — *Schists*. — CHOKE-CHERRY.

2. *P. virginiana* (L.) Mill. Tree with ascending branches, becoming 35 m. tall, the bark aromatic and bitter: leaf-blades firm, oblong or elliptic, varying to obovate, or lanceolate, 5–15 cm. long, acuminate or acute at both ends, or rounded at the base, crenate-serrulate with callous-tipped teeth, glabrous or nearly so: sepals ovate, longer than broad: corolla 8–10 mm. broad: drupes globose, 8–10 mm. in diameter, dark-purple or nearly black, sweet but slightly astringent. [*P. serotina* (Ehrh.) Agardh.] — Common, in thickets and woods. — WILD BLACK-CHERRY. RUM-CHERRY.

FAMILY 12. CASSIACEAE. SENNA FAMILY.

Trees, shrubs, or herbs. Leaves alternate: blades compound, usually 1–2-pinnate, rarely 1-foliolate. Flowers perfect, polygamous, monoecious, or dioecious, more or less irregular. Calyx of 3–5, usually slightly united, sepals, sometimes borne on the edge of a well-developed hypanthium. Corolla of 3–5 unequal distinct petals. Androecium of 6–10 distinct or nearly distinct stamens. Gynoecium 1-carpellary. Fruit a legume.

Corolla apparently papilionaceous: leaves with 1-foliolate blades.

1. *CERCIS*.

Corolla more or less irregular, sometimes nearly regular: leaves with pinnately compound blades.

Leaves with 1-pinnate blades: flowers perfect: petals yellow or whitish, unequal.

Calyx-lobes obtuse: pods tardily dehiscent or indehiscent.

Calyx-lobes acuminate: pods elastically dehiscent.

Leaves with 2-pinnate blades: flowers polygamous: petals greenish, nearly equal.

2. CASSIA.

3. CHAMAECRISTA.

4. GLEDITSIA.

1. **CERCIS** L. Shrubs or trees. Leaves 1-foliolate: leaflet broad. Calyx shallowly lobed: tube gibbous. Corolla pink-purple: keel-petals of the apparently papilionaceous corolla longer than the others. Anthers short, opening lengthwise. Pod very flat.

1. **C. canadensis** L. Shrub or tree: leaf-blades broadly ovate to reniform: pedicels mostly less than 1.5 cm. long: sinuses of the calyx nearly as broad as the lobes: larger petals 12-13 mm. long; blades ovate: pods linear-oblong, 5-10 cm. long. — Common, on rocky hills. — Spr. — RED-BUD. JUDAS-TREE.

2. **CASSIA** [Tourn.] L. Herbs, shrubs, or trees. Leaves abruptly 1-pinnate: stipules deciduous. Flowers in axillary racemes or panicles. Sepals nearly distinct, leathery or petaloid. Petals mainly yellow or whitish. Pod more or less turgid, indehiscent or rather tardily dehiscent. — SENNA.

1. **C. marylandica** L. Perennial, 8-20 dm. tall, sparingly pubescent: leaflets 12-20; blades elliptic to oblong, mucronate, 4-5 cm. long: petiolar gland obovate, stipitate, near the base of the rachis: sepals 6-8 mm. long: petals 10-12 mm. long, cuneate to spatulate: pods curved, somewhat hispid, 10-12 cm. long: seeds flat, nearly as wide as long. — Common, in moist grounds, especially near streams. — Sum. — WILD-SENNA.

3. **CHAMAECRISTA** Moench. Herbs or shrubs. Leaves abruptly 1-pinnate: stipules persistent. Flowers clustered in leaf-axils. Sepals nearly distinct, membranous. Petals mainly yellow or whitish. Pod flattish, promptly dehiscent, the valves elastic. — Sum. — SENSITIVE-PEA. SENSITIVE-PLANT.

Corolla small, less than 1 cm. wide: anthers 5, nearly equal.

1. *C. nictitans*.

Corolla large, over 1 cm. wide: anthers 10, very unequal.

2. *C. fasciculata*

1. **C. nictitans** (L.) Moench. Stem branching and spreading freely, finely pubescent: leaflets 12-28; blades glabrous, linear to linear-elliptic, acute or mucronate, 10-14 mm. long or less: petiolar gland ureolate, sessile: stipules lanceolate: sepals 5-7 mm. long, sparingly pubescent: standard obovate, sometimes broadly so, smaller than the large wing-petal: pods pubescent, 2.5-3.5 cm. long, 6 mm. wide. — Common, in dry soil. — WILD SENSITIVE-PLANT.

2. **C. fasciculata** (Michx.) Greene. Stem erect or spreading, finely pubescent: leaflets 16-28; blades oblong-elliptic, acute or mucronate, 1.5 cm. long or less: petiolar gland sessile, compressed, truncate: stipules lanceolate-linear: sepals 12-17 mm. long, short-hairy: standard 13-20 mm. long: pods pubescent, 4-5 cm. long, 5 mm. wide. — Common, in dry soil. — PARTRIDGE-PEA.

4. **GLEDITSIA** L. Trees with simple or branched thorns. Leaves relatively small, 2-pinnate: stipules present. Calyx-lobes obtuse, about as long as the petals. Petals nearly equal. Pod flat.

1. **G. triacanthos** L. Tree becoming 40 m. tall: leaflets 1-2.5 cm. long; blades ovate-lanceolate varying to elliptic: sepals narrowly oblong to lanceolate: pods black and lustrous, pulpy within. — S. Rather common, in thickets. — *Schists*. — Late spr. — HONEY-LOCUST.

FAMILY 13. **FABACEAE.** PEA FAMILY.

Herbs, shrubs, trees, or vines. Leaves alternate: blades 1-compound, sometimes 1-foliolate, or rarely simple. Flowers mostly perfect, irregular. Calyx of 5 more or less unequal partially united sepals. Corolla of 5 unequal distinct or nearly distinct petals which are, 2 keel-petals and 2 wings, and 1 standard which surrounds the others. Androecium of 10 monadelphous, diadelphous or rarely distinct stamens, or rarely of 9 or 5. Gynoecium 1-carpellary. Ovary superior. Fruit a dehiscent or indehiscent legume or a loment.

Stamens 10: filaments distinct.	Tribe	I. PODALYRIEAE.
Stamens 10 or fewer: filaments monadelphous or diadelphous.		
Leaves destitute of tendrils.		
Herbs, shrubs, trees, or woody vines.		
Fruit 2-valved or indehiscent, not a loment.		
Anthers of 2 kinds: filaments monadelphous.	Tribe	II. GENISTEAE.
Anthers all alike: filaments diadelphous, at least beyond the middle.		
Leaf-blades 3-5-foliolate.		
Leaflets toothed.	Tribe	III. TRIFOLIEAE.
Leaflets entire.	Tribe	IV. LOTEAE.
Leaf-blades pinnately several- to many-foliolate, or rarely 1-foliolate.		
Fruit a loment.	Tribe	V. GALEGEAE.
Herbaceous vines.	Tribe	VI. HEDYSAREAE.
Leaves bearing tendrils.	Tribe	VII. PHASEOLEAE.
	Tribe	VIII. VICIEAE.

TRIBE I. PODALYRIEAE.

Herbs usually turning black in drying, the pods short, inflated or turgid.
1. BAPTISIA.

TRIBE II. GENISTEAE.

Herbs with 1-foliolate or 5-11-foliolate leaf-blades: calyx-lips very unequal.
Pod turgid or inflated: lower calyx-lip prominently 3-lobed: leaf-blades 1-foliolate. 2. CROTALARIA.
Pod flattened: lower calyx-lip obscurely 3-lobed: leaf-blades 5-11-foliolate. 3. LUPINUS.
Shrubs with 1-3-foliolate leaf-blades: calyx-lips nearly equal. 4. CYTISUS.

TRIBE III. TRIFOLIEAE.

Pods curved or coiled: ovary curved, short-beaked. 5. MEDICAGO.
Pods straight: ovary straight, long-beaked.
Pods leathery: corolla free from the androecium, and deciduous. 6. MELILOTUS.
Pods membranous: corolla adherent to the androecium, and persistent. 7. TRIFOLIUM.

TRIBE IV. LOTEAE.

Pods included in the calyx, the body broad, long-stipitate: filaments partially diadelphous, united to about the middle. 8. ANTHYLLIS.
Pods exserted, not stipitate: filaments wholly diadelphous, one of them wholly distinct. 9. LOTUS.

TRIBE V. GALEGEAE.

Herbs: wings and keel-petals cohering. 10. CRACCA.
Shrubs or trees: wings and keel-petals free. 11. ROBINIA.

TRIBE VI. HEDYSAREAE.

Calyx narrowed to a stipe-like base: corolla yellow: stamens monadelphous. 12. STYLOSANTHES.
Calyx not narrowed to a stipe-like base: corolla white, blue, purple, or violet: stamens diadelphous, or monadelphous near the base.
Wings with short claws: leaflets stipellate: loment of several joints. 13. MEIBOMIA.
Wings with long claws: leaflets not stipellate: loment of 1, or rarely of 2 joints. 14. LESPEDEZA.

TRIBE VII. PHASEOLEAE.

Keel neither curved nor coiled.

Standard distinctly clawed: style glabrous or sparingly pubescent below.

Keel-petals short-clawed: calyx subtended by two bractlets.

Keel-petals long-clawed: calyx without bractlets.

Standard not distinctly clawed: style bearded along the inner side.

Keel coiled or curved.

Keel spirally twisted.

Leaves without stipels: leaflets 5 or more: wings with very short claws.

Leaves with stipels: leaflets 3: wings with rather long claws.

Keel incurved.

15. GALACTIA.

16. FALCATA.

17. CLITORIA.

18. GLYCENE.

19. PHASEOLUS.

20. STROPHOSTYLES.

TRIBE VIII. VICIEAE.

Style terete, with a tuft of hairs at the apex.

Style flattened, pubescent along the inner side.

21. VICIA.

22. LATHYRUS.

1. **BAPTISIA** Vent. Perennial herbs with rootstocks. Stipules not decurrent on the stem. Leaf-blades mostly digitately 3-foliolate, the leaflets broadest above the middle. Calyx somewhat 2-lipped. Corolla white, cream-colored, yellow, or blue. Style usually longer than the short ovary. Pods long-stipitate. — FALSE-INDIGO.

1. **B. tinctoria** (L.) R. Br. Leaflets 1-3 cm. long; blades obovate to spatulate-cuneate; calyx becoming 4-5 mm. long; lower lobes deltoid, all acute: corolla yellow; wings 12-15 mm. long; pod-body 4-5 mm. thick. — Common, in dry soil. — Sum. — WILD-INDIGO.

2. **CROTALARIA** [Dill.] L. Annual or perennial, sometimes partially woody herbs. Stipules often decurrent on the stem. Leaf-blades 3-foliolate, or 1-foliolate in our species. Calyx with a prominently 2-lobed upper lip and a deeply 3-lobed lower lip. Corolla yellow or blue: standard with a pair of callosities near the base of the blade: wings with the scarcely auricled blades broadened upward: blades of the keel-petals broad, scythe-shaped. Pods globular to cylindric.

1. **C. sagittalis** L. Stems 1-5 dm. tall, conspicuously pubescent: blades of the leaflets oblong to lanceolate or linear-lanceolate: calyx loosely-pubescent: corolla yellow, about as long as the calyx: pods oblong, 2.5-4 cm. long. — Rather common, on sandy banks. — *Schists*. — Sum. — RATTLE-BOX.

3. **LUPINUS** [Tourn.] L. Annual, biennial, or perennial herbs, or woody plants. Stipules not decurrent. Leaf-blades several-many-foliolate or rarely 1-foliolate. Calyx with a lobed upper lip and an entire or slightly 3-lobed lower lip. Corolla variously colored or white: standard without callosities: wings with blunt auricles: keel-petals scythe-shaped. Pods oblong to linear.

1. **L. perennis** L. Plants 2-6 dm. tall, the stipules early deciduous: leaflets 7-11; blades oblanceolate to elliptic, obtuse or mucronulate: lower lip of the calyx with the middle lobe acute and projecting beyond the others: corolla blue or purplish-blue: pods mostly 7-8 mm. wide, long-pedicelled. — N. S. Rather rare, on dry open hillsides. — *Sandstones and shales, schists*. — Spr. — LUPINE.

4. **CYTISUS** [Tourn.] L. Shrubs with much-branched stems, sometimes broom-like. Leaf-blades 3-foliolate or 1-foliolate: blades of the leaflets narrow or broad, mostly entire, or obsolete. Calyx with an obscurely lobed upper

lip and a minutely 3-lobed lower lip. Corolla mostly yellow: standard with a broad blade: wings with acutish auricles: keel-petals with broad blades. Pods rather narrow. — BROOM.

1. **C. scoparius** (L.) Link. Plants with many stiff erect sharp-angled branches, 1-1.5 m. tall, the younger parts finely pubescent: leaflets 3, or 1 in the upper leaves; blades obovate to oblong, 5-15 mm. long, obtuse or acute, entire: racemes leafy-bracted: calyx about 4 mm. long: corolla bright-yellow; standard suborbicular, 1.5-2 cm. long: pods broadly linear, 4-5 cm. long, long-ciliate. — E. Rather rare, on railroad embankments and in fields. Nat. of Eu. — Sum. — SCOTCH-BROOM.

5. **MEDICAGO** [Tourn.] L. Annual or perennial herbs, or partially woody plants. Leaflets 3, pinnate. Racemes capitate or slightly elongate. Calyx-lobes nearly equal, about as long as the tube or longer. Corolla yellow, blue, or violet: wings with a hooked auricle at the base of the blade. Style very short, at least shorter than the ovary. — MEDIC.

Corolla violet or blue: standard with an oblong or cuneate blade: perennial upright plant.

Corolla yellow: standard with a blade about as wide as long: annual prostrate plant.

1. *M. sativa*.

2. *M. lupulina*.

1. **M. sativa** L. Leaflets 8-16 mm. long; blades cuneate-obovate to cuneate or oblanceolate: calyx 4-6 mm. long: standard 8-10.5 mm. long: pods 3-4 mm. broad. — Rather common, in fields and waste places. Nat. of Eu. — Spr. and sum. — ALFALFA. LUCERNE.

2. **M. lupulina** L. Leaflets 5-15 mm. long; blades obovate or rhomboidal: calyx 1.5-2 mm. long: standard 1.5-2 mm. long: pods 2-3 mm. broad. — Common, in waste places and on roadsides. Nat. of Eu. — Sum. — NONESUCH. BLACK-MEDIC. HOP-MEDIC.

6. **MELILOTUS** [Tourn.] Juss. Annual or biennial herbs. Leaflets 3, pinnate. Racemes greatly elongate and ultimately interrupted. Calyx-lobes nearly equal, shorter than the tube. Corolla yellow or white: wings with a slender auricle at the base of the blade. Style long. — Sum. — SWEET-CLOVER. MELILOT.

Corolla yellow: standard shorter than the wing-petals.

Corolla white: standard surpassing the wing-petals.

1. *M. officinalis*.

2. *M. alba*.

1. **M. officinalis** (L.) Lam. Leaflets 1-3 cm. long; blades narrowly oblong, oblanceolate, or oval: racemes 2-12 cm. long: calyx-lobes about $\frac{1}{2}$ as long as the tube: keel-petals much shorter than the wings: ovary stipitate: pods about 4 mm. long, pubescent. — Rather scarce, in waste places, except in the limestone region. Nat. of Eu. — YELLOW-MELILOT.

2. **M. alba** Desv. Leaflets 1-3 cm. long; blades linear-oblong, oblanceolate, or elliptic: racemes fully as long as in *M. officinalis*: calyx-lobes slightly shorter than the tube: keel-petals slightly shorter than the wings: ovary sessile: pods 3-3.5 mm. long, glabrous. — Common, in waste places and river banks. Nat. of Eu. — WHITE-MELILOT.

7. **TRIFOLIUM** [Tourn.] L. Annual or perennial herbs. Leaflets 3, digitate or pinnate, or rarely 5 or 7. Calyx-lobes nearly equal, or the 2 upper longer than the 3 lower ones and sometimes partially united. Corolla variously colored or white: standard oblong or obovate, or elongate and clawed: other petals with long claws, the wings with an angle or a rounded auricle at the base of the blade. — CLOVER. TREFOIL.

Corolla yellow: ovary and pod decidedly stipitate.

Standard entire: terminal leaflet longer-stalked than the lateral ones.

Standard toothed: terminal leaflet not longer-stalked than the lateral ones.

Corolla white, pink, or purple: ovary and pod sessile or nearly so.

Heads peduncled: claw of the standard shorter than the blade.

Corolla shorter than the calyx.

Corolla longer than the calyx.

Heads cylindrical: calyx-lobes plumose.

Heads globose or ovoid: calyx-lobes not plumose.

Calyx-lobes subulate, not dilated, the sinuses

pubescent: stems ascending or procumbent.

Calyx-lobes lanceolate or triangular, with dilated

bases, the sinuses glabrous: stems creeping.

Heads sessile: claw of the standard longer than the blade.

1. *T. procumbens*.

2. *T. agrarium*.

3. *T. arvense*.

4. *T. incarnatum*.

5. *T. hybridum*.

6. *T. repens*.

7. *T. pratense*.

1. **T. procumbens** L. Stem and branches ultimately diffuse or procumbent: leaflets 6-12 mm. long; blades cuneate to obovate: stipules long, the free parts ovate: standard less than 4.5 mm. long: seeds pale. — Common, on dry banks and roadsides. Nat. of Eu. — Sum. — LOW HOP-CLOVER.

2. **T. agrarium** L. Stem and branches erect, ascending or reclining: leaflets 16-30 mm. long; blades oblong-cuneate, rhombic, or obovate: stipules long, the free parts lanceolate: standard over 5.5 mm. long: seeds dark. — Common, on roadsides and banks and in woods. Nat. of Eu. — Sum. — YELLOW HOP-CLOVER.

3. **T. arvense** L. Stems erect, villose-lanuginous: leaflets 1-2.5 cm. long; blades linear to oblanceolate, entire or nearly so: heads 1-3 cm. long: calyx 4.5-5 mm. long; lobes subulate, plumose: standard nearly oblong, 3-3.5 mm. long, white. — Common, on dry banks and in fields. Nat. of Eu. — Sum. — RABBIT-FOOT CLOVER. STONE-CLOVER.

4. **T. incarnatum** L. Stems 2-9 dm. tall, appressed-pubescent or somewhat villose: leaflets 1-4 cm. long; blades obovate to broadly cuneate, denticulate, finely veined: heads 3-7 cm. long: calyx densely strigillose, obscurely 2-lipped; lobes setaceous, longer than the tube, those of the upper lip slightly longer than those of the lower lip: standard 11-13 mm. long, linear-spatulate, crimson. — Common, in fields and waste places. Nat. of Eu. — Spr. — CRIMSON-CLOVER. ITALIAN-CLOVER.

5. **T. hybridum** L. Stems erect or decumbent: leaflets 11-25 mm. long; blades oval to oblong, varying to ovate or obovate, or suborbicular, denticulate: calyx 3.5-4 mm. long; lobes about as long as the tube: standard oblong, 7-9 mm. long, pink or rarely nearly white: style mostly shorter than the ovary. — Common, in fields and on roadsides. Nat. of Eu. — Sum. — ALSIKE-CLOVER.

6. **T. repens** L. Stems creeping: leaflets 9-15 mm. long; blades obovate to orbicular-obovate or oval: calyx about 5 mm. long; shorter lobes abruptly acuminate from dilated bases: standard oblong, 7-8 mm. long: style mostly longer than the ovary. — Common, in fields and waste places and on roadsides. Nat. of Eu. — Spr. and sum. — WHITE-CLOVER.

7. **T. pratense** L. Stems 2-7 dm. tall, pubescent: leaflets 1-4 cm. long; blades oblong, elliptic, or oval: calyx about 8 mm. long; lobes filiform, the largest one much longer than the tube: corolla red, purple, or white; standard 12-14 mm. long, the claw very broad. — Common, in fields and waste places. Nat. of Eu. — Sum. — RED-CLOVER.

8. **ANTHYLLIS** [Rivinius] L. Herbs with diffuse branches. Leaflets few or several, pinnately disposed, or the lateral ones sometimes wanting. Flower-clusters involucrate, approximate, the compound cluster long-peduncled. Calyx manifestly 2-lipped: upper lip with broad, short lobes; lower lip with

3 narrow lobes, exceeded by the upper lip. Corolla red, yellow, or white: standard with a broad blade with incurved basal auricles and a slender claw: other petals very long-clawed, the blades of the wings wider than those of the keel-petals.

1. **A. Vulneraria** L. Plants 1-5 dm. tall, loosely pubescent: leaflets 5-11, or fewer, unequal, the terminal and adjacent ones large, 1.5-5 cm. long, the lower ones narrower, all obtuse or acutish: flower-clusters globular or depressed, 2.5-3.5 cm. in diameter: calyx 11-14 mm. long, pubescent; lateral lobes of the lower lip ovate, broader than the middle one: corolla yellow or crimson; standard about 1.5 cm. long, the blade orbicular-ovate, shorter than the claw: pod with a filiform stipe, the body 4.5-5.5 mm. long. — S. Rare, in fields near Wakefield. Nat. of Eu. Introduced with alfalfa seed. — Sum. — LADY'S-FINGERS.

9. **LOTUS** [Tourn.] L. Herbs with diffusely spreading branches. Leaflets 3: blades broad or relatively so, entire. Stipules often conspicuous. Flower-clusters long-peduncled. Calyx obscurely 2-lipped: lobes slightly unequal, long and narrow. Corolla yellow or reddish: standard with a broad blade and a broad rather long claw: other petals slender-clawed, the blades of the wings prominently auricled: keel-petals strongly curved, very broad.

1. **L. corniculatus** L. Plants perennial, with several or many decumbent or ascending branches, 1-6 dm. long, finely pubescent, sometimes becoming glabrous: leaflets 3; blades obovate to oblong, 6-17 mm. long, obtuse or abruptly pointed: flower-clusters long-peduncled: calyx 8-9 mm. long; lobes subulate, the larger ones as long as the tube or nearly so: corolla bright-yellow, or partially reddish; standard 11-13 mm. long, the blade suborbicular: pods 2-2.5 cm. long, the body narrowly linear, with a slender subulate beak. — S. Rare, in fields near Wakefield. Nat. of Eu. Introduced with alfalfa seed. — Sum. — BIRD'S-FOOT TREFOIL.

10. **CRACCA** L. Perennial long-rooted herbs or woody plants. Leaflets several or many, thick. Flowers in racemes or spike-like panicles. Calyx somewhat 2-lipped, the 2 upper lobes usually shorter than the others and partially united. Corolla pink, purple, or red, or white: standard pubescent: wings auricled on one side at the base of the blade: keel-petals usually with an angular auricle. Ovary sessile. Pods flat or flattish. — HOARY-PEA.

1. **C. virginiana** L. Stems 3-6 dm. tall, loosely pubescent: leaflets 11-21; blades of the lateral ones 10-30 mm. long, oblong to elliptic; rachis mostly villous: calyx 9.5-10.5 mm. long; lobes with very slender tips, the upper ones much longer than the tube: corolla cream-colored, and tinged with purple or pink: standard and wings 19-24 mm. long: pods 3-5 cm. long. — N. S. Rather common, on dry banks. *Sandstones and shales, schists.* — Sum. — CAT-GUT. GOAT'S-RUE.

11. **ROBINIA** L. Shrubs or trees, often with stipular spines. Leaflets several, thin. Flowers racemose. Calyx markedly 2-lipped, the 2 upper lobes wholly or partially united. Corolla pink or purplish, or white: standard glabrous: blades of the wings auricled on one or both sides: keel-petals with a rounded auricle at the base of the blade. Ovary stipitate. Pods flat, sometimes bristly or prickly. — LOCUST.

1. **R. Pseudacacia** L. Tree becoming 35 m. tall, with furrowed bark: stipules spine-like on vigorous shoots: leaflets 9-19; blades thin, elliptic to ovate, 2.5-4.5 mm. long: racemes drooping: lateral lobes of the calyx triangular: claws of the keel-petals about $\frac{1}{2}$ as long as the blades: pods 5-10 cm. long. —

Common, naturalized in waste places and on roadsides. Native in woods along the Susquehanna River. — FALSE-ACACIA. LOCUST-TREE.

12. STYLOSANTHES Sw. Perennial herbs. Leaflets 3, veiny. Flowers of two kinds, the one complete, but sterile, the other without perianth, but fertile. Calyx 2-lipped: upper lip with 2 broad lobes: lower lip with the middle lobe longer and narrower than the lateral ones. Corolla yellow or orange, persistent: standard with a very broad blade: blades of the wings and the keel-petals auricled, the latter incurved. Loment flat, 1- or 2-jointed, the lower joint empty, the upper one opening at the apex. — Sum. — PENCIL-FLOWER.

Blade of the standard longer than wide, the spurs curved: terminal joint of the pod with a lateral beak. 1. *S. biflora*.
Blade of the standard wider than long, the spurs straight: terminal joint of the pod with the beak nearly axial. 2. *S. riparia*.

1. *S. biflora* (L.) B.S.P. Plants upright, the stem finely pubescent: leaflets 9–35 mm. long; blades elliptic, linear-elliptic, lanceolate, or oblanceolate: standard 6–7 mm. long: terminal joint of the pod very inequilateral, about 5 mm. long. — N. S. Common, on dry banks. — *Sandstones and shales, schists*.

2. *S. riparia* Kearney. Plants decumbent: leaflets 10–18 mm. long; blades elliptic, oblanceolate, or cuneate-obovate, thinner than those of *S. biflora*: standard 8–9 mm. long: terminal joint of the pod slightly inequilateral, 3–4 mm. long. — S. Rather rare, on roadsides and banks. — *Schists*.

13. MEIBOMIA Heister. Herbs, shrubs, or vines. Leaflets 3, or rarely 1 or 5. Racemes simple or compound. Calyx 2-lipped, sometimes obscurely so, the middle lobe of the lower lip often smaller or narrower and longer than the lateral ones. Corolla variously colored or white: standard with a broad blade: blades of the wings and the keel-petals auricled on one side, short-clawed. Ovary slender. Loment few-several-jointed, usually with hooked hairs. — Sum. — TICK-TREFOIL. BEGGAR'S-TICKS.

Calyx shallowly lobed: loment straight along the dorsal suture, deeply constricted along the ventral suture, long-stipitate.

Terminal leaflet-blades relatively scarcely wider than the lateral ones: peduncle arising from the rootstock. 1. *M. nudiflora*.

Terminal leaflet-blades conspicuously wider than lateral ones, or wider than long: peduncle terminating the stem. 2. *M. grandiflora*.

Calyx deeply lobed: loment constricted on both sutures, but more deeply so in the ventral than the dorsal side, short-stipitate or nearly sessile.

Stem and branches weak, trailing: stipules broad. 3. *M. Michauxii*.

Stem and branches rigid, erect or ascending: stipules narrow. 4. *M. sessilifolia*.

Leaves with very short or no petioles.

Leaves with relatively long petioles.

Joints of the loment manifestly longer than broad.

Bracts small and inconspicuous: panicle-branches long-hairy: leaflets with obtuse or obtusish yellowish-green rough-pubescent blades. 5. *M. canescens*.

Bracts large and conspicuous: panicle-branches short-hairy: leaflets with acuminate glabrous blades, glaucous beneath. 6. *M. bractcosa*.

Joints of the loment only slightly longer than broad.

Loment manifestly stipitate.

Calyx ciliate: plants glabrous or nearly so. 7. *M. paniculata*.

Calyx ciliate: plants pubescent or scabrous-pubescent.

Standard 5–6 mm. long: leaflet-blades leathery, velvety beneath: loment-joints rounded. 8. *M. viridiflora*.

- Standard 9-10 mm. long: leaflet-blades thin, somewhat pubescent beneath: loment-joints angular. 9. *M. Dillenii*.
- Lomentis sessile or nearly so.
- Corolla conspicuous: standard 8-10 mm. long: lower calyx-lobes narrow: lomentis 4-7-jointed. 10. *M. canadensis*.
- Corolla inconspicuous: standard 4-5 mm. long: lower calyx-lobes broad: lomentis 2- or 3-jointed.
- Upper calyx-lip entire or sharp-notched: leaflets scabrous or pubescent, and ciliate.
- Blade of the terminal leaflet fully twice as long as wide: loment-joints somewhat rhomboidal. 11. *M. rigida*.
- Blade of the terminal leaflet little longer than wide: loment-joints rounded. 12. *M. obtusa*.
- Upper calyx-lip emarginate, obtuse-lobed: leaflets glabrous or nearly so. 13. *M. marylandica*.

1. *M. nudiflora* (L.) Kuntze. Leaves clustered on the short decumbent or ascending stem: leaflets 2-8 cm. long, the blades oval or ovate: standard 8-10 mm. long: wings not auricled on the lower side: joints of the loment 3-3.5 mm. wide. — Common, in woodlands and on hillsides.

2. *M. grandiflora* (Walt.) Kuntze. Leaves clustered at the end of the short erect stem: leaflets 8-13 cm. long, the blades broadly ovate to orbicular-ovate: standard 7-9 mm. long: wings minutely auricled on the lower side: loment-joints 4.5-6 mm. wide. — Common, in woodlands and thickets.

3. *M. Michauxii* Vail. Stems prostrate: stipules ovate: leaflets 3; blades suborbicular, 3-6 cm. long: lateral calyx-lobes lanceolate, longer than the tube, acuminate: standard 9-11 mm. long: loment-joints rounded on one side, half-rhombic on the other, about 3 mm. wide. — Common, in dry open places and on banks.

4. *M. sessilifolia* (Torr.) Kuntze. Stems erect: stipules linear: leaflets 2-5 cm. long; blades linear or linear-oblong, reticulate, pubescent beneath: lateral calyx-lobes deltoid, the markedly longer lower one triangular-lanceolate: standard 5-6 mm. long: wings dilated near the tip: loment-joints obliquely half-obovate, 3-3.5 mm. wide. — Lower Susquehanna valley. Rare, on the river shore and islands. — *Schists*.

5. *M. canescens* (L.) Kuntze. Stems erect: stipules ovate: leaflets 3-10 cm. long; blades ovate to ovate-rhomboid: lateral calyx-lobes lanceolate, longer than the tube, acute, the lower lobe longer and slender-tipped: standard 9-12 mm. long, narrowly obovate: androecium 9-11 mm. long: loment-joints half-rhombic, 4.5-5.5 mm. wide. — Common, in fence-rows and thickets.

6. *M. bracteosa* (L.) Kuntze. Stems erect: stipules lanceolate: leaflets 5-15 cm. long; blades ovate to ovate-lanceolate, cuspidate or long-acuminate: lateral calyx-lobes lanceolate, the lower lobe slightly longer: standard broadly obovate, 8-10 mm. long: loment-joints half-rhombic, the one side somewhat more prominent than the other. — S. Rather rare, in thickets. — *Schists*.

7. *M. paniculata* (L.) Kuntze. Stems glabrous or nearly so: stipules subulate: leaflets 3-9 cm. long; blades mainly oblong to lanceolate, obtuse or acutish: lateral calyx-lobes triangular, sometimes deltoid, acute, the lower lobe decidedly longer and attenuate: standard cuneate or cuneate-obovate, 4.5-5.5 mm. long: keel-petals about as long as the standard: loment-joints 4-5 mm. wide, the ventral side prominently rounded, the dorsal side curved. — Common, in dry soil, often in woods.

8. *M. viridiflora* (L.) Kuntze. Stems downy: stipules lanceolate: leaflets 4-9 cm. long; blades oblong to ovate or ovate-oblong, densely pubescent beneath: lateral calyx-lobes deltoid, shorter than the tube, the lower lobe

lanceolate, longer and narrower: corolla pale-purple, turning green; standard broadly obovate, 5-6 mm. long: loment-joints about as wide as long, obliquely obovate. — S. Rare, in open woods. — *Schists*.

9. *M. Dillenii* (Darl.) Kuntze. Stems glabrous or sparingly pubescent: stipules subulate: leaflets 4-10 cm. long; blades oblong or oblong-ovate, not scabrous: lateral calyx-lobes lanceolate, the lower lobe longer but about as wide: corolla bright-purple; standard narrowly obovate, 9-10 mm. long: loment-joints obliquely rhombic, much longer than wide. — Common, in thickets and woods.

10. *M. canadensis* (L.) Kuntze. Stems pubescent: stipules lanceolate-linear: leaflets 4-10 cm. long; blades oblong or oblong-lanceolate, pubescent beneath: upper calyx-lip deeply notched; lateral calyx-lobes subulate-lanceolate, longer than the tube, the lower one scarcely longer: standard narrowly obovate, 8-10 mm. long: loment-joints obliquely obovate. — Common, on creek and river banks, and on edges of woods.

11. *M. rigida* (Ell.) Kuntze. Stems minutely pubescent: leaflets 2.5-8 cm. long; blades ovate-oblong or elliptic, pubescent and reticulate beneath: lateral calyx-lobes deltoid, acute, the lower lobe triangular: standard 4-5 mm. long: stipe of the loment much less than $\frac{1}{2}$ as long as the joints. — S. Not very common, in dry thickets. — *Schists*.

12. *M. obtusa* (Muhl.) Vail. Stems hirsute or minutely pubescent: leaflets 1-2.5 cm. long; blades orbicular-ovate or oval, sparingly pubescent beneath: lateral calyx-lobes deltoid, acute, the lower lobe lanceolate: standard 4-5 mm. long: stipe of the loment $\frac{1}{2}$ as long as the joint. — Common, in dry soil, often on hillsides.

13. *M. marylandica* (L.) Kuntze. Stems glabrous or rarely with scattered hairs: stipules subulate: leaflets 1-2.5 cm. long; blades ovate or sometimes suborbicular or elliptic, glabrous or nearly so: lateral calyx-lobes ovate, obtuse, the lower lobe scarcely longer: standard 3.5-4.5 mm. long: loment-joints oblique. — S. Frequent, in dry soil. — *Schists*.

14. **LESPEDEZA** Michx. Herbs or shrubs. Leaflets 3 or rarely 1. Flowers perfect, but sometimes partially apetalous. Calyx 2-lipped, the 2 upper lobes more or less united. Corolla pink, purple, yellow, or white: standard with a broad blade: blades of the wings and the keel-petals auricled on one side, long-clawed. Ovary turgid. Loment with 1 or 2 joints. — Sum. — BUSH-CLOVER.

Annual plants: stipules ovate: calyx-lobes about as wide as long.

Perennial plants: stipules lanceolate: calyx-lobes longer than wide.

Plants with both petaliferous and apetalous flowers: corolla purple or purplish: pod manifestly surpassing the calyx.

Flower-clusters on slender peduncles which generally surpass the leaves.

Petaliferous flowers in close spike-like clusters or capitate.

Plants with slender trailing or diffusely procumbent stems: pods suborbicular, abruptly pointed.

Upper calyx-lip deeply notched: stems glabrous or pubescent with appressed hairs.

Upper calyx-lip shallowly notched: stems woolly or pubescent with downy hairs.

Plants with rather stout erect stems: pods elliptic, acuminate.

Petaliferous flowers loosely paniculate.

Flower-clusters of both the petaliferous and apetalous flowers sessile or nearly so.

Upper calyx-lobes slightly united, subulate: leaflets with oblong, oval or suborbicular blades.

1. *L. striata*.

2. *L. repens*.

3. *L. procumbens*.

4. *L. Nuttallii*.

5. *L. violacea*.

6. *L. Sturcii*.

- Upper calyx-lobes much united, lanceolate: leaflets with linear or linear-oblong blades.
- Plants with complete flowers: corolla whitish or yellowish: pod shorter than the calyx or rarely a little longer.
- Standard-blade suborbicular: peduncles exceeding the leaves: calyx about as long as the pod.
- Standard-blade oblong: peduncles shorter than the leaves: calyx exceeding the pod.
7. *L. virginica*.
8. *L. hirta*.
9. *L. capitata*.
1. *L. striata* (Thunb.) H. & A. Plants erect or diffuse, 1-4 dm. tall: leaflets 8-25 mm. long; blades oblong to oblong-obovate: calyx 2-2.5 mm. long; lobes ovate: keel-petals 5-7 mm. long: pods somewhat longer than the calyx. — S. Locally common. This plant appeared in a serpentine pasture in 1905. It is now very abundant on the serpentine barrens, and it also grows occasionally on paths and roadsides near the Susquehanna.
2. *L. repens* (L.) Bart. Plants procumbent: leaflets 6-15 mm. long; blades oval or obovate: calyx 4-5 mm. long; lower lobes longer than the tube, subulate, acuminate: keel-petals 6-7 mm. long: pods 3.5-4.5 mm. long. — N. S. Common, in dry places and on roadsides. — *Sandstones and shales, schists*.
3. *L. procumbens* Michx. Plants procumbent: leaflets 10-25 mm. long; blades oval or elliptic, or sometimes obovate: calyx 4-5.5 mm. long; lobes subulate, about twice as long as the tube: keel-petals 4.5-5.5 mm. long, or sometimes longer: style mostly glabrous: pods 4-5 mm. long. — N. S. Common, on dry banks and roadsides. — *Sandstones and shales, schists*.
4. *L. Nuttallii* Darl. Plants 5-10 dm. tall, often copiously pubescent: leaflets 8-20 mm. long; blades obovate, oval, or suborbicular: calyx 3.5-4.5 mm. long; lobes linear-lanceolate, somewhat longer than the tube: ovary copiously pubescent: pods 6-8 mm. long. — M. Occasional, in thickets and woods. — *Limestones*.
5. *L. violacea* (L.) Pers. Plants 3-9 dm. tall, diffuse, sparingly pubescent: leaflets 9-20 mm. long; blades elliptic, oblong-elliptic, or oval: calyx 4-4.5 mm. long: pods short-beaked, mostly 5-6 mm. long, with short scattered hairs. — S. Frequent, on dry banks and about thickets. — *Schists*.
6. *L. Stuevei* Nutt. Plants 6-12 dm. tall, velvety or downy: leaflets 9-20 mm. long, or rarely longer; blades oblong, oval, or suborbicular, densely pubescent: calyx 4-5 mm. long; lobes subulate, those of the upper lip united to below the middle: standard 5-6 mm. long; blade suborbicular: pods long-beaked, 4-6 mm. long, copiously pubescent. — Susquehanna valley. Frequent, on rocky shores and islands. — *Schists*.
7. *L. virginica* (L.) Britton. Plants 3-11 dm. tall, appressed-pubescent: leaflets 12-35 mm. long; blades linear to linear-oblong, sometimes finely pubescent beneath: calyx 3-4.5 mm. long: pods elliptic to ovate, 5-6 mm. long, minutely pubescent. — S. Not common, on roadsides and banks. — *Schists*.
8. *L. hirta* (L.) Ell. Plants 5-12 dm. tall, with spreading hairs: leaflets 12-40 mm. long; blades oval to suborbicular: calyx 6-6.5 mm. long; lobes 3-4 times as long as the tube: style glabrous: pods 7-8 mm. long. — N. S. Common, in thickets and on banks. — *Sandstones and shales, schists*.
9. *L. capitata* Michx. Plants 5-16 dm. tall, silky- or silvery-pubescent: leaflets 25-35 mm. long; blades oblong to oval: calyx 10-12 mm. long; lobes 5-6 times as long as the tube: standard 7-8 mm. long; blade oblong: style pubescent: pods 5-5.5 mm. long. — S. Not common, in thickets. — *Schists*.
15. **GALACTIA** P. Br. Vines with prostrate or twining stems, or erect partially woody plants. Leaflets 3, or rarely 1, 5 or 7. Panicles raceme-like. Calyx 2-lipped, the lobes relatively long. Corolla violet, red, or white: standard

erect or spreading: wings and keel-petals with relatively short claws. Ovary sessile or nearly so. Pod turgid, elongate, or the subterranean ones, when present, short.

1. **G. regularis** (L.) B.S.P. Stems minutely retrorse-pubescent: leaflets 2-4.5 cm. long; blades elliptic-oblong or ovate-oblong: calyx 7-9 mm. long; lobes obscurely scarioso-margined: keel-petals 11-13 mm. long: pods 2.5-4.5 mm. long. — M. Rare, along the Conestoga Creek, near Lancaster. — *Limestones*. — Sum. — MILK-PEA.

16. **FALCATA** Gmel. Slender vines. Leaflets 3. Racemes several-many-flowered. Calyx 2-lipped, the upper lip broader than the lobes of the lower lip which are shorter than the tube or slightly longer. Corolla not showy, blue, violet, or white: blade of the standard obovate: wings and keel-petals with elongate claws. Ovary long-stipitate. Pod rather flat, short.

1. **F. comosa** (L.) Kuntze. Leaflets 3-8 cm. long; blades ovate to ovate-lanceolate: calyx 6-8 mm. long; upper lip deltoid; lower lobes triangular-subulate, less than $\frac{1}{2}$ as long as the tube: blades of the keel-petals much shorter than the claws: pods 2.5-3 cm. long. — Common, in thickets. — Sum. — HOG-PEANUT.

17. **CLITORIA** L. Vines or diffuse plants, with long roots. Leaflets 3 or several. Racemes or panicles 1-several-flowered. Calyx 2-lipped, the lobes of the upper lip scarcely united, resembling the lateral lobes of the lower lip, but often shorter. Corolla blue, purple, red, or white: standard erect, the blade obovate: blades of the wings and the keel-petals long-clawed, those of the former not auricled, those of the latter curved. Style curved, pubescent. Pod narrow, somewhat flattened.

1. **C. mariana** L. Stems 3-12 dm. long: leaflets 2.5-6 cm. long; blades ovate-lanceolate to narrowly ovate: calyx 22-25 mm. long; lobes of the upper lip acuminate: standard 50-60 mm. long; blades of the keel-petals shorter than the claws: pods 2.5-3 cm. long: seeds 4-5 mm. long. — S. Islands and shores of the Susquehanna. — *Schists*. — Sum. — BUTTERFLY-PEA.

18. **GLYCENE** L. Vines with tuberous rootstocks. Leaflets 5-9. Racemes or panicles many-flowered, dense. Calyx 2-lipped: upper lip broad, often 2-lobed: lower lip 3-lobed. Corolla red, purple, or chocolate-colored: standard reflexed, the blade often broader than long: blades of the wings and keel-petals short-clawed, the former auricled at the base, those of the latter spiral. Style spiral, glabrous. Pod turgid.

1. **G. Apios** L. Rootstocks bearing numerous fleshy oblong, oval, or globose tubers 1-2 cm. thick: leaflets 5-7, or rarely 3; blades ovate to lanceolate, 3-10 cm. long: calyx 4-5 mm. long: standard 9-13 mm. long: pods 6-12 cm. long. — Common, in thickets and meadows. — Sum. — GROUNDNUT.

19. **PHASEOLUS** [Tourn.] L. Vines or diffuse plants. Leaflets 2 or rarely 1. Racemes or panicles simple or branched. Calyx short and very broad, 2-lipped, the upper lip entire or broadly 2-lobed, the lower lip 3-lobed. Corolla variously colored: blades of the wings much smaller than that of the standard, short-clawed; blades of the keel-petals not dilated at the base, short-clawed. Style curved. Seeds with rounded ends. — BEAN.

1. **P. polystachyus** (L.) B.S.P. Leaflets 4-10 cm. long; blades ovate to orbicular-ovate: upper calyx-lobes deltoid, acute: standard 11-12 mm. long: wings

10-17 mm. long; pods 4-8 cm. long.—N. S. Common, in thickets.—*Sandstones and shales, schists*.—Sum.—WILD-BEAN. BEAN-VINE.

20. **STROPHOSTYLES** Ell. Vines or trailing plants. Leaflets 3. Racemes or panicles cluster-like. Calyx similar to that of *Phascolus*, but the lower lip with a larger middle lobe. Corolla mainly pink-purple or white; blades of the keel-petals widely dilated at the base. Style spiral. Seeds with truncate ends.

1. **S. umbellata** (Muhl.) Britton. Stems trailing; leaflets 1-4 cm. long; blades oblong-lanceolate, varying to ovate or lanceolate; corolla pink or pale-purple, often fading yellowish; blade of the standard reniform, 1-2 cm. broad; pods 2.5-5 cm. long.—S. Common, in dry soil.—*Serpentine*.—Sum.—WILD-BEAN.

21. **VICIA** [Tourn.] L. Trailing or climbing herbs. Leaflets few or many; blades entire, or toothed at the apex. Racemes few-many-flowered, usually 1-sided. Calyx more or less 2-lipped; lobes of the lower lip usually longer than those of the upper. Corolla variously colored or white; blades of the wings more prominently auricled than those of the keel-petals. Filaments united to near the tips. Style with a tuft of hairs at the apex, or pubescent on the side opposite the keel. Pods relatively flat.—Sum.—VETCH. TARE. PEA-VINE.

Longer calyx-lobes shorter than the tube; peduncles elongate.

Wings with the claw shorter than the blade; standard less than 15 mm. long.

Longer calyx lobes subulate; blades of the keel-petals shorter than the claws.

1. *V. Cracca*.

Longer calyx-lobes triangular-lanceolate; blades of the keel-petals as long as or longer than the claws.

2. *V. caroliniana*.

Wings with the claw as long as or longer than the blade; standard over 15 mm. long.

3. *V. americana*.

Longer calyx-lobes longer than the tube; peduncles very short, or obsolete.

4. *V. sativa*.

1. **V. Cracca** L. Leaflets 18-24; blades linear to oblong-linear, 9-20 mm. long, acute or mucronate; calyx 5-6 mm. long; upper lobes deltoid; lower lobes lanceolate, about as long as the tube; corolla blue or purple; standard pandurate, 10.5-11.5 mm. long; keel 8-8.5 mm. long; pods 2-2.5 cm. long.—M. Occasional, in fields and waste places. Nat. of Eu.

2. **V. caroliniana** Walt. Leaflets 8-16; blades oblong to oval-oblong, 1-2 cm. long, mucronate; calyx 2.5-3 mm. long; lobes triangular; corolla white, except the blue-tipped keel; standard 9-10 mm. long; keel 5-6 mm. long; pods 2.5-3 cm. long.—S. Islands in the Susquehanna.—*Schists*.

3. **V. americana** Muhl. Leaflets 8-14; blades ovate to oblong, 1.5-4 cm. long, mucronate; racemes 4-8-flowered; calyx 6-7 mm. long; lobes triangular or deltoid, much shorter than the tube; corolla purple or purplish; standard 15-18 mm. long; pods 2.5-3.5 cm. long.—M. Rare, on shaded banks of the Conestoga Creek.—*Limestones*.

4. **V. sativa** L. Leaflets 8-14; blades linear, linear-lanceolate, or oblong, 1-4 cm. long; calyx 10-12 mm. long; corolla purple or deep-pink; standard and wings mostly over 15 mm. long; pods 4-8 cm. long.—M. Rare, in fields and on roadsides. Nat. of Eu.—SPRING VETCH.

22. **LATHYRUS** L. Plants similar to *Vicia* in habit, but usually larger; filaments usually less united; style pubescent on the side opposite the standard; pod more turgid.—Sum.—VETCHLING.

Racemes many (10-20)-flowered: leaflets 8-12; blades ovate or oval.

Racemes few (2-6)-flowered: leaflets 4-8; blades oblong or elliptic.

1. *L. venosus*.

2. *L. myrtifolius*.

1. **L. venosus** Muhl. Stems angled: leaflets 3-6 cm. long; blades ovate, oval, elliptic, or oblong: calyx 9-10 mm. long; longer lobes lanceolate, ciliate: standard obovate, 14-18 mm. long: pods 3.5-4.5 cm. long. — Lower Susquehanna valley. Rather rare, in sandy soil. — *Schists*.

2. **L. myrtifolius** Muhl. Stems angled: leaflets 2.5-4 cm. long; blades elliptic to oval: calyx 7.5-8.5 mm. long; longer lobes lanceolate, ciliate: standard cuneate, 13-16 mm. long: pods 4-6 cm. long. — M. Rare, in the Dillerville swamp, Lancaster. — *Limestones*.

Order GERANIALES.

Herbs, shrubs, or trees. Leaves alternate or opposite: blades simple or compound. Flowers perfect, monoecious, or dioecious, mostly regular. Calyx of distinct sepals. Corolla of distinct or nearly distinct petals, or rarely wanting. Androecium of as many stamens as there are sepals or twice as many, or rarely more. Gynoecium of 2 or several united carpels. Ovary superior. Fruit various.

Plants without secreting glands or cells in their tissues.

Filaments partially united.

Styles adnate around a column from which they separate at maturity.

Fam. 1. GERANIACEAE.

Styles not united around a central column.

Stamens as many as the sepals.

Fam. 2. LINACEAE.

Stamens twice as many as the sepals.

Fam. 3. OXALIDACEAE.

Filaments distinct.

Calyx irregular, one sepal spurred or saccate: anthers united over the top of the gynoecium.

Fam. 4. BALSAMINACEAE.

Calyx regular, none of the sepals spurred or saccate: anthers distinct.

Fam. 5. LIMNANTHACEAE.

Plants with secreting glands or cells which are often in the leaves or only in the bark.

Leaf-blades pellucid-punctate: fruit capsular in our species.

Fam. 6. RUTACEAE.

Leaf-blades not punctate: fruit samaroid in our species.

Fam. 7. SIMARUBACEAE.

FAMILY 1. GERANIACEAE. GERANIUM FAMILY.

Herbs, or somewhat woody plants. Leaves typically opposite: blades toothed, lobed, or divided. Flowers perfect, regular or nearly so, cymose. Calyx of 5 persistent sepals. Corolla of 5 deciduous petals. Receptacle with 5 glands. Androecium of 10, or rarely of 5, stamens. Gynoecium of 5 carpels whose styles are adnate to an elongate column from which they separate at maturity, each carpel 2-ovuled but with only 1 seed at maturity.

Carpel-bodies turgid: carpel-tails (styles) glabrous within and merely recoiling at maturity: anthers usually 10. 1. GERANIUM.

Carpel-bodies spindle-shaped: carpel-tails (styles) pubescent within and spirally coiled at maturity: anthers 5. 2. ERODIUM.

1. **GERANIUM** [Tourn.] L. Annual, biennial, or perennial herbs. Leaf-blades palmately or radially lobed, cleft, or parted. Sepals usually awn-tipped. Stamens 10 or rarely 5. Carpels thick, rounded at the base. — CRANESBILL. WILD-GERANIUM.

Corolla less than 2 cm. wide: plants annual or biennial.

Seeds smooth: sepals without subulate tips.

1. *G. molle*.

Seeds reticulate or pitted: sepals with subulate tips.

Cymes many-flowered, glomerate: carpel-bodies pubescent: style-beak and branches less than 3 mm. long.

2. *G. carolinianum*.

Cymes few-flowered, open: carpel-bodies glabrous: style-beak and branches over 4 mm. long.
 Corolla over 2 cm. wide: plants perennial by rootstocks.

3. *G. columbinum*.
 4. *G. maculatum*.

1. ***G. molle*** L. Stems spreading or decumbent, 1-5 dm. long, softly pubescent: leaf-blades 2-6 cm. wide: sepals 3-4 mm. long, the outer ovate to elliptic-ovate: petals somewhat longer than the sepals: carpel-bodies 2-2.5 mm. long, wrinkled. — M. Occasional, in fields and on roadsides. Nat. of Eu. — Sum.

2. ***G. carolinianum*** L. Stems erect, 2-5 dm. tall, glandular-pubescent: leaf-blades 3-6 cm. wide: sepals 6-10 mm. long, the outer ovate: petals about as long as the sepals, usually pink: carpel-bodies 3-3.5 mm. long. — Common, on dry banks and in thickets. — Sum.

3. ***G. columbinum*** L. Stems diffuse, mostly 1-4 dm. tall, sparingly pubescent: leaf-blades 2-4 cm. wide: sepals 9-12 cm. long, the outer lanceolate: petals rose-purple, somewhat longer than the sepals: carpel-bodies 3-3.5 mm. long. — S. River banks and roadsides. Nat. of Eu. — Early sum.

4. ***G. maculatum*** L. Stems 2-6 dm. tall, retrorse-pubescent: leaf-blades 5-12 cm. wide: sepals 8-10 mm. long, elliptic to elliptic-lanceolate or oblong: petals 1-1.5 cm. long: carpel-bodies 3-3.5 mm. long; style-column 2-3 cm. long. — Common, on roadsides and in thickets and woods. — Sum. — WILD-CRANESBILL.

2. **ERODIUM** L'Her. Annual or perennial herbs. Leaf-blades toothed, pinnatifid, or pinnately parted. Sepals awn-tipped, the tips sometimes bristle-appendaged. Stamens 5, accompanied by 5 staminodia. Carpel-bodies narrow, acute at the base.

1. ***E. cicutarium*** (L.) L'Her. Branches villose and viscid: leaf-blades oblong in outline; petioles shorter than the blades: sepals oblong, 4-5 mm. long: petals hardly longer than the sepals: carpel-bodies 4-6 mm. long, the beak 2-4 cm. long. — S. Rare, in fields near Wakefield. Nat. of Eu. — Spr. and sum. — STORKSBILL. PINE-NEEDLES.

FAMILY 2. LINACEAE. FLAX FAMILY.

Herbs or woody plants, the sap bland. Leaves alternate or opposite: blades simple. Flowers perfect, regular. Calyx of 4-6 deciduous or persistent sepals. Corolla of 4-6 ephemeral petals. Receptacle glandular. Androecium of 4-6 stamens, often with staminodia: filaments united at the base. Gynoecium of 2-5 partially united carpels, the styles wholly or partially distinct. Fruit capsular.

Stigmas introrse and more or less elongate: sepals glandless. 1. LINUM.
 Stigmas terminal and capitate: sepals, at least the inner ones, with marginal glands. 2. CATHARTOLINUM.

1. **LINUM** [Tourn.] L. Herbs. Leaves alternate, without stipules. Sepals 5, glabrous, or the inner ones sometimes ciliate. Petals blue or rarely white, unappendaged. Androecium of 5 stamens and 5 short staminodia. Styles 5, distinct. Capsule 5-celled and with incomplete partitions, the carpels ridged on the back.

1. ***L. usitatissimum*** L. Stems 2-9 dm. tall: leaves relatively few, long and thin; blades long-pointed: corolla blue, 1.5-2 cm. wide: capsules 7-10 mm. long. — Occasional, in fields, on roadsides and railroads. Nat. of Eu. — Sum. — COMMON-FLAX.

2. CATHARTOLINUM Reichenb. Herbs. Leaves alternate or occasionally opposite, sometimes with stipular glands. Sepals 5, the inner ones at least with gland-tipped teeth. Petals yellow, sometimes pubescent within near the base. Androecium of 5 stamens, generally without staminodia. Styles 5, distinct or united. Capsule 5-celled, or completely or incompletely 10-celled by false partitions. — Sum. — YELLOW-FLAX.

Calyx as long as the capsule or shorter; sepals entire at maturity, the inner ones sometimes erose on account of the deciduous glandular hairs.

Outer sepals 2-2.5 mm. long at maturity: stem paniculately branched.

Outer sepals 3-3.5 mm. long at maturity: stem corymbosely branched.

Calyx exceeding the capsule; inner sepals strongly toothed.

1. *C. striatum*.

2. *C. virginianum*.

3. *C. medium*.

1. **C. striatum** (Walt.) Small. Stems 2-8 dm. tall, paniculate, winged below the nodes: leaves mainly opposite; blades oblong or elliptic, 1-3 cm. long: outer sepals lanceolate to oblong-lanceolate, 2-2.5 mm. long; inner sepals ovate to suborbicular: capsules depressed-globose, 2 mm. broad. — M. S. Not common, in low grounds and swamps. — *Limestoncs, schists*.

2. **C. virginianum** (L.) Small. Stems 2-6 dm. tall, corymbose above, the branches long: leaves mainly alternate, spreading; blades thinnish, spatulate or oblanceolate to elliptic, 1-3 cm. long: outer sepals lanceolate to oblong-lanceolate, 3-3.5 mm. long; inner sepals rather broader than the outer: capsules depressed, 2 mm. broad. — Common, on roadsides and in thickets.

3. **C. medium** (Planch.) Small. Stems 3-6 dm. tall, corymbose above, the branches rigid: leaves mainly alternate, erect or appressed; blades spatulate to linear-elliptic or linear-lanceolate, 0.6-2 cm. long: outer sepals oblong to lanceolate, 2-4 mm. long: capsules depressed-globose, 2-3 mm. broad. — S. Not common, on hillsides and roadsides, and in thickets. — *Schists, serpentine*.

FAMILY 3. OXALIDACEAE. WOOD-SORREL FAMILY.

Herbs or rarely shrubs, the sap sour. Leaves mostly alternate: blades 3-foliolate or 1-foliolate, the leaflets commonly notched at the apex. Flowers perfect, essentially regular, cymose. Calyx of 5 persistent sepals. Corolla of 5 white or colored petals. Androecium of 10-15 unequal stamens: filaments united at the base. Gynoecium of 5 partially united carpels: styles distinct. Fruit a loculicidal capsule, rarely baccate.

Plants acaulescent, with coated bulbs: sepals tubercled at the apex.

1. **IONOXALIS**.

Plants caulescent, with fibrous roots or elongate rootstocks: sepals without apical tubercles.

2. **XANTHOXALIS**.

1. **IONOXALIS** Small. Erect herbs. Leaf-blades palmately 3-10-foliolate: leaflets with tubercles in the apical sinus. Flowers usually borne in umbel-like cymes. Sepals tubercled at the apex. Petals violet, blue, red, or white.

1. **I. violacea** (L.) Small. Plants 5-35 cm. tall: leaflets 3; blades 6-16 mm. long: scapes glabrous: sepals oblong to ovate-oblong: petals rose-purple or rarely white: capsules 4-5 mm. long. — Common, in woods and on shaded banks. — Spr. — **VIOLET WOOD-SORREL**.

2. **XANTHOXALIS** Small. Herbs. Leaf-blades palmately 3-foliolate: leaflets not tubercled at the apical sinus. Flowers in umbel-like or dichotomous cymes. Sepals 5, the inner narrower than the outer ones. Filaments glabrous

or the longer ones pubescent. Capsules elongate, erect. — SOURGRASS. YELLOW WOOD-SORREL.

Pedicels appressed-pubescent.

Longer filaments glabrous.

Longer filaments pubescent.

Cymes typically 1-flowered: leaves numerous; leaflets small, 4-8 mm. wide.

Cymes typically several-flowered: leaves few; leaflets large, 10-16 mm. wide.

Pedicels loosely pubescent.

1. *X. stricta*.

2. *X. filipes*.

3. *X. Brittoniae*.

4. *X. cymosa*.

1. ***X. stricta*** (L.) Small. Stems sometimes tufted: leaflets glabrous or with scattered hairs: sepals oblong to linear-lanceolate, sparingly ciliate, and more or less pubescent on the back: petals pale-yellow: capsules 16-30 cm. long. — Rather common, on banks and in fields and waste places. — Spr. and sum.

2. ***X. filipes*** Small. Stems usually tufted on the slender rootstock: leaves mostly clustered, usually irregularly so; blades of the leaflets mainly 4-8 mm. wide, glabrous or sparingly pubescent: sepals lanceolate to oblong-lanceolate: petals 5-9 mm. long, light-yellow: capsules slender, 8-12 mm. long. — S. Rare, on the islands and shores of the Susquehanna. — *Schists*. — Spr. and sum.

3. ***X. Brittoniae*** Small. Stems 1-4 dm. tall, loosely pubescent: leaves not clustered; blades of the leaflets 10-16 mm. wide: cymes dichotomous when well developed: sepals 3.5-5.5 mm. long, ciliate all around: petals 5-10 mm. long, bright-yellow: capsules 7-12 mm. long. — S. Frequent, on banks. — *Schists*. — Sum.

4. ***X. cymosa*** Small. Stems 2-11 dm. tall, loosely pubescent: leaflets 10-27 mm. wide: cymes dichotomous: sepals 3-4 mm. long: petals 7-10 mm. long, deep-yellow: filaments glabrous: capsules slender. — Common, in thickets, cultivated ground and waste places. — Sum.

FAMILY 4. BALSAMINACEAE. JEWEL-WEED FAMILY.

Herbs with succulent tissues. Leaves mostly alternate: blades simple. Flowers perfect, irregular. Calyx of 3 sepals (2 obsolete), the posterior one petaloid, saccate and spurred, all deciduous. Corolla of 5 petals, the lateral pair on each side united. Receptacle glandless. Androecium of 5 stamens: filaments appendaged and partially united. Gynoecium of 5 united carpels. Styles very short or wanting. Fruit an elastically bursting capsule.

1. **IMPATIENS** [Rivinius] L. Herbs with stems enlarged at the nodes. Capsules drooping. — Sum. and fall. — TOUCH-ME-NOT.

Flowers in peduncled panicles: outer sepals broad: capsules elongate, glabrous.

Spur incurved, $\frac{2}{3}$ as long as the sac, or more: sac longer than broad.

Spur at right angles to the sac, $\frac{1}{4}$ as long as the sac, or less:

sac as broad as long.

Flowers in sessile clusters: outer sepals narrow: capsules short, pubescent.

1. *I. biflora*.

2. *I. pallida*.

3. *I. Balsamina*.

1. ***I. biflora*** Walt. Plants 1-2 dm. tall: leaf-blades ovate to elliptic, 2-12 cm. long, deep-green: sepals, and petals, orange, the saccate sepal conic, longer than wide. — Common, in swamps and on banks of spring-runs.

2. ***I. pallida*** Nutt. Similar to *I. biflora* in habit, the foliage paler: sepals, and petals, yellow, the saccate sepal cup-like, about as wide as long. — Not as common as No. 1, on rich shaded hillsides.

3. ***I. Balsamina*** L. Plants 3-6 dm. tall, the stem succulent, finely pubescent: leaf-blades oval or oblong to elliptic-spatulate, those of the upper leaves larger

than the lower ones, more or less acuminate at both ends, rather sharply serrate: flowers variously-colored: capsules ovoid or oblong-ovoid, 2-3 cm. long, pubescent. — Occasional, in waste places and about gardens. Nat. of E. Indies. —GARDEN BALSAM.

FAMILY 5. **LIMNANTHACEAE.** FALSE-MERMAID FAMILY.

Herbs with tender tissues. Leaves alternate: blades pinnately divided. Flowers perfect, axillary. Calyx of 2-5 sepals. Corolla of 2-5 petals. Androecium of 4-10 stamens. Gynoecium of 2-5 carpels united only by their bases and styles. Fruit 2-5-lobed, fleshy, the carpels separating as achenes.

1. **FLOERKEA** Willd. Annual diffuse herbs. Leaf-segments narrow. Flowers inconspicuous. Sepals 3. Petals 3, white. Stamens 6. Ovary 3-celled. Achenes 1-3, rough.

1. **F. proserpinacoides** Willd. Stems decumbent, 1-4 dm. long: leaves 2-8 cm. long, the segments 3-5, distant: sepals ovate-lanceolate to lanceolate, 3 mm. long: petals oblong-obovate, 1.5 mm. in diameter: achenes subglobose, 2-2.5 mm. in diameter. — M. Local, on shaded creek-banks near Lancaster. — *Limestones*. — Spr.

FAMILY 6. **RUTACEAE.** RUE FAMILY.

Shrubs or trees, or rarely herbs, often prickly-armed, and with glandular-punctate tissues. Leaves alternate or opposite: blades simple or pinnately compound, sometimes 1-foliolate. Flowers perfect or polygamous, mostly regular. Calyx of 3-5, or rarely more, sepals, or wanting. Corolla of 3-5, or rarely more, petals. Androecium of as many stamens as there are sepals or petals or rarely thrice as many. Gynoecium of 2-5 distinct or united carpels. Fruit capsular, samaroid, drupaceous, or baccate.

1. **ZANTHOXYLUM** L. Shrubs or trees. Leaf-blades pinnate, sometimes 1-foliolate. Flowers polygamous, in axillary cymes. Sepals present or wanting. Petals 4 or 5, mostly erect. Mature carpels solitary, or 2-5 together. — PRICKLY-ASH.

1. **Z. americanum** Mill. Shrub 1-3 m. tall, with prickly branches: leaves 1-3 dm. long; leaflets 4-8 cm. long, the blades ovate, oblong or rarely oval: corolla 3-3.5 mm. wide: capsules 4-5 mm. in diameter. — M. S. Not common, in thickets and on banks. — *Limestones*, *schists*. — Spr. — NORTHERN PRICKLY-ASH. TOOTHACHE-TREE.

FAMILY 7. **SIMAROUBACEAE.** AILANTHUS FAMILY.

Shrubs or trees, or rarely herbs. Leaves alternate or rarely opposite: blades pinnately compound, 1-3-foliolate, or rarely simple. Flowers polygamous, deciduous, or rarely perfect, solitary, spicate, racemose, or paniculate. Calyx of 3-5 sepals. Corolla of 3-5 petals, or wanting. Androecium of as many stamens as there are sepals or twice as many, or rarely very many. Gynoecium of 2-5 more or less united carpels. Ovary usually lobed. Stigmas mostly introrse. Fruit a drupe or a samara, or baccate.

1. **AILANTHUS** Desf. Trees. Leaf-blades unequally pinnate, the leaflets thin. Flowers polygamo-dioecious, paniculate. Sepals 5, short. Petals 5,

valvate, much larger than the sepals. Stamens 10, unappendaged at the base. Ovary 2-5-celled, deeply lobed at the apex: style columnar. Fruit a cluster of 5, or fewer, samaras with the style-bases lateral.

1. *A. glandulosa* Desf. Tree becoming 30 m. tall: leaflets 13-41; blades lanceolate to oblong-lanceolate, 7-18 cm. long: samaras 4-5 cm. long, linear-elliptic, numerous in drooping clusters, the seed in the middle. — M. Frequent, on the banks of the Conestoga Creek. Nat. of As. — Sum. — TREE-OF-HEAVEN.

Order POLYGALALES.

Herbs, shrubs, or trees. Leaves alternate, opposite, or whorled, sometimes scale-like. Flowers perfect. Perianth mostly irregular, each whorl of 5, or rarely 3 or 4, parts. Androecium of 6, 8, or 10 stamens, the filaments often partially united. Anthers opening by terminal pores or cracks. Gynoecium of 2 united carpels, or rarely of more. Fruit capsular.

FAMILY 1. POLYGALACEAE. MILKWORT FAMILY.

Herbs, or rarely shrubs or trees. Leaf-blades mostly entire. Flowers solitary, spicate, or racemose, irregular. Calyx of mostly 5 sepals, the 2 inner petaloid. Corolla of 5, or often of 3, small, partially united petals, the lower one keel-like. Androecium of 6-8 stamens, partially coherent with the petals. Anthers 1-celled. Capsule usually 2-seeded.

1. **POLYGALA** [Tourn.] L. Herbs or woody plants. Leaf-blades mostly entire. Spikes or racemes lax or dense. Sepals 5, the 2 lateral ones (wings) larger than the others. Petals 3, or rarely 5, the middle one (keel) commonly lobed or crested at the apex. Stamens 8 or 6: filaments united into a tube or into 2 sets. Style curved. Capsule flattened. Seed usually carunculate. — MILKWORT.

Flowers 1 or few, axillary to leaf-like-bracts, individually showy. 1. *P. paucifolia*. Flowers several or many, in terminal, often spike-like racemes, not individually showy.

Leaves alternate.

Wings suborbicular: plants perennial.

Wings decidedly longer than wide: plants annual.

Petals united into a long cleft tube: keel long-clawed.

Petals not united into a long tube: keel short-clawed.

Bracts persistent: wings of an elliptic type.

Bracts deciduous: wings of a broadly ovate type.

Leaves mainly opposite or whorled.

Wings obtuse: bracts deciduous: keel short-clawed: racemes slender.

Branches mostly alternate: racemes long-peduncled: flowers purplish or greenish-purple.

Branches mostly opposite or whorled: racemes short-peduncled: flowers green or greenish.

Wings acuminate: bracts persistent: keel long-clawed: racemes stout.

2. *P. Senega*.

3. *P. incarnata*.

4. *P. Nuttallii*.

5. *P. viridescens*.

6. *P. ambigua*.

7. *P. verticillata*.

8. *P. cruciata*.

1. *P. paucifolia* Willd. Plants 0.5-2 dm. tall: leaf-blades various, those of the lower leaves scale-like, those of the upper elliptic, oval, or ovate: bracts similar to the upper leaves: flowers rose-colored, rose-purple, or white: sepals 4-6 mm. long: wings spatulate to obovate, 10-18 mm. long: keel 15-20 mm. long, the claw longer than the body: lateral petals 15-20 mm. long: capsules suborbicular or orbicular-obovate, 5-8 mm. wide. — S. Occasional, on banks of the Octoraro Creek. — *Schists*. — Spr. — FLOWERING-WINTERGREEN. FRINGED-POLYGALA.

2. *P. Senega* L. Plants 1-5 dm. tall: blades of the upper leaves linear to lanceolate or ovate, more or less serrulate: flowers greenish-white: sepals 1.5-2 mm. long: wings orbicular-obovate or suborbicular, 2-3 mm. long, obtuse: keel about as long as the wings, short-clawed: lateral petals 2-3 mm. long: capsules broader than long, 3.5-4.5 mm. long. — M. Rare, in woods. — *Limestones*. — Spr. — SENECA-SNAKEROOT.
3. *P. incarnata* L. Plants 2-7 dm. tall: blades of the upper leaves linear-subulate to subulate: flowers pink, purple, or white: sepals 2-2.5 mm. long, acute: wings lanceolate to spatulate, 3-4 mm. long: keel 6-8 mm. long, the claw longer than the body: lateral petals 5-7 mm. long: capsules ovoid, 3-4 mm. long. — S. Rare, in swamps and low grounds. — *Schists*. — Sum.
4. *P. Nuttallii* T. & G. Plants 1-2.5 dm. tall: blades of the lower leaves linear-spatulate, those of the upper ones narrowly linear: flowers purplish or greenish: sepals about 1 mm. long or less: wings elliptic or elliptic-lanceolate, 2-2.5 mm. long: keel about as long as the wings: lateral petals about 2 mm. long: capsules about 1.5 mm. long: earuncle about $\frac{1}{3}$ as long as the seed. — S. Rather common, on moist banks and roadsides. — *Schists*. — Sum.
5. *P. viridescens* L. Plants 1-5 dm. tall: blades of the lower leaves spatulate, those of the upper ones linear to linear-oblong: flowers reddish-purple, green, or white: sepals 1.5-2 mm. long: wings broadly ovate or oval, 4-6 mm. long: keel 2.5-3 mm. long: lateral petals much shorter than the wings: capsules about 2 mm. long: earuncle usually fully $\frac{1}{2}$ as long as the seed. — N. S. Common, on banks and in moist places. — *Sandstones and shales, schists*. — Sum.
6. *P. ambigua* L. Plants 1-3 dm. tall: blades of the lower leaves spatulate to linear-spatulate, those of the upper ones linear, usually narrowly so: flowers purplish or greenish-purple: sepals about 1 mm. long or less: wings suborbicular, 1.5-2 mm. wide: keel 1.5-2 mm. long: capsules suborbicular, fully 1.5 mm. long. — Common, in fields and on roadsides, and in woods. — Sum.
7. *P. verticillata* L. Plants 0.5-3 dm. tall: blades of the lower leaves spatulate, those of the upper ones linear to linear-lanceolate: sepals 1.5 mm. long or less: wings ovate to obovate, 1-1.5 mm. long: keel about 1.5 mm. long: capsules broadly oblong to ovoid-oblong, 2 mm. long. — S. Rather common, in fields and on roadsides, and in woods. — Sum.
8. *P. cruciata* L. Plants 0.5-4 dm. tall: blades of the lower leaves spatulate or obovate, those of the upper ones linear-spatulate or almost linear: flowers rose-purplish or greenish: sepals not ciliate, 1.5-2 mm. long: wings deltoid or hastate-deltoid, 4.5-6 mm. long, eaudate-acuminate: capsules obovate or cuneate-obovate. — S. Rare, in swamps and low grounds. — *Schists*. — Sum.

Order EUPHORBIALES.

Herbs, shrubs, or trees, sometimes aquatic or amphibious, but mainly terrestrial, commonly with milky juice. Leaves various, sometimes reduced to scales, or almost wanting. Flowers mainly monoecious or dioecious, regular. Calyx of several sepals. Corolla of several petals, or often wanting. Androecium of more than one stamen, except when the staminate flowers are scattered over the inside of an involuere. Filaments distinct or united into a column. Anthers opening by longitudinal or transverse valves. Gynoecium of 2, 3, or 4, or rarely more, united carpels, superior. Styles, or stigmas, usually distinct and cleft or foliaceous, united by pairs in *Callitrichaceae*. Ovules 1, 2, or 3 in each cavity. Fruit

capsular; sometimes achene-like, drupaceous or baccate. Seeds often carunculate.

Styles or stigmas distinct or mainly so, cleft or foliaceous: ovary 3-celled or rarely 1- or 2-celled: stamens several, except when on the inside of an involucre.

Fam. 1. EUPHORBIACEAE.

Styles united by pairs: ovary 4-celled: stamen solitary. Fam. 2. CALLITRICHACEAE.

FAMILY 1. EUPHORBIACEAE. SPURGE FAMILY.

Herbs, shrubs, or trees often with milky sap. Leaves opposite, whorled, or alternate: blades entire, toothed, or lobed. Flowers monoecious or dioecious, solitary, or variously clustered, or much reduced and in an involucre (*Chamaesyce* and genera following). Calyx of 2-several sepals, or obsolete. Corolla of 2-several petals, or wanting. Androecium of few-many stamens. Gynoecium of 3 or many united carpels, or 1-carpellary. Fruit capsular or drupaceous.

Flowers not borne in an involucre: calyx of several sepals.

Ovules, and seeds, 2 in each carpel.

1. PHYLLANTHUS.

Ovule, and seed, 1 in each carpel.

Leaf-blades not peltate: inflorescence spicate: stamens few: filaments not forked.

2. ACALYPHA.

Leaf-blades peltate: inflorescence racemose or paniculate: stamens very numerous: filaments much forked.

3. RICINUS.

Flowers borne in involucre: calyx a minute scale or obsolete.

Glands of the involucre with petal-like appendages.

Leaves opposite, stipulate: blades inequilateral: inflorescence axillary or clustered

4. CHAMAESYCE.

Leaves alternate or scattered, without stipules: blades equilateral: inflorescence umbel-like.

5. TITHYMALOPSIS.

Glands of the involucre without petal-like appendages, entirely naked, sometimes with crescent-like horns.

Stem topped by an umbel: stipules none: involucre in open cymes, each with 4 glands and entire or toothed lobes.

6. TITHYMALUS.

Stem not topped by an umbel: stipules gland-like: involucre in cluster-like cymes, each with a single gland or rarely 4 glands and fimbriate lobes.

7. POINSETTIA.

1. **PHYLLANTHUS** L. Herbs or partially woody plants. Leaf-blades entire. Flowers apetalous. Staminate flowers with 5 or 6 sepals and usually 3 stamens. Pistillate flowers with 5 or 6 sepals and a 3-celled ovary. Fruit capsular.

1. **P. carolinensis** Walt. Plants 1-5 dm. tall, the stem glabrous: leaf-blades obovate to oblong-obovate, rather gradually narrowed to the base: staminate calyx 1.5 mm. wide; sepals suborbicular: mature pistillate calyx 2.5 mm. wide; sepals oblong to oblong-spatulate: capsules about 2 mm. wide. — S. Rare, on river-banks and roadsides. — *Schists*. — Sum.

2. **ACALYPHA** L. Herbs or shrubs. Leaf-blades entire or toothed. Flowers monoecious or sometimes dioecious. Staminate flowers with 4 sepals and 8-16 stamens. Pistillate flowers with 3-5 sepals and a 3-celled ovary, each subtended by a foliaceous bract. Fruit a capsule.

1. **A. virginica** L. Stems 1-7 dm. tall: leaf-blades ovate or elliptic, 2-10 cm. long, serrate: larger bracts about 2 cm. long, lobed: capsules about 3 mm. in diameter: seeds nearly 2 mm. long. — Common, in waste places, thickets and woods. — Sum. — THREE-SEEDED MERCURY.

3. **RICINUS** [Tourn.] L. Herbs, shrubs, or trees. Leaf-blades peltate, palmately lobed. Flowers monoecious, apetalous. Staminate flowers with 3-5

sepals and numerous stamens. Pistillate flowers with caducous sepals and a 3-celled ovary. Fruit a capsule.

1. **R. communis** L. Plants herbaceous or shrubby, 1-5 m. tall, or larger southward; leaf-blades nearly orbicular, 6-11-lobed: capsules 12-16 mm. in diameter, echinate. — M. Occasional, in waste places and about gardens. Nat. of the tropics. — Sum. — CASTOR-BEAN. CASTOR-OIL PLANT.

4. **CHAMAESYCE** S. F. Gray. Annual or perennial herbs, or shrubs. Leaves opposite: blades oblique at the base. Involucres axillary or in axillary cluster-like cymes, each with 4 nearly naked or appendaged glands, one sinus being glandless. Capsules smooth, sometimes pubescent. Seeds smooth or transverse-wrinkled. — Sum. — SPURGE.

Plants branched at the base, the branches prostrate: capsules less than 2 mm. wide: involucre-appendages minute.

Capsules pubescent: involucre not split: stem and branches with appressed hairs. 1. *C. maculata*.

Capsules glabrous: involucre split on one side: stem and branches with spreading hairs. 2. *C. Rafinesquei*.

Plants not branched at the base, erect or ascending: capsules over 2 mm. wide: involucre-appendages relatively large. 3. *C. Preslii*.

1. **C. maculata** (L.) Small. Stem and branches puberulent or pilose: leaf-blades oblong or ovate-oblong, 8-12 mm. long: involucres mostly 1 mm. long, pubescent; appendages white or red, narrow, nearly equal, entire: capsules less than 1.5 mm. wide, pubescent: seeds nearly 1 mm. long, black beneath the pale coating. — Common, in cultivated and waste grounds. — MILK-PURSLANE.

2. **C. Rafinesquei** (Greene) Small. Stem and branches hirsute: leaf-blades oblong, oblong-ovate, or ovate, 4-14 cm. long, obtuse or acute, light-green above, pale-green and with scattered hairs beneath, serrate, short-petioled: involucres about 1 mm. long, glabrous; appendages obscure or very narrow and pale: capsules globose-ovoid, less than 2 mm. wide, glabrous: seeds less than 1.5 mm. long, red beneath the gray coating. — Local, on dry banks on and near the Welch mountains. — *Quartzite*.

3. **C. Preslii** (Guss.) Arthur. Stem and branches glabrous or nearly so: leaf-blades oblong or linear-oblong, varying to ovate or obovate, 1.5-3.5 cm. long, usually red-margined: involucres in loosely clustered cymes; appendages usually white, entire: capsules fully 2 mm. wide. — Common, in fields and waste places.

5. **TITHYMALOPSIS** Kl. & Gareke. Perennial herbs often topped by an umbel. Leaf-blades entire. Involucres scattered or somewhat clustered in an umbel-like inflorescence, each with appendaged glands. Capsule smooth. Seeds punctate.

1. **T. corollata** (L.) Small. Plants bright-green, 2-9 dm. tall: leaf-blades linear, oblong, or oblong-spatulate, 2-4 cm. long: involucres numerous, conspicuous, 1-1.5 mm. long: appendages white, mostly cuneate or orbicular-cuneate: capsules exerted, 3.5-4.5 mm. broad: seeds 2.5 mm. long. — Common, in fields and thickets, and on roadsides. — Sum. — FLOWERING-SPURGE.

6. **TITHYMALUS** Adans. Annual or perennial herbs or partially woody plants topped by an umbel. Leaf-blades entire or finely toothed. Stipules wanting. Involucres in open or compact cymes, each with 4 naked or appendaged glands. Capsule smooth or tuberculate. Seeds pitted. — Sum. — SPURGE.

Leaves mainly opposite and decussate: capsules 10 mm. wide and more.

- Leaves alternate or scattered: capsules less than 10 mm. wide.
- | | |
|---|-----------------------------|
| Leaf-blades serrulate: involucre with oblong, oval, or orbicular glands: plants annual. | 1. <i>T. Lathyrus</i> . |
| Leaf-blades entire: involucre with reniform or crescent-shaped glands: plants annual, biennial, or perennial. | 2. <i>T. Helioscopia</i> . |
| Plants annual or biennial: seeds pitted. | |
| Capsules with 2-crested carpels: seeds with 1-4 series of pits. | 3. <i>T. Peplus</i> . |
| Capsules with rounded carpels: seeds pitted all over. | 4. <i>T. commutata</i> . |
| Plants perennial: seeds smooth. | |
| Glands of the involucre oblong: leaf-blades broad. | 5. <i>T. Darlingtonii</i> . |
| Glands of the involucre lunate: leaf-blades narrow. | 6. <i>T. Cyparissias</i> . |

1. **T. Lathyrus** (L.) Hill. Stems 2-12 dm. tall: blades of the upper leaves lanceolate to linear-lanceolate, 3.5-12 cm. long: bracts ovate to ovate-lanceolate: involucre 4-5 mm. long; lobes triangular, toothed at the apex, surpassing the broad crescent-shaped glands: capsules 10-12 mm. broad: seeds oblong-ovoid, 5-6 mm. long, wrinkled. — M. S. Occasional, on roadsides and about gardens. Nat. of Eu. — MOLE-PLANT. CAPER-SPURGE. MYRTLE-SPURGE.

2. **T. Helioscopia** (L.) Hill. Stems 1-3.5 dm. tall: leaf-blades spatulate to cuneate, 1.5-4 cm. long, finely toothed near the rounded or emarginate apex: bracts of the rays cuneate to oblong-cuneate: involucre turbinate-campanulate, about 1.5 mm. high, short-peduncled: glands transversely oval, about 0.5 mm. wide, unappendaged: capsules about 4 mm. broad, the lobes rounded: seeds ovoid, nearly 2 mm. long, finely reticulate. — S. Occasional, in fields. Nat. of Eu. — WARTWEED.

3. **T. Peplus** (L.) Hill. Stems erect, 1-3 dm. tall: leaf-blades oblong or obovate, 1-4 cm. long: bracts ovate or triangular-ovate: involucre 1-1.5 mm. long; horns less than 1 mm. long: capsules 2.5-3 mm. broad, smooth: seeds oblong or ovoid-oblong, 1.5 mm. long or less, with 1-4 series of pits. — M. Occasional, on roadsides and fields. Nat. of Eu. — PETTY-SPURGE.

4. **T. commutatus** (Engelm.) Kl. & Garcke. Stems decumbent, 1-4 dm. long: leaf-blades spatulate to ovate, 1-4 cm. long: bracts reniform or ovate-reniform: involucre 2.5 mm. long; horns 1 mm. long or nearly so: capsules 3.5-4 mm. broad, smooth: seeds ovoid, fully 2 mm. long, or sometimes smaller, irregularly pitted. — S. Frequent, in woods, especially near Safe Harbor. — *Schists*.

5. **T. Darlingtonii** (A. Gray) Small. Stems 3-15 dm. tall: leaves few; blades oblanceolate to oblong-lanceolate, 3.5-10 cm. long: bracts broadly ovate to reniform: involucre 3-4 mm. long; lobes ovate or quadrate, toothed or often notched; glands oblong: capsules 8-9 mm. broad, warty: seeds ovoid-globose, 3-4 mm. long. — S. Rare, in woods and thickets. — *Schists*.

6. **T. Cyparissias** (L.) Hill. Stems often tufted, 1-3 dm. tall: leaves very numerous; blades linear, 2-4 cm. long, acute or acutish, entire: bracts ovate, deltoid or reniform: involucre campanulate, about 2 mm. long, sessile: glands lunate, nearly 1 mm. wide: capsules 3-lobed, about 3 mm. wide, granular, the lobes rounded: seeds ovoid, nearly 2 mm. long, smooth. — Frequent, on roadsides and in waste places. Nat. of Eu. — CYPRESS-SPURGE.

7. **POINSETTIA** Graham. Annual or perennial herbs, or woody plants. Leaf-blades entire, toothed, or lobed. Stipules present. Involucre solitary or eymose, each with 1, or rarely 3 or 4, unappendaged glands. Capsule smooth. Seeds tuberculate.

1. **P. dentata** (Michx.) Small. Stems 2-4 dm. tall, pubescent: leaf-blades 1-9 cm. long, ovate, lanceolate, or nearly linear: involucre 2.5-3 mm. long; glands usually solitary: capsules 4-4.5 mm. broad: seeds prominently tuberculate. — M. Rare, along the Conestoga Creek, Lancaster. Nat. of the West. — Not recently collected. — Sum.

FAMILY 2. **CALLITRICHACEAE.** WATER-STARWORT FAMILY.

Herbs, often aquatics, with tender tissues. Leaves opposite: blades entire, 3-nerved. Flowers polygamous, minute, axillary, often minutely bracted. Calyx wanting. Corolla wanting. Androecium of a single stamen. Gynoecium of 4 united carpels. Ovary 4-celled. Fruit leathery, indeliscient, 4-lobed.

1. **CALLITRICHE** L. Aquatic or more or less amphibious plants, the opposite leaves often approximate or congested at the ends of the stem and branches. Flowers inconspicuous.

1. **C. palustris** L. Aquatic, the foliage scaly: blades of the submersed leaves linear, those of the emersed ones spatulate, shorter than the submersed ones: flower-stalks with 2 scales: fruit obovoid, about 1.5 mm. long. — Common, in ponds and streams. — Spr. and sum. — WATER-STARWORT.

Order **SAPINDALES.**

Shrubs or trees. Leaves various: blades simple and entire or toothed, or compound. Calyx of distinct sepals. Corolla of distinct petals, regular or rarely irregular, or wanting. Androecium of as many stamens as there are petals, or of twice as many, or rarely of more or fewer. Filaments distinct. Gynoecium of a single carpel, or of several united carpels. Ovary superior. Ovules 1 or 2, or several, in each cavity of the ovary, pendulous, with the raphe away from the axis of the ovary, or erect or ascending. Fruit various.

Ovary 1-celled (in our plants): fruit a drupe.

Ovary 2-several-celled: fruit various.

Leaf-blades simple: pinnately veined.

Seed without an aril: fruit drupaceous.

Seed with an aril: fruit capsular.

Leaf-blades simple, palmately veined, or compound.

Leaves opposite.

Fruit a capsule.

Flowers regular: fruit a bladderly 3-lobed capsule.

Flowers irregular: fruit a leathery globular capsule.

Fruit a 2-winged samara.

Leaves alternate.

Fam. 1. SPONDIACEAE.

Fam. 2. AQUIFOLIACEAE.

Fam. 3. CELASTRACEAE.

Fam. 4. STAPHYLEACEAE.

Fam. 5. AESCULACEAE.

Fam. 6. ACERACEAE.

Fam. 7. SAPINDACEAE.

FAMILY 1. **SPONDIACEAE.** SUMAC FAMILY.

Shrubs, trees, or vines, with milky, resinous, often acid or caustic, sap. Leaves alternate: blades simple or pinnately compound. Flowers monoecious, dioecious, or polygamous. Calyx of 3-5 sepals. Corolla of 3-5 petals larger than the sepals. Androecium of 3-6, or rarely more, stamens. Gynoecium of 1 carpel or of 3-5 more or less united carpels. Fruit a drupe.

Flowers in terminal compact panicles: drupe with a dark-pubescent outer coat: stone smooth. 1. RHUS.

Flowers in lax axillary panicles: drupe with a glabrous or pale-pubescent outer coat: stone ribbed. 2. TOXICODENDRON.

1. **RHUS** L. Shrubs or trees. Leaf-blades pinnately compound, several-foliolate. Flowers polygamous, borne in terminal, compact panicles. Sepals commonly 5. Petals commonly 5. Ovary pubescent. Style short. Drupe pubescent. Stone smooth and even. — Sum. — SUMAC.

Rachis of the leaf winged.

Rachis of the leaf not winged.

Leaves and twigs copiously bristly pubescent: leaflets not glaucous.

Leaves and twigs glabrous or nearly so: leaflets glaucous beneath.

1. *R. copallina*.

2. *R. hirta*.

3. *R. glabra*.

1. ***R. copallina*** L. Shrub, or tree becoming 10 m. tall: leaflets 9–21; blades oblong to oblong-lanceolate or sometimes oval, 3–10 cm. long: stone of the drupe about 4 mm. long. — Common, in old fields, thickets and waste places. — DWARF-SUMAC.

2. ***R. hirta*** (L.) Sudw. Shrub, or tree becoming 12 m. tall: leaflets 11–31; blades oblong to lanceolate, or that of the terminal one ovate-lanceolate, 4–15 cm. long: petals about 3 mm. long: drupes bristly, the stone 3–3.5 mm. long. — Common, on roadsides and hillsides, and in thickets. — STAGHORN-SUMAC.

3. ***R. glabra*** L. Shrub, or tree becoming 2–4 m. tall: leaflets 11–31; blades oblong or lanceolate (that of the terminal one often ovate), 3–8 cm. long: petals about 2 mm. long: drupes velvety, the stone 3–3.5 mm. long. — Common, in fields and thickets. — SMOOTH-SUMAC.

2. **TOXICODENDRON** [Tourn.] Mill. Shrubs, trees, or vines, with poisonous sap. Leaf-blades pinnately compound. Flowers polygamous, in rather dense panicles. Sepals 4–6. Petals 4–6. Ovary glabrous: styles short. Drupe glabrous, the sarcocarp wax-secreting. Stone ribbed.

Leaves with 3 leaflets: vine: panicles short-peduncled.

1. *T. radicans*.

Leaves with 7–13 leaflets: shrub or tree: panicles long-peduncled.

2. *T. Vernix*.

1. ***T. radicans*** (L.) Kuntze. Stems climbing: blades of the leaflets membranous, ovate to ovate-lanceolate, 4–20 cm. long: sepals ovate, 1 mm. long: petals oblong to oblong-ovate, 2.5–3 mm. long: drupes 5–6 mm. in diameter, in spreading panicles. — Common, in thickets, woods and fence-rows. — SUM. — POISON-IVY. POISON-OAK.

2. ***T. Vernix*** (L.) Kuntze. Shrubs or small tree: blades of the lateral leaflets oblong, elliptic, or oval, 4–15 cm. long, undulate: petals linear-oblong, about 2 mm. long: drupes subglobose, about 5 mm. broad, in drooping panicles. — Frequent, in swamps. — Spr. — POISON-SUMAC. POISON-DOGWOOD. POISON-ELDER.

FAMILY 2. AQUIFOLIACEAE. HOLLY FAMILY.

Shrubs or trees. Leaves alternate: blades simple. Flowers perfect or polygamous. Calyx of 4–6 persistent sepals. Corolla of 4–6 petals, which are often united at the base. Androecium of 4–6 stamens. Gynoecium of 4–8 united carpels. Fruit drupaceous.

1. **ILEX** L. Shrubs or trees. Leaves mostly persistent: blades entire or toothed. Flowers sometimes nearly dioecious. Sepals persistent. Corolla rotate, deciduous. Drupe with 4–8 nutlets. — Spr. — HOLLY.

Leaves deciduous: blades not leathery, not spiny-toothed: nutlets smooth.

Staminate and pistillate flowers short-pedicelled: sepals ciliate.

1. *I. verticillata*.

Staminate flowers long-pedicelled, pistillate flowers short-pedicelled: sepals not ciliate.

2. *I. laevigata*.

Leaves persistent: blades leathery, spiny-toothed: nutlets ribbed.

3. *I. opaca*.

1. ***I. verticillata*** (L.) A. Gray. Shrub, or small tree sometimes 7 m. tall, with glabrous or slightly pubescent twigs: leaf-blades thickish, elliptic or oval, varying to ovate or obovate, 2–8 cm. long, acute or acuminate at both ends, more or less pubescent beneath, often reticulate, serrate: staminate calyx about 2.5 mm. wide: staminate corolla 6–7 mm. wide: drupes 6–8 mm. in diameter, red. — Frequent, in swamps and low grounds. — WINTERBERRY. BLACK-ALDER.

2. *I. laevigata* (Pursh) A. Gray. Shrub, or small tree rarely 6 m. tall, with glabrous twigs: leaf-blades thinish, elliptic or oval, or sometimes lanceolate or oblanceolate, 3-9 cm. long, acute or mostly acuminate, appressed-serrate, glabrous on both surfaces or sometimes sparingly pubescent on the veins beneath: staminate calyx 3.5-4 mm. wide: staminate corolla 6-7.5 mm. wide: drupes 8-10 mm. in diameter, orange-red. — S. Rare, in woods. — *Schists*. — SMOOTH-WINTERBERRY.

3. *I. opaca* Ait. Tree 15 m. tall or less, the bark white or pale-gray: leaf-blades oval, elliptic, or obovate, 4-10 cm. long, spine-toothed or individually entire, lustrous and dark-green above, pale and dull beneath: corolla 5.5-6.5 mm. broad: drupes globose or globose-ovoid, about 1 cm. in diameter, red or rarely yellow. — S. Frequent, in woods on the banks and islands of the lower Susquehanna. — *Schists*. — AMERICAN-HOLLY.

FAMILY 3. CELASTRACEAE. STAFF-TREE FAMILY.

Shrubs or trees, or vines. Leaves alternate, opposite, or whorled: blades simple. Flowers perfect, polygamous, or dioecious, variously borne. Calyx of 3-5 sepals. Corolla of 3-5 petals. Androeceium of 3-5 stamens borne on or under the disk. Gynoeceium of 3-5 united carpels. Fruit a capsule, a drupe or a berry. Seed often arillate.

Flowers borne in axillary cymes, or solitary: fruits 3-5-lobed: leaves opposite.

Flowers borne in terminal racemes or panicles: fruits terete: leaves alternate. 1. EUONYMUS.
2. CELASTRUS.

1. **EUONYMUS** [Tourn.] L. Shrubs, trees, or rarely vines. Leaves opposite: blades entire or toothed. Flowers perfect. Sepals 4 or 5. Petals 4 or 5. Stamens 4 or 5, borne on the lobes of the disk: filaments very short: anther-sacs diverging. Stigmas 3-5. — Early sum.

Capsules warty, shallowly lobed: leaf-blades short-petioled or nearly sessile: parts of the flower usually in fives. 1. *E. americanus*.

Capsules smooth, deeply lobed: leaf-blades rather long-petioled: parts of the flower usually in fours. 2. *E. atropurpureus*.

1. ***E. americanus*** L. Erect or straggling shrub 2 m. tall or less: leaf-blades oval to lanceolate, 2-10 cm. long, acute or acuminate, crenate-serrate: calyx about 5 mm. wide; sepals usually 5, equal: corolla mostly over 1 cm. wide; petals greenish or greenish-purple: filaments arising from the edge of the disk; anthers fully 1 mm. wide: seed-body 4.5-5.5 mm. long. — S. Not common, in thickets near the Susquehanna. — *Schists*. — STRAWBERRY-BUSH.

2. ***E. atropurpureus*** Jacq. Erect shrub, or tree becoming 8 m. tall: leaf-blades oblong, elliptic, oval, ovate, or obovate, 5-16 cm. long, short-acuminate, serrate: calyx about 4 mm. wide; sepals usually 4, in unequal pairs: corolla mostly less than 1 cm. wide; petals dark-purple: filaments arising from the top of the disk; anthers less than 1 mm. wide: seed-body 8-9 mm. long. — M. S. Not common, in thickets and on river-banks and creek-banks. — *Limstones*. *Schists*. — BURNING-BUSH. WAAHOO. SPINDLE-TREE. BLEEDING-HEART.

2. **CELASTRUS** L. Vines with woody stems. Leaves alternate, deciduous: blades membranous, broad, entire or toothed. Flowers inclined to be dioecious, racemose or paniculate. Sepals 5. Petals 5. Stamens 5, borne at the sinuses of the disk. Capsules in drooping clusters.

1. ***C. scandens*** L. Diffuse climber: leaf-blades elliptic, oval, or oblong, varying to ovate or obovate, 6-10 cm. long, serrate: panicles drooping: corolla greenish, about 8 mm. broad: capsules subglobose, about 1 cm. in diameter,

orange, 3-valved, the scarlet seeds persistent and conspicuous in early winter. — Common, in thickets and fence-rows. — Early sum. STAFF-TREE. SHRUBBY-BITTERSWEET. CLIMBING-BITTERSWEET. WAXWORK.

FAMILY 4. **STAPHYLEACEAE.** BLADDERNUT FAMILY.

Shrubs or trees. Leaves mostly opposite: blades pinnately compound. Flowers perfect or polygamous, racemose or paniculate, drooping. Calyx of 5 sepals. Corolla of 5 equal petals. Androecium of 5 stamens. Gynoecium of 2 or 3 partially or wholly united carpels. Fruit an inflated capsule.

1. **STAPHYLEA** L. Shrubs or small trees. Leaf-blades pinnate, often 3-foliolate. Racemes cluster-like, drooping. Sepals and petals nearly erect. Capsule bladderly, 2-3-lobed.

1. **S. trifoliata** L. Shrub: leaflets 3: blades oval or elliptic, varying to ovate or obovate, 5-10 cm. long, serrate: racemes 5-10 cm. long: sepals 7-10 mm. long: petals spatulate, surpassing the sepals: capsules 4-6 cm. long, the lobes apiculate. — Common, in rich woods and along streams. — Spr. — BLADDERNUT.

FAMILY 5. **AESCULACEAE.** BUCKEYE FAMILY.

Shrubs or trees. Leaves opposite: blades palmately compound. Flowers polygamous, in terminal erect racemes or panicles. Calyx of 4 or 5 partially united sepals. Corolla of 4 or 5 unequal clawed petals. Androecium of 5-8 stamens. Gynoecium of 3 united carpels. Fruit a leathery loculicidal capsule.

1. **AESCULUS** L. Shrubs or trees. Leaf-blades palmately 5-9-foliolate. Petals with their claws mostly in the calyx-tube. Filaments slender. Capsule smooth or echinate. — HORSE-CHESTNUT.

1. **A. parviflora** Walt. Shrub: leaflets 5-7: blades elliptic-oblanceolate to obovate, 5-18 cm. long: calyx 5-7 mm. long: lateral petals 12-15 mm. long: capsules globular, 2.5-3 cm. in diameter. — S. In thickets, near Fishing Creek. Nat. southward. — Early sum. — BUCKEYE.

FAMILY 6. **ACERACEAE.** MAPLE FAMILY.

Shrubs or trees. Leaves opposite: blades simple or compound. Flowers perfect or polygamous, in cymes, racemes, or panicles, or often in congested clusters. Calyx of 4 or 5, or rarely more, deciduous sepals. Corolla of 4 or 5, or rarely more, petals, or wanting. Androecium of as many stamens as there are sepals. Gynoecium of 2 more or less united carpels. Fruit 2 nutlets with wings (samaras).

Leaves with simple or rarely digitately compound blades: flowers polygamodioecious. 1. ACER.
Leaves with pinnately compound blades: flowers dioecious. 2. NEGUNDO.

1. **ACER** [Tourn.] L. Shrubs or trees. Leaf-blades simple or digitately compound. Flowers polygamous-dioecious. Disk present. Stamens mostly 8. Samaras 2 together. — Spr. — MAPLE.

Flower-clusters expanding before the leaves, sessile or nearly so, not drooping.
Petals wanting or obsolete: ovary pubescent. 1. *A. saccharinum*.
Petals present: ovary glabrous. 2. *A. rubrum*.
Flower-clusters expanding with the leaves, drooping: petals wanting.

Leaf-blades scarcely paler beneath than above; lobes entire or undulate.

Leaf-blades pale or glaucous beneath; lobes coarsely toothed. 3. *A. nigrum*.

4. *A. Saccharum*.
1. *A. saccharinum* L. Tree rarely 36 m. tall, the bark flaky at maturity, gray, or that of the twigs reddish-brown: leaf-blades about as long as broad, 10-15 cm. long, with 3-5 prominent incised lobes longer than the body, silky when young, glabrate, bright-green above, glaucous or silvery-white beneath, truncate or cordate at the base: calyx greenish or yellowish: samaras 5-6 cm. long, tomentose, or glabrate at maturity, green, at length widely spreading.—Common, on river-banks and on creek-banks.—SILVER-MAPLE. WHITE-MAPLE.

2. *A. rubrum* L. Tree sometimes 35 m. tall, the bark dark-gray and fissured on the trunk, smooth and pale or white-gray on the branches: leaf-blades commonly broader than long, deep-green above, pale or glaucous beneath, mostly shallowly 5-lobed, rather evenly serrate, cordate at the base: flower-clusters red or yellowish: sepals nearly distinct: petals narrower than the sepals: samara-wings commonly red.—Common, in low grounds and swamps.—RED-MAPLE. SWAMP-MAPLE.

3. *A. nigrum* Michx. f. Tree sometimes 30 m. tall, the bark dark, coarsely flaky, the twigs light orange-brown: leaf-blades mainly broader than long, often 15-20 cm. broad, relatively thin, deep-green above, scarcely paler and more or less downy beneath, with 3-5 entire or merely undulate lobes; basal sinus closed by the overlapping lobes: calyx campanulate, about 5 mm. long; sepals rounded: samaras 3-4 cm. long, slightly spreading.—S. Not common, on river hills.—*Schists*.—BLACK-MAPLE.

4. *A. Saccharum* Marsh. Tree sometimes 40 m. tall, the bark usually separating in coarse scales at maturity, the twigs red-brown: leaf-blades firm, mostly with 5 sinuate-toothed lobes, 8-15 cm. in diameter, deep-green above, pale or glaucous beneath, with an open shallow sinus: calyx campanulate, about 5 mm. long; sepals obtuse: samaras slightly spreading, 3.5-4 cm. long.—Common, on river-banks and creek-banks.—SUGAR-MAPLE. HARD-MAPLE. ROCK-MAPLE. SUGAR-TREE.

2. **NEGUNDO** [Ray] Ludwig-Boehmer. Trees. Leaf-blades pinnately compound. Flowers dioecious. Disk wanting. Stamens mostly 5 or 4. Fruit resembling that of *Acer*.

1. *N. Negundo* (L.) Karst. Tree becoming 25 m. tall: leaflets 3-9; blades oval, ovate, or ovate-lanceolate, often 5-12 cm. long, coarsely toothed: flowers greenish, drooping: samaras 2.5-3.5 cm. long.—Common, along creeks and the Susquehanna.—Spr.—BOX-ELDER.

FAMILY 7. SAPINDACEAE. SOAPBERRY FAMILY.

Shrubs, trees, or vines. Leaves opposite or alternate: blades simple or pinnate, sometimes 1-foliolate. Flowers dioecious, polygamous, or polygamo-dioecious, or rarely perfect, in racemes, panicles, or corymbs. Calyx of 4 or 5 sepals. Corolla of 4 or 5 petals, or wanting. Disk sometimes gland-bearing. Androecium mostly of 5 or more stamens. Gynoecium of 2-4 more or less united carpels. Fruit capsular or baccate.

1. **CARDIOSPERMUM** L. Herbaceous or woody vines. Leaves alternate: blades biternate or decompound. Flowers polygamo-dioecious, irregular. Sepals 4. Petals 4, unequal. Disk 1-sided, with 2 glands opposite the lower petals. Stamens 8. Capsule bladderly.

1. *C. Halicacabum* L. Leaflets 3; blades ovate to ovate-lanceolate, coarsely serrate, incised, or parted: petals 3.5-4.5 mm. long: capsules obovoid.—M. Occasional, about gardens. Nat. of trop. Am.—Sum.—BALLOON-VINE.

Order RHAMNALES.

Shrubs, trees, or vines. Leaves typically alternate. Flowers regular, sometimes imperfect or incomplete. Calyx present. Corolla present or wanting. Androecium of as many stamens as there are sepals. Gynoecium of 2 or more united carpels. Ovary superior or nearly so. Fruit a capsule or a berry or drupaceous.

Sepals manifest: petals involute: fruit capsular or drupaceous.

Sepals minute or obsolete: petals valvate: fruit baccate. Fam. 1. FRANGULACEAE.
Fam. 2. VITACEAE.

FAMILY 1. FRANGULACEAE. BUCKTHORN FAMILY.

Shrubs, trees, or vines. Leaf-blades simple, pinnately veined. Flowers perfect or polygamous, or sometimes dioecious. Calyx of 4 or 5 sepals. Corolla of 4 or 5 petals, or wanting. Androecium of 4 or 5 stamens opposite the petals. Gynoecium of 2 or 3 united carpels. Fruit capsular or drupaceous, sometimes separating into nutlets.

Fruits pulpy: disk free from the ovary.

Fruits dry: disk adnate to the ovary.

1. RHAMNUS.

2. CEANOTHUS.

1. **RHAMNUS** [Tourn.] L. Shrubs or trees. Leaves alternate: blades entire or toothed, many-ribbed. Flowers perfect or polygamo-dioecious. Sepals 4 or 5, keeled within. Petals 4 or 5, commonly concave, clawless, or nearly so, shorter than the sepals, or wanting. Stamens 4 or 5, surrounded by the petals: anthers acute. Drupe berry-like, not lobed, with 3 or 4 nutlets.

1. **R. alnifolia** L'Her. Shrub mostly 1 m. tall or less, the twigs glabrous or puberulent: leaf-blades elliptic or oval, varying to ovate or obovate, 3-10 cm. long, obtuse or acutish, rather finely serrate, short-petioled: flowers short-pedicelled: sepals triangular or triangular-lanceolate, 1.5 mm. long: fruits obovoid or globose, 8-10 mm. in diameter, black.—M. Rare, in the Diller-ville swamp, Lancaster.—Limestones.—Spr.—BUCKHORN.

2. **CEANOTHUS** L. Shrubs or trees. Leaves alternate: blades usually toothed, commonly 3-ribbed. Flowers perfect. Sepals 5, converging. Petals 5, longer than the sepals, clawed, the blades hooded. Stamens 5, exerted: anthers emarginate. Drupe lobed, separating into 3 carpels.

1. **C. americanus** L. Shrub 2-9 dm. tall: leaf-blades ovate to ovate-lanceolate, or rarely orbicular-ovate, serrate: sepals about 1.5 mm. long: petals about 2 mm. long: fruits 5-6 mm. broad.—Common, in dry thickets and woods.—Spr. and sum.—NEW-JERSEY TEA. RED-ROOT.

FAMILY 2. VITACEAE. GRAPE FAMILY.

Vines, sometimes shrubby or tree-like, usually with tendrils. Leaves alternate or the lower ones opposite: blades simple or compound. Flowers perfect, polygamous, or dioecious, often fragrant. Calyx of 4 or 5 sepals, or obsolete. Corolla of 4 or 5 often caducous petals, or wanting. Androecium of 4 or 5 stamens opposite the petals. Gynoecium of usually 2 united carpels. Fruit a berry.

Corolla not expanding: inflorescence elongate: hypogynous disk present: leaf-blades simple.

Corolla expanding: inflorescence flat-topped: hypogynous disk wanting, or obsolete: leaf-blades compound.

1. VITIS.

2. PARTHENOCESSUS.

1. **VITIS** [Tourn.] L. Vines. Leaf-blades palmately lobed, angled or coarsely toothed. Flowers in elongate racemes or panicles. Calyx minute. Petals cohering. Berries juicy, mostly edible. Seeds pyriform. — GRAPE.

Leaf-blades glabrous or nearly so.

Leaf-blades not glaucous beneath.

Leaves with merely coarsely toothed blades, scarcely lobed.

Bushy vine: leaf-blades mostly less than 10 cm. long: berries sweet.

1. *V. rupestris*.

High climbing vine: leaf-blades mostly over 10 cm. long: berries sour.

2. *V. cordifolia*.

Leaves with prominently 3-5-lobed blades.

3. *V. vulpina*.

Leaf-blades glaucous beneath.

4. *V. bicolor*.

Leaf-blades woolly or copiously pubescent beneath.

Lower surface of the leaf-blade loosely tomentose: berries

8-10 mm. in diameter, not murky.

5. *V. aestivalis*.

Lower surface of the leaf-blade felty-tomentose: berries 15-

20 mm. in diameter, murky.

6. *V. Labrusca*.

1. **V. rupestris** Scheele. Stems 1-2 m. tall: leaf-blades commonly broader than long, reniform to ovate-reniform, 4-10 cm. in diameter, coarsely toothed and rarely slightly, and sometimes somewhat irregularly, lobed, and with an abrupt tip at the apex, mostly lustrous above, glabrous or sparingly pubescent on the veins beneath, somewhat glaucescent on both sides: panicles 2-10 cm. long, slender, not dense: berries subglobose, 7-14 mm. in diameter, purple-black, somewhat glaucous, pleasant-tasted. — W. Occasional, along the river at Collin's Ferry. — *Limestones*. — Spr. — SAND-GRAPE. SUGAR-GRAPE.

2. **V. cordifolia** Lam. Stems greatly elongate: leaf-blades thin, deep-green, longer than broad, commonly ovate in outline, rarely 3-lobed or 3-angled near the apex, rather coarsely and irregularly toothed, glabrous or sometimes sparingly pubescent beneath, more or less deeply cordate at the base: panicles 1-3 dm. long, commonly drooping: berries globose, 8-10 mm. in diameter, black under a slight bloom, pleasantly acid, persistent. — Common, in thickets and woods. — Early sum. — FROST-GRAPE. CHICKEN-GRAPE.

3. **V. vulpina** L. Leaf-blades thin, commonly longer than broad, 5-20 cm. broad, mostly sharply 3-lobed and coarsely and irregularly toothed, glabrate or pubescent on and about the nerves beneath, cordate or nearly truncate at the base, the teeth and lobes acuminate: panicles 6-20 cm. long, often much branched: berries globose, 8-10 mm. in diameter, very dark with a copious bloom, the pulp sour. — S. Islands of the Susquehanna, and on the river hills. — *Schists*. — Early sum. — RIVERSIDE-GRAPE. FROST-GRAPE.

4. **V. bicolor** Le Conte. Leaf-blades thinnish, mostly longer than broad, 1-3 dm. in diameter, 3-5-lobed, shallowly toothed, glabrous above, glaucous and glabrous beneath or the veins sparingly pubescent, or dull-green at maturity: panicles 5-10 cm. long, commonly long-peduncled: berries globose, 10-14 mm. in diameter, black beneath the bloom, rather sour but pleasant-tasted. — W. S. Occasional, in woods, and on islands and river hills. — *Sandstones and shales, schists*. — Early sum. — SUMMER-GRAPE. BLUE-GRAPE. WINTER-GRAPE.

5. **V. aestivalis** Michx. Leaf-blades varying from broader than long to longer than broad, 1-3 dm. in diameter, angularly or deeply 3-5-lobed, shallowly toothed, dull-green and glabrate above, more or less densely, often unevenly, tomentose beneath, with rusty or brown hairs, cordate; petioles usually glabrous: panicles 1-2.5 dm. long, often conspicuously elongate and rather simple: berries globose, 8-10 mm. in diameter, black, under a bloom, with a tough skin, and pulp varying from sweet to very astringent. — Common, in thickets and woods. — Early sum. — SUMMER-GRAPE. PIGEON-GRAPE.

6. **V. Labrusca** L. Leaf-blades thickish, suborbicular to broadly ovate, mostly longer than broad, shallowly toothed or scalloped, otherwise entire, or 3-lobed near the apex, becoming glabrous above, densely tomentose beneath: panicles 5-12 cm. long, usually simple: berries globose, 1.5-2 cm. in diameter, amber

to purple, with a slight bloom, the skin and tough pulp sweet and musky, or astringent.—Common, in thickets and woods.—Early sum.—FOX-GRAPE. PLUM-GRAPE.

2. **PARTHENOCISSUS** Planch. Vines, the tendrils often disk-bearing. Leaf-blades digitately compound. Flowers in compound cymes. Petals spreading. Berries inedible.

1. **P. quinquefolia** (L.) Planch. Leaflets 5; blades usually thinnish, oval, elliptic, or oblong, the lateral ones inequilateral, coarsely serrate above the middle with rather appressed teeth: tendrils with disks: berries 8–9 mm. in diameter, deep-blue with scant bloom, pulpy: seeds 4–4.5 mm. long, prominently rugose, rather dull, each with an orbicular raphe.—Common, in thickets and on rocky river-banks.—Sum.—VIRGINIA-CREEPER. WOODBINE. AMERICAN-IVY.

Order MALVALES.

Herbs, shrubs, or trees. Leaves alternate or opposite: blades simple, often lobed and toothed. Flowers mostly perfect, regular and involucrate. Calyx of distinct or partially united sepals. Corolla of distinct petals. Androecium of numerous monadelphous or grouped stamens. Gynoecium of several distinct or united carpels. Fruit capsular, follicular, berry-like, or nut-like.

Stamens in several groups: anthers 2-celled: embryo straight. Fam. 1. TILIACEAE.
Stamens monadelphous: anthers 1-celled: embryo curved. Fam. 2. MALVACEAE.

FAMILY 1. TILIACEAE. LINDEN FAMILY.

Shrubs or trees, or rarely herbs. Leaves mostly alternate: blades simple. Flowers usually perfect. Calyx of 4 or 5 sepals. Corolla of 4 or 5 petals which sometimes bear a petaloid scale at the base. Androecium of usually numerous stamens, sometimes of as many or twice as many as the sepals. Gynoecium of 2–several united carpels. Fruit capsular, nut-like, or berry-like.

1. **TILIA** [Tourn.] L. Trees. Leaf-blades oblique, toothed. Sepals 5. Petals 5, longer than the sepals. Stamens sometimes in groups opposite the petals and accompanied by staminodia. Anther-sacs separated. Berry 1–2-seeded.—LINDEN. LINN. LIME-TREE. BEE-TREE. WAHOO.

1. **T. americana** L. Tree becoming 40 m. tall: leaf-blades ovate to orbicular-ovate, 8–15 cm. long, bright-green beneath: bracts decurrent nearly to the base of the peduncles: sepals ovate-lanceolate to lanceolate, 6–8 mm. long, acute, puberulent: petals 9–11 mm. long, pale-yellow, obtuse: staminodia spatulate: berries oval, about 1 cm. long.—Common, on rocky hillsides and river-banks.—Sum.—WHITEWOOD. BASSWOOD.

FAMILY 2. MALVACEAE. MALLOW FAMILY.

Herbs, shrubs, or trees. Leaves alternate: blades simple, palmately veined. Flowers perfect. Calyx of 5 more or less united valvate sepals. Corolla of 5 convolute petals. Androecium of numerous monadelphous stamens. Gynoecium of several united, often whorled, carpels. Fruit capsular or sometimes baccate.

Fruit of several radial carpels about an axis: stamen-column anther-bearing at the top.

Stigmas terminal, capitate: mature carpels persistent and dehiscent.

Carpels 2-few-seeded.

Carpels 1-seeded.

Stigmas introrse, elongate: mature carpels deciduous.

Involucels of 6-9 bractlets.

Involucels of 1-3 bractlets.

Fruit a loculicidal capsule: stamen-column anther-bearing below the top.

1. ABUTILON.
2. SIDA.
3. ALTHAEA.
4. MALVA.
5. HIBISCUS.

1. **ABUTILON** [Tourn.] Mill. Herbs, shrubs, or rarely trees. Leaf-blades entire, toothed, or lobed. Involucel wanting. Sepals 5, united below. Petals 5, often yellow. Carpels 5-30, beaked at maturity.

1. **A. Abutilon** (L.) Rusby. Stems 3-18 dm. tall, velvety-pubescent: leaf-blades suborbicular to ovate or reniform-orbicular, 9-30 cm. long: calyx-lobes abruptly pointed: petals yellow, 10-15 mm. long: carpels 15-20 mm. long. — Common, in cultivated and waste grounds. Nat. of As. — Sum. — INDIAN-MALLOW. VELVET-LEAF.

2. **SIDA** L. Herbs or partially woody plants. Leaf-blades usually toothed. Involucel wanting. Sepals 5, partially united. Petals 5, white or colored. Carpels 5—many, 1-celled, commonly singly or doubly beaked. — Sum.

Leaf-blades toothed: flowers solitary: corolla yellow: carpels 5.

1. *S. spinosa*.

Leaf-blades lobed: flowers clustered: corolla white: carpels 10.

2. *S. hermaphrodita*.

1. **S. spinosa** L. Plants 1-6 dm. tall, pubescent: leaf-blades oblong to ovate or ovate-lanceolate to linear-lanceolate; 1-5 cm. long, serrate: calyx-lobes triangular: corolla pale-yellow: mature carpels about 5, 4 mm. long. — Common, in cultivated grounds and waste places. Nat. of trop. Am.

2. **S. hermaphrodita** (L.) Rusby. Plants erect, 9-40 dm. tall: leaf-blades palmately 3-7-lobed: calyx-lobes triangular: petals white: mature carpels 6-7 mm. long. — S. Rare, on river bank at Cooks Landing. — *Schists*.

3. **ALTHAEA** L. Herbs resembling *Malvae* in habit. Involucel of several, mostly 6-9, bractlets which are more or less united at the base.

1. **A. officinalis** L. Perennial, the stem branched: leaf-blades ovate in outline, 3-5-angled or 3-5-lobed, irregularly and prominently toothed: cymes several-flowered: lobes of the involucel subulate or lanceolate-subulate: calyx-lobes 4-6 mm. long, acuminate: corolla white or pink, 2-3 cm. wide: carpel-heads about 1 cm. wide. — M. Local, about Lancaster. Nat. of Eu. — Sum. — MARSH-MALLOW.

4. **MALVA** [Tourn.] L. Herbs. Leaf-blades lobed or dissected. Involucel of usually 3 bractlets. Sepals 5, partially united. Petals 5, sometimes eroded. Carpels many, 1-celled, beakless, the faces radially striate or ribbed at maturity. — MALLOW.

Petals as long as the calyx or twice as long: mature carpels smooth.

1. *M. rotundifolia*.

Petals thrice as long as the calyx or four times as long: mature

carpels veiny.

2. *M. sylvestris*.

1. **M. rotundifolia** L. Plants depressed: leaf-blades obscurely lobed, crenate-dentate: calyx-lobes ovate to triangular-ovate: petals light-blue or white, 9-14 mm. long: carpels 1.5-2 mm. long. — Common, in cultivated grounds and waste places. Nat. of Eu. — Spr. and sum. — CHEESES.

2. **M. sylvestris** L. Plants 3-4 dm. tall: leaf-blades prominently lobed and crenate-dentate: calyx-lobes triangular or nearly so: petals light-purple to

reddish-purple, 2-2.5 cm. long: carpels obovate, 3 mm. long. — Rare, in fields and waste places and about gardens. Nat. of Eu. — Sum. — HIGH-MALLOW.

5. **HIBISCUS** L. Herbs, shrubs, or trees. Leaf-blades entire, lobed, or parted. Involucrel of several, rarely 3 or 5, bractlets. Sepals 5, more or less united. Petals 5, broad. Carpels forming a 5-valved capsule. — Sum. — ROSE-MALLOW.

Shrub or tree.

1. *H. syriacus*.

Herbs.

Calyx fitting closely to the capsule: perennial plants: leaf-blades toothed or hastate.

Leaf-blades white-pubescent beneath: seeds glabrous or nearly so.

2. *H. Moscheutos*.

Leaf-blades glabrous: seeds pubescent.

3. *H. militaris*.

Calyx inflated: annual plants: leaf-blades pedately lobed.

4. *H. Trionum*.

1. **H. syriacus** L. Plants 1-6 m. tall (occasionally tree-like): leaf-blades 3-lobed, coarsely crenate, 3-12 cm. long: bractlets linear or linear-spatulate, 10-20 mm. long: calyx-lobes triangular-ovate: petals deep-pink, or white with crimson blotches at the base: capsules oblong-ovoid, 2-2.5 cm. long. — Common, in waste places and about gardens. Nat. of As. — SHRUBBY-ALTHAEA.

2. **H. Moscheutos** L. Plants 8-20 dm. tall, velvety-tomentose: leaf-blades lanceolate to broadly ovate, dentate-serrate and often angulately 3-5-lobed: petals mainly pink, 10-12 cm. long: capsules 2.5-3 cm. long. — N. M. Rare, on banks of the Conestoga Creek and the Susquehanna, also locally in ponds. — LIMESTONES. — SWAMP ROSE-MALLOW.

3. **H. militaris** Cav. Plants 9-20 dm. tall, glabrous or nearly so: leaf-blades ovate to broadly lanceolate in outline, 6-16 cm. long, serrate-dentate and hastately 3-5-lobed: bractlets 1.5-2 cm. long: calyx-lobes ovate: petals pink with a purple blotch: capsules 1.5-2.5 cm. long. — S. Islands of the lower Susquehanna. — SCHISTS. — HALBERD-LEAVED ROSE-MALLOW.

4. **H. Trionum** L. Plants 1-4 dm. tall, hispid: leaf-blades ovate to suborbicular in outline, pedately 3-5-lobed or 3-5-parted, the lobes coarsely toothed or incised: bractlets about 1 cm. long: calyx-lobes triangular: petals yellow or whitish with a purple or brown-purple blotch: capsules about 1.5 cm. long. — S. Common, in cultivated fields and on roadsides. Nat. of Eu. — FLOWER-OF-AN-HOUR.

Order HYPERICALES.

Herbs, shrubs, or trees. Leaves various. Flowers mostly perfect, complete and regular (irregular in *Violaceae*), sometimes involucrel. Calyx of distinct or essentially distinct sepals. Corolla of distinct petals, rarely wanting. Androecium of usually numerous stamens, but sometimes as few as 5. Gynoecium of several united carpels. Ovary superior, mostly with parietal placentae. Fruit capsular, baccate, or drupaceous.

Corolla regular: petals often inequilateral.

Styles distinct, or partially united or coherent until maturity: seeds with little or no endosperm. Fam. 1. HYPERICACEAE.

Styles wholly and permanently united: seeds with copious endosperm. Fam. 2. CISTACEAE.

Corolla irregular: petals very unequal, one of them spurred. Fam. 3. VIOLACEAE.

FAMILY 1. HYPERICACEAE. ST. JOHN'S-WORT FAMILY.

Herbs or shrubs. Leaves opposite: blades mostly punctate, entire or nearly so, sometimes scale-like. Flowers perfect. Calyx of 4 or 5 sometimes unequal sepals. Corolla of 4 or 5 yellow or pink petals. Androecium

cium of few or many stamens, sometimes grouped, the groups sometimes alternating with glands. Gynoeceum of 2-5 united carpels. Fruit a capsule.

- Sepals 4, in more or less unequal pairs; petals mostly 4. 1. **ASCYRUM**.
 Sepals and petals mostly 5.
 Petals yellow.
 Leaves with flat more or less spreading blades. 2. **HYPERICUM**.
 Leaves reduced to erect or appressed minute or slightly
 elongate scales without blades. 3. **SAROTHRA**.
 Petals pink, sometimes tinged with green or purple. 4. **TRIADENUM**.

1. **ASCYRUM** L. Shrubs. Sepals 4, very unequal. Stamens not in groups. Styles relatively short. Capsule included in the calyx. — **ST. PETER'S-WORT**.

1. **A. hypericoides** L. Plants diffuse; leaf-blades narrowly oblong-obovate, spatulate, or linear, 5-15 mm. long; outer sepals ovate to oblong-ovate, 7-9 mm. long, the inner much smaller than the outer; petals linear-oblong; capsules 7-8 mm. long. — S. Common, on dry banks. — *Schists*. — **SUM**. — **ST. ANDREW'S-CROSS**.

2. **HYPERICUM** [Tourne.] L. Herbs or shrubs. Sepals 5, essentially equal. Stamens mostly in groups. Style relatively long. Capsule not included. — **SUM**. — **ST. JOHN'S-WORT**.

Styles 3, or rarely 4; capsule 3-celled or rarely 4-celled; stigmas slender or slightly thickened.

Herbs; stems simple or sparingly branched.

Stamens few, 5-12.

Leaf-blades linear, 3-veined, not clasping.

Leaf-blades oblong to ovate, 5-nerved, clasping.

Stamens numerous, 15-40.

Capsules 3-celled; stamens grouped; petals with black dots or lines.

Petals pale-yellow, with dots and lines; stem terete.

Petals deep-yellow, with marginal dots; stem flattened.

Capsules 1-celled; stamens not grouped; petals without dots.

Shrub; stems bushy-branched.

Styles 5; capsule 5-celled; stigmas discoid.

1. *H. canadense*.

2. *H. mutilum*.

3. *H. maculatum*.

4. *H. perforatum*.

5. *H. ellipticum*.

6. *H. prolificum*.

7. *H. Ascyron*.

1. **H. canadense** L. Plants 1-6 dm. tall; leaf-blades 3-nerved; sepals lanceolate or linear-lanceolate, 3-5 mm. long; petals 3-6 mm. long; capsules 4-8 mm. long, acute. — N. S. Common, in moist sandy soil. — *Sandstones and shales, schists*.

2. **H. mutilum** L. Plants 1-8 dm. tall; leaf-blades oblong-ovate to ovate, or sometimes oblong, 5-nerved; sepals oblong to oblong-lanceolate; petals about 3.5 mm. long; capsules 2-3 mm. long, obtuse. — Common, in moist places.

3. **H. maculatum** Walt. Plants 2-9 dm. tall; leaf-blades leathery, ovate to oblong-ovate or nearly oblong, 1-6 cm. long, obtuse, punctate; sepals lanceolate, 3-4 mm. long, acute; corolla pale-yellow, 8-13 mm. wide; petals delicate, copiously black-dotted; capsules ovoid, 3-6 mm. long. — Common, in dry fields and on hillsides.

4. **H. perforatum** L. Plants 4-7 dm. tall; leaf-blades linear-oblong, 5-20 mm. long, glandular-punctate, those of the main stem usually subtending leafy branches; sepals linear-lanceolate, 3-4 mm. long, acute, glandular-punctate; corolla deep-yellow, 19-24 mm. wide; petals toothed on one side from the middle to the apex, bearing black glands near the teeth; capsules ovoid, oblique, 6-8 mm. high. — Common, in dry fields and waste places. **Nat. of Eu.**

5. **H. ellipticum** Hook. Plants 1-5 dm. tall; leaf-blades oblong to oval or slightly broadest above the middle, 1-3 cm. long, obtuse, sessile and often

slightly clasping: cymes few-flowered: sepals oblong to oblong-obovate, 4-5.5 mm. long: petals bright-yellow, 7-10 mm. long: capsules globose-ovoid, 4-5 mm. long, obtuse. — S. Islands and sandy shore of the Susquehanna. — *Schists*.

6. **H. prolificum** L. Plants shrubby, 3-12 dm. tall, the branches narrowly 2-winged: leaf-blades narrowly oblong or rarely lanceolate, 2-8 cm. long, short-petioled: cymes few-flowered, short-peduncled, in cylindric panicles: sepals mostly obovate, 4-6 mm. long: petals deep-yellow, 8-10 mm. long: capsules conic or narrowly ovoid, 8-10 mm. long, acute. — Susquehanna valley. Frequent, on shores and islands. — SHRUBBY ST. JOHN'S-WORT.

7. **H. Ascyron** L. Plants mostly 1-2 m. tall: leaf-blades ovate-lanceolate to oblong-lanceolate, or narrowly ovate, 3-8 cm. long, obtuse or acutish, clasping: cymes few-flowered: sepals ovate, 7-11 mm. long: petals bright-yellow, 2-2.5 cm. long: capsules conic, 2-3 cm. long. — M. S. Islands and shore of the Susquehanna, and along the Little Conestoga. — *Limestones, schists*.

3. **SAROTHTRA** L. Partially succulent annual herbs. Sepals 5, equal or nearly so. Stamens grouped. Styles relatively long. Capsule exerted.

1. **S. gentianoides** L. Stems 1-5 dm. tall: leaves scale-like, appressed, often subulate or those on the lower part of the stem sometimes linear or narrowly oblong: sepals linear or linear-lanceolate, 2-3 mm. long: corolla yellow, 4-8 mm. broad: stamens 5-10: capsules conic; 4-5 mm. long. — Common, in sandy and gravelly soil. — Sum. — PINEWEED. ORANGE-GRASS.

4. **TRIADENUM** Raf. Herbs, resembling species of *Hypericum*. Sepals 5, equal. Stamens mostly 9, grouped in 3's, the filaments of each group well united. Styles relatively long. Capsule exerted.

1. **T. virginicum** (L.) Raf. Stems 2-6 dm. tall: leaf-blades oblong, elliptic, or ovate, 2-10 cm. long, obtuse, clasping: sepals lanceolate to oblong, 5-6 mm. long, acute: petals obovate to oblanceolate or nearly oblong, 8-10 mm. long, acute, delicately nerved: capsules oblong, 8-10 mm. long. — N. S. Rare, in swamps. — *Sandstones and shales, schists*. — Sum. — MARSH ST. JOHN'S-WORT.

FAMILY 2. CISTACEAE. ROCK-ROSE FAMILY.

Shrubs or partially woody plants. Leaves alternate or opposite: blades simple. Flowers generally perfect. Calyx of 3-5 persistent sepals. Corolla of 5 or 3 often fugaceous petals, or wanting. Androecium of 6 or more stamens. Gynoecium of usually 3 united carpels. Fruit a capsule.

Petals 5, yellow, fugaceous, or wanting: stigmas not fimbriate. 1. CROCANTHEMUM.
Petals 3, not yellow, marcescent-persistent: stigmas fimbriate. 2. LECHEA.

1. **CROCANTHEMUM** Spach. Erect plants. Leaf-blades linear or wider. Flowers complete and showy, and with many stamens in the early part of the season, inconspicuous and with few stamens later or sometimes all conspicuously petaliferous. Ovules pendulous. Capsules of the petaliferous flowers larger than those of the apetalous ones. — ROCK-ROSE.

1. **C. canadense** (L.) Britton. Stems 1-6 dm. tall: leaf-blades oblong, linear-oblong, or oblanceolate, nearly sessile, 1.2-3 cm. long, rough and dark-green above, paler and anescent beneath: petaliferous flowers with 30 stamens and 30-60 ovules, their corollas 1.8-3 cm. wide, their capsules ovoid or obovoid and 6-8 mm. long: apetalous flowers appearing later, axillary, nearly sessile, with 4 stamens and 6-20 ovules, their capsules about 4 mm. in diameter: seeds papillose. — Common, on dry banks and in stony soil. — Spr. and sum. — FROST-WEED.

2. **LECHEA** Kalm. Erect plants with many very leafy shoots at the base of the stem in the fall. Leaf-blades narrow, or those of the leaves on the shoots often broad and short. Flowers complete, minute. Corolla purplish or greenish. Ovules erect. Capsules all alike. — Sum. — PINWEED.

Capsules oblong; pedicels over 1.5 mm. long; calyx glabrous at maturity.

Capsules globular; pedicels 1 mm. long or less; calyx permanently pubescent.

1. *L. racemulosa*.

2. *L. villosa*.

1. **L. racemulosa** Michx. Stems 1.5–5 dm. tall, the branches divergent or ascending; stem-leaves with oblong or linear-oblong blades narrowed at the base, 8–18 mm. long; leaves of the basal shoots smaller than the stem-leaves; panicle sparsely leafy; flowers not close together; inner sepals broadly oblong, about 1.5 mm. long; petals linear-oblong, about 1.5 mm. long; pods oblong or nearly so, longer than the sepals. — M. S. Common, on dry banks and roadsides. — *Quartzite, schists*.

2. **L. villosa** Ell. Stems 3–8 dm. tall, the branches ascending; stem-leaves with oblong or elliptic blades 15–25 mm. long; leaves of the basal shoots broader than the stem-leaves; panicle-branches ascending; flowers close together; inner sepals broadly oblong, 1.5–1.8 mm. long; petals linear-oblong, about 1 mm. long; pods globose, about 1.5 mm. in diameter. — M. S. Occasional, on the river shore, and along the Conestoga. — *Limestones, schists*.

FAMILY 3. VIOLACEAE. VIOLET FAMILY.

Herbs, or rarely shrubs or trees. Leaves alternate or opposite; blades simple. Flowers perfect, irregular. Calyx of 5 nearly equal sepals. Corolla of 5 unequal petals. Androecium of 5 converging or syngenesious stamens. Gynoecium of 3 united carpels. Fruit a capsule.

Sepals auricled at the base; lower petal spurred; stamens distinct. 1. **VIOLA**.

Sepals not auricled at the base; lower petal not spurred; stamens united.

2. **CUBELIUM**.

1. **VIOLA** [Tourn.] L. Scapose or caulescent herbs, with short or elongate rootstocks. Leaf-blades narrow or broad, often of a cordate type. Flowers various: petaliferous ones appearing in spring, solitary on elongate peduncles; later cleistogamous flowers appear which produce fruits with abundant seed. Corolla mostly violet, purple, yellow, or white. Stamens 5 in each petaliferous flower, the two lower ones with appendages that project into the sac or spur of the lower petal; these two stamens alone develop in the cleistogamous flowers. Capsule often nodding, elastically 3-valved. — Allied species freely hybridize; the hybrids show marked vegetative vigor, but impaired fertility. — **VIOLET**. — The following treatment of *Viola* is taken from that written by Professor Ezra Brainerd for my Flora of the Southeastern United States. (Second Edition, 1913.) — *J.K.S.*

Plants acaulescent: leaves and scapes from a rootstock or from runners.

Flowers without marked fragrance: native plants.

Corolla violet or purple: plants without stolons.

All petals beardless: cleistogamous flowers wanting.

1. *V. pedata*.

Lateral petals bearded: cleistogamous flowers present.

Cleistogamous flowers ovoid, on short prostrate peduncles: capsules usually brown.

All, or all except the early and late, leaves with lobed, parted or divided blades.

All leaves, except sometimes the first leaf of spring, with palmately 5–11-lobed or -parted blades.

- Plants with villous foliage: seeds brown.
- Plants with nearly or quite glabrous foliage: seeds buff.
- Earliest and latest leaves with entire or merely toothed blades, the others usually pedately 3-7-lobed, -parted or -divided.
- All leaves with entire or merely toothed blades.
- Plants with nearly or quite glabrous foliage.
- Plants with markedly pubescent foliage.
- Leaves with villous petioles and lower blade-surface: seeds dark-brown.
- Leaves with hirsutulous upper and glabrous lower surface: seeds buff.
- Cleistogamous flowers on ascending or erect peduncles.
- Cleistogamous flowers ovoid, on long ascending peduncles: capsules brown.
- Cleistogamous flowers subulate or sagittate, on erect peduncles: capsules green.
- Spurred petal glabrous; lateral petals bearded with clavate hairs: leaves glabrous; blades broadly ovate-cordate, toothed.
- Spurred petal villous at the base; lateral petals bearded with capillary hairs.
- Plants with finely pubescent foliage.
- Plants with nearly or quite glabrous foliage.
- Leaf-blades lanceolate to oblong-lanceolate, incised at the base.
- Leaf-blades deltoid to broadly ovate, coarsely toothed at the base.
- Corolla white or yellow and sometimes dark-streaked: plants stoloniferous.
- Corolla white.
- Cleistogamous flowers on prostrate peduncles, their capsules ovoid, commonly reddish-brown: plants of cold ravines and low rich woods.
- Cleistogamous flowers on erect peduncles, their capsules ellipsoid, green: plants of open bogs or swamps.
- Leaf-blades broad.
- Leaf-blades broadly cordate-ovate: seeds 1 mm. long.
- Leaf-blades oblong to ovate: seeds 1.5 mm. long.
- Leaf-blades narrow, lanceolate to narrowly elliptic.
- Corolla yellow.
- Flowers very fragrant: naturalized plant.
- Plants caulescent: flowers axillary.
- Style-tip slender or enlarged, but not hollow at the apex: stipules entire or bristly toothed.
- Style-tip swollen: corolla-spur short: stipules nearly entire.
- Petals yellow.
- Basal leaves usually 1-3: plants sparingly pubescent.
- Basal leaves usually wanting: plants markedly pubescent.
- Petals white within, usually violet without.
- Style-tip slender: corolla-spur at least twice as long as thick: stipules bristly toothed.
- Spur short, less than 8 mm. long: lateral petals bearded.
- Corolla white or cream-colored.
- Corolla violet-blue.
- Spur elongate, over 10 mm. long: lateral petals beardless.
- Style-tip markedly swollen, the globose apex hollow: stipules foliaceous, pectinate at the base.
2. *V. palmata.*
3. *V. Stoncana.*
4. *V. triloba.*
5. *V. papilionacca.*
6. *V. sororia.*
7. *V. hirsutula.*
8. *V. affinis.*
9. *V. cucullata.*
10. *V. fimbriatula.*
11. *V. sagittata.*
12. *V. emarginata.*
13. *V. blanda.*
14. *V. pallens.*
15. *V. primulifolia.*
16. *V. lanceolata.*
17. *V. rotundifolia.*
18. *V. odorata.*
19. *V. criocarpa.*
20. *V. pubescens.*
21. *V. canadensis.*
22. *V. striata.*
23. *V. conspersa.*
24. *V. rostrata.*

Blades of the upper leaves and of the terminal stipule-lobe entire or nearly so: petals twice as long as the sepals or less; lateral ones narrow.

25. *V. Rafinesquii*.

Blades of the upper leaves and of the terminal stipule-lobe markedly toothed: petals over twice the length of the sepals, the lateral ones broad.

26. *V. tricolor*.

1. **V. pedata** L. Plant nearly glabrous: rootstock short, erect: leaf-blades 3-divided, the lateral divisions pedately 3-5-parted or cleft, the segments linear to spatulate, often 2-4-toothed or -cleft near the apex; the leaf-blades of early spring and of late autumn often smaller and less deeply dissected: corolla 2-3 cm. broad, the upper petals dark-violet, the three lower lilac-purple (or all petals lilac-purple in *V. pedata lineariloba*), all beardless: the orange tips of the stamens large and conspicuous at the center of the flower: capsules green, glabrous: seeds copper-colored: apetalous flowers wanting, but petaliferous frequent in late summer and fall. — N. S. Common, on dry banks. — *Sandstones and shales, schists*. — BIRDFOOT-VIOLET.

2. **V. palmata** L. Leaf-blades palmately 5-11-lobed or -parted, the segments variously toothed or cleft, the middle segment usually widest; petioles, and veins of the lower leaf-surface villous, the upper surface often glabrous: sepals ovate-lanceolate, rather blunt: corolla violet-purple, 2-3 cm. broad: cleistogamous flowers on prostrate peduncles, their capsules ovoid, mottled with brown, 8-12 mm. long: seeds brown. — Common, in dry rich woods.

3. **V. Stoneana** House. Similar to *V. palmata* in habit, glabrous, except for few fine hairs on the leaf-margins and veins: leaf-blades palmately 3-parted or 3-divided, the divisions 2-3-cleft into dilated toothed segments: peduncles often as tall as the leaves: petals violet, paler toward the tips, the outer ones bearded, the spurred one glabrous: cleistogamous flowers on short prostrate peduncles, their capsules ovoid, mottled with purple: seeds buff. — E. Occasional, in moist woods and on banks. — *Quartzite, schists*.

4. **V. triloba** Schwein. Earliest leaf-blades, and those put forth in late summer, broadly cordate-ovate, usually uncut, sparsely pubescent or glabrate; those unfolding at petaliferous flowering, densely villous beneath like the petioles, 3-lobed or rarely 3-parted, the middle segment broad, the lateral lunate, divaricate, often coarsely toothed or pedately cleft, the upper subdivision narrow; blades 10-15 cm. wide when mature: peduncles mostly glabrous, shorter than the leaves: outer sepals ovate-lanceolate, somewhat obtuse, slightly ciliate: petals deep-violet: cleistogamous capsules ovoid, purplish: seeds buff or brown. — Frequent, in dry rich woods.

5. **V. papilionacea** Pursh. Plants glabrous, commonly robust, from a stout horizontal branching rootstock: leaf-blades often 12 cm. broad, sometimes deltoid in outline above the cordate base, sometimes rounded and abruptly pointed; petioles often sparingly pubescent: outer sepals ovate-lanceolate: corolla deep-violet, white or greenish-yellow at the base, sometimes wholly white, the odd petal often narrow and boat-shaped, usually glabrous: cleistogamous flowers ovoid, on horizontal peduncles usually underground but lengthened and erect when the capsules ripen: capsules ellipsoid or cylindrical, green or reddish-brown, 10-15 mm. long: seeds 2 mm. long, dark-brown. — Common, in moist meadows and woods, and about dwellings.

6. **V. sororia** Willd. Leaf-blades broadly cordate-ovate, villous-pubescent especially on the under surface when young, and on the petioles, often 10 cm. wide when mature: vernal flowers on peduncles about the length of the leaves: outer sepals ovate-oblong, commonly obtuse, all finely ciliate below the middle and on the short rounded auricles: corolla violet to lavender and occasionally white: cleistogamous capsules usually mottled with brown: seeds dark-brown, 2 mm. long. — Occasional, in moist meadows and on shaded banks, and about dwellings.

7. *V. hirsutula* Brainerd. Plants of small size: leaf-blades frequently appressed to the ground, 2-5 cm. wide, cordate-ovate to reniform, obtuse, purplish and glabrous beneath, silvery pubescent above, often purple-veined and mottled with different shades of green: flowers on peduncles exceeding the leaves: corolla reddish-purple: apetalous flowers small, ovoid, on short prostrate peduncles, developing ovoid capsules 6-8 mm. long, purplish, bearing each 20-30 light-brown seeds. — Lower Susquehanna valley. Occasional, on shaded banks. — *Schists*.

8. *V. affinis* LeConte. Plant nearly glabrous: leaf-blades that unfold at vernal flowering narrowly cordate-ovate and commonly attenuate toward the apex, becoming 4-6 cm. wide in summer, the margin noticeably crenate-serrate; petioles slender: corolla violet with the white base conspicuous, the spurred petal more or less villous: cleistogamous flowers small, ovoid, on rather long ascending peduncles: capsules oblong, 5-8 mm. long, usually reddish-brown, sometimes green, either glabrous or clothed with minute dense pubescence: sepals half the length of the capsule, with small appressed auricles: seeds normally buff. — Frequent, in moist meadows and low woods, and along streams.

9. *V. cucullata* Ait. Plant glabrous: leaf-blades, except the earliest, cordate-ovate, acute or subacuminate, often 9 cm. wide when mature: peduncles commonly much exceeding the leaves: sepals narrowly lanceolate: corolla violet-blue, darker-colored at the throat, the lateral petals with strongly clavate beard, the spurred petal glabrous, generally somewhat shorter than the lateral ones: cleistogamous flowers long and slender, on erect often elongated peduncles: capsules ovoid-cylindric, green, 10-15 mm. long, but little exceeding the long-auricled sepals: seeds nearly black, 1.5 mm. long. — Common, in wet places.

10. *V. fimbriatula* J. E. Smith. Rootstock becoming long and stout, usually erect: earliest leaf-blades ovate, obtuse, the later ones ovate-oblong, acute, finely pubescent, obscurely crenulate toward the apex, the basal lobes often sharply toothed, incised or auriculate: scapes commonly exceeding the leaves. auricles of the sepals somewhat spreading and ciliate: corolla violet-purple: capsules green, ovoid, 6-10 mm. long: seeds brown: cleistogamous flowers on erect peduncles. — E. Occasional, on dry banks. — *Quartzite*.

11. *V. sagittata* Ait. Plant usually glabrous, except the often ciliate leaves, or finely pubescent throughout: leaf-blades lanceolate or oblong-lanceolate, becoming 4-8 cm. long, hastately or sagittately toothed or cleft at the base; the earliest and those produced in late summer often deltoid-ovate, obtuse, merely crenate at the base: sepals narrowly lanceolate, acute, glabrous: corolla violet-purple: capsules 8-14 mm. long, containing 50-70 brown seeds. — N. S. Common, in dry places and on roadsides and banks. — *Sandstones and shales, schists*.

12. *V. emarginata* (Nutt.) LeConte. Plant glabrous: mature leaf-blades deltoid or broadly ovate, the base truncate or subcordate, often decurrent, obscurely crenate-serrate above the middle, coarsely toothed or incised below: corolla violet-blue, the petals sometimes emarginate: cleistogamous capsules ellipsoid, 8-14 mm. long: peduncles erect, somewhat shorter than the leaves: seeds brown. — Frequent, in dry woods and on hillsides.

13. *V. blanda* Willd. Leaf-blades cordate-ovate with narrow sinus, commonly acute, often acuminate, glabrous except for minute scattered hairs on the upper surface; petioles, and scapes, usually tinged with red: lateral petals beardless, the upper pair often long, narrow, and strongly reflexed, sometimes twisted: cleistogamous capsules ovoid, dark-purple: seeds dark-brown, minutely rugose, acute at base, 1.5 mm. long: plants freely producing, in summer, slender leafy runners. [*V. LeConteana* G. Don.] — N. S. Occasional, in cool ravines and on shaded slopes. — *Sandstones and shales, schists*.

14. *V. pallens* (Banks) Brainerd. Leaf-blades broadly cordate-ovate, obtuse or rarely acute, glabrous on both sides; petioles and scapes often dotted with red in summer and more or less hirsutulous: lateral petals usually bearing a small tuft of hairs, the upper petals broadly obovate: seeds 1 mm. long, almost black. [*V. blanda* of recent authors, not of Willd.] — N. S. Occasional, in springy places and along streams. — *Sandstones and shales, schists.*
15. *V. primulifolia* L. Plant often quite glabrous, but usually more or less pubescent especially toward the base of the petioles: leaf-blades oblong or ovate, the base slightly cordate, rounded or tapering, obscurely crenate-serrate; petioles often broadly winged above: flowers white: capsules green, their peduncles erect as in *V. lanceolata*: seeds reddish-brown, 1.5 mm. long. — N. S. Frequent, in moist open grounds. — *Sandstones and shales, schists.*
16. *V. lanceolata* L. Stolons leafy, often bearing apetalous flowers: leaves and scapes glabrous, 5–8 cm. high at time of vernal flowering; later leaves with lanceolate or elliptic blades, 10–15 mm. wide, 7–15 cm. long, obscurely erenulate, gradually tapering into margined, often reddish, petioles: sepals broadly lanceolate, acute: lateral petals usually beardless: cleistogamous capsules 6–12 mm. long, on erect peduncles but usually shorter than the leaves: seeds dark-brown. — E. S. Rather rare, in moist meadows. — *Quartzite, schists.*
17. *V. rotundifolia* Michx. Rootstock long and stout, jagged with the persistent bases of former leaves: runners short, usually without roots or leaves, bearing 1–4 cleistogamous flowers: leaf-blades oval or orbicular, cordate with short and narrow sinus, repand-erenulate, at vernal flowering sparsely hirtellous, 2–3 cm. wide, in midsummer mostly glabrate, 6–10 cm. wide, prostrate: corolla bright-yellow, the three lower petals with brown veins, the lateral ones bearded: style clavate, abruptly capitate, beakless: capsules ovoid, 6–8 mm. long, closely dotted with purple: seeds nearly white. — N. S. Rare, in dry or rocky woods. — *Sandstones and shales, schists.*
18. *V. odorata* L. Plant producing above ground leafy stolons rooting freely at the nodes: leaf-blades broadly cordate-ovate, finely pubescent: flowers violet or white, very fragrant: style hook-shaped: capsules from apetalous flowers broadly ovoid, angled, pubescent, purple: seeds large, cream-colored. — Common, on roadsides and about dwellings. Nat. of Eu. — SWEET-VIOLET. ENGLISH-VIOLET.
19. *V. eriocarpa* Schwein. Plant glabrous except for minute pubescence along veins on lower leaf-surfaces and on upper parts of petioles and stem: stems ascending, commonly 2–4 from one rootstock: radical leaves 1–5; blades cordate-reniform, on long petioles; cauline leaves only on upper half of stem; blades broadly ovate, subcordate, acuminate, the uppermost smaller, truncate, nearly sessile; stipules ovate to lanceolate, nearly entire, glabrous, tardily scarious: sepals narrowly lanceolate: lateral petals bearded: capsule ovoid, woolly or sometimes glabrous: cleistogamous flowers on short peduncles from axils of upper leaves: seeds brown, 2.5 mm. long. [*V. scabriuscula* Schwein.] — Common, in low open woods. — SMOOTH YELLOW-VIOLET.
20. *V. pubescens* Ait. Plant softly pubescent: stems 2–3 dm. high, often solitary: leaves, either cauline, 2–4, near the summit, or occasionally a long-petioled root-leaf is present; blades broadly ovate, cordate or truncate-decurrent at the base, crenate-dentate, somewhat pointed; stipules large, ovate-oblong: sepals narrowly lanceolate: lateral petals bearded: capsules ovoid, 10–12 mm. long, glabrous or sometimes woolly: seeds brown, 2.5 mm. long. — Common, in dry rich woods. — DOWNY YELLOW-VIOLET.
21. *V. canadensis* L. Stems usually 3–4 dm. high, minutely pubescent: leaf-blades cordate-ovate, pointed, serrate; stipules sharply lanceolate: sepals slender, acuminate, spreading: lateral petals bearded, the spurred petal yellow at the base and striped with fine dark lines: capsules subglobose, 6–10 mm.

long, often downy or puberulent: seeds brown. — N. Rare, in woods. — *Sandstones and shales*. — CANADA-VIOLET.

22. *V. striata* Ait. Stems several, ascending, 15–30 cm. long when in flower, in late summer often 6 dm. long, decumbent: leaves glabrous or nearly so; blades cordate-ovate, 2–4 cm. broad, usually acuminate, finely crenate-serrate; stipules large, oblong-lanceolate: sepals ciliolate, narrow, attenuate: corolla white or cream-colored: style beaked: capsules ovoid, glabrous, 4–6 mm. long: seeds light-brown. — Common, in low thickets and woods.

23. *V. conspersa* Reichenb. Rootstock oblique, often much branched: stems, at time of vernal flowering, 8–16 cm. high: lower leaf-blades cordate-orbicular, obtuse, the upper ones cordate-ovate, crenate, subacuminate, becoming 2–4 cm. wide: flowers numerous, usually pale-violet, sometimes white, raised above the leaves on axillary peduncles 5–8 cm. long: cleistogamous flowers in summer on short peduncles from the same axils that bore vernal flowers, or from axils of later leaves of the lengthened stem: styles bent downward at the tip and slightly hairy: seeds light-brown. — Common, in low woods and shaded grounds.

24. *V. rostrata* Pursh. Stems often numerous, commonly 1–2 dm. high: leaf-blades orbicular to broadly ovate, cordate, nearly or quite glabrous, serrate, the upper acute or pointed: petaliferous flowers borne on long peduncles above the leaves: petals spotted with darker-violet, all beardless, the spur slender, 10–12 mm. long: later cleistogamous flowers with minute or aborted petals and on short peduncles from the axils of the upper leaves: style straight, beakless, glabrous: capsules ovoid, 3–5 mm. long, glabrous: seeds light-brown. — N. Occasional, in woods. — *Sandstones and shales*. — LONG-SPURRED VIOLET.

25. *V. Rafinesquii* Greene. Plant annual, glabrous, with the slender stem often branched from the base: leaf-blades small, the lowest 6–10 mm. wide, orbicular, on slender petioles, the upper obovate to linear-oblancoate, sparsely erenulate, attenuate at the base; stipules pectinately cut, the upper segment elongated, narrowly spatulate, mostly entire; internodes usually exceeding the leaves: flowers small, but the obovate bluish-white to cream-colored petals nearly twice the length of the lanceolate sepals: seeds light-brown, 1.2 mm. long. — Common, on banks and roadsides and in fields.

26. *V. tricolor* L. Similar to the preceding but stouter, often 3 dm. high, erect or branching and decumbent: leaf-blades ovate on the lower part of the stem, lanceolate or oval above, noticeably crenate or crenate-serrate; stipules laciniate or pinnatifid, the upper lobe usually much enlarged, oblanceolate, crenate: corolla much longer than the lanceolate sepals, mostly yellow, violet, purple, or white, or variegated: capsules obovoid or oval. — Occasional, about gardens and on roadsides. Nat. of Eu. — PANSY.

2. **CUBELIUM** Raf. Caulescent herbs. Leaf-blades relatively broad. Corolla green. Style bent above the ovary. Capsule several-seeded.

1. *C. concolor* (Forst.) Raf. Plant pubescent, 3–9 dm. high: leaf-blades oblong or elliptic, tapering to a short petiole; stipules linear: flowers on short recurved peduncles, 1–3 in the axils: petals 3.5–4.5 mm. long: capsules oblong, 1.5–2 cm. long: seeds ovoid, 4–5 mm. long. — M. S. Occasional, in rich woods. — *Limestones, quartzite, schists*. — Spr. — GREEN-VIOLET.

Order PASSIFLORALES.

Herbs, vines, or shrubby plants, or succulent trees with milky sap. Leaves alternate: blades entire or lobed. Flowers perfect or dioecious. Calyx of 4 or 5 more or less united sepals. Corolla of 4 or 5 distinct or united petals, sometimes accompanied by a fringed crown, or rarely want-

ing. Androecium of 5 stamens, or of 10 stamens in 2 equal rows. Gynoecium of 3-5 carpels. Ovary superior. Fruit a berry or a capsule.

FAMILY 1. **PASSIFLORACEAE.** PASSION-FLOWER FAMILY.

Herbs, tendril-bearing vines, or shrubby plants. Leaves with entire or lobed, simple or rarely compound, blades. Corolla mostly rotate. Stamens 5: filaments usually monadelphous around the gynoecium. Fruit baccate.

1. **PASSIFLORA** L. Perennial vines. Leaf-blades entire, lobed, or parted. Crown filamentous, single, double, or triple. Anthers versatile.

1. **P. lutea** L. Twigs finely pubescent or glabrous: leaf-blades 3-15 cm. broad, mostly obtuse, glabrous: cymes 1-flowered: sepals 8-12 mm. long: corolla greenish-yellow, about 2 cm. broad: berries 10-15 mm. in diameter, purple.— Lower Susquehanna valley. Frequent, in woods, on the river shore and islands.— *Schists.* — Early sum. — PASSION-FLOWER.

Order **OPUNTIALES.**

Succulent typically spine-armed herbs, shrubs, or trees, nearly leafless or essentially so, or leafy rigid herbs with more or less specialized hairs. Flowers perfect. Hypanthium present. Calyx of 4 or 5, or of many sepals. Corolla of 4 or 5, or of many petals. Androecium of usually many stamens, in several series or groups, sometimes partially reduced to staminodia. Gynoecium of 4, or 2-several united carpels. Ovary inferior. Fruit baccate or capsular.

FAMILY 1. **OPUNTIACEAE.** CACTUS FAMILY.

Succulent plants typically spine-armed and often with cushions of bristles or hairs at the base of the spines. Leaves mostly wanting or obsolete.

1. **OPUNTIA** [Tourn.] Mill. Plants conspicuously jointed, with separated usually spine-bearing areolae. Flowers arising from the cushions of remote bristles of the areolae. Style cylindric.

1. **O. Opuntia** (L.) Coulter. Stems prostrate, the joints orbicular to obovate, 5-10 cm. long: leaves thick, 4-5 mm. long: bristle-cushions rather remote, usually unarmed: bristles few, yellowish-green: spines few, when present solitary, less than 2.5 cm. long, variegated: flowers pale-yellow, 5-6 cm. broad: fruit obovoid or clavate-obovoid, 2-3 cm. long: seeds 5 mm. long, thick-margined.— Lower Susquehanna valley. Local, on rocks on Mountain island, Peach Bottom.— *Schists.* — Spr. and early sum. — PRICKLY-PEAR. INDIAN-FIG.

Order **THYMELEALES.**

Shrubs or trees, or partially herbaceous plants. Leaves opposite or alternate, the blades simple, rarely mere scales, or obsolete. Flowers perfect, polygamous, or dioecious, regular or nearly so. Calyx of 5 or fewer sepals. Corolla wanting (in our species). Androecium of as many stamens as there are sepals or twice as many. Anthers opening by slits

or hinged valves. Gynoecium a single carpel. Ovary superior. Ovule mostly solitary. Fruit usually baccate or drupaceous.

Anthers opening by slits: plants not aromatic.

Fam. 1. DAPHNACEAE.

Anthers opening by hinged valves: plants aromatic.

Fam. 2. LAURACEAE.

FAMILY 1. DAPHNACEAE. MEZEREON FAMILY.

Shrubs or trees, or rarely herbs, often pubescent. Leaves opposite or alternate: blades entire. Calyx of 4 or 5 sepals, sometimes with 4 or 5 scales within. Androecium of as many stamens as there are sepals or twice as many. Gynoecium seated in the bottom of the hypanthium. Style usually eccentric.

1. **DIRCA** L. Shrubs. Leaves alternate. Flowers appearing before the leaves. Sepals usually shorter than the hypanthium. Filaments slender. Ovary 1-celled: style filiform. Drupe slightly elongate.

1. **D. palustris** L. Shrub 0.5-2 m. tall: leaf-blades oval or obovate, 4-8 cm. long: flowers lemon-yellow: hypanthium 7-8 mm. long: sepals very short: drupe oval, 7-9 mm. long, red. — M. Rather rare, in woods and thickets along creeks. — *Limestones*. — Spr. — MOOSE-WOOD. LEATHER-WOOD.

FAMILY 2. LAURACEAE. LAUREL FAMILY.

Shrubs or trees. Leaves alternate or opposite: blades entire or lobed. Flowers in open or congested cymes. Perianth of 6 (rarely 4-10) sepals in 2 series. Androecium of usually more stamens than there are sepals, in 2-4 series, those of the third series usually glandular-appendaged, those of the fourth series mostly mere staminodia. Gynoecium a single carpel. Ovary 1-celled. Fruit drupaceous.

Anthers 4-celled, 4-valved: flowers borne in peduncled corymb-like racemes.

Anthers 2-celled, 2-valved: flowers borne in sessile or nearly sessile clusters.

1. SASSAFRAS.

2. BENZOIN.

1. **SASSAFRAS** Nees. Trees. Leaves alternate, dioecious: blades lobed or individually entire. Flowers in axillary peduncled corymb-like racemes. Style columnar: stigma depressed. Drupe somewhat elongate.

1. **S. Sassafras** (L.) Karst. Large tree with ridged bark: leaf-blades 3-lobed or rarely entire or 2-lobed: flowers greenish-yellow: sepals 6, narrowly oblong, 2.5-3 mm. long: drupes oval, 8-10 mm. long, red or orange. — Common, on dry hills and in woods. — Spr. — SASSAFRAS.

2. **BENZOIN** Fabr. Shrubs or trees, strong-scented. Leaves alternate, deciduous: blades entire. Flowers in sessile cluster-like or umbel-like cymes. Style slender-columnar. Drupes somewhat elongate.

1. **B. aestivale** (L.) Nees. Shrub 1-3 m. tall, the branches glabrous: leaf-blades thin, obovate, oval or elliptic, 5-12 cm. long, pale beneath: flowers yellow, in clusters before the leaves: calyx 6-8 mm. wide; sepals obtuse: drupe oval, about 1 cm. long, red. — Common, along streams and in moist soil, usually in thickets. — Spr. — SPICE-BUSH. FEVER-BUSH. BENJAMIN-BUSH.

Order MYRTALES.

Herbs, shrubs, or trees, sometimes aquatic or amphibious. Leaves alternate or opposite. Flowers regular or irregular, complete or much reduced. Hypanthium merely enclosing the ovary or adnate to it.

Style present, simple or compound: stigma terminal.	
Anthers opening by pores.	Fam. 1. MELASTOMACEAE.
Anthers opening by longitudinal valves.	
Hypanthium merely enclosing the ovary.	Fam. 2. LYTHRACEAE.
Hypanthium adnate to the ovary or mainly so.	Fam. 3. EPILORACEAE.
Style wanting: stigmas sessile.	Fam. 4. GUNNERACEAE.

FAMILY 1. **MELASTOMACEAE.** MEADOW-BEAUTY FAMILY.

Herbs, shrubs, or trees. Leaves opposite: blades with 3-several ribs. Flowers perfect. Calyx of 3-6 sepals surmounting the hypanthium. Corolla of 3-6 oblique petals. Androecium of 6-12 stamens, those opposite the petals sometimes abortive. Gynoecium of mostly 4 united carpels. Ovary enclosed in or adnate to the hypanthium. Fruit baccate or capsular.

1. **RHEXIA** L. Perennial herbs with rootstocks. Leaf-blades usually 3-5-ribbed. Hypanthium urceolate, prolonged beyond the ovary. Sepals 4, persistent. Petals 4, deciduous. Ovary 4-celled, free. Capsule included, 4-valved. — DEERGRASS.

1. **R. virginica** L. Stems 2-10 dm. tall: leaf-blades oblong-elliptic, oval, lanceolate, or ovate-lanceolate, 2-10 cm. long: sepals lanceolate or triangular-lanceolate: petals bright-purple, 11-17 mm. long: capsules 7-10 mm. long. — S. Rare, in moist sandy soil. — *Schists.* — Sum. — MEADOW-BEAUTY.

FAMILY 2. **LYTHRACEAE.** LOOSESTRIFE FAMILY.

Herbs, shrubs, or tropical trees. Leaves mostly opposite: blades usually entire. Flowers perfect. Calyx of 4 or 5 sepals, commonly with accessory teeth. Corolla of 4 or 5 petals, or wanting. Androecium of few or many stamens: anthers versatile. Gynoecium of mostly 2-6 united carpels. Ovary 2-6-celled, or rarely 1-celled, free from the hypanthium. Fruit a capsule, included in the hypanthium.

Hypanthium campanulate or turbinate, becoming hemispheric or globose.	
Herbs: flowers mostly solitary in the axils: capsule septicial: stamens 4.	1. ROTALA.
Shrubs: flowers in axillary cymes: capsule loculicidal: stamens 8-10.	2. DECODON.
Hypanthium elongate, cylindrical or tubular.	
Flowers regular: hypanthium symmetrical.	3. LYTHRUM.
Flowers irregular: hypanthium oblique.	4. PARSONSIA.

1. **ROOTALA** L. Annual leathery-succulent herbs. Leaf-blades narrow, entire. Flowers usually solitary in the axils. Sepals with accessory teeth. Petals usually 4. Stamens 4. Style very short.

1. **R. ramosior** (L.) Koehne. Stems 0.5-4 dm. long: leaf-blades oblong to linear or spatulate, 1-3 cm. long: sepals acute: petals minute: capsules 2.5-3.5 mm. in diameter. — Mostly on islands and shores of the Susquehanna, and swamps in the southern part. — Sum.

2. **DECODON** J. F. Gmel. Aquatic shrubs. Leaves deciduous: blades entire. Flowers in axillary peduncled cymes. Sepals 5-7, alternating with small teeth. Petals 5-7. Stamens 10 or rarely 8, alternating short and long, the longer exerted. Capsule loculicidally 3-6-valved.

1. **D. verticillatus** (L.) Ell. Stems arching, mostly 4-16 dm. long: leaf-blades lanceolate or elliptic-lanceolate, 3-20 cm. long: sepals acuminate: petals purple, lanceolate to ovate, 7-9 mm. long: capsules about 5 mm. in diameter.

— S. River valley near Safe Harbor. — *Schists*. — Sum. — SWAMP-LOOSESTRIFE. WATER-WILLOW.

3. **LYTHRUM** L. Herbs or shrubs. Leaf-blades entire. Flowers axillary or in terminal spikes or racemes. Sepals 4-6, alternating with spreading teeth. Petals 4-6, nearly equal. Stamens adnate to the lower part of the hypanthium. Embryo with auricled cotyledons.

1. **L. Salicaria** L. Plant perennial, 1 m. tall or less, with finely pubescent branches: leaf-blades lanceolate to linear-lanceolate, 3-11 cm. long, acute or acuminate at the apex, cordate and clasping at the base: panicle many-flowered, showy: hypanthium 5-6 mm. long, ribbed: sepals deltoid, $\frac{1}{2}$ - $\frac{3}{4}$ as long as the slender, subulate appendages: petals magenta, oblong or nearly so, 8-10 mm. long: capsule oblong, shorter than the hypanthium. — W. Swamps, near Columbia. Nat. of Eu. — Sum. — LOOSESTRIFE.

4. **PARSONSIA** P. Br. Herbs or woody plants, mostly clammy-pubescent. Leaf-blades entire. Flowers axillary, or in terminal spikes or racemes. Sepals 6, alternating with small teeth. Petals 6, unequal. Stamens adnate to near the top of the hypanthium. Embryo with orbicular cotyledons.

1. **P. petiolata** (L.) Rusby. Plants annual, 1-7 dm. tall: leaf-blades lanceolate to ovate-lanceolate, 1-1.5 cm. long: petals purple, mostly ovate, the upper ones 4.5-5.5 mm. long: capsules 6-8 mm. long. — Common, in fields and woods, and on roadsides. — Sum. — CLAMMY-WEED.

FAMILY 3. EPILOBIACEAE. EVENING-PRIMROSE FAMILY.

Herbs or rarely shrubs. Leaves alternate or opposite: blades simple. Flowers typically perfect. Hypanthium often elongate. Calyx of 2-6, usually 4, sepals. Corolla of 2-9, usually 4, petals, or rarely wanting. Androecium of as many stamens as the sepals, or twice as many. Gynoecium of several, usually 4, united carpels. Ovary 1-6-celled, usually 4-celled, inferior. Styles united. Fruit capsular or nut-like.

Floral whorls of 4 parts or more.

Fruit a many-seeds capsule, opening by valves or by a pore, or by the breaking down of the walls.

Hypanthium not prolonged beyond the ovary.

Seed naked, i. e., without a tuft or hairs.

Leaves opposite: stems prostrate, creeping or floating: flowers sessile or nearly so: corolla wanting or very small. 1. ISNARDIA.

Leaves alternate: stems erect: flowers peduncled: corolla showy.

Seeds furnished with a tuft of silky hairs.

Hypanthium prolonged beyond the ovary.

Seeds with a tuft of silky hairs.

Seeds naked or merely tuberculate.

Flowers with all the stamens equal in length.

Flowers with the alternate stamens longer.

Fruit indehiscent, nut-like.

Floral whorls of 2 parts.

2. LUDWIGIA.
3. CHAMAENERION.
4. EPILOBIUM.
5. OENOTHERA.
6. KNEIFFIA.
7. GAURA.
8. CIRCAEA.

1. **ISNARDIA** L. Perennial succulent herbs. Leaf-blades relatively wide. Flowers axillary. Sepals 4, broad. Petals minute, reddish to greenish, or wanting. Filaments very short. Ovary short. Style wanting or nearly so. Capsule obovoid or turbinate.

1. **I. palustris** L. Stem diffusely branched: leaf-blades spatulate to oval or ovate, 1.5-2.5 cm. long: hypanthium glabrous: sepals triangular: petals wanting or minute and reddish: capsules 3-4 mm. long. — Common, in swamps. — Sum. — MARSH-PURSLANE. WATER-PURSLANE.

2. **LUDWIGIA** L. Annual or perennial herbs. Leaf-blades narrow, entire or rarely shallowly toothed. Flowers axillary or terminal. Sepals generally persistent. Petals usually 4. Ovary usually 4-celled. Capsule cylindric or prismatic to globose. — FALSE-LOOSESTRIFE.

1. **L. alternifolia** L. Plants 6–12 dm. tall: leaf-blades lanceolate, 6–12 cm. long: sepals ovate: petals about equalling the sepals: capsules slightly winged on the angles, 5–7 mm. long. — Common, in wet places. — Sum. — SEEDBOX.

3. **CHAMAENERION** Adans. Perennial herbs. Leaf-blades entire or nearly so. Flowers irregular, in showy racemes. Sepals 4, deciduous. Petals 4, entire. Stamens 8, declined. Stigmas 4. Capsule elongate, obtusely angled. Seeds comose.

1. **C. angustifolium** (L.) Scop. Plants 5–25 dm. tall, often clustered: leaf-blades lanceolate, 5–15 cm. long: corolla purple or sometimes white; petals 1–1.5 cm. long: capsules 5–7.5 cm. long: coma of seeds about 10 mm. long. — Occasional, in woods and thickets and on hillsides. — Sum. — FIRE-WEED. WILLOW-HERB.

4. **EPILOBIUM** L. Perennial herbs or somewhat woody plants. Leaf-blades entire or toothed. Flowers solitary, spicate, or racemose. Sepals 4, short, deciduous. Petals 4, pink or white, often notched. Stamens 8. Stigmas 4, or united and clavate. Capsules elongate, 4-sided. Seeds comose. — Sum. and fall. — WILLOW-HERB.

Stem and branches terete: leaf-blades linear to lanceolate, revolute, essentially entire.

Corolla small, about 1 cm. wide: leaf-blades petioled: plants caescent.

Corolla large, about 1.5 cm. wide: leaf-blades sessile: plants

glandular-pubescent.

Stem and branches with decurrent ridges below the leaf-bases:

leaf-blades ovate to lanceolate, flat, serrate.

1. *E. lineare*.

2. *E. strictum*.

3. *E. coloratum*.

1. **E. lineare** Muhl. Plants 3–5 dm. tall: leaf-blades linear or nearly so, 2.5–5 cm. long: flowers erect: sepals 2–3 mm. long: petals 4–5 mm. long, shallowly notched: capsules 3.5–5.5 cm. long: seeds about 1.5 mm. long. — S. Rare, in moist grounds. — *Schists*.

2. **E. strictum** Muhl. Plants 3–9 dm. tall: leaf-blades lanceolate to linear, 1.5–4 cm. long, entire or obscurely toothed, veiny, sessile: sepals 3–4 mm. long: petals cuneate, about 8 mm. long, deeply notched: capsules 5–7 cm. long: seeds about 2 mm. long. — M. Rare, Dillerville swamp, Lancaster. — *Limestones*.

3. **E. coloratum** Muhl. Plants 3–9 dm. tall: leaf-blades lanceolate, 5–15 cm. long: flowers generally nodding: sepals 2.5–3.5 mm. long: petals 3–4 mm. long, shallowly notched: capsules 4.5–6 cm. long. — Common, in low grounds.

5. **OENOTHERA** L. Annual or biennial large herbs. Leaf-blades undulate or toothed. Buds erect. Flowers nocturnal, spicate. Sepals elongate. Corolla yellow. Capsules 4-sided, tapering. [*Onagra* Adans.] — Sum. — EVENING-PRIMROSE.

Sepals less than 3 cm. long, the free tips subulate, less than 4 mm. long: corolla 2–5 cm. wide.

Sepals over 3 cm. long, the free tips filiform, over 5 mm. long:

corolla 8–12 cm. wide.

1. *O. biennis*.

2. *O. grandiflora*.

1. **O. biennis** L. Stems 13–25 dm. tall, hirsute: leaf-blades oblong to lanceolate, 2.5–15 cm. long, repand-denticulate: petals bright-yellow, 1–2.5 cm. long: capsules narrowly oblong-conic, 18–25 mm. long, nearly terete. — Common, on roadsides and in thickets.

2. *O. grandiflora* Ait. Similar to *O. biennis*, but larger throughout, sometimes 3 m. tall: petals 4-6 cm. long, golden-yellow: capsules linear-conic, 3-4 cm. long, 4-sided. — Occasional, on roadsides and in fence rows. Nat. of Ala.

6. *KNEIFFIA* Spach. Annual or perennial small herbs. Leaf-blades entire or shallowly toothed. Buds mostly erect. Flowers spicate, diurnal. Petals yellow. Ovary clavate or stout. Capsule clavate or with an oblong or ovoid body, 4-winged, or 4-angled. Seeds not tubercled. — Sum. — **SUNDRUPS.**

Capsules clavate.

Young inflorescence erect: capsules pubescent: petals over 1 cm. long.

Pubescence of the capsule of straight spreading hairs: pedicel-like base longer than the capsule-body whose thick wings are pubescent.

Pubescence of the capsule of minute curved hairs: pedicel-like base shorter than the capsule-body whose thin wings are often glabrous.

Young inflorescence nodding at the tip: capsules glabrous or nearly so: petals less than 1 cm. long.

Capsules oblong or nearly so.

1. *K. longipedicellata*.

2. *K. linearis*.

3. *K. pumila*.

4. *K. fruticosa*.

1. *K. longipedicellata* Small. Stems puberulent or short-hirsute, 3-8.5 dm. tall: basal leaves with spatulate or obovate-spatulate blades 3.5-7.5 cm. long: stem-leaves few; blades linear-lanceolate, 2.5-6.5 cm. long, entire, sometimes undulate: sepals hirsute, 12-19 mm. long: petals mostly over 2 cm. long: capsule-body narrowly obovoid, 6-10 mm. long, hirsute. — Occasional, in low grounds.

2. *K. linearis* (Michx.) Spach. Stems puberulent, short-pilose or nearly glabrous, 1.5-5 dm. tall: basal leaves with spatulate or broadly oblanceolate blades, 5-8 cm. long, entire or nearly so: stem-leaves usually few; blades linear or linear-lanceolate, 2.5-7.5 cm. long, slightly toothed: sepals about 1 cm. long, pubescent: petals mostly 1.5-2 cm. long: capsule-body oblong-clavate, 7-14 mm. long, canescent. — S. Occasional, in the Susquehanna valley and adjacent parts. — *Schists.*

3. *K. pumila* (L.) Spach. Stems puberulent, 2-6 dm. tall: basal leaves with oblanceolate or spatulate blades: stem-leaves few or many; blades oblong, linear or elliptic, 2-8 cm. long, entire or very nearly so: sepals 5-7 mm. long: petals 6-9 mm. long: capsule-body obovoid or oblong-obovoid, 6-12 mm. long, glabrous or nearly so. — W. S. Not very common, in moist sandy places. — *Sandstones and shales, schists.*

4. *K. fruticosa* (L.) Raimann. Stems 3-9 dm. tall, green or purple, puberulent: leaf-blades lanceolate, ovate-lanceolate, or oblong, 2.5-10 cm. long, mostly denticulate: sepals 15-20 mm. long: petals 2-3 cm. long: capsule-body oblong, 6-9 mm. long, prominently winged. — Common, in dry soil.

7. *GAURA* L. Annual, biennial, or perennial herbs. Leaf-blades entire, toothed, or pinnatifid. Flowers spicate or racemose. Hypanthium narrow, somewhat prolonged beyond the ovary. Petals unequal, with clawed blades. Stamens 8, declined. Style declined. Stigma 4-lobed, surrounded by a cup-like border. Fruit ribbed or angled, often with a pedicel-like base.

1. *G. biennis* L. Stems 6-15 dm. tall, villous-hirsute: leaf-blades lanceolate, oblong-lanceolate, or elliptic, 3-10 cm. long, remotely denticulate or merely undulate: buds pubescent: base of the hypanthium villous: sepals 8-9.5 mm. long: petals white, sometimes turning pink, 7-11 mm. long: fruit elliptic to oval-elliptic, 6-10 mm. long, more or less hirsute. — Rather common, in dry soil and along streams. — Sum.

8. *CIRCAEA* [Tourn.] L. Perennial herbs. Leaves opposite: blades mostly toothed, petioled. Flowers racemose. Sepals 2. Petals 2, notched.

Stamens 2, alternate with the petals. Ovary 1-2-celled. Fruit obovoid, usually bristly with hooked hairs.

1. *C. lutetiana* L. Plants 3-6 dm. tall; leaf-blades ovate, 5-10 cm. long, remotely denticulate; pedicels 4-8 mm. long; corolla about 3 mm. broad; fruits broadly obovoid, about 4 mm. long, with stiff hairs. — Common, in woods and thickets. — Sum. — ENCHANTER'S-NIGHTSHADE.

FAMILY 4. **GUNNERACEAE.** WATER-MILFOIL FAMILY.

Perennial, or rarely annual, aquatic or amphibious herbs. Leaves alternate or whorled: blades entire to dissected, often of 2 kinds on the same plant. Flowers perfect or monoecious. Calyx of 2-4 sepals. Corolla of 2-4 small petals, or wanting. Androecium of 1-8 relatively large stamens. Gynoecium of 1, or of 2-4, sometimes united, carpels. Ovary inferior. Stigmas 1-4. Fruit an angled, ribbed, or winged nutlet or drupe.

1. *PROSERPINACA* L. Herbs with creeping stems. Leaves alternate: blades toothed or pectinate-pinnatifid, the lower ones more finely dissected. Flowers perfect, axillary. Petals wanting.

1. *P. pectinata* Lam. Leaf-blades pectinate or pectinate-pinnatifid; fruits 3.5-4 mm. long, the angles rather obtuse. — M. Rare, in swamps along the Conestoga near Lancaster. — *Limestones.* — Sum. — MERMAID-WEED.

Order **AMMIALES.**

Herbs, shrubs, or trees, or vines. Leaves alternate or opposite: blades simple or compound. Flowers perfect, polygamous, or dioecious, often borne in umbels. Calyx of typically 5 small sepals surmounting the hypanthium. Corolla of typically 5 petals, or wanting. Androecium of as many stamens as sepals. Gynoecium 2-carpellary or rarely several-1-carpellary. Ovary inferior. Fruit drupaceous or baccate, or dry (a cremocarp).

Fruit drupaceous or baccate: gynoecium 1-several-carpellary, if 2-carpellary, stigmas introrse.

Styles single or united: ovule with a dorsal raphe: leaves mostly opposite; blades entire or merely toothed. Fam. 1. NYSSACEAE.

Styles distinct: ovule with a ventral raphe: leaves mostly alternate; blades lobed or compound. Fam. 2. HEDERACEAE.

Fruit dry, a cremocarp: gynoecium 2-carpellary: stigmas terminal. Fam. 3. AMMICEAE.

FAMILY 1. **NYSSACEAE.** DOGWOOD FAMILY.

Shrubs or trees, or rarely partly herbaceous plants. Leaves opposite or alternate: blades usually entire. Flowers perfect or unisexual, borne in naked or involucrate, open or congested cymes. Calyx of mostly 4 or 5 sepals. Corollas of 4 or 5, or rarely more, petals, or wanting. Androecium of usually as many stamens as sepals. Gynoecium of 1 carpel or of 2-4 united carpels. Styles single or united. Fruit mostly a drupe, or baccate.

Flowers dioecious or polygamo-dioecious: stigmas lateral: drupe with a 1-celled, 1-seeded stone. 1. NYSSA.

Flowers perfect: stigmas terminal: drupe with a 2-celled, 2-seeded stone.

Flowers in open cymes, not subtended by an involucre: fruit surmounted by the style, globular, not red. 2. SVIDA.

Flowers in a head, subtended by a large involucre: fruit surmounted by the calyx, elongate, red. 3. CYNXYLON.

1. **NYSSA** L. Shrubs or trees, with terete branches. Leaves alternate, deciduous. Flowers polygamo-dioecious, on spreading peduncles, the staminate with 5-several sepals and 5-many stamens, the pistillate with 5 sepals and a 1-celled pistil. Drupe somewhat elongate.—TUPELO.

1. **N. sylvatica** Marsh. Tree becoming 50 m. tall: leaf-blades oval or obovate, or rarely oblanceolate, 5-15 cm. long: flowers slender-peduncled, green: drupes oval, 15-17 mm. long, dark-blue.—Common, in dry soil.—Spr.—SOUR-GUM. BLACK-GUM. PEPPERIDGE.

2. **SVIDA** Opiz. Shrubs or trees. Leaves opposite or rarely alternate. Flowers in naked erect corymb-like cymes. Sepals 4, minute. Petals 4, white, spreading. Stamens 4. Drupe globular or depressed.—Spr. or early sum.—CORNEL. DOGWOOD.

Leaves opposite, remote: drupes white or pale- or light-blue.

Drupes blue: leaf-blades copiously pubescent beneath, at least when young.

Leaf-blades orbicular or ovate-orbicular: sepals deltoid. 1. *S. circinata*.

Leaf-blades ovate or ovate-lanceolate: sepals lanceolate. 2. *S. Amomum*.

Drupes white: leaf-blades glabrous or nearly so beneath. 3. *S. candidissima*.
Leaves alternate, approximate at the end of the branches:
drupes deep-blue or blue-black. 4. *S. alternifolia*.

1. **S. circinata** (L'Her.) Small. Shrub 3 m. tall or less with green twigs: leaf-blades oval, or somewhat ovate to suborbicular, 5-15 cm. long, acute or short-acuminate, sparingly pubescent but green above, pale and rather copiously woolly beneath: cymes dense, 4-9 cm. wide: sepals deltoid, acute: petals lanceolate or ovate-lanceolate, 3-3.5 mm. long: stamens exceeding the petals: drupes globose, about 5 mm. in diameter, light-blue.—M. Rare, along the Conestoga above Lancaster.—*Limestones*.

2. **S. Amomum** (Mill.) Small. Shrub with purple twigs: leaf-blades lanceolate to broadly ovate, 3-13 cm. long, silky and often somewhat rusty beneath: drupes 6-8 mm. in diameter, pale-blue.—Common, in moist thickets and along streams.—KINNIKINNIK. SILKY-CORNEL.

3. **S. candidissima** (Marsh.) Small. Shrub with gray twigs: leaf-blades elliptic or lanceolate, 4-15 cm. long: sepals triangular: petals oblong to oblong-lanceolate: drupes subglobose, 4-5 mm. in diameter.—N. E. Rather rare, in thickets and on roadsides.—*Sandstones and shales*.

4. **S. alternifolia** (L. f.) Small. Shrub, or tree sometimes 9 m. tall: leaf-blades elliptic or oval, varying to ovate or obovate, 5-15 cm. long, whitish beneath, prominently ribbed: petals oblong-ovate: drupes depressed-globose, 8-10 mm. in diameter, blue-black.—N. Rather rare, in woods and thickets.—*Sandstones and shales*.

3. **CYNOXYLON** Raf. Trees or shrubs. Leaves opposite. Flowers perfect, in conspicuously involucrate heads. Sepals 4, broadly ovate to oblong. Petals 4, greenish or yellow-green, recurving. Stamens 4. Drupe elongate.

1. **C. floridum** (L.) Raf. Shrub, or tree sometimes 15 m. tall, with very rough black bark: leaf-blades elliptic to oval, 6-18 cm. long, pale beneath: involucre bracts white or pink, obovate, 4-6 cm. long: petals linear, 3-4.5 mm. long: drupes oblong to oval, about 15 mm. long, red.—Common, in woods and on hillsides.—Spr.—FLOWERING-DOGWOOD.

FAMILY 2. HEDERACEAE. IVY FAMILY.

Herbs, shrubs, trees, or vines. Leaves alternate: blades simple or compound. Flowers perfect or polygamous, often umbellate. Calyx of 5 sepals, or obsolete. Corolla of 5 or 10 stamens. Gynoecium of 2-5 united carpels. Styles distinct. Fruit a berry or a drupe.

Umbel simple: plants scapose, the bracts whorled: styles 2 or 3. 1. PANAX.
 Umbel compound: plants caulescent, the leaves alternate: styles 5. 2. ARALIA.

1. **PANAX** L. Perennial herbs. Leaf-blades palmately compound. Scape topped with a whorl of bracts quite similar to the leaves. Umbel simple. Ovary mostly 2- or 3-celled. Styles distinct. Fruit red, yellowish or yellow.

Rootstock globular: leaflets sessile, obtuse: berries yellow. 1. *P. trifolium*.
 Rootstock fusiform: leaflets stalked, acuminate: berries bright-crimson. 2. *P. quinquefolium*.

1. **P. trifolium** L. Plants 1-2 dm. tall: bracts 3: leaflets 3, the blades oblong or elliptic, 1-8 cm. long: petals white: berries 4-5 mm. broad. — Common, in damp places in woods. — Spr. — DWARF-GINSENG. GROUND-NUT.

2. **P. quinquefolium** L. Plants 2-4 dm. tall: bracts 3 or 5: leaflets 5-7, the blades obovate, or those of the basal leaflets oval or suborbicular, 2-12 cm. long: petals greenish: berries 8-10 mm. broad. — Rare, in rich woods. — Sum. — GINSENG.

2. **ARALIA** [Tourn.] L. Perennial herbs, shrubs, or trees, sometimes prickly-armed or spiny. Leaves alternate: blades pinnately or ternately compound. Umbel compound. Ovary mostly 5-celled. Styles distinct or united at the base. Fruit black. — SPIKENARD. SARSAPARILLA.

Umbels few, in terminal corymbs or few-rayed umbels.

Plants with elongate rootstocks, a peduncle or a leaf, or both, arising together at intervals from the rootstock: anthers globular. 1. *A. nudicaulis*.

Plants with leafy branches arising from the rootstocks: anthers oblong. 2. *A. hispida*.

Umbels numerous, in terminal or axillary racemes or panicles.

Large unarmed herb: leaflets membranous: hypanthium campanulate: anthers globular. 3. *A. racemosa*.

Shrub or small tree, with prickly-armed stems: leaflets leathery: hypanthium broadly turbinate: anthers oblong. 4. *A. spinosa*.

1. **A. nudicaulis** L. Plants 2-3.5 dm. tall, sparingly soft-pubescent or glabrous: leaf usually solitary: inflorescence overtopped by the leaf: berries 6-8 mm. in diameter: seeds 4.5-5 mm. long, very flat. — Common, in woods and on rocky hillsides. — Spr. and sum. — WILD SARSAPARILLA.

2. **A. hispida** Vent. Plants 2-9 dm. tall, bristly pubescent: leaves several or many: inflorescence overtopping the leaves: berries rather smaller than those of *A. nudicaulis*: seeds 2.5-3 mm. long, swollen. — E. S. Rather rare, in thickets and rocky woods. — *Sandstones and shales, schists*. — Sum. — WILDELDER. BRISTLY-SARSAPARILLA.

3. **A. racemosa** L. Herb 1-2 m. tall, unarmed: blades of the leaflets membranous: hypanthium campanulate: petals rather shorter than the hypanthium: berries 4-5 mm. in diameter: seeds about 2.5 mm. long. — Common, in rich woods. — Sum. — SPIKENARD.

4. **A. spinosa** L. Shrub or small tree, prickly-armed: blades of the leaflets leathery: hypanthium broad-turbinate: petals longer than the hypanthium: berries 6-7 mm. in diameter: seeds about 4 mm. long. — Locally escaped from cultivation. — Sum. — PRICKLY-ASH. TOOTHACHE-TREE. HERCULES'-CLUB.

FAMILY 3. AMMIACEAE. CARROT FAMILY.

Herbs with hollow stems. Leaves typically alternate: blades dissected, or sometimes merely toothed, or entire. Flowers perfect or polygamous, umbellate. Calyx of 5 tooth-like sepals, or obsolete. Corolla of 5 petals. Androecium of 5 stamens. Gynoecium of 2 united carpels, often with a stylopodium. Fruit dry, a cremocarp, the ribbed or winged carpels separating at maturity.

- Fruit with obscure or obsolete oil-tubes.
 Fruit strongly flattened laterally. 1. HYDROCOTYLE.
 Fruit not strongly flattened laterally, sometimes turgid.
 Seed-face concave.
 Stylopodium conic.
 Fruit bristly-pubescent. 5. WASHINGTONIA.
 Fruit smooth and glabrous. 4. CEREFOLIUM.
 Stylopodium obsolete or flat.
 Fruits turgid, prominently ribbed: leaf-blades dissected. 7. CONIUM.
 Fruits of an oblong type, inconspicuously ribbed: leaf-blades entire, perfoliate. 8. BUPLEURUM.
 Seed-face essentially flat. 14. AEGOPDIUM.
 Fruit with distinct oil-tubes.
 Fruit strongly flattened dorsally, the lateral ribs of the carpels more or less strongly winged.
 Stylopodium conic.
 Fruit not notched at the apex, the carpels not very flat. 19. OXYPOLIS.
 Fruit notched at the apex, the carpels very flat. 21. HERACLEUM.
 Stylopodium obsolete or flat.
 Corolla white.
 Fruit spineless. 18. ANGELICA.
 Fruit armed with barbed spines. 22. DAUCUS.
 Corolla yellow. 20. PASTINACA.
 Fruit more or less flattened laterally, sometimes slightly dorsally flattened.
 Oil-tubes solitary in the intervals.
 Stylopodium conic.
 Leaf-segments, at least those of the upper leaves, narrowly linear or filiform. 6. CORIANDRUM.
 Leaf-segments neither narrowly linear nor filiform.
 Seed-face concave or grooved. 3. CHAEROPHYLLUM.
 Seed-face flat.
 Fruit short, often as wide as long. 11. CICUTA.
 Fruit elongate-oblong. 12. DERINGA.
 Stylopodium obsolete or flat.
 Corolla white. 9. CELERI.
 Corolla yellow.
 Fruit with winged ribs. 17. THASPIUM.
 Fruit with merely filiform ribs. 10. ZIZIA.
 Oil-tubes more than one on the intervals.
 Stylopodium conic. 16. LIGUSTICUM.
 Stylopodium flat or obsolete.
 Fruit without ribs, spiny. 2. SANICULA.
 Fruit ribbed, spineless.
 Carpel-ribs filiform. 13. TAENIDIA.
 Carpel-ribs corky, at least the lateral ones.
 Oil-tubes continuous around the seed cavity: stylopodium flat. 8. BUPLEURUM.
 Oil-tubes 2-3 in the intervals: stylopodium obsolete. 15. SIUM.

1. HYDROCOTYLE [Tourn.] L. Perennial amphibious herbs. Leaves solitary at each node. Umbels simple or proliferous. Sepals manifest. Petals valvate. Carpels with distinct ribs, and oil-bearing tissues beneath the epidermis. — Sum. — MARSH-PENNYWORT. WATER-PENNYWORT.

Umbels nearly sessile: leaf-blades shallowly lobed. 1. *H. americana*.
 Umbels long-peduncled: leaf-blades deeply lobed. 2. *H. ranunculoides*.

1. H. americana L. Leaf-blades reniform, 2-5 cm. wide, crenate-lobed: petals less than 1 mm. long: fruits 1-1.5 mm. wide, sharply ribbed, oval in cross-section. — Common, in swamps.

2. H. ranunculoides L. f. Leaf-blades reniform to orbicular-reniform, 2-5 cm. wide, deeply lobed: petals over 1 mm. long: fruits 2.5-3 mm. wide, obscurely ribbed, oblong in cross-section. — Rare, in wet places, especially abundant in the Susquehanna valley.

2. SANICULA [Tourn.] L. Biennial or perennial, glabrous or nearly glabrous herbs. Leaves alternate: blades pinnatifid or palmately 3-7-foliolate:

leaflets toothed or incised. Umbels irregular, compound, few-rayed. Bracts of the involucre resembling the leaves. Sepals 5, persistent. Petals white, yellowish, or purple. Fruit subglobose or oblong, somewhat dorsally flattened, armed with hooked bristles: carpels ribless: oil-tubes usually 5. — Sum. — SNAKE-ROOT. BLACK SNAKE-ROOT. SANICLE.

Plants perennial: stamens and style much exserted: fruits mostly over 6 mm. long.

Plants biennial: stamens and style included: fruits mostly less than 6 mm. long.

1. *S. marylandica*.

2. *S. canadensis*.

1. *S. marylandica* L. Stems 4.5–13 dm. tall, mostly simple below the inflorescence: leaves bluish-green: involucre of scale-like bractlets: petals slightly longer than the sepals: fruits obovoid, not stipitate. — Common, in woods and thickets.

2. *S. canadensis* L. Stems 3–13 dm. tall: divisions of the leaf-blade cuneate-obovate to narrowly oblong: involucre of minute bracts: fruits subglobose, 3–5 mm. long, very short-stipitate. — Common, in woods and thickets.

3. **CHAEROPHYLLUM** [Tourn.] L. Annual herbs. Leaf-blades ternately decomposed, the segments narrow. Umbels irregular, compound. Involucres of 1 or 2 bracts, or usually wanting. Involucels of several small bracts. Sepals obsolete. Petals white, usually unequal, inflexed at the apex. Fruit elongate: carpels 5-angled, the angles equally ribbed: oil-tubes solitary in the intervals and 2 in the inner face.

1. *C. procumbens* (L.) Crantz. Plants decumbent or spreading: umbels few-flowered: fruits narrow, about 8 mm. long, glabrous. — Frequent, in rich woods along the Conestoga and the Susquehanna. — Spr. — CHERVIL.

4. **CEREFOLIUM** [Rivin.] Haller. Annual herbs, resembling *Chaerophyllum*. Leaf-blades ternately decomposed, the segments small. Umbels compound, regular or nearly so. Involucre of toothed or compound bracts. Involucels of narrow, mostly entire, bractlets. Sepals obsolete. Petals white, usually nearly or quite equal, inflexed at the apex. Fruit elongate. Carpels more or less angled, but not ribbed: oil-tubes wanting. [*Anthriscus* Bernh.]

1. *C. Cerefolium* (L.) Britton. Plants 1 m. tall or less, often weak-stemmed: leaf-blades broad, the segments rather numerous, thin: umbels long-peduncled, the rays few, 2–4 mm. long: petals white, obovate, 1.5–2 mm. long: fruits linear-subulate, 8–10 mm. long, shining slender-beaked. — M. Locally abundant on moist banks. Nat. of Eu. — Spr. — CHERVIL.

5. **WASHINGTONIA** Raf. Perennial herbs. Leaf-blades ternately compound, the segments broad. Umbels loose, compound. Involucres and involucels of few bracts or bractlets, or wanting. Sepals obsolete. Petals white, inflexed at the apex. Fruits elongate: carpels 5-angled, with barely equal ribs: oil-tubes obsolete or wanting. — Spr. — SWEET-CICELY.

Rachis of the leaf-blades glabrous or with short hairs: stylopodium and styles fully 3 mm. long.

1. *W. longistylis*.

Rachis of the leaf-blades with villous hairs: stylopodium and styles about 1 mm. long.

2. *W. Claytonii*.

1. *W. longistylis* (Torr.) Britton. Roots sweet-aromatic: foliage finely pubescent: fruits 15–18 mm. long. — Common, in rich woods.

2. *W. Claytonii* (Michx.) Britton. Roots slightly if at all aromatic: foliage more copiously pubescent than in *W. longistylis*: fruits 18–20 mm. long. — Common, in rich woods.

6. **CORIANDRUM** [Tourn.] L. Annual slender herbs. Leaf-blades pinnately dissected. Umbels compound. Involucres wanting. Sepals acute, unequal. Petals white, often unequal, broadest above the middle. Fruit subglobose, not constricted at the commissure: carpels with 5 delicate ribs: oil-tubes solitary under the secondary ribs.

1. **C. sativum** L. Stems 2-6 dm. tall: blades of the lower cauline and basal leaves with coarse-toothed, incised, or lobed segments, those of the upper leaves with narrowly linear segments: umbel-rays 4-8, 12-21 mm. long: pedicels 1-3 mm. long: fruits subglobose or ovoid-globose, 3-3.5 mm. long: carpels slightly ribbed. — M. Occasional, in waste places. Nat. of Eu. — Sum. — CORIANDER.

7. **CONIUM** L. Biennial large herbs with spotted stems. Leaf-blades broad, pinnately decomposed. Umbels compound, the rays unequal. Involucres and involucels inconspicuous, of entire, scarious-margined bracts or bractlets. Sepals minute or obsolete. Petals white, somewhat unequal, broadest above the middle, inflexed at the apex. Fruit short and thick: carpels with prominent wavy ribs: oil-tubes wanting.

1. **C. maculatum** L. Plants 1-2 m. tall, the stem usually much branched: leaf-blades broad, the segments very numerous: umbels rather long-peduncled; rays 2-4 cm. long: petals white, obovate or cuneate, mostly about 1 mm. long: fruits ovoid, 2.5-3 mm. long. — M. Frequent, in waste places. Nat. of Eu. — Sum. — POISON-HEMLOCK.

8. **BUPLEURUM** [Tourn.] L. Annual or perennial herbs. Leaf-blades entire. Umbels compound. Involucre wanting (in our species). Involucels conspicuous, of entire bractlets. Sepals obsolete. Petals broad, yellow or greenish. Fruit oblong or oval: carpels with slender ribs and no oil-tubes in our species.

1. **B. rotundifolium** L. Plants 3-10 dm. tall: leaf-blades oblong, ovate or elliptic, 2-8 cm. long, perfoliate: corolla yellow: fruits 3-3.5 mm. long, about 2.5 mm. broad. — Occasional, on roadsides and in fields. Nat. of Eu. — Sum. — THOROUGH-WAX.

9. **CELERI** Adans. Annual or perennial herbs. Leaf-blades pinnate or ternately decomposed. Umbels compound. Involucres present or wanting. Sepals obsolete or minute. Petals white, broad. Fruit somewhat smooth or tuberculate: carpels 5-angled or 5-ribbed, with 1 oil-tube in each interval or 2 in the inner face.

1. **C. graveolens** (L.) Britton. Stems 2-9 dm. tall: leaf-segments cuneate to suborbicular, incised and toothed: petals 0.5-1 mm. long: fruits ovoid, about 1.5 mm. long. [*Apium graveolens* L.] — M. Occasional, on roadsides and about gardens. Nat. of Eu. — Spr. and sum. — CELERY.

10. **ZIZIA** Koch. Perennial erect herbs. Leaf-blades 3-foliolate or ternately compound, or the basal ones sometimes simple. Umbels compound, the central umbellet sessile. Involucres wanting. Involucels of a few bractlets. Sepals prominent. Petals yellow. Fruit somewhat elongate, laterally flattened: carpels with 5 slender wingless ribs and an oil-tube in each interval and under each rib. — Spr. and sum. — MEADOW-PARSNIP.

Fruits oblong: basal leaves with ternately 2-3-compound blades. 1. *Z. aurea*.
Fruits ovate or oval: basal leaves with merely toothed cordate blades. 2. *Z. cordata*.

1. *Z. aurea* (L.) Koch. Blades of the basal leaves ternate; segments oblong-ovate to lanceolate; umbels with 9-25 rays; fruits oblong, about 4 mm. long. — Common, in wet places. — GOLDEN-ALEXANDERS.

2. *Z. cordata* (Walt.) DC. Blades of the basal leaves ovate to orbicular, 3-10 cm. long, crenate; fruits ovate or oval, about 3 mm. long. — Common, in moist places.

11. *CICUTA* L. Perennial herbs with tuberous roots. Leaf-blades pinnately compound or decomposed. Umbels compound. Involucres of few bracts or wanting. Involucels of several small bractlets. Sepals acute. Petals white. Fruit short; carpels with 5 corky ribs, and oil-tubes in each interval and 2 in the linear face. Sum. and fall. — WATER-HEMLOCK.

Plants not bulblet-bearing: leaf-segments of a lanceolate type. 1. *C. maculata*.
Plants bulblet-bearing: leaf-segments of a linear type. 2. *C. bulbifera*.

1. *C. maculata* L. Plants stout, 1-2 m. tall: leaf-blades 1-6 dm. long, the veins ending in the notches of the segments; fruits with lateral ribs manifestly much larger than the others and wedge-shaped in section, and contiguous. — Common, in swamps. — SPOTTED-COWBANE. MUSQUASH-ROOT.

2. *C. bulbifera* L. Plants slender, mostly 1 m. tall or less; leaf-segments linear to narrowly linear-lanceolate, sharply few-toothed; umbels few-rayed (or replaced by clusters of bulblets); petals white, orbicular-obovate, less than 1 mm. long; fruits globose-ovoid, about 1.5 mm. long. — Occasional, in the Susquehanna valley and along tributary streams.

12. *DERINGA* Adans. Perennial herbs with fibrous roots. Leaf-blades 3-foliolate. Umbels irregular, compound. Involucres and involucels wanting. Sepals obsolete. Petals white. Fruit elongate; carpels with 5 low ribs, and an oil-tube beneath each rib and in each interval.

1. *D. canadensis* (L.) Kuntze. Plants 3-10 dm. tall; leaf-blades ovate, oval, or elliptic, 4-10 cm. long, serrate; umbels few-rayed; fruits oblong, 4-6 mm. long, often curved. — Common, in thickets and waste places. — Spr. and sum. — HONEWORT.

13. *TAENIDIA* Drude. Perennial herbs with fibrous roots. Leaf-blades pinnate or ternately compound. Umbels compound. Involucres and involucels wanting; sepals obsolete or minute. Petals 5, their tips inflexed. Fruit oblong; carpels 5-angled, with slender ribs and 3 oil-tubes in the intervals. Seeds nearly terete except the flat face.

1. *T. integerrima* (L.) Drude. Plants 3-9 dm. tall, from a tough root; leaflets ovate to oblong or oblong-lanceolate, 1-3 cm. long, entire; umbel-rays 10-20, elongate; corolla yellow; fruits broadly oblong, 3.5-4 mm. long. — M. Frequent, along the Conestoga above Lancaster. — *Limestones*. — Spr. — PIMPERNELL.

14. *AEGOPODIUM* L. Perennial caulescent herbs. Leaf-blades ternate, the leaflets or segments large, toothed. Umbel compound, the rays equal or nearly so. Involucres and involucels of narrow bracts and bractlets, or wanting. Sepals minute or obsolete. Petals white, equal or nearly so, broadest above the middle, inflexed at the apex. Fruit short, but longer than thick; carpels turgid, the angles margined; oil-tubes wanting.

1. *A. Podagraria* L. Plants 3-11 dm. tall, simple or sparingly branched; leaflets oblong or elliptic to ovate, 2.5-9 cm. long, serrate, incised or lobed:

umbels long-peduncled; rays 2-4 cm. long; petals white, obovate or orbicular-obovate, 1-1.5 mm. long; fruits conic-ovoid, about 4 mm. long.—M. Occasional, on roadsides and in thickets near Lancaster. Nat. of Eu.—Sum.—GOUTWEEED.

15. **SIUM** [Tourn.] L. Perennial herbs. Leaf-blades pinnately compound. Umbels compound. Involucres and involucels of narrow bracts and bractlets. Sepals small, acute. Petals white. Fruit stout, somewhat laterally flattened; carpels ribbed, the intervals with 1-3 oil-tubes. Seeds 5-angled.

1. **S. cicutaefolium** Schrank. Plants 5-18 dm. tall: leaflets 7-17, linear, oblong, or lanceolate, 4-15 cm. long, sharply serrate (submersed leaves sometimes finely dissected): fruits orbicular to oblong-orbicular, 3-3.5 mm. long.—Frequent, in the Susquehanna valley.—Sum.—WATER-PARSNIP.

16. **LIGUSTICUM** L. Perennial herbs with large roots. Leaf-blades ternately compound. Umbels compound. Involucres of a few narrow bracts. Involucels of numerous narrow bractlets. Sepals obsolete. Petals white, broadened upward. Fruit more or less elongate: carpels with sharp prominent ribs and 2-6 oil-tubes in each interval.

1. **L. canadense** (L.) Britton. Stems 5-20 dm. tall: leaflets oblong, elliptic-oval, or ovate, 3-8 cm. long, coarsely toothed: fruits oblong, oval, or ovate, 4-6 mm. long, the ribs narrow-winged.—S. Rare, in rich woods.—Schists.—Sum.—ANGELICO. NONDO.

17. **THASPIUM** Nutt. Perennial herbs. Leaf-blades 3-foliolate or ternately compound, or those of the basal leaves sometimes simple. Umbels compound. Involucere of few bracts. Involucels of many bracts. Sepals present. Petals yellow or purple. Fruit longer than wide: carpels with winged ribs and 2-6 oil-tubes in each interval.—Sum.—MEADOW-PARSNIP.

Petal-blades less than 1 mm. long: leaves with ternate blades: leaflets relatively thick, crenate. 1. *T. trifoliatum*.

Petal-blades over 1 mm. long: leaves with biternate blades: leaflets relatively thin, incised or lobed. 2. *T. barbinode*.

1. **T. trifoliatum** (L.) A. Gray. Stems 2-7 dm. tall: leaf-segments ovate to lanceolate, serrate: corolla dark-purple (or deep-yellow in *T. trifoliatum aureum*): fruits globose-ovoid, about 4 mm. long.—M. Rare, in the Dillerville swamp, Lancaster.—Limestones.

2. **T. barbinode** (Michx.) Nutt. Stems 3-12 dm. tall: leaf-segments commonly ovate, coarsely toothed, cleft, or parted: corolla pale- or light-yellow: fruits oblong or oval, 5-6 mm. long, glabrous.—Common, in moist places.

18. **ANGELICA** L. Perennial caulescent herbs. Leaf-blades pinnate or decomposed. Umbels compound. Involucres and involucels present or wanting. Sepals small or obsolete. Petals white or greenish, broadest above the middle. Fruit longer than broad: carpels with the dorsal and contiguous ribs prominent, and broadly winged lateral ribs: oil-tubes solitary or several in the intervals and 2-10, or more, in the inner face.—Sum. and fall.—ANGELICA.

Fruit glabrous: branches of the umbel glabrous or nearly so: leaves with acute or acutish segments. 1. *A. atropurpurea*.

Fruit pubescent: branches of the umbel copiously pubescent: leaves with obtuse segments 2. *A. villosa*.

1. **A. atropurpurea** L. Plant 11-21 dm. tall, the stem dark-purple: leaflets 2.5-7.5 cm. long; blades thick, ovate to lanceolate, coarsely serrate: umbel-

rays 2.5-7.5 cm. long; pedicels 10-16 mm. long; corolla white or greenish-white; fruits oblong to oval-orbicular, 6-6.5 mm. long, glabrous. — Occasional, in low grounds.

2. *A. villosa* (Walt.) B.S.P. Plants 6-18 dm. tall; leaflets 2-5 cm. long, the blades thickish, oblong, oblong-lanceolate, or oval, 2-5 cm. long, serrate; umbel-rays 2-5 cm. long; pedicels 3-4 mm. long; corolla white; fruits orbicular or orbicular-obovate, 4.5-5 mm. long, pubescent. — Common, in dry thickets and woods.

19. *OXYPOLIS* Raf. Perennial herbs. Leaf-blades pinnate or ternate, or rarely reduced to hollow septate phyllodia. Umbels compound. Involucres and involucels present. Sepals acute. Petals white. Fruit longer than broad, dorsally flattened; carpels with the dorsal and contiguous ribs thin, and winged lateral ribs, the latter nerved near the inner part of the wing; oil-tubes solitary in the intervals and 2-6 in the inner face.

1. *O. rigidior* (L.) Raf. Plants 5-18 dm. tall; leaves with relatively short, often broad, leaflets; blades entire or saliently toothed, pale beneath; umbel usually many-rayed; fruits oblong or oval, 5-6.5 mm. long, pale-winged. — S. Rare, in swamps. — *Schists.* — Sum.

20. *PASTINACA* L. Annual or biennial herbs. Leaf-blades pinnately compound. Umbels compound. Involucres and involucels usually wanting. Sepals obsolete. Petals yellow. Fruit somewhat longer than broad, much dorsally flattened; carpels with the dorsal and contiguous ribs slender, and thin lateral wings; oil-tubes solitary in the intervals and 2-4 in the inner side.

1. *P. sativa* L. Plants coarse, strong-scented, 6-20 dm. tall; leaf-segments ovate or oblong, crenate-serrate, incised or lobed; fruits obovate, oval, or orbicular-oval, 5-6 mm. long. — Common, on roadsides and in waste places. — Nat. of Eu. — Sum. — WILD-PARSNIP.

21. *HERACLEUM* L. Perennial herbs. Leaf-blades ternately compound. Umbels compound. Involucres and involucels of few, often deciduous, bracts and bractlets or the former wanting. Sepals minute or obsolete. Petals white, broadest above the middle, those of the outer and inner flowers different in shape. Fruit usually longer than broad, strongly dorsally flattened; carpels with the dorsal and contiguous ribs slender, and broadly winged lateral ribs, the latter nerved near the outer edge; oil-tubes solitary in each interval, and 2-4 in the outer face, rarely extending beyond the middle of the carpel.

1. *H. lanatum* Michx. Plants coarse and heavy-scented, 6-25 dm. tall; leaf-blades 1-4 dm. long, the segments sharply toothed; umbel-rays 8-30, stout, 3-15 cm. long; fruits oval to obovate-oval, 8-12 mm. long. — Common, in fields and waste places. — Sum. — COW-PARSNIP.

22. *DAUCUS* [Tourn.] L. Annual or biennial herbs. Leaf-blades pinnately decomposed. Umbels compound. Involucres and involucels various, or wanting. Sepals minute or obsolete. Petals white or rarely colored, often unequal, broadest above the middle, inflexed at the apex. Fruit longer than broad; carpels with 5 low primary ribs and 4 winged secondary ribs which are also armed with a row of barbed bristles; oil-tubes solitary under the secondary ribs and 2 on the inner face. — CARROT.

1. *D. Carota* L. Plants hispid, 4-12 dm. tall; leaf-segments very numerous; umbel-rays many; corollas unequal in size and the central one often purple:

petals unequal: fruit 3-4 mm. long, the wings prickly. — Common, in fields and waste places. — Sum. — WILD-CARROT.

Series 2. **GAMOPETALAE.**

Petals more or less united, or occasionally distinct, or very rarely wanting.

Order **ERICALES.**

Herbs, undershrubs, shrubs, or trees, sometimes humus-plants or saprophytes. Leaves alternate, often evergreen: blades simple. Flowers mainly perfect and complete. Calyx of 2-8, usually 5, partially united sepals. Corolla of 2-8, usually 5, mostly united petals. Androecium of as many or twice as many stamens as petals, sometimes partially reduced to staminodia: filaments mostly free. Gynoecium of several united carpels. Fruit capsular, baccate, or drupaceous.

Gynoecium superior: fruit capsular, sometimes fleshy but not truly baccate or drupaceous.

Corolla of essentially distinct petals.

Herbaceous perennials with persistent green leaves.

Herbaceous saprophytes destitute of green leaves.

Corolla of manifestly united petals.

Gynoecium inferior: fruit baccate or drupaceous.

Fam. 1. PYROLACEAE.

Fam. 2. MONOTROPACEAE.

Fam. 3. ERICACEAE.

Fam. 4. VACCINIACEAE.

FAMILY 1. **PYROLACEAE.** WINTERGREEN FAMILY.

Perennial evergreen herbs, with elongate rootstocks. Leaves alternate, mostly near the base of the stem: blades leathery. Flowers in terminal clusters or solitary, sometimes irregular. Calyx of 4 or 5 persistent sepals. Corolla often white or pink, of 4 or 5 essentially distinct, wax-like petals. Androecium of twice as many stamens as there are petals: anthers inverted in anthesis. Gynoecium of 4 or 5 united carpels: stigmas united. Fruit a 4- or 5-valved loculicidal capsule.

Style elongate: flowers racemose: filaments unappendaged: capsule opening from base to top. 1. PYROLA.

Style very short: flowers corymbed or umbel: filaments appendaged at the base: capsule opening from top to base. 2. CHIMAPHILA.

1. **PYROLA** [Tourn.] L. Leaves with broad blades. Flowers in elongate racemes. Filaments unappendaged and glabrous. Capsule nodding, the valve-margins cobwebby. — Sum. — WINTERGREEN. SHIN-LEAF.

Stamens converging: style straight: anthers not contracted below the opening. 1. *P. secunda*.

Stamens declined: style declined: anthers contracted below the opening.

Leaf-blades lustrous: sepals oblong or lanceolate. 2. *P. americana*.

Leaf-blades not lustrous: sepals ovate to triangular.

Anther-horns long: leaf-blades orbicular, leathery, mostly shorter than the petioles. 3. *P. chlorantha*.

Anther-horns very short and stout: leaf-blades oval, membranous, mostly longer than the petioles. 4. *P. elliptica*.

1. **P. secunda** L. Plants mostly 1-1.5 dm. tall: leaf-blades ovate, oval, or orbicular-ovate, 1-3 cm. long, acute or mucronate, shallowly serrate, longer than the petioles: calyx 1.5-2 mm. long; sepals ovate to ovate-oblong: petals oblong or ovate-oblong, 4-6 mm. long; anthers 1.5 mm. long; capsules 4-5 mm. wide. — Very rare. Collected many years ago, perhaps in the western or northern part of the county.

2. *P. americana* Sweet. Plants 2-3 dm. tall: leaf-blades thickish, 2-5 cm. long, mostly shorter than the petiole: sepals 2-3 mm. long: petals obovate to orbicular-obovate, 7-9 mm. long: capsules 6-7 mm. wide. — Common, in woods.

3. *P. chlorantha* Sw. Plants mostly 1.5-3 dm. tall: leaf-blades suborbicular, varying to oval or reniform, 1-2.5 cm. long, obtuse, undulate, or obscurely toothed, mostly shorter than the petioles: sepals deltoid: petals suborbicular to orbicular-obovate, 6.5-9 mm. long: anthers 2.5 mm. long: capsules 7-9 mm. wide. — Turkey Hill, along the Susquehanna. — *Limestones, schists.*

4. *P. elliptica* Nutt. Plant 1-3 dm. tall: leaf-blades thinnish, 3-9 cm. long, mostly longer than the petiole: sepals triangular-ovate: petals oblong to oblong-obovate, 5.5-7 mm. long: capsules 5-6 mm. wide. — Common, in woods.

2. **CHIMAPHILA** Pursh. Leaves with relatively narrow blades. Flowers in corymbs. Filaments with pubescent or erose-ciliate appendages at the base. Capsule erect, the valve-margins glabrous. — Sum. — PIPSISSEWA.

Sepals longer than wide: petals ciliolate all around: filament-appendages pubescent.

1. *C. maculata.*

Sepals wider than long: petals erose-ciliolate and jagged at the apex: filament-appendages erose-ciliate.

2. *C. umbellata.*

1. *C. maculata* (L.) Pursh. Plant 7-22 cm. tall: leaf-blades lanceolate or sometimes broader, 2-5 cm. long, variegated: sepals rounded at the apex, ciliolate: petals 10-12 mm. long: filament-appendages narrow. — Common, in woods. — SPOTTED-WINTERGREEN.

2. *C. umbellata* (L.) Nutt. Plant 9-32 cm. tall: leaf-blades oblanceolate, cuneate, or obovate-cuneate, 2-10 cm. long, not variegated: sepals not rounded at the apex, erose: petals 9-11 mm. long: filament-appendages broad. — Common, in woods. — PRINCE'S-PINE.

FAMILY 2. MONOTROPACEAE. INDIAN-PIPE FAMILY.

Saprophytic or humus herbs, with matted roots. Stems scape-like, simple. Leaves reduced to scales. Flowers in racemes, or solitary, nodding. Calyx of 2-6 deciduous sepals. Corolla white or colored, of 3-6 petals, or wanting. Androecium of 6-12 stamens: anthers with valves or pores. Gynoeceum of 4-6 united carpels: stigma capitate, disc-like, or funnellform. Fruit a 4-6-valved loculicidal capsule.

Flower solitary: anthers opening by 2 pores: plant white or pale pink, drying black.

Flowers several: anthers unequally valvate: plant yellowish or red.

1. MONOTROPA.

2. HYPOPITYS.

1. **MONOTROPA** L. White or pale-pink wax-like herbs. Flowers colorless. Sepals 2-4, unequal. Petals 5 or 6, dilated at the apex. Gynoeceum glabrous.

1. *M. uniflora* L. Plant 1-3 dm. tall, black when dry: sepals spatulate or oblong-spatulate, 10-16 mm. long: erose at the apex: petals 17-18 mm. long. — Common, in rich woods. — Sum. — INDIAN-PIPE. CORPSE-PLANT.

2. **HYPOPITYS** Adans. Colored fragrant herbs. Flowers in a terminal raceme, deep-pink, yellow, red, or crimson. Sepals and petals 5 each in the earliest flower, 3 or 4 in the later ones. Gynoeceum pubescent. — Sum. and fall. — PINE-SAP. FALSE BEECH-DROPS.

Stigma not retrorsely bearded: style sparingly pubescent: sepals and petals with short cilia.

1. *H. americana.*

Stigma retrorsely bearded: style copiously pubescent: sepals and petals with long cilia.

2. *H. lanuginosa.*

1. *H. americana* (D.C.) Small. Plants tawny or yellow, finely pubescent or nearly glabrous, 1-3 dm. tall: sepals 7-10 mm. long: petals sparingly pubescent: capsules oval or oblong-oval, 7-10 mm. long. — S. Occasional, in woods.

2. *H. lanuginosa* (Michx.) Nutt. Plants deep pink and crimson, markedly or copiously pubescent, 0.5-3.5 dm. tall: sepals 6-9 mm. long: petals markedly pubescent: capsules globular, 4-5 mm. long. — Common, in woods and thickets.

FAMILY 3. ERICACEAE. HEATH FAMILY.

Shrubs, trees, or undershrubs. Leaves often persistent: blades commonly leathery. Flowers typically perfect. Calyx of 4-7 distinct or partially united sepals. Corolla of 4-7 distinct or partially united petals, sometimes slightly 2-lipped. Androecium of as many or twice as many stamens as there are petals: anthers opening by pores, chinks, or valves. Gynoecium of 2-7 united carpels. Fruit a capsule, or sometimes baccate or drupaceous.

Capsule septical: anthers unappendaged.

Anthers opening by pores: corolla not salverform: erect shrubs or trees: capsules dry.

Flowers from scaly buds: corolla irregular: seeds winged.

Corolla of a funnelform type: leaves deciduous; blades gland-tipped.

1. AZALEA.

Corolla of a campanulate type: leaves persistent; blades not gland-tipped.

2. RHODODENDRON.

Flowers not from scaly buds: corolla regular: seeds not winged.

3. KALMIA.

Anthers longitudinally dehiscent: corolla salverform: prostrate and creeping slightly shrubby plants: capsules fleshy.

4. EPIGAEA.

Capsule loculicidal, sometimes enclosed in the fleshy accrescent hypanthium and calyx (*Gaultheria*).

Calyx dry, not accrescent: fruit dry, not berry-like.

5. EUBOTRYS.

Capsules not angled, the valve-margins not thickened: calyx-lobes imbricate, at least in the bud.

Capsules angled or the valve-margins thickened: calyx-lobes valvate or separate in the bud.

Filaments appendaged: corolla of a cylindraceous-campanulate type.

6. NEOPIERIS.

Filaments unappendaged: corolla of an urceolate type.

7. ARSENOCOCCUS.

Calyx fleshy, accrescent: fruit fleshy, berry-like.

8. GAULTHERIA.

1. **AZALEA** L. Erect deciduous-leaved shrubs. Leaves alternate: blades sometimes bristle-toothed. Calyx deciduous: lobes 5, conspicuously ciliate. Corolla variously colored, funnelform: tube elongate: limb 2-lipped. Stamens 5 or rarely 10, conspicuously exerted: anthers with terminal pores. Style declined. Capsule elongate.

Corollas expanding before the leaves; limb deep-pink or purple.

1. *A. nudiflora*.

Corollas expanding after the leaves; limb white or pale-pink.

Calyx-lobes ovate to triangular-ovate: leaves with the midrib strigillose beneath.

2. *A. viscosa*.

Calyx-lobes lanceolate to linear: leaves with the midrib glabrous beneath.

3. *A. arborescens*.

1. **A. nudiflora** L. Shrub 0.5-3 m. tall, the twigs tomentulose and strigose-hispid: leaf-blades oblong to obovate, 3-10 cm. long, hispidulous beneath: pedicels 10-20 mm. long: corolla deep-pink to purple, or rarely white; tube about 2 cm. long: capsules 1-3 cm. long, strigose or hirsute-strigose. — Common, in woods. — Spr. — HONEYSUCKLE. PINXTER-FLOWER.

2. **A. viscosa** L. Shrub 1-3 m. tall, the twigs hispidulous: leaf-blades oblong to elliptic-oblancoelate, cuneate, or obovate, 2-6 cm. long, strigillose beneath: calyx-lobes 1-2 mm. long: corolla white or pale-pink; tube 2-2.5 cm. long: anthers about 2 mm. long: capsules 1.5-2 cm. long, slender, rather strigose, gradually narrowed at the apex. — N. S. Common, in moist thickets. — *Sandstones and shales, schists*. — Spr. and sum. — SWAMP-HONEYSUCKLE. CLAMMY-AZALEA.

3. **A. arborescens** Pursh. Shrub, or tree becoming 6 m. tall, the twigs glabrous: leaf-blades elliptic, oval, oblanceolate, or cuneate, 4-10 cm. long, glabrous beneath: calyx-lobes 4-6 mm. long: corolla white or pale-pink; tube 2.5-3 cm. long: anthers about 3 mm. long: capsules 1-2 cm. long, stout, bristly-glandular, abruptly narrowed at the apex. — Islands and shores of the Susquehanna. — *Schists.* — Late spr. and early sum. — SMOOTH-AZALEA.

2. **RHODODENDRON** L. Evergreen shrubs or trees. Leaves alternate: blades leathery, not ciliate. Calyx persistent: lobes broad and short. Corolla variously colored, campanulate: tube very short; limb 2-lipped. Stamens usually 10, slightly exerted, with terminal pores. Style declined. Capsule elongate.

1. **R. maximum** L. Shrub, or tree becoming 12 m. tall, the twigs glabrous or nearly so: leaf-blades oblong to oblong-oblancoolate, 10-25 cm. long, bright-green: calyx-lobes 4-6 mm. long: corolla white or pink, mottled with yellow or orange, 3-6 cm. wide. — Ravines, near the Susquehanna and rarely near other large streams. — Sum. — GREAT-LAUREL.

3. **KALMIA** L. Evergreen shrubs or trees. Leaves alternate, opposite, or whorled: blades entire. Calyx persistent: lobes 5, leathery. Corolla regular, white, pink, purple, or crimson, rotate, the lobes obtuse: tube short, with 10 sacs. Stamens 10: filaments elastically straightening at maturity: anthers short, attached near the top. Capsule spheroidal. — Sum. — LAUREL.

Corolla about twice as long as the calyx: inflorescence lateral: sepals not ciliate.
1. *K. angustifolia*.

Corolla several times as long as the calyx: inflorescence terminal: sepals ciliate.
2. *K. latifolia*.

1. **K. angustifolia** L. Shrub 2-12 dm. tall, the twigs glabrous or nearly so: leaf-blades oblong to lanceolate, 2-6 cm. long, pale beneath: calyx-lobes ovate to oblong-ovate, 1-1.5 mm. long: corolla purple to crimson, 6-8 mm. wide: filaments 3-4 mm. long: capsules 3-3.5 mm. wide. — S. Rare, on moist banks near New Texas. — *Schists.* — SHEEP-LAUREL. LAMBKILL. WICKY.

2. **K. latifolia** L. Shrub, or tree becoming 12 m. tall, the twigs often fuzzy when young: leaf-blades elliptic to oval, 5-12 cm. long, glabrous, dark-green: calyx-lobes oblong to oblong-ovate, about 2 mm. long: corolla white or pink, 20-25 mm. wide: filaments 10-12 mm. long: capsules 5-7 mm. wide. — Common, in dry woods. — MOUNTAIN-LAUREL. CALICO-BUSH. SPOON-WOOD.

4. **EPIGAEA** L. Evergreen creeping undershrubs. Leaves alternate: blades entire. Flowers perfect or dioecious, in axillary clusters. Calyx-lobes 5, persistent, but scarcely accrescent. Corolla white or pink, salverform, the limb 5-lobed. Filaments slender, with a tuft of hairs near the middle: anthers oblong-ovoid, awnless. Stigma 5-lobed. Capsule depressed.

1. **E. repens** L. Stem and branches 5-30 cm. long, hirsute: leaf-blades oblong to oblong-ovate or suborbicular, 2-10 cm. long, finely reticulate: calyx-lobes lanceolate, acuminate: corolla about twice as long as the calyx; lobes ovate: capsules spheroidal, 5-lobed. — N. S. Common, in dry woods and on banks. — *Sandstones and shales, schists.* — Spr. — TRAILING-ARBUTUS. MAYFLOWER.

5. **EUBOTRYS** Nutt. Deciduous-leaved shrubs with rigid stems and branches. Leaves alternate: blades finely toothed. Flowers in terminal racemes. Calyx-lobes very short. Stamens 10, included: anthers awned. Capsule depressed.

1. *E. racemosa* (L.) Nutt. Shrub 1-4 m. tall, the twigs glabrous, at least in age: leaf-blades oblong or elliptic, 2-7 cm. long: calyx-lobes triangular, becoming triangular-lanceolate or deltoid-ovate: corolla 8-9 mm. long: anthers much shorter than the filaments: capsules 4-5 mm. wide. — S. Rare, in swamps and lower Susquehanna valley. — *Schists.* — Spr. — FETTER-BUSH.

6. *NEOPIERIS* Britton. Deciduous-leaved shrubs. Leaves alternate: blades entire. Flowers in clusters or leafless branches. Calyx-lobes 5, much longer than the tube. Corolla white or pink, cylindraceous-campanulate, 5-lobed. Filaments appendaged near the top: anthers awnless. Capsules of an ovoid type.

1. *N. mariana* (L.) Britton. Deciduous-leaved shrub 1-2 m. tall: leaf-blades membranous, oblong to oval, or broadened upward, 2-6 cm. long, obtuse or apiculate: flower-clusters lateral: calyx-lobes broadly lanceolate, acute: corolla white or pinkish, 10-12 mm. long, less than twice as long as the calyx: capsules 7-9 mm. long, rib-angled. — S. Rare, in dry soil or woods. — *Schists.* — Spr. — STAGGER-BUSH.

7. *ARSENOCOCCUS* Small. Deciduous-leaved shrubs with more or less pubescent foliage. Leaves alternate: blades membranous or thickish. Flower-clusters in terminal paniced racemes. Calyx-lobes broad, short, persistent. Corolla urceolate, usually globular or depressed, with very short spreading or recurved lobes. Filaments thickened below the anthers, unappendaged. Capsule depressed, usually spheroidal, not angled.

1. *A. ligustrinus* (L.) Small. Deciduous-leaved shrub 1-4 m. tall: leaf-blades oblong, elliptic, or obovate, 3-7 cm. long, entire or indistinctly serrulate: corolla mostly over 3.5 mm. long, not appressed: capsules globular, mainly 3-4 mm. wide. — N. S. Common, in dry woods and thickets. — *Sandstones and shales, schists.* — Sum. — MALE-BERRY.

8. *GAULTHERIA* L. Evergreen undershrubs, with rootstocks. Leaves alternate, approximate near the ends of the branches: blades shallowly toothed. Flowers axillary. Calyx-lobes 5, persistent and accrescent. Corolla urceolate, 5-lobed. Filaments dilated near the base, pubescent: anthers awned. Capsule enclosed in the accrescent fleshy calyx.

1. *G. procumbens* L. Plants 3-15 cm. tall: leaf-blades oval or elliptic, varying to ovate or obovate, 1.5-6 cm. long, serrate: calyx-lobes ovate: corolla white, 6-7 mm. long; lobes recurved: fruit globular, 7-11 mm. thick, red or white, spicy. — Common, in moist woods. — Sum. — WINTERGREEN. CREEPING-WINTERGREEN. CHECKERBERRY.

FAMILY 4. VACCINIACEAE. HUCKLEBERRY FAMILY.

Shrubs or trees. Leaves alternate: blades simple. Flowers perfect, regular, solitary or variously clustered, drooping. Calyx of 4 or 5 sepals. Corolla of 4 or 5 usually partially united petals. Androeceium of twice as many stamens as there are corolla-lobes. Gynoeceium of several united carpels, the ovary wholly inferior or half inferior. Fruit a berry or drupe.

Ovary 10-celled: fruit a berry-like drupe with 10 outlets.

1. GAYLUSSACIA.

Ovary 4-5-celled: fruit a many-seeded berry.

Petals more or less united: berries blue or black: erect shrub or trees.

Anthers exerted, awned: corolla campanulate.

2. POLYCODIUM.

Anthers included, awnless: corolla globose, ovoid, urceolate or cylindric.

3. VACCINIUM.

Petals distinct: berries red: trailing and creeping undershrubs.

4. OXYCOCCUS.

1. GAYLUSSACIA H.B.K. Shrubs. Leaves deciduous: blades entire, commonly reticulate-veiny. Flowers in lateral racemes. Sepals 5. Corolla campanulate, globular-campanulate, or conic. Stamens included; anthers tubular at the top, unappendaged. Drupe globular, nodding, with 10 nutlets. — HUCKLEBERRY.

Anthers several times as long as the filaments, the tubular appendages much longer than the sacs. 1. *G. dumosa*.
 Anthers slightly if at all longer than the filaments, the tubular appendages scarcely if at all longer than the sacs.
 Corolla campanulate to globular-campanulate: drupes blue, glaucous. 2. *G. frondosa*.
 Corolla conic, sometimes becoming cylindraceous: drupes black, not glaucous. 3. *G. baccata*.

1. *G. dumosa* (Andr.) Nutt. Shrub 1-5 dm. tall: leaf-blades oval, obovate, or oblanceolate, or rarely narrower, 2-4 cm. long: hypanthium and sepals minutely glandular-pubescent: corolla 5-6 mm. long: drupes 6-8 mm. in diameter. — S. Frequent, mostly in sphagnous swamps. — *Schists.* — Sum. — DWARF-HUCKLEBERRY.

2. *G. frondosa* (L.) T. & G. Shrub 10-30 dm. tall, with puberulent foliage, at least when young: leaf-blades oblong-oblanceolate, ovate, oval, or obovate, glaucous and globular-resiniferous beneath: hypanthium and sepals glabrous: anthers about as long as the filaments: drupes 8-10 mm. in diameter, blue. — S. Rare, in swamps. — *Schists.* — Early sum. — BLUE-TANGLE.

3. *G. baccata* (Wang.) C. Koch. Shrub 3-11 dm. tall, with sticky-resinous foliage: leaf-blades elliptic, oval, or oblong, 2-4.5 cm. long: hypanthium and sepals resinous-atomiferous: corolla red or reddish-green, 5-6 mm. long: drupes 6-10 mm. in diameter, black. — N. S. Common, in dry woods and thickets. — Early sum. — BLACK-HUCKLEBERRY.

2. POLYCODIUM Raf. Shrubs. Leaves mainly deciduous: blades entire. Flowers in leafy-bracted racemes. Sepals 5. Corolla open-campanulate: lobes not contiguous in the bud. Stamens exerted: anthers tubular at the top and appendaged. Berry globular or pyriform, often mawkish, green or yellowish, few-seeded. — Spr. — BUCKBERRY. SQUAW-HUCKLEBERRY. DEER-BERRY.

Leaf-blades green beneath, the hairs inconspicuous: berries green or yellowish. 1. *P. stamineum*.
 Leaf-blades glaucous beneath, the hairs pale or white: berries glaucous. 2. *P. candicans*.

1. *P. stamineum* (L.) Greene. Plants 1-2 m. tall. Leaf-blades oblong to elliptic, varying to oblong-lanceolate or oblong-cuneate, 7-8 cm. long, green and inconspicuously pubescent beneath: corolla about 5 mm. long: filaments slightly longer than the anther-sacs: berries about 10 mm. in diameter. — S. Common, in thickets and woods. — *Schists.*

2. *P. candicans* (C. Mohr) Small. Plants 1-2 m. tall. Leaf-blades narrowly oblong or elliptic, 3-8 cm. long, narrowly subcordate or truncate at the base, glaucous and pubescent beneath with pale or white hairs: filaments decidedly longer than the anther-sacs: berries fully 10 mm. long, glaucous. — E. Frequent, in woods on the Welsh mountains. — *Quartzite*.

3. VACCINIUM L. Shrubs or small trees. Leaves mostly deciduous: blades entire or slightly toothed. Flowers in racemes or clusters. Sepals 5. Corolla ovoid, cylindraceous, or campanulate-oblong. Stamens included: anthers tubular at the apex, unappendaged. Berry globular, blue or black. — BLUEBERRY.

- Corolla cylindric or nearly so, twice or thrice as long as thick. 1. *V. corymbosum*.
 Corolla urn-shaped, oblong or cylindric-oblong, once or twice
 as long as thick.
 Leaf-blades not glaucous beneath: twigs green.
 Berries black: leaf-blades entire or essentially so,
 pubescent beneath. 2. *V. atrococcum*.
 Berries glaucous: leaf-blades manifestly serrulate, gla-
 brous or nearly so. 3. *V. angustifolium*.
 Leaf-blades glaucous beneath: twigs yellowish. 4. *V. vacillans*.

1. *V. corymbosum* L. Plant 1-4 m. tall, the twigs glabrous or nearly so: leaf-blades oblong to elliptic, 2.5-8 cm. long, entire, pubescent on or near the veins beneath: corolla white or pale-pink, cylindric or narrowly ovoid, 8-12 mm. long: berries 6-10 mm. in diameter, deep-blue and glaucous. — Common, in moist thickets. — Spr. — HIGH-BLUEBERRY. SWAMP-BLUEBERRY.

2. *V. atrococcum* (A. Gray) Heller. Plant 0.4-4 m. tall, the twigs finely pubescent: leaf-blades oval to elliptic, or sometimes slightly broadest above the middle, 2-7 cm. long, entire, dark-green above, pubescent beneath: corolla yellowish or greenish-white, and sometimes red-tinged, ovoid-campanulate, 4-8 mm. long: berries 6-8 mm. in diameter, not glaucous. — Common, in moist thickets. — Spr. — BLACK HIGH-BLUEBERRY.

3. *V. angustifolium* Ait. Plant mostly 2-3 dm. tall, the twigs minutely pubescent: leaf-blades oblong or elliptic, varying to broadest above or below the middle, 1.5-3.5 cm. long, acute at both ends, ciliate, pubescent on the mid-rib or veins beneath: sepals deltoid: corolla white or pinkish, long-campanulate, 4-6 mm. long: berry globular, 6-10 mm. in diameter, glaucous, very sweet. [*V. pennsylvanicum* Lam.] — M. Rare, in open woods, near Fruitville. — Limestones. — Spr. — LOW-BLUEBERRY. EARLY-BLUEBERRY. SWEET-BLUEBERRY.

4. *V. vacillans* Kalm. Plant 1-12 dm. tall, the twigs glabrous: leaf-blades oval, broadly oblong, or sometimes ovate to obovate, 2-5 cm. long, more or less distinctly serrulate, glabrous beneath: corolla greenish-yellow, and sometimes red-tinged, cylindric-oblong, 4-7 mm. long: berries 4-7 mm. in diameter, blue and glaucous. — Common, in dry places. — Early sum. — LATE SWEET-BLUEBERRY.

4. **OXYCOCCUS** Hill. Vines. Leaves persistent: blades entire. Flowers solitary or several together on terminal peduncles. Sepals 4 or 5. Petals 4 or 5, pink or red, distinct. Stamens conspicuously exerted. Anthers terminating in long tubes. Berry mainly globose, rarely elongate or depressed, red.

1. **O. macrocarpus** (Ait.) Pers. Stems trailing and creeping, sometimes 1 m. long: leaf-blades oblong, rarely varying to ovate or orbicular, 6-14 mm. long, revolute: sepals fully as broad as long: petals lanceolate to oblong-lanceolate, 7-9 mm. long: berries 1-2 cm. in diameter, acid. — E. S. Rare, in wet sandy soil. — *Schists*. — Sum. — CRANBERRY.

Order PRIMULALES.

Herbs, shrubs, trees, or vines. Leaves alternate or opposite, sometimes all basal. Flowers perfect or polygamo-dioecious, variously disposed. Calyx of 2-several partially united sepals. Corolla of 2-several distinct or partially united petals. Androecium of as many stamens as there are sepals or petals, sometimes accompanied by staminodia. Gynoecium of 4-6 united carpels, or rarely more. Fruit capsular or drupaceous, or rarely an achene or a utricle.

FAMILY PRIMULACEAE. PRIMROSE FAMILY.

Herbs, various in habit. Leaves alternate, opposite, or whorled, sometimes all basal: blades entire, toothed, or rarely dissected. Flowers perfect. Calyx of 4-9 partially united sepals, commonly persistent. Corolla of 4-9 partially united petals, or rarely wanting. Androecium of as many stamens as there are sepals and alternate with them, sometimes with staminodia. Gynoecium a single pistil, with central placentae. Style single. Fruit a 1-celled 2-8-valved capsule.

Ovary superior.

Corolla-lobes erect or merely spreading: anthers not sagittate.

Plants with a whorl of leaf-like bracts subtending the inflorescence: corolla white.

1. TRIENTALIS.

Plants without a whorl of bracts subtending the inflorescence: corolla colored.

Capsule opening lengthwise, not nodding.

Androecium without staminodia: filaments united below the middle: anthers ovoid.

2. LYSIMACHIA.

Androecium with staminodia: filaments distinct or essentially so: anthers linear.

3. STEIRONEMA.

Capsule circumscissile, nodding.

4. ANAGALLIS.

Corolla-lobes reflexed: anthers sagittate.

5. DODECATHEON.

Ovary half-inferior.

6. SAMOLUS.

1. **TRIENTALIS** L. Perennial caulescent herbs with slender rootstocks. Leaves mostly reduced to minute scales on the scape-like stem. Flowers solitary or clustered at the top of the stem, slender-pedicelled, subtended by a whorl of leaf-like bracts. Calyx-lobes narrow. Corolla rotate: lobes much longer than the tube. Filaments slender. Anthers narrow, curved. Capsule short.

1. **T. borealis** Raf. Plants 5-25 cm. tall, slender: leaves (scales) remote, mostly 2-8 mm. long: bracts leaf-like, 5-10; blades elliptic to elliptic-lanceolate, 3-10 cm. long, acuminate at both ends: pedicels filiform, 2-5 cm. long: sepals linear: corolla 1.5-2 cm. wide; lobes oblong or elliptic, acuminate: capsules 3-4 mm. in diameter. — S. Rare, in woods near Wakefield. — *Schists.* — Spr. — STAR-FLOWER. CHICKWEED-WINTERGREEN.

2. **LYSIMACHIA** [Tourn.] L. Perennial or rarely annual herbs, the foliage glandular-punctate. Leaves opposite or apparently whorled. Corolla yellow, rotate or nearly so: lobes entire, acute or obtuse. Filaments partially united. Staminodia wanting. Anthers ovoid. — Sum. — LOOSESTRIFE.

Calyx-lobes ovate: stem and branches creeping.

1. *L. Nummularia.*

Calyx-lobes lanceolate, oblong-lanceolate or linear: stems erect.

Flowers in a terminal raceme, the racemes sometimes leafy bracted: corolla streaked.

Inflorescence extending nearly the length of the plant: flowers axillary to leaf-like bracts.

2. *L. quadrifolia.*

Inflorescence a terminal virgate raceme: flowers axillary to small bracts.

3. *L. terrestris.*

Flowers in a terminal panicle: corolla without dots or streaks.

4. *L. vulgaris.*

1. **L. Nummularia** L. Stem and branches 1-7 dm. long: leaf-blades sub-orbicular, 0.8-3 cm. long: calyx-lobes ovate, 8-9 mm. long, cordate at the base: corolla-lobes 11-14 mm. long, obovate to ovate: capsules about 4 mm. thick. — Common, on moist banks, and about gardens. Nat. of Eu. — MONEYWORT.

2. **L. quadrifolia** L. Stem 2-9 dm. tall: leaf-blades lanceolate to oval, 1.5-9 cm. long: pedicels shorter than the bracts: calyx-lobes lanceolate, 5-6 mm. long, acuminate: corolla-lobes oblong to ovate-oblong, exceeding the calyx: capsules 2.5-3 mm. thick. — Common, in thickets and woods.

3. *L. terrestris* (L.) B.S.P. Stem 5–8 dm. tall: leaf-blades lanceolate, oblong-lanceolate, or narrowly elliptic, 2–6 cm. long, abruptly smaller near the inflorescence: pedicels longer than the bracts: calyx-lobes oblong-lanceolate, about 2 mm. long: corolla-lobes oblong-lanceolate: capsules about 2 mm. thick.—Common, in wet sandy soil and swamps.

4. *L. vulgaris* L. Stems commonly 1 m. tall or less, softly fine-pubescent: leaf-blades lanceolate, oblong, oblong-lanceolate, or narrowly ovate, 5.5–13 cm. long, acute or slightly acuminate: flowers short-pedicelled: calyx-lobes lanceolate, dark-margined, acuminate: corolla deep-yellow, 1.5–2 cm. wide; lobes ovate or oblong-ovate: capsules 3.5–4.5 mm. in diameter.—S. Shore of the Susquehanna at Tuckquan. Nat. of Eu.

3. **STEIRONEMA** Raf. Perennial herbs, the foliage not glandular-punctate. Leaves opposite. Corolla yellow, rotate: lobes erose or erose-ciliate, mucronate. Filaments distinct or nearly so, alternating with manifest staminodia. Anthers linear.—Sum.—**LOOSESTRIFE**.

Bracts with ovate blades: leaf-blades rounded or cordate at the base.

1. *S. ciliatum*.

Bracts with linear, oblong or narrowly lanceolate blades:

2. *S. lanceolatum*.

leaf-blades narrowed at the base.

1. *S. ciliatum* (L.) Raf. Stem 2–15 dm. tall: leaf-blades ovate, oblong-ovate or broadly lanceolate, 4–12 cm. long, like the petioles ciliate: calyx-lobes narrowly lanceolate, 6–7 mm. long: corolla-lobes ovate or obovate, erose-ciliate: capsules about 5 mm. thick.—Common, in damp thickets.

2. *S. lanceolatum* (Walt.) A. Gray. Stem 2–6 dm. tall: lower cauline leaves with oblong or lanceolate blades; upper cauline leaves much longer than the lower ones, the blades mainly linear, 3–10 cm. long, the petiole-like bases only or mainly ciliate near the stem: calyx-lobes 4–5 mm. long: corolla-lobes 5–8 mm. long: staminodia ovate: capsules 2.5–3 mm. thick.—S. Rare, in sandy soil, islands at McCall's Ferry.—*Schists*.

4. **ANAGALLIS** [Tourn.] L. Annual or rarely perennial herbs of cultivated or waste places. Leaves mostly opposite: blades thinnish. Corolla rotate, longer than the calyx; lobes dilated. Filaments pubescent: anthers oblong.

1. *A. arvensis* L. Stem and branches 5–30 cm. long: leaf-blades ovate, or oval, 5–20 mm. long, entire, sessile: calyx-lobes lanceolate, about 2 mm. long: corolla scarlet or rarely white (blue in *A. arvensis coerulea*), 5–7 mm. wide; lobes glandular-ciliate: capsules about 4 mm. in diameter, on recurved pedicels.—Common, in sandy soil and in fields and waste places. Nat. of Eu.—Sum.—**POOR-MAN'S WEATHER-GLASS. SHEPHERD'S WEATHER-GLASS. PIMPERNEL.**

5. **DODECATHÉON** L. Perennial scapose herbs of cliffs or bluffs. Leaves on a short caudex: blades entire to coarsely toothed. Flowers showy, in a terminal umbel, nodding. Calyx-lobes reflexed in anthesis. Corolla with a very short tube and reflexed longer lobes. Stamens erect.

1. *D. Meadia* L. Leaf-blades spatulate to oblong, 5–20 cm. long, entire to coarsely crenate: scapes overtopping the leaves: calyx-lobes linear to linear-lanceolate, much longer than the tube: corolla pink-purple or almost white; petals 1–1.5 cm. long: capsules oblong-cylindric, 1.2–1.5 cm. long, much longer than the calyx.—M. S. Occasional, on rocky hillsides along the Conestoga Creek and the Susquehanna.—*Limestones, schists*.—Spr.—**MEADIA. SHOOTING-STAR. AMERICAN-COWSLIP.**

6. **SAMOLUS** [Tourn.] L. Annual or perennial caulescent herbs of wet places. Leaves alternate: blades entire. Flowers in simple or branched,

sessile or nearly sessile, racemes. Calyx perigynous: sepals 5. Corolla perigynous: lobes 5, imbricate, with staminodia at the sinuses. Stamens 5: filaments very short, adnate to the base of the very short corolla-tube. Ovary and capsule half-inferior.

1. *S. floribundus* H.B.K. Plant glabrous, 1-6 dm. tall: leaf-blades spatulate to oval or obovate, 3-15 cm. long: sepals ovate or triangular-ovate, barely 1 mm. long, acute: corolla white, 3 mm. wide; lobes oblong: capsules 2.5-3 mm. in diameter. — M. Rare, in wet soil, along the Conestoga Creek. — *Limestones*. — Sum. — WATER-PIMPERNEL. BROOKWEED.

Order EBENALES.

Shrubs or trees. Leaves alternate, opposite, or whorled: blades simple. Flowers perfect, monoecious, or dioecious. Calyx of 3-12 partially united sepals. Corolla of 3-12 partially united petals. Androeium of as many stamens as there are corolla-lobes or twice as many, or more, sometimes accompanied by staminodia. Gynoeium of 3-several united carpels. Fruit capsular or baccate.

FAMILY 1. EBENACEAE. EBONY FAMILY.

Shrubs or trees. Leaves mostly alternate: blades entire. Flowers solitary or in cymes. Calyx of 3-7 partially united sepals, persistent, accrescent. Corolla of 3-7 partially united petals, often urecolate. Androeium of 3 or 4 times as many stamens as there are corolla-lobes. Gynoeium of 3-several united carpels. Fruit a berry, or sometimes capsular.

1. *DIOSPYROS* L. Shrubs or trees. Leaves scattered: blades entire. Calyx 3-7-lobed. Stamens with pubescent filaments and anthers opening lengthwise. Berry spheroidal or elongate.

1. *D. virginiana* L. Shrub, or tree becoming 35 m. tall, the bark very rough: leaf-blades ovate, oval, or elliptic, 8-20 cm. long, acute or acuminate: corolla 8-13 mm. long; lobes reniform: berries 3-4 cm. in diameter, astringent when green, yellow or reddish and sweet when ripe. — Common, in fields, thickets and open woods. — Sum. — PERSIMMON.

Order OLEALES.

Shrubs, trees, undershrubs, or herbaceous plants. Leaves opposite, or rarely alternate or whorled: blades simple or pinnately compound. Flowers perfect, polygamous, or dioecious. Calyx of 4 or more partially united sepals, or wanting. Corolla of 2-6 distinct or partially united petals, or wanting. Androeium of 2-4 stamens partially adnate to the corolla when it is present. Gynoeium of 2 united carpels, the ovary superior. Fruit a capsule, a samara, or a berry, usually 1-celled by suppression.

FAMILY 1. OLEACEAE. OLIVE FAMILY.

Woody or partially woody plants with erect or climbing stems. Leaves predominately opposite: blades simple and entire or toothed, or pinnately compound.

Fruit a samara: leaf-blades pinnately compound.
 Fruit fleshy, a drupe or a berry: leaf-blades simple.
 Corolla of nearly distinct petals: flowers in drooping
 panicles.
 Corolla of united petals: flowers in erect panicles.

1. *FRAXINUS*.2. *CHIONANTHUS*.
3. *LIGUSTRUM*.

1. **FRAXINUS** [Tourn.] L. Shrubs or trees. Leaves opposite: blades unequally pinnate. Flowers polygamous, dioecious, or rarely perfect, in clusters or panicles. Calyx unequally 4-lobed, or obsolete. Corolla of 2-4 petals, or wanting. Stamens 2 or rarely 3 or 4. Stigma 2-lobed. Samara winged at the tip or all around. — Spr. — **ASH**.

Samara-wing extending along the sides of the slender body.
 Samara-wing terminal on the stout body.

Samara-body long, several times as long as thick, tapering to the base: wing with decidedly curved sides: leaves glabrous.

Samara-body short, about twice as long as thick, abruptly narrowed at the base: wing with parallel or almost parallel sides: leaves pubescent.

1. *F. pennsylvanica*.2. *F. americana*.3. *F. biltmoreana*.

1. **F. pennsylvanica** Marsh. Tree becoming 26 m. tall, the twigs pubescent or glabrous: leaflets 5-7; blades of the lateral ones lanceolate, elliptic-lanceolate, or elliptic, 5-15 cm. long, undulate or irregularly serrulate: samaras 2-6 cm. long, the wing linear or nearly so. — Common, in low grounds. — **RED-ASH**.

2. **F. americana** L. Tree becoming 40 m. tall, the twigs glabrous: leaflets 5-9; blades of the lateral ones lanceolate, oblong, or elliptic, 5-15 cm. long, relatively thin, entire or shallowly toothed: samaras 2.5-3.5 cm. long, the wing linear-spatulate or oblong-spatulate, terminal or nearly so on the oblong-cylindric body. — Common, in low rich woods and on hillsides. — **WHITE-ASH**.

3. **F. biltmoreana** Beadle. Tree becoming 18 m. tall, the twigs densely soft-pubescent: leaflets 7-9; blades of the lateral ones ovate to oblong-lanceolate, 7-14 cm. long, relatively thick, entire or obscurely toothed: samaras 3.5-5 cm. long, the wing linear or nearly so, terminal or nearly so on the stout elliptic body. — S. Occasional, especially at McCall's Ferry. — *Schists*.

2. **CHIONANTHUS** L. Shrubs or trees. Leaves opposite: blades simple. Flowers perfect or polygamous, in drooping festoon-like panicles. Calyx deeply 4-lobed. Corolla white: lobes narrow, many times longer than the tube. Stamens 2: filaments adnate to the corolla-tube. Stigma notched or 2-lobed. Drupe oval to subglobose.

1. **C. virginica** L. Shrub, or tree rarely 10 m. tall: leaf-blades oval, oblong, or elliptic, varying to obovate, 5-15 cm. long: panicles 5-20 cm. long: calyx-lobes ovate to lanceolate, acute: petals linear, 1.5-2.5 cm. long: drupes 1.5-2 cm. long, deep-purple or nearly black. — S. Rather common, in damp woods. — *Schists*. — Spr. — **FRINGE-TREE**. **OLD-MAN'S BEARD**. **FLOWERING-ASH**. **SUN-FLOWER-TREE**.

3. **LIGUSTRUM** [Tourn.] L. Shrubs or trees. Leaves opposite: blades simple. Flowers perfect, in erect panicles. Calyx shallowly 4-lobed or nearly truncate. Corolla white or greenish, funnelform: lobes broad, about as long as the tube. Stigmas 2: filaments adnate to the corolla-tube. Stigma 2-lobed. Drupe mostly subglobose.

1. **L. vulgare** L. Shrub becoming 3 m. tall: leaves tardily deciduous; blades oblong, elliptic, or oblong-lanceolate, 1-6 cm. long, entire: calyx fully 1 mm. long: corolla 4-6 mm. long: drupes 6-8 mm. in diameter, black. — M. S. Common, on roadsides and in thickets. Nat. of Eu. — Sum. — **PRIVET**. **PRIM**.

Order GENTIANALES.

Herbs, shrubs, or trees, sometimes aquatic or humus plants or vines. Leaves mainly opposite: blades simple or 3-foliolate. Flowers mostly perfect, solitary or in cymes. Calyx of 5 partially united sepals, or more or fewer. Corolla of 5 partially united petals, or more or fewer. Androecium of as many stamens as there are corolla-lobes: filaments often partially adnate to the corolla-tube. Gynoecium of 2 more or less united carpels. Fruit capsular, baccate, or drupaceous.

Leaves opposite: corolla-lobes convolute or imbricate in the bud.

Leaves alternate: corolla-lobes induplicate-valvate.

Fam. 1. GENTIANACEAE.

Fam. 2. MENTHANTHACEAE.

FAMILY 1. GENTIANACEAE. GENTIAN FAMILY.

Annual or perennial caulescent herbs, or rarely shrubs. Leaves typically opposite: blades entire, sometimes connate. Flowers perfect, solitary or variously clustered. Calyx of 2, 4 or 5, or more, partly united sepals, persistent. Corolla of 4 or 5, or more, partly united petals, varying from rotate to tubular. Androecium of as many stamens as there are corolla-lobes, the filaments partly adnate to the corolla-tube. Gynoecium of 2 united carpels. Fruit a capsule.

Corolla-lobes convolute in the bud: leaves with dilated blades present.

Style filiform, mostly deciduous: anthers recurving or twisting at maturity.

Stigmas roundish, much shorter than the style.

1. CENTAURIUM.

Stigmas linear or nearly so, about as long as the style.

2. SABBATIA.

Style stout, short or wanting: anthers straight at maturity.

Corolla without plaits in the sinuses of the lobes: calyx without an interior membrane.

3. ANTHOPOGON.

Corolla with plaits in the sinuses of the lobes: calyx with an interior membrane.

4. DASYSSTEPHANA.

Corolla-lobes imbricate in the bud: leaves, or those of stem, reduced to scales.

Calyx-lobes 2, broadened upward: petals well united.

5. OEOLARIA.

Calyx-lobes 4, narrowed upward: petals slightly united.

6. BARTONIA.

1. **CENTAURIUM** Hill. Annual, biennial, or sometimes perennial, relatively small herbs. Flowers in terminal cymes. Calyx-lobes 4 or 5, keeled. Corolla white, or commonly deep-pink or rose-purple, salverform: lobes 4 or 5, shorter than the tube, often strongly involute and thus acuminate.

1. **C. pulchellum** (Sw.) Druce. Stem 3–25 cm. tall: blades of the upper leaves oblong to ovate, 5–20 mm. long, obtuse: calyx 6–8 mm. long: corolla 9–10 mm. long: lobes oblong-ovate, 5–6.5 mm. long, obtuse: capsule 7.5–8 mm. long. — Common, on roadsides and in waste places. Nat. of Eu. — Sum. — CENTAURY.

2. **SABBATIA** Adans. Annual or biennial, relatively slender herbs. Flowers solitary or in cymes. Calyx-lobes 4–12, narrow. Corolla white, or of pale tints, often with a distinct eye, rotate: lobes entire, longer than the tube.

1. **S. angularis** (L.) Pursh. Stem 3–8 dm. tall: blades of the upper leaves ovate to ovate-lanceolate, 1.5–3 cm. long: flowers fragrant: calyx 7–8 mm. long: lobes much longer than the tube: corolla typically deep-pink; lobes 10–18 mm. long: capsules 4.5–5.5 mm. long. — N. E. Rather common, on *serpentine* especially. — Sum. — ROSE-PINK. BITTER-BLOOM.

3. **ANTHOPOGON** Neck. Annual, biennial, or rarely perennial herbs. Flowers solitary at the ends of the stem and its branches, the whorls mostly Lancaster County Flora 15.

of 4 parts each. Calyx relatively large: lobes keeled, unequal, the inner ones broader than the outer and hyaline or scarious-margined. Corolla salverform-funnelform: lobes shorter than the tube, without plaits in the sinuses. Stigmas very broad.

1. **A. crinitum** (Froel.) Raf. Stem 2-5 dm. tall, mostly branched: leaf-blades ovate to lanceolate, mainly 2-5 cm. long, partly clasping: calyx 25-30 mm. long: corolla sky-blue, 4-5 cm. long; lobes fimbriate: capsule about 3 cm. long. — M. S. Rare, in swamps and moist thickets. — *Limestones, schists.* — Fall. — FRINGED-GENTIAN.

4. **DASYSTEPHANA** Adans. Annual, biennial, or perennial herbs. Flowers in a compact terminal cyme and axillary cymes or solitary, the whorls mainly of 5 parts each. Calyx persistent: lobes minute or foliaceous, essentially equal. Corolla salverform, funnelform, or clavate, with neither glands at the base of the tube nor filaments at the base of the lobes: lobes much shorter than the tube, with plaits at the sinuses. Stigmas narrow. Capsule stipitate. — Fall. — GENTIAN.

Calyx-lobes spatulate to linear-lanceolate: corolla-lobes about as long as the plaits.

Calyx-lobes ciliolate-scarious: corolla rose-purple to blue. 1. *D. Saponaria.*

Calyx-lobes smooth and glabrous: corolla greenish-white or purplish-green. 2. *D. villosa.*

Calyx-lobes elliptic, oval or ovate: corolla-lobes minute or obsolete. 3. *D. Andrewsii.*

1. **D. Saponaria** (L.) Small. Stem 3-8 dm. tall, glabrous: leaf-blades lanceolate to oblong or elliptic, 2.5-7.5 cm. long: calyx 15-20 mm. long; lobes spatulate to linear-spatulate, mainly shorter than the tube: corolla blue or purplish-blue, 3.5-4 cm. long; lobes mainly shorter than the plaits: capsule-body fully 1.5 cm. long. — S. Rather common, on moist shaded banks. — *Schists.* — SOAPWORD-GENTIAN.

2. **D. villosa** (L.) Small. Stem 1-6 dm. tall, glabrous: leaf-blades spatulate to obovate, oblong, or oval, 2-8 cm. long: calyx 25-30 mm. long; lobes linear to linear-spatulate, longer than the tube: corolla greenish-white or purplish-green, 4.5-5 cm. long; lobes much longer than the plaits: capsule-body 2.5-3 cm. long. — S. Rather rare, in open woods. — *Schists.* — SAMPSON'S-SNAKE-ROOT.

3. **D. Andrewsii** (Griseb.) Small. Stem 3-6 dm. tall, glabrous: leaf-blades lanceolate to linear-lanceolate or ovate-lanceolate, mainly 4-9 cm. long: calyx 8-18 mm. long; lobes elliptic, oval, or ovate, shorter than the tube, unequal: corolla blue, or purplish, or rarely white, 2.5-3.5 cm. long; lobes minute or obsolete: plaits conspicuous: capsule-body 2-2.5 cm. long. — Common, in swamps and moist thickets. — CLOSED-GENTIAN.

5. **OBOLARIA** L. Perennial small, but stout herbs. Leaves mere dilated scales. Flowers in spike-like cymes, each subtended by a dilated bract. Calyx-lobes 2, dilated upward. Corolla white, pinkish, or purplish, broadly funnelform: lobes 4, about as long as the tube.

1. **O. virginica** L. Plant purplish-green, 5-20 cm. tall: leaves (scales) 5-10 mm. long, the upper ones broadened upward, longer than the lower ones: calyx-lobes spatulate or oblong-spatulate: corolla 7-10 mm. long; lobes nearly as long as the tube, acute: capsules 5-6 mm. long. — S. Rare, in rich woods. — *Schists.* — Spr. — PENNYWORD.

6. **BARTONIA** Muhl. Annual or biennial, slender herbs. Leaves mere narrow scales. Flowers in racemose or paniced cymes, or solitary, each sub-

tended by a narrow bract. Calyx-lobes 4, keeled, narrowed upward. Corolla white or yellowish, rotate: lobes 4, longer than the tube. — Sum. and fall.

Corolla-lobes oblong, more or less crose, abruptly pointed: branches and pedicels stiff.

Corolla-lobes lanceolate, entire, acute or acuminate: branches and pedicels lax.

1. *B. virginica*.

2. *B. lanceolata*.

1. *B. virginica* (L.) B.S.P. Plant 1-4 dm. tall: leaves (scales) opposite, or alternate on small plants: calyx-lobes subulate or lanceolate-subulate: corolla yellowish-white; lobes mostly 2-2.5 mm. long: capsules 3-5 mm. long. — S. Rare, on grassy banks. — *Schists*.

2. *B. lanceolata* Small. Plants 2-6 dm. tall: leaves (scales) opposite or alternate: calyx-lobes similar to those of *B. virginica*: corolla greenish-white; lobes mostly 2.5-3 mm. long: capsules 4-5 mm. long. — S. Rather rare, in swamps. — *Schists*.

FAMILY 2. MENYANTHACEAE. BUCKBEAN FAMILY.

Perennial aquatic or bog herbs. Leaves alternate: blades simple or 3-foliolate. Flowers perfect, solitary, or in clusters or racemes. Calyx of 5 partly united sepals. Corolla white or colored, rotate, or funnellform. Androecium of 5 stamens, with the filaments partly adnate to the corolla-tube. Gynoecium of 2 united carpels. Style very short. Fruit a capsule, sometimes indehiscent.

1. **MENYANTHES** [Tourn.] L. Bog herbs with stout rootstocks. Leaves erect: blades 3-foliolate. Raceme or panicle erect. Calyx persistent: lobes 5. Corolla funnellform, deciduous: lobes as long as the tube or longer, bearded within. Filaments slender. Anthers curved. Capsule erect, short, opening irregularly.

1. *M. trifoliata* L. Rootstock sheathed: leaflets 3-11 cm. long; blades oblong to obovate, sessile: scape 1-3 dm. tall: bracts fleshy: calyx-lobes ovate-lanceolate to lanceolate, 4-5 mm. long: corolla white or reddish, 8-11 mm. long: capsules subglobose, 6-7.5 mm. in diameter, apiculate. — M. Rare and local, in Dillerville swamp and along the Conestoga Creek above Lancaster. — *Limestones*. — Spr. and sum. — BUCKBEAN.

Order ASCLEPIADALES.

Herbs, shrubs, or trees, commonly with a milky juice. Leaves alternate or opposite: blades entire. Inflorescence cymose, sometimes umbellate. Calyx of usually 5 partially united sepals. Corolla of 5 partially united petals. Androecium of mostly 5 distinct or monadelphous stamens, partially adnate to the corolla in *Asclepiadaceae* and accompanied by a 5-lobed crown. Pollen granular or in waxy masses. Gynoecium of usually 2 carpels sometimes united only at the apex. Stigma terminal. Fruit a pair of follicles, or drupaceous.

Styles united: stamens distinct: pollen loosely granular. Fam. 1. APOCYNACEAE.

Styles distinct: stamens monadelphous: pollen united into waxy masses. Fam. 2. ASCLEPIADACEAE.

FAMILY 1. APOCYNACEAE. DOGBANE FAMILY.

Perennial herbaceous or woody plants, with mostly dichotomous cymose inflorescence. Androecium of mostly 5 stamens, with the anthers

converging around the stigma or slightly adhering to it, not accompanied by a crown. Gynoecium of 2 carpels, the styles and stigmas, and sometimes the carpel-bodies, united: two carpels usually maturing.

Anthers unappendaged at the base, not connected with the stigma: corolla-lobes sinistrorsely convolute: flowers axillary to leaf like bracts. 1. VINCA.
Anthers appendaged at the base, converging around the stigma and partially adherent to it: corolla-lobes dextrorsely convolute: flowers in terminal cymes. 2. APOCYNUM.

1. **VINCA** L. Trailing or creeping herbs. Leaves opposite. Corolla-tube dilated at the mouth.

1. **V. minor** L. Stems 2-7 dm. long: leaf-blades ovate to oblong, 1.5-4 cm. long: calyx-lobes lanceolate to subulate-lanceolate, 3-3.5 mm. long: corolla blue; tube 9-10 mm. long; lobes undulate-truncate. — Rather common, on banks near dwellings. Nat. of Eu. — Spr. — PERIWINKLE. MYRTLE.

2. **APOCYNUM** [Tourn.] L. Upright herbs. Leaves opposite: blades relatively broad. Corolla campanulate to urceolate, with entire appendages near the base, the lobes erect or recurved, narrow. — Sum. — DOGBANE. INDIAN-HEMP.

Corolla pink, 5-9 mm. long: lobes revolute: stamens nearly as long as the corolla-tube. 1. *A. androsaemifolium*.

Corolla white or greenish, 2.5-4 mm. long: lobes erect or nearly so: stamens much shorter than the corolla-tube.

Leaf-blades narrowed at the base, distinctly petioled. Corolla greenish, 3.5-4 mm. long: follicles 12-20 cm. long.

Corolla white, 2.5-3 mm. long: follicles 6-9 cm. long.

Leaf-blades, at least those of the stem-leaves, with broad cordate-clasping bases, sessile.

2. *A. cannabinum*.

3. *A. album*.

4. *A. sibiricum*.

1. **A. androsaemifolium** L. Plants 3-15 dm. tall: leaf-blades ovate, oblong, or oval, 4-11 cm. long: cymes rather long: calyx-lobes ovate to ovate-lanceolate, 2-2.5 mm. long: corolla-lobes nearly as long as the tube: follicles 10-17 cm. long. — Common, in thickets.

2. **A. cannabinum** L. Plants 8-18 dm. tall: leaf-blades oblong to oblong-ovate or oblong-lanceolate, 5-12 cm. long: cymes rather dense: calyx-lobes lanceolate, 2.5-3 mm. long: corolla-lobes about half as long as the tube: follicles 12-20 cm. long. — Common, in thickets.

3. **A. album** Greene. Stems 3-9 dm. tall, with spreading often glaucous branches: leaf-blades oblong, elliptic, or ovate-oblong, 2.5-8 cm. long, acute at both ends, or rounded at the base, short-petioled: cymes rather lax: calyx-lobes lanceolate, 2-2.5 mm. long, acuminate: corolla white or whitish, 3-4 mm. long; lobes ovate, erect or nearly so: follicles 6-9 cm. long. — Susquehanna valley. Frequent, in rocky places.

4. **A. sibiricum** Jacq. Stems 3-8 dm. tall, with ascending usually glaucous branches: leaf-blades ovate, ovate-lanceolate, or oblong, 3-9 cm. long, abruptly pointed, those of the cauline leaves subcordate or cordate at the base, sessile or nearly so: cymes rather dense: calyx-lobes linear-lanceolate or subulate, 2.5-3.5 mm. long, acuminate: corolla greenish-white, 3-4 mm. long; lobes ovate, erect or nearly so: follicles 11-14 cm. long. — Susquehanna valley. Rather common, in rocky places.

FAMILY 2. ASCLEPIADACEAE. MILKWEED FAMILY.

Perennial herbaceous or woody plants, with usually umbel-like cymes. Androecium of usually 5 stamens, with the anthers more adherent to the

stigma than in *Apocynaceae*, the filament-appendages forming a crown. Gynoecium of 2 carpels with the stigmas united: one carpel usually maturing.

Erect or spreading herbs: pollinia pendulous: stigma neither saucer-shaped nor cup-shaped.

Hoods of the crown without horns.

Hoods of the crown each with a projecting horn.

Vines: pollinia horizontal: stigma saucer-shaped or cup-shaped.

1. ACERATES.

2. ASCLEPIAS.

3. VINCEETOXICUM.

1. **ACERATES** Ell. Erect or spreading herbs, with narrow or relatively narrow leaf-blades. Calyx-lobes 5. Corolla rotate: lobes reflexed. Hoods of the crown approximate to the anthers, the column very short or stout.

1. **A. viridiflora** (Raf.) Eaton. Plants 2-6 dm. tall: leaf-blades oval to oblong, 4-6 cm. long: corolla-lobes 5-6 mm. long: hoods 3-4 mm. long: column very short: anther-wings about 4 mm. long: pollinium-bodies 2-3 mm. long: seed-coma 2.5-3 cm. long.—N. S. Common, in dry soil.—*Sandstones and shales, schists*, and especially common in *serpentine*.—Sum.—GREEN-MILKWEED.

2. **ASCLEPIAS** [Tourn.] L. Erect or spreading herbs, with narrow or broad leaf-blades. Calyx-lobes 5. Corolla rotate: lobes reflexed. Hoods of the crown (corona) approximate to the anthers, or nearly so, not adnate to the anther-column, the horn mainly adnate only to the base of the hood. Anther-wings salient at the base. Pollinia longer than the caudicles.—Sum.—MILKWEED. SILKWEED.

Corolla and hoods orange-yellow: leaves, or some of them, alternate.

Stems decumbent or procumbent: leaves, at least the upper ones, opposite: blades mainly oblong.

Stems erect or ascending: leaves mainly alternate: blades lanceolate-oblong to linear-lanceolate.

Corolla and hoods red, purple, green or white: leaves opposite or whorled.

Leaf-blades broad.

Follicles erect on deflexed pedicels.

Leaf-blades sessile and sometimes clasping.

Leaf-blades rounded or abruptly narrowed at the apex: hoods broad, truncate and blunt-mucronate, the horn exserted.

Leaf-blades acuminate: hoods narrow, obtuse or acutish, the horn not exserted.

Leaf-blades petioled.

Corolla colored.

Corolla dark-purple: hoods narrow, obtuse: petals less than twice as long as the crown.

Corolla paler: hoods broad, truncate or broadly rounded: petals over twice as long as the crown.

Leaf-blades not acuminate at both ends: hoods rounded and slightly auricled, the horns scarcely exserted.

Leaf-blades decidedly acuminate at both ends: hoods truncate and prominently auricled, the horns long exserted.

Corolla white.

Follicles erect on erect pedicels.

Leaves all opposite: hoods slightly auricled.

Leaf-blades typically lanceolate or oblong-lanceolate: plant glabrous or puberulent.

Leaf-blades typically oblong: plant copiously pubescent.

Leaves, at least the main ones, whorled in 4's or 6's: hoods prominently auricled.

Leaf-blades narrow, linear or nearly so, usually elongate.

1. *A. decumbens*.

2. *A. tuberosa*.

3. *A. amplexicaulis*.

4. *A. rubra*.

5. *A. purpureascens*.

6. *A. syriaca*.

7. *A. exaltata*.

8. *A. variegata*.

9. *A. incarnata*.

10. *A. pulchra*.

11. *A. quadrifolia*.

12. *A. verticillata*.

1. **A. decumbens** L. Stems decumbent or procumbent, 3-6 dm. long, hirsute or hispid: leaf-blades mainly oblong above the more or less hastate base, 3-19 cm.

long: corolla-lobes 6-7 mm. long: horn arising above the hood-auricles: follicles mostly over 10 cm. long.—Occasional, in dry soil.

2. *A. tuberosa* L. Stems mostly erect or ascending, 3-6 dm. tall, hirsute: leaf-blades lanceolate-oblong to linear-lanceolate, 3-9 cm. long: corolla-lobes 5-6 mm. long: horn arising opposite the hood-auricles: follicles mostly less than 10 cm. long.—N. S. Common, in fields and on roadsides.—*Sandstones and shales, schists.*—BUTTERFLY-WEED. PLEURISY-ROOT.

3. *A. amplexicaulis* J. E. Smith. Stems 3-10 dm. tall, glabrous: leaf-blades horizontal, oblong or elliptic, 6-12 cm. long: corolla-lobes greenish or greenish-purple, 7-9.5 mm. long: hoods about 4 mm. long, exceeding the androecium, shallowly lobed; horn subulate, much exerted: anther-wings twice as long as wide: follicles 10-16 cm. long.—S. Not very common, on roadsides.—*Schists.*

4. *A. rubra* L. Stems 3-12 dm. tall, glabrous: leaf-blades ovate, ovate-lanceolate, or oblong-lanceolate, 7-20 cm. long: corolla-lobes purple-red, or rarely purplish-green, 7-8 mm. long: hoods lanceolate, about 6 mm. long, narrowed to the apex; horn nearly as long as the hood: follicles 9-11 cm. long.—S. Rare, in swamps.—*Schists.*

5. *A. purpurascens* L. Stems 3-12 dm. tall, becoming glabrous: leaf-blades mainly oblong-ovate, 9-20 cm. long: corolla-lobes purple, 8-10 mm. long: hoods 4.5-5.5 mm. long, fully twice as long as the androecium, oblong-ovate at the entire apex; horn much shorter than the hood: anther-wings nearly as wide as long: follicles 10-12 cm. long.—Common, on roadsides and in thickets.—PURPLE-MILKWEED.

6. *A. syriaca* L. Stems 5-15 dm. tall, becoming glabrous: leaf-blades horizontal, oblong or oblong-ovate, 9-15 cm. long: corolla-lobes greenish-purple, 6-8 mm. long: hoods 3-4 mm. long, about equalling the androecium, broadly rounded; horn subulate, about as long as the hood: anther-wings much longer than wide: follicles 7-9 cm. long.—Common, in fields and fence-rows.—COMMON-MILKWEED.

7. *A. exaltata* (L.) Muhl. Stems 9-15 dm. tall, sometimes pubescent in lines above: leaf-blades mainly elliptic to elliptic-lanceolate, 1-2.5 cm. long: corolla-lobes flesh-colored or bluish, 7-8 mm. long: hoods 3.5-4 mm. long, about equaling the androecium, erose-truncate; horn with a much exerted subulate incurved tip: anther-wings much longer than wide: follicles 12-16 cm. long.—Not common, in thickets and on roadsides.—POKE-MILKWEED.

8. *A. variegata* L. Stems 3-9 dm. tall, sometimes pubescent above: leaf-blades typically oval, varying to ovate or obovate, 6-14 cm. long: corolla-lobes white, 6-8 mm. long: hoods about 3 mm. long, rounded, much exceeding the androecium; horn very broad, with a horizontal tip: anther-wings nearly as wide as long: follicles 10-13 cm. long.—N. S. Common, in woods.—*Quartzite, schists.*

9. *A. incarnata* L. Stems 6-11 dm. tall, glabrous or puberulent: leaf-blades mainly oblong-lanceolate, 4-17 cm. long, glabrous or nearly so: corolla-lobes pink or rarely white, 4-6 mm. long: hoods oblong, 2.5-3 mm. long, somewhat exceeding the androecium; horn slender, much longer than the hood: follicles 7-9 cm. long.—Common, in low meadows and swamps and on roadsides.—SWAMP-MILKWEED.

10. *A. pulchra* Ehrh. Stems 5-15 dm. tall, closely pubescent: leaf-blades broadly lanceolate to oblong, 6-12 cm. long, pubescent: corolla-lobes rose-purple or rarely white, 5-6 mm. long: hoods oblong, about 2.5 mm. long, slightly exceeding the androecium; horn slender, much longer than the hood: follicles 5-7 cm. long.—N. S. Common, in low meadows and swamps.—*Sandstones and shales, schists.*

11. *A. quadrifolia* Jacq. Stems 3-6 dm. tall, sometimes puberulent: leaf-blades ovate to ovate-lanceolate, 4-10 cm. long; corolla-lobes pink or nearly white, about 5 mm. long; hoods ovate-oblong, 4-5 mm. long, about twice as long as the androecium; horn slender, much shorter than the hood: follicles 10-12 cm. long. — Common, in woods.

12. *A. verticillata* L. Stems 3-8 dm. tall, commonly pubescent in lines: leaf-blades narrowly linear to linear-filiform, 2-6 cm. long; corolla-lobes greenish-white, 3-4 mm. long; hoods about 1 mm. long, about equalling the androecium or shorter, with erect auricles within; horn slender, much exceeding the hood: column mostly less than 1 mm. long; follicles 7-10 cm. long. — Common, in dry soil and fields.

3. **VINCETOXICUM** Walt. Stout vines with broad leaf-blades. Calyx-lobes longer than the corolla-tube. Corolla rotate or campanulate: lobes often relatively long. Crown saucer-shaped or cup-like, sometimes lobed, single or double. Stigma flat or depressed.

1. *V. obliquum* (Jacq.) Britton. Leaf-blades broadly ovate to orbicular-ovate, 7-20 cm. long, the basal lobes mostly forming a closed sinus by the overlapping edges: calyx-lobes about 3 mm. long; corolla reddish-purple; lobes 9-14 mm. long; crown with the longer lobes truncate or emarginate; follicles 7-8 cm. long; seeds about 7 mm. long. — Susquehanna valley. Occasional, in woods and thickets. — Sum. — ANGLE-POD.

Order POLEMONIALES.

Herbs, or sometimes shrubs or trees, the plants of some groups parasitic. Leaves with dilated blades, or scale-like. Flowers mainly perfect. Calyx of partially united sepals. Corolla of partly united petals, regular or irregular. Androecium of as many stamens as there are corolla-lobes, or fewer, sometimes partly represented by staminodia, or partly obsolete. Gynoecium of 2 distinct or several united carpels. Ovary superior. Fruit a capsule, a berry, or a drupe, or a group of nutlets, or utricle-like.

Stamens 5.

Fruit capsular or baccate: ovary not 4-lobed.

Styles or stigmas distinct.

Ovary 1-2-celled, or rarely 4-celled: stigmas 2.

Ovary 2-celled or 4-celled.

Corolla unappendaged within: plants with well-developed leaves, at least if vines. Fam. 1. CONVULVULACEAE.

Corolla appendaged within: parasitic twining plants with scale-like leaves.

Ovary 1-celled.

Ovary 3-celled: stigmas 3.

Calyx-lobes imbricate: corolla mostly plaited in the bud.

Calyx-lobes valvate: corolla merely convolute in the bud.

Styles or stigmas wholly united.

Median axis of the gynoecium in the same axis as the stem: seeds mostly pitted.

Median axis of the gynoecium not in the axis of the stem: seeds mostly tuberculate.

Fruit drupaceous, or of 2 or 4 nutlets.

Stamens 4 and didynamous, or 1 or 2.

Carpels ripening into a group of 4 nutlets, an achene or a drupe.

Style apical on the lobeless ovary.

Ovary 2-celled.

Ovary 1-celled.

Style arising between the 4 lobes of the ovary.

Carpels ripening into a capsule.

Fam. 7. VERBENACEAE.

Fam. 8. PYRYMACEAE.

Fam. 9. LAMIACEAE.

Fam. 10. RHINANTHACEAE.

Fam. 6. BORAGINACEAE.

Fam. 1. CONVULVULACEAE.

Fam. 2. CUSCUTACEAE.

Fam. 3. HYDROLEACEAE.

Fam. 4. POLEMONIACEAE.

Fam. 5. SOLANACEAE.

Placentae of the ovary axial.

Ovary 2-celled, or rarely 3-5-celled.

Corolla-lobes imbricate: capsule not elastically dehiscent.

Corolla-lobes convolute: capsules elastically dehiscent.

Ovary 1-celled.

Placentae of the ovary parietal.

Herbs parasitic on the roots of other plants: leaves scale-like: foliage not green.

Trees, shrubs or woody vines, or herbs, but not parasitic: leaves not scale-like: foliage green.

Ovary and capsule 2-celled: trees, shrubs or woody vines: seeds winged.

Ovary and capsule 1-celled: herbs: seeds wingless.

Fam. 10. RHINANTHACEAE.

Fam. 11. ACANTHACEAE.

Fam. 12. PINGVICULACEAE.

Fam. 13. OROBANCHACEAE.

Fam. 14. BIGNONIACEAE.

Fam. 15. MARTYNIACEAE.

FAMILY 1. CONVULVULACEAE. MORNING-GLORY FAMILY.

Annual or perennial herbs or vines, or rarely shrubs or trees. Leaves alternate, without stipules: blades various. Flowers perfect, regular, solitary or cymose. Calyx of 5 more or less united sepals, equal or unequal, in one or two series. Corolla superior, convolute in aestivation, its limb often entire. Androecium of 5 stamens, partially adnate to the corolla-tube, alternate with the lobes. Gynoecium free, of two united carpels. Ovary 2-4-celled (rarely 5-celled or 1-celled by the breaking down of the septa). Seeds 1 or 2 in each cavity, often villous.

Stigmas ovoid or subglobose.

Stamens and style exserted: corolla salverform.

Stamens and style included: corolla funnelform.

Calyx-lobes coriaceous or membranous, not elongate: ovary

2- or 4-celled.

Calyx-lobes herbaceous, elongate, usually pilose: ovary

3-celled.

Stigmas filiform or oblong-cylindric.

1. QUAMOCLIT.

2. IPOMOEA.

3. PHARBITIS.

4. CONVULVULUS.

1. **QUAMOCLIT** [Tourn.] Moench. Annual (ours) or perennial vines, with twining, glabrous stems. Blades entire, lobed, or divided. Flowers in axillary cymes or solitary. Calyx-lobes equal or nearly so. Corolla scarlet, salverform: tube narrowly funnelform; limb spreading, shorter than the tube. Ovary 2- or falsely 4-celled. Capsules usually 4-celled and 4-seeded. — Sum. and fall.

Leaf-blades pinnately parted, the segments narrow: calyx-lobes obtuse or mucronate.

Leaf-blades entire: calyx-lobes acuminate.

1. *Q. Quamoclit.*

2. *Q. coccinea.*

1. **Q. Quamoclit** (L.) Britton. Leaf-blades 2-10 cm. long; segments narrowly linear: pedicels clavate: calyx-lobes appressed to the corolla-tube: corolla-tube clavate, 2.5-3 cm. long; lobes ovate or triangular. — M. Occasional, in waste places. Nat. of trop. Am. — CYPRESS-VINE.

2. **Q. coccinea** (L.) Moench. Leaf-blades ovate, 3-10 cm. long, acuminate, angled or entire: peduncles usually stouter than the pedicels: calyx-lobes oblong: corolla scarlet or orange, rarely white; tube 2-4 cm. long; limb cup-like, 1.5-2 cm. broad. — S. Rather rare, in fields. Nat. of trop. Am.

2. **IPOMOEA** L. Annual or perennial, climbing or trailing vines, or rarely upright plants. Leaf-blades entire, angled, or divided. Flowers solitary on axillary peduncles or in cymes. Calyx-lobes coriaceous or membranous, rarely fleshy. Corolla funnelform, the limb usually spreading. Capsules mostly septifragally 2- or 4-valved. Seeds often pubescent. — Sum. and fall. — MORNING-GLORY.

Calyx-lobes obtuse: corolla-limb over 5 cm. wide. 1. *I. pandurata*.
 Calyx-lobes acute or acuminate: corolla-limb less than 5 cm. wide. 2. *I. lacunosa*.

1. ***I. pandurata*** (L.) G. F. W. Mey. Perennial by a huge root: stems glabrous or glabrate, trailing or twining: leaf-blades ovate, often fiddle-shaped, 3-10 cm. long: peduncles 5-10 cm. long, 1-5-flowered: calyx-lobes oblong, 12-18 mm. long, obtuse, erect, imbricate and forming a tube: corolla 7-10 cm. broad; tube lavender within.—Common, in waste places and cultivated grounds.—WILD POTATO-VINE. MAN-OF-THE-EARTH.

2. ***I. lacunosa*** L. Annual: stems twining, sparingly hirsute or glabrate: leaf-blades ovate, entire or 3-lobed, 2-7 cm. long, deeply cordate: peduncles 1-3-flowered: calyx-lobes oblong or ovate, 10-12 mm. long, acute or acuminate: corolla 1.5-2 cm. long; limb often purple-margined.—Susquehanna valley. Frequent, on islands.—*Schists*.

3. **PHARBITIS** Choisy. Annual (ours), or perennial, climbing or trailing vines. Leaf-blades entire, lobed, or angled. Calyx-lobes equal or unequal, herbaceous, each with a pubescent base and a narrow tip. Corolla white, blue, or purple, funnellform. Ovary 3-5-celled. Seeds smooth.—Sum. and fall.—MORNING-GLORY.

Calyx-lobes 1-1.5 cm. long, the tips acute or acuminate. 1. *P. purpurea*.
 Calyx-lobes 2-3 cm. long, the tips elongate. 2. *P. hederacea*.

1. ***P. purpurea*** (L.) Voigt. Stems twining: leaf-blades ovate or orbicular-ovate, 6-18 cm. long, short-acuminate, cordate: calyx-lobes 10-15 mm. long: corolla 5-7 cm. long; limb purple or sometimes pink, blue, white, or variegated, 4-6 cm. broad.—Common, in waste places. Nat. of trop. Am.—COMMON MORNING-GLORY.

2. ***P. hederacea*** (L.) Choisy. Stems twining: leaf-blades 5-12 cm. long, deeply 3-lobed; lobes acuminate: peduncles usually shorter than the petioles: calyx-lobes 2-3 cm. long, the bases ovate or oval: corolla 3-4.5 cm. long, deep-blue, or the tube white; limb about 3 cm. broad.—S. Occasional, in cultivated grounds. Nat. of trop. Am.

4. **CONVOLVULUS** [Tourn.] L. Annual or (ours) perennial, trailing or twining vines. Leaf-blades usually hastate or cordate at the base. Flowers solitary, or clustered on axillary peduncles. Calyx naked or subtended by bracts. Calyx-lobes equal or the outer longer. Corolla funnellform or campanulate. Ovary 1- or 2-celled. Ovules 4. Capsule globose or nearly so. Seeds glabrous.—Sum.—BINDWEED.

Calyx enclosed by 2 large bracts which subtend it.

Stems trailing or twining.

Leaf-blades broadly hastate or triangular-hastate: corolla single.

Leaf-blades narrowly hastate: corolla double.

Stems erect or ascending.

Calyx without bracts.

1. *C. americanus*.
2. *C. japonicus*.
3. *C. spithameus*.
4. *C. arvensis*.

1. ***C. americanus*** (Sims) Greene. Stems twining, 1-3 m. long, glabrate. Leaf-blades broadly hastate or ovate-hastate, 5-12 cm. long, acuminate or apiculate: peduncles as long as the leaves or longer: bracts 2-3 cm. long: corolla pink or rose-purple, 5-7 cm. broad.—Common, in thickets, fields, and fence-rows.—HEDGE-BINDWEED.

2. ***C. japonicus*** Thunb. Similar to *C. americanus* in habit, but usually smaller: leaf-blades narrowly hastate: corolla double, pink, mostly 4-5.5 cm. wide.—E. Occasional, in fields. Nat. of Japan.

3. *C. spithameus* L. Stems finely pubescent, 1-7 dm. long: leaf-blades oblong-ovate or fiddle-shaped, 4-10 cm. long, rounded or subcordate at the base: peduncles usually from the lower axils: bracts 1.5-3 cm. long: corolla white or pink, 4-6 cm. long. — Common, in fields and on roadsides.

4. *C. arvensis* L. Stems branched at the base, the branches prostrate or low-twining: leaf-blades oblong, ovate-sagittate, or linear-hastate, 1-5 cm. long: peduncles shorter than the leaves: calyx-lobes oval or suborbicular, 3-3.5 mm. long: corolla white or pink, 1.5-2 cm. long. — M. Common, in fields and waste places, and on roadsides. Nat. of Eu. — FIELD-BINDWEED.

FAMILY 2. CUSCUTACEAE. DODDER FAMILY.

Herbaceous parasitic vines, with pale foliage. Leaves mere alternate scales. Flowers perfect, cymose. Calyx of 4 or 5 distinct or partly united sepals. Corolla regular, of 4 or 5 partly united petals, usually bearing fringed scales below the sinuses. Androecium of 4 or 5 stamens, the filaments partly adnate to the corolla-tube. Gynoecium of 2 partly united carpels, the styles distinct, or partly united: stigmas capitate. Capsule circumscissile or indehiscient.

1. *CUSCUTA* [Tourn.] L. Annual, slender, yellow or reddish vines twining on herbs and shrubs and adhering to the bark by means of suckers. The plants arise from the ground, but later become wholly parasitic, the stems and branches often matted. — DODDER. LOVE-VINE.

Scales within the corolla merely crenulate: stigmas slender: capsule circumscissile.

1. *C. Epilinum.*

Scales within the corolla fringed: stigmas capitate: capsule utriculate-like.

Sepals partially united.

Flowers sessile or essentially so: corolla persistent around the base of the fruit.

Calyx-lobes obtuse: corolla-scales ovate, fringed.

2. *C. arvensis.*

Calyx-lobes acutish: corolla-scales obsolete or of several processes.

3. *C. Polygonorum.*

Flowers markedly pedicelled: corolla surrounding or capping the fruit, or deciduous.

Capsule depressed: corolla-scales shorter than the corolla-tube.

4. *C. Cephalanthi.*

Capsule globose and umbonate: corolla-scales exceeding the corolla-tube.

5. *C. Gronovii.*

Sepals distinct, accompanied by nearly similar bracts.

6. *C. compacta.*

1. *C. Epilinum* Weihe. Branches slender, lax: flowers in dense heads: corolla 2-2.5 mm. long; lobes acutish, about $\frac{1}{4}$ the length of the tube: scales less than $\frac{1}{2}$ the length of the corolla-tube, divided, the lobes crenulate near the top: capsules about 3 mm. long. — S. Found in a field of flax, New Texas. Nat. of Eu. Not recently collected. — FLAX-DODDER.

2. *C. arvensis* Beyrich. Branches slender, loosely matted: corolla 2-2.5 mm. long; lobes acute or acuminate, as long as the tube: scales short-fringed all around: capsules barely 2 mm. long. — S. Rare, on herbs.

3. *C. Polygonorum* Engelm. Branches rather coarse, often loosely matted: corolla about 2 mm. long; lobes acute, longer than the tube: scales obsolete, usually of 1-3 processes on either side of the filament: capsules 2.5-3 mm. long. — Susquehanna valley. Occasional, on herbs.

4. *C. Cephalanthi* Engelm. Branches rather coarse, seldom matted: corolla about 2 mm. long; lobes obtuse, about $\frac{1}{2}$ as long as the tube: scales fringed mainly near the tip: capsules 3.5-4.5 mm. long. — Susquehanna valley. Occasional, on shrubs and tall herbs.

5. *C. Gronovii* Willd. Branches slender, sometimes matted; corolla about 3 mm. long; lobes obtuse, somewhat shorter than the tube: scales sparingly fringed at the top, more sparingly so on the sides: capsules about 3 mm. long. — Common, on bushes and herbs.

6. *C. compacta* Juss. Branches stoutish, often widely matted: corolla about 4 mm. long; lobes obtuse, much shorter than the tube: scales fringed mainly near the top: capsules 3–3.5 mm. long. — Susquehanna valley. — Common, on shrubs.

FAMILY 3. HYDROLEACEAE. WATER-LEAF FAMILY.

Annual or perennial herbs, or shrubby plants. Leaves alternate or opposite: blades toothed, lobed, or dissected, or rarely entire. Flowers purple, in scorpioid racemes, or in cymes. Calyx of 5 partly united sepals. Corolla regular, of 5 partly united petals, the tube often appendaged within. Androecium of 5 stamens, the filaments partly adnate to the corolla. Gynoecium 2-carpellary. Fruit a capsule.

Corolla-lobes convolute in the bud: ovary-placentae dilated.

Calyx not much enlarged at maturity: stamens exerted.

Calyx much enlarged at maturity: stamens included.

Corolla-lobes imbricate in the bud: ovary-placentae narrow.

1. HYDROPHYLLUM.

2. NYCTELEA.

3. PHACELIA.

1. **HYDROPHYLLUM** [Tourne.] L. Perennial herbs. Leaf-blades lobed, pinnatifid, or pinnately divided. Cymes long-peduncled. Calyx but little changed in fruit. Corolla white or colored. Filaments surpassing the corolla-lobes, bearded at the middle. Seeds reticulate. — WATER-LEAF.

Calyx unappendaged: lobes linear: plants perennial.

Leaf-blades pinnatifid or pinnately lobed.

Leaf-blades palmately lobed.

Calyx with reflexed appendages at each sinus; lobes lanceolate: plants biennial.

1. *H. virginicum*.

2. *H. canadense*.

3. *H. appendiculatum*.

1. *H. virginicum* L. Plants 2–7 dm. tall: leaf-segments coarsely toothed or incised: cymes open: calyx-lobes linear, about 5 mm. long, much longer than the tube: corolla white or purplish, 8.5–10 mm. long; lobes rounded at the apex. — Common, in rich woods. — Spr. and sum.

2. *H. canadense* L. Plants 2–7 dm. tall: leaf-lobes coarsely toothed or again lobed: cymes open: calyx-lobes linear to linear-lanceolate, much longer than the tube: corolla white, 9–10 mm. long, the lobes notched at the apex. — Susquehanna valley. Occasional, in rich soil, on the river shore and islands. — *Schists*. — Sum.

3. *H. appendiculatum* Michx. Plants 3–6 dm. tall: leaf-lobes coarsely toothed, acute or acuminate: cymes open: calyx-lobes narrowly lanceolate or subulate-lanceolate, much longer than the tube: corolla 9–11 mm. long; lobes rounded at the apex. — M. Rare, in rich soil. — *Limestones*. — Sum.

2. **NYCTELEA** Scop. Annual herbs. Leaf-blades pinnately divided or 1–3-pinnatifid. Flowers solitary in the axils. Calyx accrescent. Corolla white or bluish, commonly smaller than the calyx. Filaments included, often unequal, not dilated. Styles united.

1. **N. Nyctelea** (L.) Britton. Plants 0.5–3 dm. tall, ultimately diffusely branched: leaf-blades with spreading segments: pedicels 1–2 cm. long: calyx-lobes triangular-lanceolate, becoming 7–8 mm. long: corolla 4–6 mm. long: capsules 5–6 mm. in diameter, pubescent. — Susquehanna valley. — Occasional, in rich soil, on the river shore and islands. — Spr.

3. **PHACELIA** Juss. Annual, biennial, or perennial herbs. Leaf-blades toothed or dissected. Flowers in scorpioid racemes or cymes. Calyx slightly accrescent. Corolla white or variously colored: lobes entire to fimbriate. Filaments not dilated at the base. Styles partly united. — Spr.

Corolla-lobes entire: filaments longer than the corolla: capsules 2.5-3 mm. long.

1. *P. dubia*.

Corolla-lobes fimbriate: filaments about as long as the corolla: capsules about 4 mm. long.

2. *P. Purshii*.

1. **P. dubia** (L.) Small. Plants 0.5-4 dm. tall, often diffuse, strigillose, as well as glandular: stem-leaves with 3-5 short broad lobes: calyx-lobes narrowly oblong or nearly so, 3-4 mm. long: corolla mainly pale-lilac, 5-6 mm. long; appendages obsolete: stamens longer than the corolla: ovary and style-base pubescent: capsules 2.5-3 mm. long. — Susquehanna valley. Common, on rich hillsides and in thickets. — *Schists*.

2. **P. Purshii** Buckl. Plants 1-3 dm. tall, with rather stiff stems: stem-leaves with 5-9 lanceolate or oblong lobes: calyx-lobes linear to oblong-spatulate, 4-5 mm. long: corolla light-blue or rose-colored, 6-7 mm. long; lobes short-fimbriate; appendages manifest: filaments about as long as the corolla: capsules about 4 mm. long. — Susquehanna valley. Rare, near Safe Harbor. — *Schists*.

FAMILY 4. POLEMONIACEAE. PHLOX FAMILY.

Annual or perennial herbs, or woody plants. Leaves opposite or alternate: blades various. Flowers perfect, in variously disposed cymes. Calyx of 5 partly united sepals. Corolla of 5 partly united petals, mostly rotate, funnellform, or salverform. Androecium of 5 stamens, partly adnate to the corolla. Gynoecium 3-carpellary. Fruit a capsule mostly included in the calyx.

Calyx not accrescent, the tube distended or ruptured by the capsule: stamens not declined.

1. PHLOX.

Calyx accrescent, the tube not distended by the capsule: stamens declined.

2. POLEMONIUM.

1. **PHLOX** L. Herbaceous or woody, erect, diffuse, or creeping plants. Leaves mainly opposite: blades entire. Corolla salverform. Filaments unequally adnate to the corolla-tube.

Calyx-lobes fully as long as the tube.

Plants with prostrate sterile shoots: leaf-blades obtuse, acute, or acutish.

1. *P. divaricata*.

Plants without prostrate sterile shoots: leaf-blades acuminate.

2. *P. pilosa*.

Calyx-lobes shorter than the tube.

Shrubby plants with prostrate stems and branches, in dense mats: leaves clustered; blades very narrow.

3. *P. subulata*.

Herbaceous plants with erect stems and branches, not matted: leaves not clustered; blades broad.

Calyx-lobes lanceolate or triangular-lanceolate.

4. *P. maculata*.

Calyx-lobes subulate and awn-tipped.

5. *P. paniculata*.

1. **P. divaricata** L. Leaf-blades oblong to lanceolate, or ovate-lanceolate, 1.5-5 cm. long, entire, sessile, the upper ones sometimes cordate; those of the shoots often longer, sometimes broadest above the middle, sessile: calyx 6-10 mm. long; lobes linear-subulate, curved at maturity: corolla lavender or bluish; tube 1-1.5 cm. long; limb 2.5-3 cm. broad, the lobes apiculate or notched: capsules subglobose, 4-5 mm. long. — Common, in rich woods. — Spr. — BLUE-PHLOX.

2. **P. pilosa** L. Leaf-blades linear to narrowly lanceolate, 3-8 cm. long, attenuate, sessile: corymbs becoming lax: calyx about 1 cm. long; lobes subulate-setaceous, as long as the tube or longer: corolla pink-purple or white;

tube 1-1.5 cm. long, more or less pubescent; limb 2 cm. broad, the lobes obovate or cuneate, sometimes apiculate; capsules globose-oblong, about 5 mm. long. — S. Rare, in low thickets, near Pleasant Grove. — *Schists.* — Spr.

3. *P. subulata* L. Leaf-blades linear or linear-subulate, 1-1.5 cm. long, acute, sessile; calyx 8-9 mm. long, pubescent like the stem; lobes lanceolate-subulate, nearly as long as the tube; corolla purple, pink, or white; tube 1-1.5 cm. long; limb 1.6-2 cm. broad, the lobes cuneate, emarginate or slightly notched; capsules oblong-ovoid, 4-4.5 mm. long. — S. Abundant, on *serpentine* hills. — Spr. — GROUND-PINK. MOSS-PINK.

4. *P. maculata* L. Leaf-blades oblong-lanceolate, lanceolate, or linear, 5-12 cm. long, acuminate, becoming parchment-like in texture, sessile or nearly so; panicles cylindrical, 1-4 dm. long, often glandular-pubescent; calyx mostly deep-green; lobes lanceolate or triangular-lanceolate, about $\frac{1}{2}$ as long as the tube; corolla pink-purple; tube 1.5-2 cm. long; limb 2-2.5 cm. broad; the lobes orbicular-obovate or broadly cuneate; capsules broadly oblong, 4 mm. long. — Common, in swamps. — Early sum. — WILD SWEET-WILLIAM.

5. *P. paniculata* L. Leaf-blades elliptic, elliptic-lanceolate, or narrowly oblong-elliptic, 8-20 cm. long, acuminate, undulate, narrowed into margined petioles or nearly sessile; panicles corymbose-pyramidal; calyx glandular or sparingly pubescent; lobes subulate, shorter than the tube; corolla pink-purple or white; tube about 2 cm. long, 1.5-2 mm. thick; limb 15-17 mm. broad, the lobes obovate or cuneate-obovate; capsules oval, 4-5 mm. long. — Susquehanna valley. Occasional, in thickets. — Sum.

2. **POLEMONIUM** [Tourn.] L. Herbaceous plants with rootstocks. Leaves alternate; blades pinnate. Corolla funnellform to almost rotate. Filaments equally adnate to the corolla, declined. — GREEK-VALERIAN.

1. *P. reptans* L. Plants 3-7 dm. tall; leaf-segments oblong, elliptic, or oblong-lanceolate, 1.5-3 cm. long; calyx 5-6 mm. long and with ovate lobes during anthesis, becoming 10-13 mm. long, and with lanceolate lobes at maturity; corolla blue; lobes spatulate to obovate, about as long as the tube; capsules oval or ovoid-oval, 5-7 mm. long. — Common, in rich thickets. — Spr.

FAMILY 5. SOLANACEAE. POTATO FAMILY.

Herbs, shrubs, trees, or vines. Leaves alternate; blades entire, toothed, or lobed. Calyx of 5 (4-6), more or less united sepals. Corolla of 5 (4-6), more or less united petals. Androecium of 5 (4-6), stamens, the filaments partly adnate to the corolla-tube. Gynoecium 2-carpellary or 3-5-carpellary. Fruit a berry or a capsule.

Fruit a berry.

Corolla plicate; lobes usually induplicate.

Berry enclosed in the accrescent calyx; anthers not connected.

Sepals nearly distinct, auricled; ovary 3-5-celled.

Sepals united to near their tips, not auricled; ovary

2-celled.

Berry seated in the little changed calyx (except in *Solanum rostratum*); anthers converging or connate.

Anther-sacs opening by terminal pores or short slits.

Anther-sacs opening lengthwise and introrsely.

Corolla little, if at all, plicate; lobes imbricate.

Fruit a capsule.

Capsule prickly-armed; calyx circumscissile at the base.

Capsule unarmed; calyx not circumscissile.

1. *PHYSALODES*.

2. *PHYSALIS*.

3. *SOLANUM*.

4. *LYCOPERSICON*.

5. *LYCUM*.

6. *DATURA*.

7. *PETUNIA*.

1. **PHYSALODES** Boehm. Annual herbs. Leaf-blades sinuate or lobed. Flowers axillary, nodding. Calyx accrescent; lobes cordate or sagittate, converging, inflated. Corolla open-campanulate, slightly 5-lobed. Ovary 3-5-celled.

1. **P. Physalodes** (L.) Britton. Plants nearly glabrous, 3-9 dm. tall: leaf-blades ovate, oval, or oblong, 5-15 cm. long, angulate-lobed or sinuate: calyx 1.5 cm. long, becoming 3.5 cm. long; lobes broadly ovate: corolla blue or violet, about 2.5 cm. wide: berries 1.5-2 cm. in diameter. — Rather common, in cultivated and waste grounds and on roadsides. Nat. of Peru. — Sum. — APPLE-OF-PERU.

2. **PHYSALIS** L. Annual or perennial herbs. Leaf-blades entire or sinuate. Flowers axillary, nodding, mostly solitary. Calyx bladder-like at maturity: lobes short and converging. Corolla mainly yellow or whitish, often dark in the center. Ovary 2-celled. — Sum. — GROUND-CHERRY.

Plants annual, with fibrous roots.

Foliage manifestly pubescent even in age: berry yellow or green.

Foliage glabrous, at least in age: berry red or purple. 1. *P. pruinosa*.
Plants perennial by rootstocks and roots. 2. *P. subglabrata*.

Leaves glabrous.

Leaves pubescent.

Stem strigose with flat hairs: berry reddish.

Stem clammy-pubescent with spreading hairs: berry yellow.

3. *P. virginiana*.

4. *P. heterophylla*.

1. **P. pruinosa** L. Stems stout, generally erect or often ascending and obtusely angled, finely villous or viscid: leaf-blades firm, 3-10 cm. long, finely pubescent, ovate-cordate, generally very oblique at the base, and deeply sinuate-toothed, the teeth broad and often obtuse: peduncles 2-4 mm., at maturity about 1 cm. long: calyx villous or viscid; lobes as long as the tube, narrow, but without subulate tips: corolla 3-8 mm. in diameter: anthers yellow or tinged with purple: fruiting calyx firm, pubescent, reticulate, 2-3 cm. long, ovoid-cordate: berry yellow or green. — Rare, in rich soil.

2. **P. subglabrata** Mack. & Bush. Stems 0.5-1.5 m. tall, dichotomously branched, glabrous or sometimes slightly pubescent with sparse and short hairs on the upper parts: leaf-blades ovate to ovate-lanceolate, often very oblique at the base and more or less acuminate, entire or repand-denticulate, 6-10 cm. long: peduncles slender, often in pairs, 1-2 cm. long, generally longer than the flower: calyx glabrous, or minutely ciliate; lobes ovate-lanceolate or triangular, sometimes broadly ovate and unequal, generally equalling the tube: corolla yellow or greenish-yellow with a purplish throat, 1.5-2.5 cm. in diameter: anthers tinged with purple: fruiting calyx at first somewhat 10-angled and sunken at the base, at maturity often filled with or even burst by the large red or purple berry. — Common, in fields and on roadsides.

3. **P. virginiana** Mill. Rootstock fleshy: stems 0.5-1 m. tall, dichotomously branched, somewhat angular, pubescent with appressed hairs, sometimes somewhat glandular, or in some forms nearly glabrous: leaf-blades ovate-lanceolate, tapering to both ends, 3-6 cm. long, generally sinuately dentate, often yellowish-green: calyx strigose-hirsute, or at least puberulent; lobes triangular or broadly lanceolate, nearly equalling the tube in length: corolla sulphur-yellow with purplish spots, 1.5-2.5 cm. in diameter: fruiting calyx pyramidal-ovoid, 5-angled and sunken at the base: berry reddish. — Occasional, in rich, often dry soil.

4. **P. heterophylla** Nees. Rootstock slender: stems 0.5-1 m. tall, erect, or later generally decumbent and spreading, viscid and glandular-villous with moderately long jointed flat hairs: leaf-blades generally over 5 cm. long, usually broadly cordate, often acute and very rarely with an acumination, thick, sinuately toothed, or sometimes subentire: calyx long-villous; lobes triangular, generally shorter than the tube: corolla 1-1.5 cm. in diameter: berry yellow. — Occasional, in rich soil, especially in fields.

3. SOLANUM [Tourn.] L. Annual or perennial herbs, or vines. Leaf-blades entire, toothed, or lobed. Flowers variously clustered. Calyx sometimes accrescent. Corolla rotate, of various colors: lobes longer than the tube. Anthers narrow, converging or united, much longer than the filaments. — Sum.

Climbing vine: berries red.

1. *S. Dulcamara*.

Upright or spreading herbs: berries not red.

Plants glabrous or simply pubescent, not prickly-armed: corolla white.

2. *S. nigrum*.

Plants stellate-pubescent, prickly-armed: corolla violet or yellow, or rarely white.

Berry not enclosed in the calyx: anthers equal: perennial plants.

3. *S. carolinense*.

Berry enclosed in the accrescent calyx: anthers unequal: annual plants.

4. *S. rostratum*.

1. S. Dulcamara L. Partially woody climber: leaf-blades ovate, 3–10 cm. long, entire or with 1 or 2 basal lobes, thin: corolla white or blue, 8–10 mm. long; lobes lanceolate to oblong-lanceolate: berries oval, 9–15 mm. long. — Common, in thickets and waste places. Nat. of Eu. — BITTERSWEET.

2. S. nigrum L. Herbaceous annual, 1–12 dm. tall: leaf-blades ovate to oblong-ovate, 2–8 cm. long, undulate or deeply repand: calyx-lobes fully 1 mm. long: corolla white; lobes lanceolate to oblong-lanceolate: berries subglobose, 4–8 mm. in diameter, black. — Common, in waste places and fields. — COMMON-NIGHTSHADE.

3. S. carolinense L. Herbaceous perennial, 2–7 dm. tall, hirsute or rough-pubescent: leaf-blades oblong to ovate in outline, 5–12 cm. long, sinuate or pinnately sinuate-lobed, the lobes of a triangular type: calyx spinescent; lobes lanceolate, often narrowly so, acuminate: corolla violet or rarely white, 25–30 mm. wide; lobes ovate: berries globular, 10–15 mm. in diameter, orange-yellow. — M. S. Common, in fields and on roadsides. — HORSE-NETTLE.

4. S. rostratum Dunal. Herbaceous annual, hoary- or yellowish-pubescent, 2–7 dm. tall: leaf-blades mostly ovate or oval, 1–2-pinnatifid, 5–22 cm. long: calyx spinescent; lobes lanceolate or linear-lanceolate: corolla yellow, about 25 mm. wide; lobes ovate to lanceolate, shorter than the tube: berries enclosed. — M. Occasional, on roadsides and along railroads. Nat. of the Plains. — BUFFALO-BUR.

4. LYCOPERSICON Mill. Annual or perennial heavy-scented herbs. Leaf-blades 1–2-pinnately divided. Flowers in cymes. Calyx not accrescent. Corolla rotate, yellow: lobes longer than the tube.

1. L. Lycopersicon (L.) Karst. Plants clammy-pubescent, 3–12 dm. tall: leaf-blades 1–4 dm. long, the divisions ovate to oblong, coarsely toothed or incised: calyx-lobes narrow, acute: corolla mainly 1.5–2 cm. wide: berries depressed, mainly 5–15 cm. wide, and red or yellow. — Occasional, in cultivated grounds. Nat. of trop. Am. — Sum. — TOMATO. LOVE-APPLE.

5. LYCIUM L. Shrubs or woody vines, commonly spiny. Leaf-blades thick, flat or sometimes terete, entire. Flowers axillary, sometimes clustered. Calyx markedly lobed. Corolla white or colored, funnellform, salverform, or nearly campanulate: lobes longer than the usually short tube, or shorter. Filaments adnate to the lower part of the corolla-tube, pubescent below: anthers shorter than the filaments. Stigma dilated.

1. L. halimifolium Mill. Plant irregularly branched, sometimes vine-like: leaves herbaceous, 1.5–5 cm. long; blades oblong, oval, ovate, lanceolate, or spatulate: calyx-lobes ovate to somewhat triangular, obtuse: corolla purplish or greenish; lobes 4–5 mm. long: berries oval or ovoid, orange or orange-red,

10-15 mm. long. — Common, near dwellings or gardens, or in fence-rows. Nat. of Eu. — Early sum. — MATRIMONY-VINE.

6. **DATURA** L. Herbs (ours annual), or shrubs or trees. Leaf-blades undulate or lobed. Flowers solitary in the axils. Calyx tubular, sometimes prismatic, more or less lobed. Corolla white or colored, funnellform. Filaments slightly unequal.

1. **D. Stramonium** L. Plant green or purple-tinged, 2-12 dm. tall: leaf-blades ovate to oblong, 10-20 cm. long, sinuate or laciniate-toothed: calyx 3-5 cm. long; lobes 5-7 mm. long: corolla white, violet, or lavender, 6-10 mm. long: capsules 4-6 cm. long, the prickles equal or the lower ones rather shorter than the upper. [*D. Tatula* L.] — Rather common, in waste places. Nat. of trop. — Sum. — THORN-APPLE. JIMSON-WEED. JAMESTOWN-WEED. STRAMONIUM.

7. **PETUNIA** Juss. Herbs. Leaf-blades entire. Flowers solitary in the axils. Sepals united to below the middle. Corolla white or colored, funnel-form or salverform. Filaments unequal, 4 of them didynamous.

1. **P. axillaris** (Lam.) B.S.P. Stem and branches rather stout, clammy-pubescent: leaf-blades oblong to ovate-oblong, 3-6 cm. long, those of the lower leaves petioled: calyx 1.5-2 cm. long; lobes mostly oblong: corolla white, almost salverform; limb mostly 4-5 cm. wide. — M. Occasional, in waste places. Nat. of Brazil. — Sum.

FAMILY 6. BORAGINACEAE. BORAGE FAMILY.

Herbs or shrubby plants, the foliage usually bristly pubescent. Leaves alternate: blades mostly entire. Flowers typically perfect, the spikes or racemes often scorpioid. Calyx of 4 or 5 slightly united sepals. Corolla of 4 or 5 partly united petals. Androecium of 4 or 5 stamens, the filaments partly adnate to the corolla. Gynoecium of 4 nearly distinct carpels, the style arising from between the lobes. Fruit of 4 or fewer nutlets.

Corolla regular.

Nutlets armed with barbed prickles.

Nutlets spreading, covered with prickles.

Nutlets erect or incurved, with prickles on the back or angles.

Nutlets unarmed.

Nutlets attached laterally to the receptacles: free portions of the filaments elongate.

Nutlets attached to the receptacles by their bases: free portions of the filaments very short.

Nutlets each with a small flat scar where attached: scales in the throat of the corolla broad.

Corolla funnellform or salverform; lobes obtuse, spreading, broad.

Racemes without bracts: calyx-lobes about as long as the tube.

Racemes with bracts: calyx-lobes much longer than the tube.

Corolla slightly longer than the calyx: style as long as the ovary or longer.

Corolla much longer than the calyx: style much elongate.

Corolla tubular; lobes acute or acuminate, erect, narrow.

Nutlets each with a large hollow scar where attached: scales in the throat of the corolla narrow.

Corolla tubular.

Corolla rotate.

Corolla irregular.

1. CYNOGLOSSUM.

2. LAPPULA.

3. MERTENSIA.

4. MYOSOTIS.

5. LITHOSPERMUM.

6. BATSCHIA.

7. ONOSMODIUM.

8. SYMPHYTUM.

9. BORAGO.

10. ECHIUUM.

1. **CYNOGLOSSUM** [Tourn.] L. Annual, biennial, or perennial pubescent herbs. Calyx manifestly accrescent. Corolla much longer than the calyx. Style relatively long. Fruit surpassing the calyx. — Sum.

Stem copiously leafy to the top: corolla slightly longer than the calyx: nutlets flat.

Stem terminated by a long peduncle: corolla much longer than the calyx: nutlets convex.

1. *C. officinale*.

2. *C. virginicum*.

1. **C. officinale** L. Stems 2–6 dm. tall: leaf-blades oblong to linear-oblong or linear-lanceolate, 5–15 cm. long: calyx-lobes becoming 6–8 mm. long or more: corolla reddish-purple or rarely white, mostly 8–10 mm. wide; lobes reniform: nutlets smooth between the spines. — Common, in dry soil, on roadsides, and in thickets. Nat. of Eu. — HOUND'S-TONGUE.

2. **C. virginicum** L. Stems 2–11 dm. tall: leaf-blades oval to oblong, 8–32 cm. long: calyx-lobes becoming 3–4 mm. long: corolla white or purplish, 7–8 mm. wide; lobes ovate: nutlets coarsely wrinkled between the spines. — Rather common, in dry soil, on roadsides, and in thickets. — WILD-COMFREY.

2. **LAPPULA** [Rivinius] Moench. Annual, biennial, or perennial, often hirsute or hispid, herbs. Calyx scarcely accrescent: lobes spreading at maturity. Corolla scarcely as long as, or a little longer than the calyx. Style relatively short. Fruit much longer than the calyx.

1. **L. virginiana** (L.) Greene. Plants 3–9 dm. tall: leaf-blades oblong or elliptic to oblong-lanceolate, the lower ones 10–20 cm. long: calyx-lobes becoming 2–2.5 mm. long: corolla-tube about 1.5 mm. long, the appendages reniform: fruit about 4 mm. wide; nutlets papillose and spiny. — Common, in thickets. — Sum. — BEGGAR'S-LICE. STICK-WEED. BUR-SEED.

3. **MERTENSIA** Roth. Perennial glabrous (ours) herbs. Calyx scarcely, if at all, accrescent. Corolla showy, conspicuously longer than the calyx. Style and free portion of the filaments elongate. Fruit much longer than the calyx.

1. **M. virginica** (L.) DC. Stems often clustered, 2–6 dm. tall: leaves 5–20 cm. long; blades oblong-elliptic to oval: calyx 2–3 mm. long, becoming 5–6 mm. long; lobes oblong to lanceolate or ovate: corolla blue or rarely white, 2.5–3 cm. long, the cup-like limb 10–15 mm. wide, shallowly lobed: nutlets ovoid, 2.5 mm. long. — Frequent, in rich woods and low grounds. — Spr. — LUNGWORT. VIRGINIA-COWSLIP.

4. **MYOSOTIS** [Rupp.] L. Annual, biennial, or perennial, pubescent herbs. Calyx slightly accrescent. Corolla manifestly longer than the calyx. Style and free portions of the filaments short. Fruit surpassed by the calyx. — Spr. and sum. — FORGET-ME-NOT. SCORPION-GRASS.

Calyx open at maturity, pubescent with straight hairs: perennial plants.

1. *M. laxa*.

Calyx closed at maturity, pubescent with hooked hairs: annual or biennial plants.

Pediceal longer than the mature calyx: style slender, about as long as the ovary: calyx regular.

2. *M. arvensis*.

Pediceal shorter than the calyx: style stout, very short: calyx 2-lipped.

3. *M. virginica*.

1. **M. laxa** Lehm. Stems 1–5 dm. long: leaf-blades spatulate to oblong-lanceolate: pedicels 5–10 mm. long: calyx-lobes triangular to triangular-lanceolate: corolla mainly pale-blue; lobes about 1 mm. long: nutlets about 1 mm. long. — Common, in spring-runs and muddy places.

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2. *M. arvensis* (L.) Willd. Stems 1-3 dm. tall: leaf-blades spatulate to oblong or oblong-lanceolate, 1-5 cm. long: calyx becoming 3-4 mm. long; lobes equal or nearly so: corolla blue or sometimes white; lobes over $\frac{1}{2}$ as long as the tube: nutlets about 1.5 mm. long. — S. Rare, in low grounds. — *Schists*.

3. *M. virginica* (L.) B.S.P. Stems 1-4 dm. tall: leaf-blades similar to those of *M. arvensis*, 1-3 cm. long: pedicels 1-3 mm. long: calyx becoming 6-7 mm. long; lobes slightly unequal: corolla white; lobes less than $\frac{1}{2}$ as long as the tube: nutlets about 1.5 mm. long. — Common, on dry hills and in fields.

5. **LITHOSPERMUM** [Tourn.] L. Annual, biennial, or perennial herbs. Calyx slightly enlarged at maturity. Corolla slightly longer than the calyx, white, greenish, or yellowish. Style as long as the ovary or somewhat longer. Fruit surpassed by the calyx. — Spr. and sum. — GROWWELL.

Annual or biennial plants: corolla white or whitish, slightly surpassing the calyx, not appendaged in the throat: nutlets dull.

1. *L. arvense*.

Perennial plants: corolla pale yellow or yellow-white, surpassing the calyx, appendaged in the throat: nutlets shining.

2. *L. latifolium*.

1. *L. arvense* L. Stems and branches 1-8 dm. long: leaf-blades linear-oblong to linear-lanceolate, 1.5-5 cm. long, acutish: calyx-lobes narrowly linear to linear-subulate, 8-10 mm. long, revolute: corolla white or pinkish; lobes $\frac{1}{2}$ - $\frac{1}{3}$ as long as the tube: nutlets about 3 mm. long, pitted and wrinkled. — Common, in fields and on dry hills. — CORN-GROWWELL.

2. *L. latifolium* Michx. Stem and branches 3-7 dm. tall: blades of the cauline leaves elliptic to elliptic-lanceolate, 4-12 cm. long, acuminate: calyx-lobes narrowly linear, becoming 8-10 mm. long, flat: corolla yellow-white or pale-yellow; lobes over $\frac{1}{2}$ as long as the tube: nutlets ovoid, 3-3.5 mm. long, smooth. — M. Rare, in fields and on roadsides.

6. **BATSCHIA** G. F. Gmel. Perennial herbs, with colored roots. Calyx nearly unchanged at maturity. Corolla much longer than the calyx (except in cleistogamous flowers), yellow. Style many times longer than the ovary. Fruit surpassed by the calyx, the nutlets mainly ovoid.

1. *B. canescens* Michx. Plants 1-4 dm. tall: leaf-blades linear to oblong or ovate-oblong, 9-21 mm. long: calyx-lobes linear or nearly so, becoming 3-5 mm. long: corolla orange-yellow; tube 9-11 mm. long: nutlets about 2.5 mm. long. — W. Frequent, in woods. Nat. of the West. — *Sandstones and shales*. — Sum. — PUCCOON.

7. **ONOSMODIUM** Michx. Perennial herbs with hard roots. Sepals nearly distinct. Corolla much longer than the calyx, without appendages in the throat, the lobes relatively long.

1. *O. virginianum* (L.) DC. Stems strigose-hispid, 2-7 dm. tall: leaf-blades oblong to linear-oblong or linear-lanceolate, 2.5-12 cm. long, obtuse or acutish: calyx-lobes narrowly linear-lanceolate, becoming 6-8 mm. long: corolla yellowish, 8-10 mm. long; lobes subulate-lanceolate, somewhat shorter than the tube: nutlets about 3 mm. long. — Common, in thickets and open woods. — Sum. — FALSE-GROWWELL.

8. **SYMPHYTUM** L. Perennial herbs with mucilaginous roots. Sepals manifestly united into a tube. Corolla much longer than the calyx, with long appendages in the throat, the lobes relatively short.

1. *S. officinale* L. Stems and branches 3-10 dm. tall, hirsute: leaf-blades oblong, lanceolate, or ovate-lanceolate, or sometimes ovate, 8-30 cm. long: calyx-

lobes acuminate, each with an ovate to lanceolate body: corolla yellowish or purplish, 10–15 mm. long; lobes ovate, obtuse, the appendages lanceolate: nutlets 3–4 mm. long. — Occasional, on roadsides and about gardens. Nat. of Eu. — Sum. — COMFREY. HEALING-HERB.

9. **BORAGO** L. Annual or perennial herbs. Corolla rotate, regular or nearly so, the throat appendaged. Free portions of the filaments short.

1. **B. officinalis** L. Plant 2–10 dm. tall, hirsute: leaf-blades oblong to oblong-ovate, 4–9 cm. long, shallowly toothed, on winged petioles: cymes few-many-flowered: calyx bristly; lobes linear-lanceolate, 10–13 mm. long; corolla blue or rarely white, 3–4 cm. wide; lobes ovate-lanceolate: nutlets 4–5 mm. long, tubercled. — M. Occasional, on roadsides. Nat. of Eu. — Sum. — BORAGE.

10. **ECHIUM** [Tourn.] L. Biennial or perennial herbs. Corolla funnel-form, markedly irregular, the throat unappendaged. Free portion of the filaments elongate.

1. **E. vulgare** L. Plants 3–7 dm. tall, bristly-pubescent: leaf-blades linear-ob lanceolate below, linear to linear-lanceolate above, 2–15 cm. long; calyx-lobes linear to linear-lanceolate, becoming 8–12 mm. long; corolla blue or purplish, or rarely white; lobes 5–6 mm. long; style pubescent: nutlets about 3 mm. long, wrinkled. Common, in old fields and on roadsides. Nat. of Eu. — Sum. — VIPER'S-BUGLOSS. BLUE-DEVIL. BLUEWEED.

FAMILY 7. **VERBENACEAE.** VERVAIN FAMILY.

Herbs, shrubs, or trees. Stems commonly angled. Leaves alternate, opposite, or whorled: blades simple or rarely compound. Calyx of 4 or 5 partially or wholly united sepals. Corolla of 4 or 5 partially united petals, sometimes 2-lipped. Androecium of 2 or 4 stamens, the filaments more or less adnate to the corolla-tube. Gynoecium 2–4-carpellary, the style terminal. Fruit baccate or drupaceous or an aggregate of 2 or 4 nutlets.

Corolla nearly regular; lobes 5: fruit of 4 nutlets.

1. **VERBENA.**

Corolla 2-lipped; lobes 4: fruit of 2 nutlets.

2. **PHYLA.**

1. **VERBENA** [Tourn.] L. Annual, biennial, or perennial herbs. Leaf-blades entire, toothed or parted. Flowers in elongate, often very slender spikes, the bracts narrow. Calyx mainly tubular, 5-lobed. Corolla white or colored, salverform: lobes 5, unequal. Anthers unappendaged. Fruit an aggregate of 4, often narrow, nutlets filling the calyx. — Sum. — **VERBENA.** **VERVAIN.**

Bracts inconspicuous, shorter than the calyx or the corolla.

Spikes slender, continuous by the imbricate fruits.

Spikes sessile or nearly so: corolla-limb 8–9 mm. wide: plants densely soft-pubescent. 1. *V. stricta.*

Spikes peduncled: corolla-limb 2.5–6 mm. wide: plants sparingly pubescent or glabrous.

Leaf-blades lanceolate to ovate-lanceolate: nutlets smooth or nearly so. 2. *V. hastata.*

Leaf-blades linear-spatulate to linear: nutlets reticulate. 3. *V. angustifolia.*

Spikes very slender, becoming interrupted, the fruits, at least, not imbricate.

Leaf-blades merely toothed: corolla white. 4. *V. urticacifolia.*

Leaf-blades pinnately 1–2-cleft or incised: corolla purple or blue. 5. *V. officinalis.*

Bracts conspicuous, much longer than the calyx and corolla. 6. *V. bracteosa.*

1. **V. stricta** Vent. Perennial, 2–12 dm. tall, densely pale-pubescent: leaves 3–10 cm. long; blades suborbicular, oval, or oblong, serrate or incised: spikes

compact and stout: calyx becoming 5 mm. long: corolla deep-blue or purple; limb 8-9 mm. wide: nutlets oblong, 2.5 mm. long, or sometimes longer. — Frequent, in fields and on roadsides. Nat. of the West. — HOARY-VERBENA.

2. *V. hastata* L. Perennial, 4-15 dm. tall, roughish-pubescent: leaves 4-14 cm. long: blades lanceolate, oblong-lanceolate, or ovate-lanceolate, sharply serrate and often incised or hastate at the base: spikes relatively slender and compact: calyx becoming 2.5 mm. long: corolla violet-blue; limb 2.5-3.5 mm. wide: nutlets linear, 1.5-2 mm. long. — Common, in moist fields and meadows. — BLUE-VERBENA.

3. *V. angustifolia* Michx. Perennial, 1-5 dm. tall, puberulent or sparingly pubescent: leaves 2-12 cm. long; blades linear-spatulate to linear-oblong or linear, distantly or coarsely serrate: spikes slender: calyx becoming 4 mm. long: corolla blue or purple; limb 5-6 mm. wide: nutlets linear, 3 mm. long. — Common, in fields and on roadsides.

4. *V. urticaefolia* L. Annual or perennial, 4-15 dm. tall, pubescent; leaves 8-21 cm. long; blades broadly lanceolate to ovate-lanceolate, or sometimes ovate to oval, coarsely crenate-serrate: spikes loosely-fruited: calyx becoming 2.5 mm. long: corolla white; limb 3-4 mm. wide: nutlets oblong, 1.5-2 mm. long. — Common, in moist fields and meadows. — WHITE-VERBENA.

5. *V. officinalis* L. Annual, 2-6 dm. tall, glabrous or nearly so: leaves 2-6 cm. long; blades of the lower ones 1-2-pinnatifid and incised: spikes very slender: calyx 2 mm. long: corolla blue or purple; tube mostly less than 3 mm. long; lobes mainly rounded: nutlets broadly oblong, about 1.5 mm. long. — M. S. Not common, in fields and waste places. Nat. of Eu. — EUROPEAN-VERBENA.

6. *V. bracteosa* Michx. Annual, the prostrate or procumbent branches 1-5 dm. long, hirsute: leaves 1-6.5 cm. long; blades pinnatifid, 2-3 cm. long: spikes thick, sessile, continuous or mainly so: calyx becoming 3-4 mm. long: corolla purple or bluish; limb 2-2.5 mm. wide: nutlets linear, 2-2.5 mm. long. — S. Occasional, along railroad tracks. Nat. of the West.

2. **PHYLA** Lour. Perennial procumbent or creeping herbs. Leaf-blades toothed or lobed. Flowers in congested axillary spikes, the bracts cuneate to flabellate. Calyx short, flattened, 2-lobed. Corolla 2-lipped: tube scarcely exceeding the calyx. Fruit as broad as long.

1. *P. lanceolata* (Michx.) Greene. Branches creeping, 1-4 dm. long: leaf-blades elliptic-lanceolate to lanceolate, 1.5-5 cm. long: spikes 9-15 mm. long; bracts erose-ciliate: corolla about 3 mm. long. — Susquehanna valley. Frequent, on sandy islands and shores. — *Schists.* — Sum. — FROG'S-FRUIT.

FAMILY 8. PHRYMACEAE. LOPSEED FAMILY.

Perennial herbs, with angled stems. Leaves opposite: blades toothed. Flowers in slender spikes or spike-like racemes. Calyx of 5 partially united sepals, 2-lipped, the upper lip very short. Corolla white and magenta-finged, of 5 partially united petals, 2-lipped, the lower lip 3-lobed. Androecium of 4 didynamous stamens. Gynoecium of 2 united carpels, the style bent at the base. Fruit an achene included in the de-flexed aecrescent calyx.

1. **PHRYMA** L. Caulescent herbs with spreading branches. Leaf-blades broad, coarsely toothed, petioled. Spikes or racemes elongate, the small flowers opposite. Achene in the bottom of the calyx.

1. *P. Leptostachya* L. Stems 3-10 dm. tall, sparingly branched above, re-flexed-pubescent: leaf-blades ovate to elliptic-ovate or ovate-lanceolate, 3-15

cm. long: calyx 3-5 mm. long, accrescent; tube ribbed, little longer than the slender upper lobes during anthesis: corolla white and magenta-tinged, about 8 mm. long; achenes 4-5 mm. long.—Common, in woods and thickets.—Sum.—LOPSEED.

FAMILY 9. **LAMIACEAE.** MINT FAMILY.

Herbs or woody plants, often aromatic. Stems 4-sided. Leaves opposite or whorled: blades simple, entire, toothed, or lobed. Flowers perfect, in open or compact cymes. Calyx of 5 partly united sepals, regular or 2-lipped. Corolla of 5 partly united petals, 2-lipped or nearly regular. Androecium of 2 or 4 stamens, the pairs often unequal. Gynoecium 2-carpellary. Ovary 4-celled. Fruit of 4 nutlets included in the calyx.

Ovary of 2 united carpels, 4-lobed: style not basal: nutlets laterally attached.

Corolla very irregular; limb nearly 1-lipped, the upper lip very short.

1. **TEUCRUM.**

Corolla nearly regular or slightly 2-lipped, the lobes nearly equal.

Calyx nearly regular: stamens only slightly exerted, nearly equal.

2. **ISANTHUS.**

Calyx decidedly 2-lipped: stamens conspicuously exerted, didynamous.

3. **TRICHOSTEMA.**

Ovary of 4 distinct or nearly distinct carpellary lobes: style basal: nutlets basally attached.

Calyx with a crest on the upper side or on the upper lip: lips 2, entire.

4. **SCUTELLARIA.**

Calyx without a crest on the upper side: lips not entire. Stamens included.

Anther-sacs divergent.

5. **SIDERITIS.**

Anther-sacs contiguous and confluent.

6. **MARRUBIUM.**

Stamens exerted.

Corolla conspicuously 2-lipped; lips different, the upper concave.

Anther-bearing stamens 4.

Upper pair of filaments longer than the lower.

Anther-sacs parallel or nearly so.

7. **AGASTACHE.**

Anther-sacs diverging.

Calyx barely 2-lipped, with 5 nearly equal lobes: erect herbs.

8. **NEPETA.**

Calyx 2-lipped, with unequal lobes: trailing herbs.

9. **GLECOMA.**

Upper pair of filaments shorter than the lower.

Calyx manifestly 2-lipped.

10. **PRUNELLA.**

Calyx merely with 3-10 lobes.

Tube of the calyx faintly nerved, inflated at maturity.

11. **DRACOCEPHALUM.**

Tube of the calyx prominently 5-10-nerved, not inflated at maturity.

Nutlets 3-sided, truncate above.

12. **LAMIUM.**

Calyx-lobes not spine-tipped.

13. **LEONCRUS.**

Calyx-lobes spine-tipped.

Nutlets nearly terete, rounded above.

14. **STACHYS.**

Anther-bearing stamens 2.

Connective of the anther elongate, bearing a perfect sac at one end and a rudimentary one at the other.

15. **SALVIA.**

Connective short: anther-sacs confluent.

16. **MONARDA.**

Corolla regular, or if 2-lipped, the upper lip flat or not concave.

Flowers in axillary whorls or clusters; these sometimes forming terminal spike-like racemes or panicles.

Corolla 2-lipped.

Filaments curved, converging under the upper lip of the corolla.

17. **HEDEOMA.**

Anther-bearing stamens 2.

Anther-bearing stamens 4.

Corolla-tube strongly bent.

18. **MELISSA.**

- Corolla-tube straight.
 Calyx with 5 nearly equal lobes, not 2-lipped. 19. SATUREIA.
 Calyx 2-lipped. 20. CLINOPODIUM.
 Filaments straight, often spreading.
 Anther-bearing stamens 4.
 Anther-sacs divergent.
 Calyx equally 5-lobed: erect herbs. 21. ORIGANUM.
 Calyx 2-lipped: creeping herbs. 22. THYMUS.
 Anther-sacs parallel. 23. KOELLIA.
 Anther-bearing stamens 2. 24. CUNILA.
 Corolla regular with 4-5 lobes.
 Anther-bearing stamens 2: foliage not aromatic. 25. LYCOPUS.
 Anther-bearing stamens 4: foliage aromatic. 26. MENTHA.
 Flowers in loose terminal panicles.
 Stamens 2: lower lip of corolla fringed: native species. 27. COLLINSONIA.
 Stamens 4: lower lip of corolla not fringed: naturalized species. 28. PERILLA.

1. **TEUCRIUM** [Tourn.] L. Perennial strict herbs. Leaf-blades toothed. Flowers in raceme-like panicles. Calyx 2-lipped. Corolla mainly pink, very irregular: upper lip minute, split: lower lip 3-lobed, projecting beyond the upper one: tube relatively long. Stamens lying against the upper side of the corolla.

1. **T. canadense** L. Stem 2-12 dm. tall: leaf-blades relatively thin, ovate to oblong-ovate, 6-14 cm. long, pubescent beneath: calyx becoming 6-8 mm. long; lower lobes acuminate: corolla purplish or pink, 15-20 mm. long: nutlets about 2.5 mm. long, wrinkled. — Common, in fields and waste places, and on roadsides. — Sum. — WOOD-SAGE. GERMANDER.

2. **ISANTHUS** Michx. Annual herbs. Leaf-blades entire or sparingly toothed. Flowers in axillary cymes. Calyx nearly regular. Corolla nearly regular, the lobes spreading. Stamens slightly ascending.

1. **I. brachiatus** (L.) B.S.P. Plants 1-4 dm. tall, viscid-pubescent: leaf-blades elliptic to linear-elliptic, 1-4 cm. long: calyx becoming 5-6 mm. long; lobes lanceolate to triangular-lanceolate: corolla blue; lobes mainly ovate: nutlets 2-2.5 mm. long. — Susquehanna valley. Frequent, on low islands and shores. — *Schists.* — Sum. — FALSE-PENNYROYAL.

3. **TRICHOSTEMA** L. Annual or perennial herbs or shrubby plants. Leaf-blades entire or repand. Flowers in axillary cymes. Calyx very irregular, 2-lipped. Corolla somewhat 2-lipped, the upper lip longer and narrower than the lower lip. Stamens lying against the lower corolla-lip.

1. **T. dichotomum** L. Plants 1-20 dm. tall: leaf-blades oblong to oblong-lanceolate, 2-7 cm. long: calyx becoming 5-6 mm. long; lobes acuminate: corolla blue to white, about 5 mm. long: nutlets 1.5-2 mm. long. — Common, in dry fields. — Sum. — BASTARD-PENNYROYAL. BLUE-CURLS.

4. **SCUTELLARIA** L. Annual or perennial herbs or shrubby plants. Leaf-blades entire or toothed. Flowers axillary or in racemes. Calyx 2-lipped, the upper lip crested. Corolla blue, violet, pink, or white, with a long curved tube, 2-lipped, the upper lip arching. — SKULLCAP.

Nutlets wingless: fruit very slightly elevated on the small gynobase.
 Corolla less than 1 cm. long: flowers in secund elongating lateral racemes.

Corolla over 1 cm. long: flowers not in secund elongating racemes. 1. *S. lateriflora.*

Flowers in terminal racemes or panicles.

Leaves with toothed blades.

Corolla over 2 cm. long, copiously pubescent: seeds about 1 mm. long.

Corolla less than 2 cm. long, glabrous or nearly so: seeds about 2 mm. long.

Leaves, at least those above the middle of the stem, with entire blades.

Flowers solitary in the axils of leaf-like bracts.

Rootstock tuber-bearing: corolla less than 1.5 cm. long, thrice as long as the calyx or less, the upper lip much shorter than the lower.

Rootstock not tuber-bearing: corolla over 1.5 cm. long, several times as long as the calyx, the upper lip about equalling the lower.

Nutlets winged: fruit elevated on a slender gynobase.

2. *S. incana*.

3. *S. pilosa*.

4. *S. integrifolia*.

5. *S. parvula*.

6. *S. galericulata*.

7. *S. nervosa*.

1. *S. lateriflora* L. Plants erect or reclining, 2-10 dm. long, glabrous, or puberulent above: leaf-blades thinnish, ovate to ovate-lanceolate, 2-6 cm. long, coarsely serrate: calyx becoming 3-4 mm. long: corolla 6-7 mm. long: nutlets about 1 mm. long. — Common, in moist soil. — Sum. — MAD-DOG SKULLCAP.

2. *S. incana* Muhl. Plants 5-12 dm. tall, finely pubescent: leaf-blades 4-12 cm. long, serrate or crenate-serrate: calyx becoming 6-7 mm. long: corolla 15-20 mm. long; lower lip 6-8 mm. wide: nutlets 1.5 mm. long. — N. S. Not very common, in thickets. — Sandstones and shales, schists. — Sum.

3. *S. pilosa* Michx. Plants 1-6 dm. tall, finely pubescent: leaf-blades ovate, oval, or deltoid-ovate, 1.5-4.5 cm. long, coarsely crenate: calyx becoming about 5 mm. long: corolla 12-13 mm. long; lower lip 5-7 mm. wide: nutlets 1 mm. long. — Common, in woods and meadows. — Sum.

4. *S. integrifolia* L. Plants 2-6 dm. tall, softly pubescent: blades of the lower leaves ovate to oblong-ovate, coarsely crenate, those of the upper ones oblong to oblong-lanceolate or linear, entire: calyx becoming 6-7 mm. long: corolla 21-25 mm. long; lower lip shallowly notched: nutlets fully 1 mm. long. — Rather common, in pastures and thickets. — Early sum.

5. *S. parvula* Michx. Plants 0.5-3 dm. tall, glabrous or minutely pubescent: leaf-blades broadly ovate to lanceolate, 1-2 cm. long, shallowly toothed or entire: calyx becoming 5-6 mm. long: corolla about 11 mm. long; lower lip 4-4.5 mm. wide: nutlets 1 mm. long. — M. S. Common, in dry soil. — Limestones, quartzite, serpentine. — Early sum.

6. *S. galericulata* L. Plants 2-9 dm. long, sometimes finely pubescent: leaf-blades oblong-lanceolate to oblong, 2-6 cm. long, shallowly serrate: calyx becoming 6-7 mm. long: corolla 16-20 mm. long; lower lip about 5 mm. wide: nutlets 1.5-2 mm. long. — Not very common, in swamps. — Sum.

7. *S. nervosa* Pursh. Plants 1-4 dm. tall, minutely pubescent: leaf-blades suborbicular to oval, or lanceolate above, 2-4 cm. long, undulate or coarsely serrate: calyx becoming about 5 mm. long: corolla 9-12 mm. long, the lower lip about 5 mm. wide: nutlets 1-2 mm. long. — M. Rare, in woods. — Sandstones and shales, limestones. — Early sum.

5. **SIDERITIS** [Tourn.] L. Herbs or shrubs. Leaves opposite: blades entire or toothed. Flowers in axillary cymes. Calyx slightly 2-lipped: tube 5-10-ribbed: lobes spine-tipped, the middle one of the upper lip usually broader than the others. Corolla yellow, white, or pink, slightly longer than the calyx, 2-lipped: upper lip entire or lobed: lower lip longer, with a broad middle lobe. Nutlets obovoid.

1. *S. romana* L. Annual, softly pubescent, the stem and branches 0.5-3 dm. tall: leaf-blades obovate to oblong, 1-3 cm. long, crenate, sessile or nearly so: calyx 7-9 mm. long; lobes shorter than the tube, the middle one of the upper

lip ovate, all subulate-tipped: corolla white or pinkish, slightly exceeding the calyx; middle lobe of the lower lip reniform: nutlets fully 1 mm. long.—S. Rare, in fields. Nat. of Eu.—Spr.

6. MARRUBIUM [Tourn.] L. Perennial low or diffuse herbs. Leaf-blades toothed, often rugose. Flowers in dense axillary clusters. Calyx nearly regular, 10-lobed; lobes slender, spreading or recurved, sometimes unequal. Corolla 2-lipped: upper lip erect: lower lip spreading, the broad middle lobe much larger than the 2 lateral ones. Filaments scarcely longer than the anthers.

1. **M. vulgare** L. Plant 2-9 dm. tall, white-woolly: leaf-blades suborbicular, oval, or ovate, 1-4 cm. long, crenate, rugose: calyx 4-5 mm. long; lobes hooked: corolla white, 5-6 mm. long; upper lip deeply notched: nutlets about 2 mm. long.—Rather common, in waste places and on roadsides. Nat. of Eu.—Sum.—HOARHOUND.

7. AGASTACHE Clayt. Perennial tall herbs. Leaf-blades many-toothed, not rugose. Flowers many in dense panicles. Calyx nearly regular, scarcely ribbed, 5-lobed: lobes erect, the upper ones sometimes broader than the lower. Corolla 2-lipped: upper lip erect: lower lip with 2 small lateral lobes and a large spreading middle lobe. Filaments elongate.—Sum.—GIANT-HYSSOP.

Calyx-lobes barely acute: corolla greenish-yellow: bracts acute or acutish.

Calyx lobes acuminate: corolla purplish: bracts acuminate. 1. *A. nepetoides*.
2. *A. scrophulariaefolia*.

1. **A. nepetoides** (L.) Kuntze. Stems glabrous or nearly so, 1-2 m. tall: leaf-blades ovate to ovate-lanceolate, 5-12 cm. long: calyx 5-6 mm. long; lobes ovate or oblong-ovate: corolla 7-9 mm. long, slightly exceeding the calyx: nutlets minutely pubescent.—Common, in thickets and woods.

2. **A. scrophulariaefolia** (Willd.) Kuntze. Stems finely hirsute, 1-2 m. tall: leaf-blades ovate to ovate-lanceolate, or elliptic above: calyx 6-7 mm. long; lobes lanceolate: corolla 6-8 mm. long, much exceeding the calyx: nutlets hispidulous.—N. M. Frequent, in woods and fence-rows.—*Sandstones and shales, limestones.*

8. NEPETA L. Annual or perennial, erect or diffuse herbs. Leaf-blades toothed or incised. Flowers in axillary clusters which are sometimes borne in racemes. Calyx slightly irregular, 15-ribbed, 5-lobed: lobes relatively long, the upper lobes slightly longer than the lower. Corolla 2-lipped: upper lip erect: lower lip spreading, the larger middle lobe toothed. Filaments relatively long.

1. **N. Cataria** L. Plants pale-green, 3-11 dm. tall, closely pubescent: leaf-blades ovate to triangular-ovate, 4-7 cm. long, crenate or serrate-crenate, mostly cordate: calyx 5-6 mm. long; lobes subulate or lanceolate-subulate: corolla pale, 6-7 mm. long: nutlets about 1 mm. long.—Common, in waste places, and fields and on roadsides. Nat. of Eu.—Sum.—CAT-MINT. CATNIP.

9. GLECOMA L. Perennial creeping herbs. Leaf-blades toothed. Flowers in axillary clusters. Calyx slightly 2-lipped, 15-ribbed, 5-lobed: lobes unequal, relatively short. Corolla 2-lipped: upper lip erect: lower lip spreading, the large middle lobe notched. Filaments relatively short.

1. **G. hederacea** L. Plants dark-green, the branches 1-11 dm. long, hirsute: leaf-blades reniform to suborbicular, 2-4 cm. in diameter, coarsely crenate: calyx 5-7 mm. long; lobes subulate-tipped: corolla blue or white, 10-15 mm.

long: nutlets about 1.5 mm. long. — Common, near dwellings, in thickets and on hillsides. Nat. of Eu. — Spr. — GROUND-IVY. GILL-OVER-THE-GROUND.

10. PRUNELLA L. Perennial erect or diffuse herbs. Leaf-blades toothed or laciniate. Flowers mostly in compact panicles. Calyx 2-lipped: upper lip with 3 broad lobes: lower lip with 2 narrow lobes. Corolla 2-lipped: upper lip arched: lower lip with the broad middle lobe generally toothed. Filaments relatively long, 2 of them forked at the apex. — SELF-HEAL.

Leaf-blades entire or shallowly toothed: calyx over 10 mm. long: lobes of the lower lip subulate. 1. *P. vulgaris*.
Leaf-blades, at least the upper ones, pinnatifid: calyx less than 10 mm. long: lobes of the lower lip lanceolate. 2. *P. laciniata*.

1. *P. vulgaris* L. Stems 0.5–4 dm. long: leaf-blades ovate, oblong, or lanceolate, 2–7.5 cm. long, undulate: bracts mostly reniform: calyx 6–8 mm. long: lobes of the upper lip mucronate: corolla purple or white, mainly 14–18 mm. long: nutlets about 2 mm. long. — Common, in fields, thickets and waste places. Nat. of Eu. — Spr. and sum. — HEAL-ALL.

2. *P. laciniata* L. Plants similar to *P. vulgaris* in habit, but often hoary-pubescent: blades of the stem-leaves more or less pinnatifid: corolla white or pale. — M. S. Occasional, in fields and lawns. Nat. of Eu. — Sum.

11. DRACOCEPHALUM [Tourn.] L. Perennial, erect or reclining herbs. Leaf-blades typically narrow, usually toothed, at least near the apex. Flowers in spike-like racemes. Calyx essentially regular: lobes 5, shorter than the tube. Corolla 2-lipped: upper lip arched, entire: lower lip 3-lobed. Stamens 4: filaments elongate, one pair at least glabrous. [*Physostegia* Benth.] — Sum. — FALSE-DRAGON-HEAD.

Leaf-blades entire or bluntly toothed: stem naked above: lateral lobes of the lower corolla-lip often entire. 1. *D. denticulatum*.
Leaf-blades sharply toothed: stem leafy above: lateral lobes of the lower corolla-lip often toothed. 2. *D. virginianum*.

1. *D. denticulatum* Ait. Stems 3–9 dm. long: leaves few: blades spatulate to oblong, 2–14 cm. long, thick, repand-crenate, mostly obtuse: calyx-lobes deltoid: corolla 20–25 mm. long: nutlets about 2 mm. long. — Susquehanna valley. Occasional, on islands and shores. — *Schists*.

2. *D. virginianum* L. Stems 3–15 dm. long: leaves many: blades narrowly oblong to linear-oblong or oblong-lanceolate, 3–12 cm. long, thickish, saliently serrate or incised-serrate, mostly acuminate or acute: calyx-lobes lanceolate to ovate-lanceolate: corolla 25–30 mm. long: nutlets about 3 mm. long. — Susquehanna valley. Frequent, on low islands and shores. — *Schists*.

12. LAMIUM L. Annual, biennial (ours), or perennial, diffuse herbs. Leaf-blades broad, toothed or incised. Flowers in axillary cymes. Calyx somewhat irregular: lobes 5, the upper ones usually the larger. Corolla blue or white, 2-lipped: upper lip entire or merely notched: lower lip 3-lobed, the middle lobe with a dilated blade, the lateral lobes with slender tips. Stamens 4: filaments pubescent. — DEAD-NETTLE.

Leaf-blades sessile or partly clasping on the upper part of the stem: corolla abruptly bent at the throat: lateral lobes of the lower lip rounded. 1. *L. amplexicaule*.
Leaf-blades petioled on the upper part of the stem: corolla curved at the throat: lateral lobes of the lower lip lobed. 2. *L. purpurcum*.

1. *L. amplexicaule* L. Stems and branches decumbent, sparingly retrorse-pubescent: leaf-blades suborbicular to orbicular-reniform, 1–3.5 cm. wide,

crenate-lobed: calyx becoming 5-6 mm. long: corolla purple, 13-17 mm. long; tube slender, the lower lip with mucronate lateral lobes and a cuneate middle lobe: nutlets slender, less than 1 mm. wide. Common, in cultivated and waste grounds. Nat. of Eu. — Spr.-fall. — HENBIT.

2. **L. purpureum** L. Stem and branches finely pubescent, the branches often creeping: leaf-blades ovate, orbicular or reniform, 1-3 cm. long, crenate, cordate at the base, mostly long-petioled: calyx becoming 9-11 mm. long; lobes lanceolate-subulate, about as long as the tube: corolla purple or purplish, 11-15 mm. long; tube stout, straight, the lower lip with a reniform middle lobe: nutlets stout, fully 1 mm. wide. — M. Occasional, in shaded places. Nat. of Eu. — Sum. — DEAD-NETTLE.

13. **LEONURUS** L. Annual, biennial, or perennial, erect herbs. Leaf-blades broad, toothed or parted. Flowers in dense axillary cymes. Calyx somewhat irregular: lobes firm, slender. Corolla 2-lipped, not curved: upper lip erect or nearly so: lower lip 3-lobed, the middle lobe much larger than the lateral ones. Stamens 4: filaments pubescent. — Sum. — MOTHERWORT.

Calyx much shorter than the corolla: corolla purple, pubescent within: blades of the lower cauline leaves lobed. 1. *L. Cardiaca*.
Calyx as long as the corolla: corolla pink, glabrous within: blades of the lower cauline leaves coarsely toothed. 2. *L. Marrubiastrium*.

1. **L. Cardiaca** L. Perennial, 3-12 dm. tall: leaf-blades orbicular to oblong, 2-10 cm. long, the lower ones palmately 3-5-lobed, with incised-serrate divisions, upper ones 3-lobed or entire: calyx-lobes exceeded by the corolla: corolla 9-10 mm. long: filaments villous. — Common, in waste places and on roadsides. Nat. of Eu.

2. **L. Marrubiastrium** L. Biennial, 5-15 dm. tall: leaf-blades ovate to oblong-ovate, 2.5-7.5 cm. long: calyx-lobes equalling the corolla: corolla 7-8 mm. long: filaments puberulent. — S. Occasional, on shaded banks of the Octoraro Creek. Nat. of Eu.

14. **STACHYS** [Tourn.] L. Annual or (ours) perennial, erect or spreading herbs. Leaf-blades entire or toothed. Flowers in continuous or interrupted panicles. Calyx nearly regular: lobes 5, shorter than the tube. Corolla mainly purple, 2-lipped: upper lip erect: lower lip spreading, 3-lobed, the middle lobe somewhat larger than the lateral ones. Stamens 4, all anther-bearing: anthers short. — Sum. — HEDGE-NETTLE.

Leaf-blades narrowed at the base. 1. *S. ambigua*.
Leaf-blades, all or some of them, cordate or truncate at the base. Foliage copiously pubescent: corolla-tube slightly longer than the calyx: calyx-lobes slender-subulate. 2. *S. palustris*.
Foliage glabrous or almost so: corolla-tube much longer than the calyx: calyx-lobes lanceolate or triangular-lanceolate. Inflorescence glabrous or nearly so: calyx-lobes glabrous or nearly so, ultimately lax: upper corolla-lip essentially glabrous and ciliate. 3. *S. tenuifolia*.
Inflorescence bristly-pubescent: calyx-lobes copiously pubescent, permanently erect: upper corolla-lip pubescent and ciliate. 4. *S. aspera*.

1. **S. ambigua** (A. Gray) Britton. Stems 3-10 dm. tall, hirsute: leaf-blades narrowly oblong to oblong-lanceolate, 3-6 cm. long, pubescent: calyx 6-8 mm. long; lobes lanceolate, as long as the tube or nearly so: corolla 11-13 mm. long: nutlets over 2 mm. long. — Susquehanna valley. Occasional, on the river shore. — *Schists*.

2. **S. palustris** L. Stems 1 m. tall or less, hirsute: leaf-blades lanceolate, oblong-lanceolate, or ovate-lanceolate, 4-10 cm. long, mostly acute or acumi-

nate, crenate-serrate, truncate or subcordate at the base, sessile or those of the lower leaves short-petioled: calyx 6-8 mm. long, finely hirsute; lobes shorter than the tube, slender-subulate, spine-tipped, diverging in age: corolla 13-16 mm. long, about twice as long as the calyx: nutlets about 2 mm. long, smooth. — *M.* Occasional, in wet soil. — *Limestones*.

3. *S. tenuifolia* Willd. Stems 3-9 dm. tall, glabrous or nearly so; leaf-blades mainly oblong to oblong-lanceolate, 3-10 cm. long, serrate: calyx 6-7 mm. long, sometimes sparingly pubescent; lobes lanceolate, as long as the tube or nearly so: corolla 10-12 mm. long; nutlets about 2 mm. long. — *S.* Occasional, in moist thickets. — *Schists*.

4. *S. aspera* Michx. Stems 5-12 dm. tall, hirsute: leaf-blades oblong, oblong lanceolate, or ovate-oblong, 3-10 cm. long, crenate-serrate: calyx 6-8 mm. long, hirsute; lobes triangular-lanceolate, shorter than the tube: corolla mainly 12-15 mm. long; nutlets about 2 mm. long. — Common, in thickets.

15. **SALVIA** [Tourn.] L. Annual or perennial, herbs, or woody plants. Leaf-blades entire, toothed, or lobed. Flowers in interrupted or continuous panicles. Calyx short, 2-lipped: upper lip 3-lobed: lower lip 2-lobed. Corolla 2-lipped: lower lip 3-lobed, the middle lobe much larger than the lateral ones. Stamens 4, but only 2 anther-bearing, or only 2: each filament surmounted by a transverse connective, one end of which bears a long anther. Stigmas very unequal. — *SAGE*.

1. *S. lyrata* L. Stems 1-6 dm. tall, scape-like, pilose or hirsute: leaves mainly basal: blades spatulate, oblanceolate, oblong, or oval, 5-20 cm. long, lyrate-pinnatifid: calyx 9-11 mm. long, hirsute; lower lobes lanceolate: corolla blue-purple, 20-25 mm. long; nutlets granular. — Common, in fields and thickets. — Early sum. — *LYRE-LEAVED SAGE*.

16. **MONARDA** L. Shrubs, or perennial erect herbs. Leaf-blades toothed. Flowers in remote or approximate dense cymes. Calyx elongate, nearly regular: lobes 5, slender, shorter than the tube. Corolla 2-lipped, elongate: upper lip narrow, erect or arched: lower lip 3-lobed, the middle lobe much longer than the lateral ones. Stamens 2: filaments elongate: anthers with divergent sacs. — Sum. — *HORSE-MINT*.

Calyx glabrous in the throat or nearly so: corolla scarlet, mostly more than 3 cm. long.

Calyx bearded in the throat: corolla white, pink or purple, mostly less than 3 cm. long. 1. *M. didyma*.
Corolla white, greenish or greenish-pink; upper lip sparingly pubescent. 2. *M. clinopodia*.
Corolla pink, purplish, or lilac; upper lip copiously pubescent. 3. *M. fistulosa*.

1. *M. didyma* L. Stems 3-12 dm. tall, sometimes sparingly pubescent: leaf-blades lanceolate or oblong-lanceolate to ovate, 8-15 cm. long, serrate: heads showy: calyx 7-11 mm. long; lobes subulate: corolla 35-50 mm. long; middle lobe of the lower lip acute. — *S.* Occasional, on roadsides. Nat. of the South. — *BEE-BALM*. *OSWEGO-TEA*.

2. *M. clinopodia* L. Stems 3-8 dm. tall, glabrous or sparingly pubescent: leaf-blades ovate to lanceolate, 3-12 cm. long, serrate: bracts pale: calyx 7-9 mm. long, somewhat bearded in the throat; lobes short-subulate: corolla 24-28 mm. long; lower lip with rounded lateral lobes: nutlets fully 1 mm. long. — Rather rare, in moist thickets.

3. *M. fistulosa* L. Stems 5-12 dm. tall, villous or villous-hirsute: leaf-blades ovate to lanceolate, 2-12 cm. long, remotely sharp-serrate: bracts usually colored: calyx 8-12 mm. long, copiously bearded in the throat; lobes long-subulate: corolla 30-34 mm. long; lower lip with acute lateral lobes: nutlets

fully 1.5 mm. long.—Common, in dry fields and on roadsides.—WILDBERGAMOT.

17. **HEDEOMA** Pers. Annual or perennial, often diffuse herbs. Leaf-blades entire or sparingly toothed. Flowers in remote or contiguous axillary cymes. Calyx 2-lipped, sometimes obscurely so: lobes of the upper lip broader and shorter than those of the lower lip. Corolla 2-lipped: upper lip sometimes notched: lower lip 3-lobed, commonly broader than the lateral ones. Stamens 2, accompanied by 2 more or less reduced ones. One stigma obsolete.—MOCK-PENNYROYAL.

1. **H. pulegioides** (L.) Pers. Plants very fragrant: stems 1-4 dm. tall, finely pubescent: leaf-blades oval-elliptic to oblong, 9-20 mm. long, sparingly serrate: calyx becoming 4-5 mm. long; tube strongly ribbed: corolla 4-5 mm. long, bluish.—Common, in dry fields and open woods.—Sum.—PENNYROYAL. AMERICAN-PENNYROYAL.

18. **MELISSA** [Tourn.] L. Perennial, erect herbs. Leaf-blades broad, toothed. Flowers in axillary clusters. Calyx 2-lipped, the broad upper lip with 3 minute lobes, the 2 lobes of the lower lip slender. Corolla 2-lipped: upper lip mostly notched: lower lip 3-lobed, the middle lobe very broad. Stamens 4, exerted.—BALM.

1. **M. officinalis** L. Plant lemon-scented, 3-9 dm. tall: leaf-blades ovate to ovate-oblong, 2-8 cm. long, crenate-serrate: calyx ringent, 7-8 mm. long; upper lip curved upward: corolla white or cream-colored, about 10 mm. long: nutlets fully 1.5 mm. long.—Common, on roadsides and in waste places. Nat. of Eu.—Sum.—BEE-BALM. LEMON-BALM.

19. **SATUREIA** [Tourn.] L. Annual or perennial herbs, or partially woody plants. Leaf-blades mostly entire. Cymes axillary or in terminal spike-like panicles. Calyx campanulate, slightly 2-lipped, the lobes of the upper lip slightly broader than those of the lower. Corolla 2-lipped: upper lip notched: lower lip with 3 broad lobes. Stamens 4: stigmas short.—SAVORY.

1. **S. hortensis** L. Plants 1-4 dm. tall, the branches minutely pubescent: leaf-blades linear-spatulate to linear, 1-2.5 cm. long, entire: inflorescence with spreading bracts similar to the upper leaves but smaller: panicles short: calyx 2.5-3.5 mm. long; lobes lanceolate or subulate-lanceolate, about as long as the tube: corolla white to deep-pink, 3-4 mm. long, the lobes rounded or retuse: nutlets fully 1 mm. long.—M. Occasional, in waste places and on roadsides. Nat. of Eu.—Sum.—SUMMER-SAVORY.

20. **CLINOPODIUM** L. Annual or perennial herbs or woody plants. Leaf-blades entire or toothed. Flowers in sessile or peduncled axillary cymes. Calyx cylindrical or tubular, 2-lipped, the upper lip with 3 short lobes, the lower lip with 2 long, narrow lobes. Corolla 2-lipped: upper lip sometimes notched: lower lip 3-lobed. Stamens 4: anthers awnless.

1. **C. vulgare** L. Stems 1-5 dm. tall, hirsute: blades of the upper leaves ovate to ovate-lanceolate, 1-4 cm. long, undulate or crenate: calyx becoming 8-9 mm. long, villous-hirsute: corolla white or purple, 11-13 mm. long; middle lobe of the lower lip broadened upward: nutlets about 1 mm. long.—Common, in thickets and open places.—Sum.—BASIL.

21. **ORIGANUM** [Tourn.] L. Perennial herbs, or partially woody plants. Leaf-blades broad, often notched. Cymes mostly borne in corymbs. Calyx

stout, nearly equally 5-lobed. Corolla 2-lipped: upper lip broad, slightly lobed; lower lip with 3 rather broad lobes. Stamens 4. Stigmas short.

1. **O. vulgare** L. Stems mostly simple below, sparingly branched above, villous-hirsute: leaf-blades ovate, mostly 1.5-2.5 cm. long, shallowly toothed: calyx 2-2.5 mm. long; lobes ovate, longer than the tube: corolla purple or rarely white, 6-7 mm. long; lobes of the upper lip rounded, the lateral lobes of the lower lip broadly ovate: nutlets less than 1 mm. long.—M. S. Frequent, on roadsides and in fields. Nat. of Eu.—Sum.—WILD-MARJORAM.

22. **THYMUS** [Tourn.] L. Perennial depressed or creeping herbs. Leaf-blades short, mostly entire. Flowers in axillary cymes or raceme-like panicles. Calyx 2-lipped, the upper lip with 3 short lobes, the lower lip with 2 longer lobes. Corolla 2-lipped: upper lip erect: lower lip 3-lobed, the middle lobe scarcely larger than the lateral ones. Stamens 4. Stigmas long.—THYME.

1. **T. Serpyllum** L. Plants fragrant, forming depressed mats: leaf-blades oblong to oval or ovate, 3-10 mm. long: calyx becoming 3.5-4 mm. long; lobes of the lower lip about as long as the tube: corolla purplish, about as long as the calyx: nutlets less than 1 mm. long.—M. Occasional on roadsides and in fields. Nat. of Eu.—Sum.—CREEPING-THYME.

23. **KOELLIA** Moench. Perennial erect herbs. Leaf-blades entire or shallowly toothed. Flowers in dense axillary and terminal cymes. Calyx nearly regular, the lobes short or elongate. Corolla 2-lipped: upper lip erect: lower lip 3-lobed, the middle lobe larger than the lateral ones. Stamens 4.—Sum.—MOUNTAIN-MINT. HORSE-MINT. BASIL.

Calyx not 2-lipped; lobes equal or nearly so.

Calyx-lobes triangular or ovate-triangular.

Calyx-lobes subulate to lanceolate.

Leaf-blades or most of them over 3 times as long as broad.

Leaves with strictly entire blades.

Leaves, or the larger ones, with toothed blades.

Flower-clusters 1-2 cm. broad at maturity, compact: calyx-lobes not bristly.

Flower-clusters 2-3 cm. broad at maturity, not crowded: calyx-lobes bristly.

Leaf-blades or most of them less than 3 times as long as broad.

Calyx manifestly 2-lipped by the partial union of the 3 upper lobes.

1. *K. virginiana*.

2. *K. flexuosa*.

3. *K. verticillata*.

4. *K. clinopodioides*.

5. *K. nutica*.

6. *K. incana*.

1. **K. virginiana** (L.) Britton. Stems 4-9 dm. tall, minutely pubescent: leaf-blades lanceolate to linear-lanceolate, 2-5 cm. long, mostly entire: calyx 3.5-4 mm. long; lobes triangular to ovate-triangular: corolla 6-7 mm. long; upper lip notched; middle lobe of the lower lip slightly narrower than the lateral ones.—Common, in thickets.

2. **K. flexuosa** (Walt.) MacM. Stems 3-8 dm. tall, glabrous: leaf-blades narrowly linear to linear-filiform, 1-4 cm. long, entire: calyx about 3.5 mm. long; lobes lanceolate to triangular-lanceolate: corolla 6-7 mm. long; upper lip minutely notched; middle lobe of the lower lip much narrower than the lateral ones.—Common, in dry soil, fields and thickets.

4. **K. clinopodioides** (T. & G.) Kuntze. Stems 4-12 dm. tall, softly-pubescent: leaf-blades lanceolate to almost linear, 2-6 cm. long, remotely or shallowly serrate: calyx 4-5 mm. long; lobes subulate-lanceolate: corolla 6-7 mm. long, or rarely longer.—Susquehanna valley. Occasional, in open thickets and woods.—*Schists*.

4. **K. clinopodioides** (T. & G.) Kuntze. Stems 4-12 dm. tall, softly-pubescent: leaf-blades lanceolate, narrowly oblong, or elliptic, 2-8 cm. long, more or less

serrate: calyx 4-4.5 mm. long; lobes lanceolate-subulate, nearly $\frac{1}{2}$ as long as the tube: corolla about 6 mm. long. — W. S. Frequent, in open woods and dry thickets. — *Schists*.

5. *K. mutica* (Michx.) Britton. Stems 6-10 dm. tall, finely pubescent: leaf-blades thick, ovate to lanceolate, 2-6 cm. long, serrate: calyx 3.5-4 mm. long; lobes deltoid to triangular-lanceolate, very short: corolla 6-8 mm. long: filaments short. — Susquehanna valley. Occasional, in open woods and thickets. — *Schists*.

6. *K. incana* (L.) Kuntze. Stems 5-12 dm. tall, softly-pubescent and often hirsute: leaf-blades ovate, elliptic, or lanceolate, 3-10 cm. long, remotely serrate: calyx 3.5-4 mm. long; lobes narrowly triangular to triangular-lanceolate: corolla 7-8 mm. long. — Common, in dry thickets and open woods.

24. **CUNILA** L. Perennial erect herbs, or woody plants. Leaf-blades broad, entire or toothed. Flowers in axillary cymes. Calyx nearly regular, the lobes shorter than the tube. Corolla 2-lipped: upper lip erect: lower lip 3-lobed. Stamens 2, long-exserted.

1. *C. origanoides* (L.) Britton. Stem 2-4 dm. tall, wiry: leaf-blades ovate to ovate-lanceolate, 1.5-2.5 cm. long, serrate: calyx 2-2.5 mm. long; lobes ovate to deltoid: corolla purplish, 4-5 mm. long. — N. S. Common, in woods and thickets, and on open hillsides. — *Sandstones and shales, schists*. — Sum. — DITTANY.

25. **LYCOPUS** [Tourn.] L. Perennial, erect or creeping, often stoloniferous herbs. Leaf-blades entire, toothed, or pinnatifid. Flowers in dense axillary cymes. Calyx regular or nearly so: lobes longer than the tube or shorter. Corolla slightly 2-lipped: upper lip notched: lower lip nearly equally 3-lobed. Stamens 2. — Sum. — BUGLE-WEED. WATER-HOARHOUND.

Corolla much longer than the calyx: blades of the lower leaves not pinnatifid.
Calyx-lobes much shorter than the tube, obtuse or merely acute: nutlets longer than the calyx-lobes.

Style included: middle lobe of the lower lip of the corolla scarcely wider than the lateral ones.

Style exserted: middle lobe of the lower lip of the corolla much wider than the lateral ones.

Leaves with very short or obsolete petioles; blades thick or firm.

Leaves with slender petioles; blades thin.

Calyx-lobes as long as the tube or longer, acuminate: nutlets shorter than the calyx-lobes.

Corolla scarcely, if at all, longer than the calyx: blades of the lower leaves pinnatifid.

1. *L. virginicus*.

2. *L. uniflorus*.

3. *L. membranaceus*.

4. *L. sessilifolius*.

5. *L. americanus*.

1. *L. virginicus* L. Stems 1-8 dm. tall, purplish or greenish-purple, obtuse-angled, not tuberous at the base, but with tuber-bearing stolons: leaf-blades ovate to oblong-ovate or elliptic, 2-14 cm. long, coarsely toothed, manifestly petioled: calyx about 2 mm. long; lobes narrow. — Common, in pastures and rather moist soil.

2. *L. uniflorus* Michx. Stems 1-8 dm. tall, green or sometimes purplish, sharp-angled, tuberous at the base, the stolons rarely tuber-bearing: leaf-blades oblong to oblong-lanceolate, 2-8 cm. long, serrate, sessile or nearly so: calyx about 1.5 mm. long; lobes wide. [*L. communis* Bicknell.] — S. Occasional, in thickets along the Pequea Creek. — *Schists*.

3. *L. membranaceus* Bicknell. Stems 2-9 dm. tall, mostly green, often blunt-angled, tuberous at the base, the stolons wanting or sparingly developed: leaf-blades lanceolate, oblong-lanceolate, or ovate-lanceolate, 4-11 cm. long, sharply serrate, decidedly petioled: calyx 1.5-2 mm. long; lobes rather broad. — S. Occasional, in moist thickets. — *Schists*.

4. *L. sessilifolius* A. Gray. Stems 2-6 dm. tall: leaf-blades ovate to oblong or lanceolate, 1.5-6 cm. long, shallowly serrate: calyx 2-2.5 mm. long; lobes as long as the tube: lower corolla-lip with a reniform notched middle lobe: filaments pubescent at the base. — Rare, in low grounds.

5. *L. americanus* Muhl. Stems 1-9 dm. tall, often much-branched: leaf-blades lanceolate to ovate-lanceolate, 2-10 cm. long, those on the lower part of the stem pinnatifid, those near the top merely toothed: calyx 2.5-3 mm. long; lobes rather shorter than the tube: corolla about as long as the calyx: staminodia thickened at the tip. — Common, in moist thickets and pastures.

26. **MENTHA** [Tourn.] L. Perennial erect or diffuse herbs. Leaf-blades toothed or incised. Flowers in dense axillary cymes, these sometimes disposed in spike-like panicles. Calyx nearly regular, the lobes shorter than the tube. Corolla obscurely 2-lipped: upper lip mostly notched: lower lip of 3 nearly equal lobes. Stamens 4. — Sum. — MINT.

Flower-clusters all axillary.

Upper leaves or bracts subtending the flower-clusters much smaller than the lower leaves. 1. *M. Cardiaca*.

Upper leaves or bracts subtending the flower-clusters only slightly smaller than the lower leaves.

Stem and branches glabrous or with short scattered hairs: calyx glabrous or nearly so, except for the ciliate lobes. 2. *M. gentilis*.

Stem and branches with retrorse or spreading hairs: calyx pubescent all over.

Stem and branches with short retrorse or retrorse-appressed hairs: larger calyx-lobes deltoid; calyx-tube closely pubescent with short hairs. 3. *M. arvensis*.

Stem and branches with long lax or spreading hairs: larger calyx-lobes typically lanceolate: calyx-tube loosely pubescent with long hairs. 4. *M. canadensis*.

Flower-clusters, at least most of them, aggregated in terminal spike-like panicles.

Flowers in short and stout raceme-like panicles, or clustered in the upper leaf-axils: longer calyx-lobes decidedly shorter than the tube: leaf-blades petioled. 5. *M. piperita*.

Flowers in slender or relatively slender, often elongate spike-like panicles: longer calyx-lobes as long as the tube or nearly so: leaf-blades sessile.

Stem and inflorescence not canescent: calyx-tube glabrous or nearly so: corolla-tube not exceeding the calyx. 6. *M. viridis*.

Stem and inflorescence canescent: calyx-tube copiously pubescent: corolla-tube much exceeding the calyx. 7. *M. atopocucroides*.

1. *M. Cardiaca* Gerarde. Stems 1.5-5 dm. tall, finely pubescent: leaf-blades lanceolate, oblong-lanceolate, or ovate, 1-5 cm. long, sharply serrate, sometimes incised, the floral ones conspicuously reduced: calyx 1.5-2 mm. long; tube finely pubescent: corolla pink, 4-5 mm. long. — Rather common, in waste grounds. Nat. of Eu.

2. *M. gentilis* L. Stems 2-7 dm. tall, glabrous or nearly so: leaf-blades oval, ovate, obovate, or elliptic, 1.5-5 cm. long, serrate, the floral ones not conspicuously reduced, with petioles often longer than the flower-clusters: calyx 1.5-2 mm. long; tube glabrous or nearly so: corolla deep-pink or lilac; upper lip notched. — M. Common, in waste places and on roadsides. Nat. of Eu.

3. *M. arvensis* L. Plant 4 dm. tall or less, often diffuse, the stem copiously, often closely pale-pubescent: leaf-blades ovate, oblong, or oval, 1.5-5 cm. long, coarsely serrate above the middle, copiously pubescent with short hairs, broad at the base: calyx 1.5-2 mm. long, minutely pubescent; lobes short-tipped: corolla usually pink, mostly 3 mm. long, the upper lip mostly notched. — M. Frequent, in and about swamps. Nat. of Eu.

4. *M. canadensis* L. Stems 2-6 dm. tall, loosely pubescent: leaf-blades lanceolate, oblong, elliptic, or oblong-lanceolate, 2-7 cm. long, serrate, narrow-based,

the floral ones with petioles as long as the flower-clusters: calyx about 2.5-3 mm. long; tube loosely pubescent: corolla pink or white; upper lip mostly obtuse. — Common, in low sandy places.

5. *M. piperita* L. Stems 2-7 dm. tall, glabrous: leaf-blades oblong, oval, oblong-lanceolate, or oblong-ovate, 1.5-5 cm. long, sharply serrate: calyx 2.5-3 mm. long; lobes much shorter than the cylindric-campanulate tube: corolla deep-pink, 3.5-4 mm. long. — Common, in waste places and on roadsides. Nat. of Eu. — PEPPERMINT.

6. *M. spicata* L. Stems 2-5 dm. tall, glabrous or nearly so: leaf-blades oblong, elliptic, or elliptic-lanceolate, 3-6 cm. long, sharply serrate: calyx 1-1.5 mm. long; lobes about as long as the campanulate tube: corolla pale-pink, 2-2.5 mm. long. — Common, in waste places and fields. Nat. of Eu. — SPEARMINT.

7. *M. alopecuroides* Hull. Stems 1 m. tall or less, finely retrorse-pubescent: leaf-blades ovate or oval, varying to orbicular, 2.5-9 cm. long, coarsely dentate-serrate, finely pale-pubescent on both sides, rounded-truncate or subcordate at the base: panicles branched, continuous, nearly 1.5 cm. thick: calyx fine-pubescent, 2-2.3 mm. long; lobes subulate, about as long as the tube: corolla white, 4.5-5 mm. long. — M. S. Occasional, on roadsides and in fields. Nat. of Eu.

27. *COLLINSONIA* L. Perennial erect herbs. Leaf-blades toothed. Flowers in panicles. Calyx 2-lipped: upper lip with 3 short lobes: lower lip with 2 longer lobes. Corolla 2-lipped, elongate. Stamens 2, exserted.

1. *C. canadensis* L. Stems erect, 3-9 dm. tall, from a thick hard root: leaf-blades thickish, oblong, elliptic, or oval, 9-16 cm. long, rather coarsely dentate-serrate: calyx becoming 5-7 mm. long: corolla about 1.5 cm. long, yellowish: nutlets obscurely reticulate, nearly 2 mm. in diameter. — Common, in moist woods and thickets. — Sum. — HORSE-BALM. STONE-ROOT.

28. *PERILLA* L. Annual erect herbs. Leaf-blades often coarsely toothed. Flowers in spike-like panicles. Calyx 2-lipped: upper lip with 3 broad lobes: lower lip with 2 longer lobes. Corolla slightly 2-lipped: upper lip broad: lower lip 3-lobed, the middle lobe the largest. Stamens 4, included.

1. *P. frutescens* (L.) Britton. Stems 2-6 dm. tall, minutely pubescent: leaf-blades ovate or oval, 4-10 cm. long, serrate or crenate-serrate: calyx 2-2.5 mm., becoming 6 mm. long; lower lobes lanceolate: corolla 3-3.5 mm. long, white, with a ring of hairs within; lobes obtuse: nutlets prominently reticulate, nearly 1.5 mm. in diameter. — Occasional, near dwellings and on roadsides. Nat. of As. — Sum.

FAMILY 10. RHINANTHACEAE. FIGWORT FAMILY.

Herbs, shrubs, or trees. Stems commonly terete. Leaves opposite or whorled, or alternate: blades entire, toothed, or divided. Flowers perfect, axillary, or spicate or racemose. Calyx regular or rarely 2-lipped, of 4 or 5 more or less united sepals. Corolla mostly irregular, of 4 or 5 partially united petals. Androecium of 4, usually didynamous stamens, the fifth one often represented by a staminodium. Gynoecium 2-carpellary. Ovary 2-celled. Fruit capsular or rarely baccate.

Upper lip, or lobes, of the corolla external in the bud (except in *Mimulus*), or wanting.

Leaves prevailing alternate.

Leaves prevailing opposite.

Corolla-tube with a spur or sac on the lower side near the base.

1. VERBASCUM.

- Leaf-blades palmately veined and palmately lobed. 2. CYMBALARIA.
 Leaf-blades pinnately veined and entire. 3. LINARIA.
 Corolla-tube with neither spur nor sac.
 Filaments 5, 4 anther-bearing, 1 sterile (staminodium)
 and different from the others.
 Staminodium a scale, adnate to the upper side of
 the corolla-tube; corolla short, with 4 erect lobes. 4. SCROPHULARIA.
 Staminodium elongate; corolla long.
 Filaments longer than the staminodium: seeds
 winged. 5. CHELONE.
 Filaments shorter than the staminodium: seeds
 wingless. 6. PENTSTEMON.
 Filaments 2 or 4.
 Trees: flowers large, in large panicles: corolla
 decurved. 7. PAULOWNIA.
 Herbs: flowers small, not in panicles: corolla not
 decurved.
 Anther-bearing filaments 4, or rarely 3. 8. MIMULUS.
 Anther-bearing filaments 2.
 Filaments short and stout, or almost
 wanting.
 Filaments elongate and slender. 9. GRATIOLA.
 10. ILYSANTHES.
 Lower lip, or lobes, of the corolla external in the bud.
 Sepals distinct or essentially so.
 Corolla rotate or campanulate: stamens not surpassing
 the corolla-lobes. 11. VERONICA.
 Corolla tubular and somewhat salverform: stamens
 exerted. 12. LEPTANDRA.
 Sepals almost wholly, or only partially, united into a tube.
 Corolla various, but only slightly 2-lipped: stamens not
 ascending under the upper lip.
 Corolla funnelliform: capsule exerted.
 Anther-sacs awned at the base: corolla yellow. 13. DASYSTOMA.
 Anther-sacs awnless: corolla rose-purple, pink, or
 white. 14. AGALINIS.
 Corolla salverform: capsule mostly in the calyx. 15. BUCHNERA.
 Corolla strongly 2-lipped: stamens ascending under the
 upper lip.
 Anther-sacs unlike, the inner pendulous. 16. CASTILLEJA.
 Anther-sacs alike, parallel.
 Ovules 1-2 in each cavity of the ovary: capsules
 1-4-seeded. 17. MELAMPYRUM.
 Ovules several to many in each cavity: capsules
 many-seeded. 18. PEDICULARIS.

1. **VERBASCUM** [Tourn.] L. Annual, biennial, or perennial herbs. Leaf-blades entire, toothed, or pinnatifid, sometimes decurrent. Flowers in spikes, racemes, or panicles. Calyx-lobes 5. Corolla slightly irregular: lobes longer than the tube, the lower lobes larger than the upper. Stamens 5, exerted. Style declined. Capsule oblong to subglobose.—Sum. and fall.—MULLEN.

Stem glabrous or mostly glandular above: racemes interrupted: capsule subglobose or depressed. 1. *V. Blattaria*.

Stem densely pubescent: racemes continuous, at least above: capsule ovoid or oblong.

Stem angled: leaf-blades crenate: capsules 4-6 mm. long. 2. *V. Lychnitis*.

Stem winged: leaf-blades entire: capsules 7-10 mm. long. 3. *V. Thapsus*.

1. **V. Blattaria** L. Stems 4-12 dm. tall, sometimes glandular above: leaf-blades narrowly elliptic or elliptic-lanceolate on the lower part of the stem, elliptic or lanceolate above, crenate: pedicels glandular: calyx-lobes linear to linear-elliptic, 4.5-6.5 mm. long: corolla white or yellow, 3-4 cm. wide: capsule globose or depressed, 6-8 mm. in diameter.—Common, in old fields and on roadsides. Nat. of Eu.—MOTH-MULLEN.

2. **V. Lychnitis** L. Stems 8-20 dm. tall, tomentose with short hairs: leaf-blades narrowly elliptic or elliptic-lanceolate on the lower part of the stem, elliptic or lanceolate above, crenate: pedicels tomentulose: calyx-lobes lanceolate to linear-lanceolate, 2.5-3.5 mm. long: corolla yellow; longer lobe 4-6 mm. long: capsules oblong or ovoid-oblong, 4-6 mm. long, much exceeding the calyx.—N. Rare, in thickets and on roadsides. Nat. of Eu.—WHITE-MULLEN.

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3. **V. Thapsus** L. Stems 3–18 dm. tall, woolly with long matted hairs: leaf-blades spatulate to elliptic-spatulate on the lower part of the stem, oblanceolate to elliptic-obovate above, entire: pedicels woolly: calyx-lobes triangular-lanceolate, 8–10 mm. long: corolla yellow or rarely white; longer lobe 8–11 mm. long: capsules ovoid, 7–10 mm. long, slightly exceeding the calyx. — Common, in old fields and thickets. Nat. of Eu. — COMMON-MULLEN.

2. **CYMBALARIA** Medic. Perennial creeping or diffuse herbs. Leaf-blades broad, mostly palmately lobed. Flowers solitary in the leaf-axils. Calyx-lobes slightly longer than the tube. Corolla 2-lipped, short-spurred, the throat nearly or wholly closed by a palate. Stamens 4: filaments glabrous. Capsule with 2 apical pores. Seeds sharply ridged-wrinkled.

1. **C. Cymbalaria** (L.) Wettst. Stem and branches trailing or creeping, glabrous, succulent: leaf-blades suborbicular to reniform, 0.5–3 cm. wide, the lobes broad: calyx 2–2.5 mm. long; lobes lanceolate: corolla blue or lilac, 8–10 mm. long; spur 1.5–2 mm. long: pedicels becoming recurved: capsules subglobose, 3–3.5 mm. in diameter. — S. Occasional, on damp stone walls. Nat. of Eu. — Sum. — KENILWORTH-IVY. COLISEUM-IVY.

3. **LINARIA** [Tourn.] L. Annual, biennial, or perennial erect herbs. Leaf-blades narrow, entire, toothed, or lobed. Flowers in spikes, racemes, or panicles. Calyx-lobes much longer than the tube. Corolla 2-lipped, spurred, the throat partly closed by a palate. Stamens 4: filaments glabrous. Capsule with subapical pores. Seeds angled or wrinkled. — Sum. — TOAD-FLAX.

Corolla blue: plants annual or biennial: leaves few.

1. *L. canadensis*.

Corolla yellow: plants perennial: leaves numerous.

2. *L. Linaria*.

1. **L. canadensis** (L.) Dumort. Stem 1–6 dm. tall, glabrous or nearly so: leaf-blades narrowly linear: calyx-lobes linear or linear-oblong, 2.5–3 mm. long: corolla 5–7 mm. long; lateral lobes of the lower lip rounded; spur mostly 4–5 mm. long: capsules about 2.5 mm. long. — S. Occasional, on dry banks. — *Schists*. — BLUE TOAD-FLAX.

2. **L. Linaria** (L.) Karst. Stems 1–10 dm. tall, glaucous: leaf-blades linear or nearly so: calyx-lobes ovate, 3–4 mm. long: corolla 2.5–3 cm. long; spur nearly as long as the lower lip: capsules 9–12 mm. long. — Common, in fields and on roadsides. Nat. of Eu. — SNAPDRAGON. BUTTER-AND-EGGS. RAMSTED.

4. **SCROPHULARIA** [Tourn.] L. Perennial stiff herbs. Leaf-blades toothed or incised. Flowers in paniced cymes. Calyx-lobes 5, relatively broad. Corolla 2-lipped: upper lip erect: lower lip glabrous, shorter than the upper one, the middle lobe recurved. Stamens 4: filaments short: anthers glabrous. Staminodium clavate. Capsule exceeding the calyx. — Sum. — FIGWORT.

Corolla dull without: staminodium-filament deep-purple.

1. *S. marylandica*.

Corolla lustrous without: staminodium-filament greenish-yellow.

2. *S. leporella*.

1. **S. marylandica** L. Stems 1–2 m. tall, glabrous or nearly so: leaf-blades oblong-ovate to lanceolate, 5–20 cm. long, serrate or crenate-serrate: corolla 6–8 mm. long: filaments mainly filiform: capsules 4–6 mm. long. — Common, in woods and on roadsides.

2. **S. leporella** Bicknell. Stems 0.5–1.5 m. tall, glabrous or nearly so: leaf-blades ovate, ovate-hastate, or lanceolate, 5–20 mm. long, incised-serrate or deeply-incised: corolla 8–10 mm. long: capsules 7–10 mm. long. — S. Rather common, in woods and on roadsides. — *Schists*.

5. **CHELONE** [Tourn.] L. Perennial herbs. Leaf-blades toothed. Flowers in congested racemes. Calyx-lobes 5, broad. Corolla 2-lipped, slightly open at the mouth: lower lip with 3 relatively small lobes. Stamens 4: filaments pubescent, nearly equally adnate to the corolla: anthers villous. Stamino-dium elongate. Capsules surpassing the calyx. — **TURTLE-HEAD**.

1. **C. glabra** L. Stems 3-18 dm. tall, mostly branched: leaf-blades broadly linear to oblong, elliptic, or lanceolate, 6-17 cm. long, rather coarsely toothed, narrowed at the base: calyx 8-10 mm. long: corolla 25-30 mm. long: stamino-dium pubescent at the base: capsules 10-12 mm. long. — Common, in swamps and low grounds. — Fall. — **BALMONY. SNAKEHEAD**.

6. **PENTSTEMON** [Mitchell] Soland. Perennial herbs. Leaf-blades entire, toothed, or rarely dissected. Flowers borne in racemose or paniculate cymes. Calyx-lobes 5, longer than the tube, sometimes toothed. Corolla 2-lipped, the lips more or less spreading. Stamens 4: filaments unequally adnate to the corolla. Stamino-dium elongate. Capsule surpassing the calyx. — **BEARD-TONGUE**.

Stem glabrous below the inflorescence.

Corolla purplish: tube not gibbous above the point of enlargement.

Corolla white or pinkish; tube gibbous above the point of

enlargement.

Stem pubescent or puberulent.

Stem hirsute: cauline leaves with prominent salient teeth.

Stem puberulent: cauline leaves with appressed or obscure teeth.

1. *P. Pentstemon*.

2. *P. Digitalis*.

3. *P. hirsutus*.

4. *P. pallidus*.

1. **P. Pentstemon** (L.) Britton. Stem 3-10 dm. tall: blades of the upper cauline leaves oblong-lanceolate to broadly linear, 8-17 cm. long, undulate or slightly toothed: calyx-lobes ovate-lanceolate to lanceolate, 4-5 mm. long, erect: corolla purplish, 16-18 mm. long: capsules 5-6 mm. long. — Common, in fields and waste places. — **Sum**.

2. **P. Digitalis** (Sweet) Nutt. Stems 3-10 dm. tall: blades of the upper cauline leaves oblong, lanceolate, or ovate-lanceolate, 5-15 cm. long, entire or remotely toothed: calyx-lobes lanceolate, 5-7 mm. long, spreading or recurved: corolla white or pinkish, 20-30 mm. long: capsules 7-9 mm. long. — S. Occasional, in fields and thickets. — **Schists**. — **Sum**.

3. **P. hirsutus** (L.) Willd. Stems 2-7 dm. tall: blades of the upper cauline leaves oblong to lanceolate, 4-10 cm. long, more or less prominently toothed: calyx-lobes 5-6 mm. long, ovate to lanceolate: corolla purplish, 19-23 mm. long: capsules 7-9 mm. long. — Common, on dry banks. — **Early sum**.

4. **P. pallidus** Small. Stems 3-9 dm. tall: blades of the upper cauline leaves oblong, lanceolate, or linear-lanceolate, 4-8 cm. long, rather remotely shallow-toothed: calyx-lobes ovate, becoming triangular, about 3 mm. long: corolla white or purplish, 20-25 mm. long: capsules 5-6 mm. long. — S. Rare, on roadsides near Quarryville. — **Schists**. — **Sum**.

7. **PAULOWNIA** Sieb. & Zucc. Trees resembling *Catalpa*. Leaf-blades ample, entire or 3-lobed. Flowers in large paniced cymes. Calyx-lobes 5, shorter than the tube. Corolla slightly 2-lipped, both lips spreading. Stamens 4: filaments about equally adnate to the corolla. Stamino-dium wanting. Capsule woody, exceeding the calyx.

1. **P. tomentosa** (Thunb.) Baill. Large tree: leaf-blades ovate to suborbicular, 1.5-4 dm. long, densely pubescent beneath, cordate, long-petioled: calyx 10-14

mm. long: corolla violet, 4.5-5.5 cm. long, pubescent; lobes rounded: capsules ovoid, 3-4 cm. long, acute: seeds winged. — Occasional, in thickets and on roadsides. Nat. of As. — Early sum. — KARRI.

8. MIMULUS L. Annual or perennial, erect herbs. Leaf-blades shallowly toothed. Flowers axillary. Calyx nearly regular: lobes much shorter than the tube. Corolla 2-lipped: upper lip 2-lobed, erect or spreading: lower lip 3-lobed, spreading. Stamens 4: filaments about equally adnate to the corolla. Staminodium wanting. Capsule included in the calyx. — Sum. and fall. — MONKEY-FLOWER.

Calyx with minute lobes and broad truncate sinuses: leaf-blades petioled.

1. *M. alatus*.

Calyx with lanceolate lobes $\frac{1}{4}$ - $\frac{1}{2}$ as long as the tube and acute
sinuses: leaf-blades sessile.

2. *M. ringens*.

1. *M. alatus* Soland. Stems 2-10 dm. tall, square or 4-winged: leaf-blades elliptic to elliptic-lanceolate, 5-15 cm. long: pedicels 4-winged: calyx 12-15 mm. long, scarcely distended by the capsule: corolla 20-25 mm. long; middle lobe of the lower lip oval. — Common, in swamps.

2. *M. ringens* L. Stems 3-13 dm. tall, flattened: leaf-blades lanceolate or narrowly elliptic, 5-20 cm. long: pedicels 2-winged: calyx 15-20 mm. long, manifestly distended by the capsule: corolla 25-30 mm. long; middle lobe of the lower lip orbicular or reniform-orbicular. — Common, in swamps.

9. GRATIOLA L. Annual or perennial, rather succulent herbs. Leaf-blades entire or shallowly toothed. Flowers axillary. Calyx-lobes 5, often unequal, sometimes toothed, glabrous or minutely pubescent. Corolla 2-lipped. Stamens 2. Staminodia mostly scale-like, or wanting. Capsule globular to broadly ovoid.

1. *G. virginiana* L. Stem viscid-puberulent, or pubescent above, 1-3 dm. tall: leaf-blades elliptic-spatulate to elliptic or oblong, 1.5-5 cm. long, undulate or shallowly toothed, often acute: calyx-lobes linear to linear-lanceolate, 4-4.5 mm. long: corolla 8-11 mm. long; tube yellowish; lips whitish, the lower one deeply notched: capsules acute. — Common, in mud or sand. — Sum. — HEDGE-HYSSOP.

10. ILYSANTHES Raf. Annual or biennial, diffuse herbs. Leaf-blades entire or shallowly toothed. Flowers axillary. Calyx-lobes 5, narrow, entire. Corolla 2-lipped, mainly blue: upper lip erect: lower lip spreading. Stamens 2. Staminodia elongate, glandular, except the small lobe near the apex. Capsules oblong to narrowly ovoid. — Sum. — FALSE-PIMPERNEL.

Sepals as long as the capsule or longer: pedicels shorter than the subtending bracts.

1. *I. attenuata*.

Sepals shorter than the capsule: pedicels longer than the subtending bracts.

2. *I. dubia*.

1. *I. attenuata* (Muhl.) Small. Stem 1-5 dm. tall, often much-branched: leaf-blades oblong to ovate, or oblanceolate to obovate below, 1-3 cm. long, shallowly serrate: calyx-lobes 4-5 mm. long, mostly ciliate: corolla 8-10 mm. long: capsules 3.5-4.5 mm. long. — Lower Susquehanna valley. Occasional, on shores and low islands. — *Schists*.

2. *I. dubia* (L.) Barnhart. Stems 1-2 dm. tall, often much-branched: leaf-blades obovate to oblong, or ovate above, 0.6-2 cm. long, entire or nearly so: calyx-lobes 3-4 mm. long, mostly ciliate: corolla 5-7 mm. long: capsules 4-5 mm. long. — Common, in mud and low grassy places.

11. VERONICA [Tourn.] L. Annual or perennial, diffuse or creeping herbs. Leaf-blades entire, toothed, or lobed. Flowers axillary or in racemes. Calyx-lobes 4, or rarely 5, nearly equal, much longer than the tube. Corolla rotate, the lower lobe usually narrower than the others. Stamens 2, borne on either side of the upper corolla-lobe: filaments divergent. Capsule flattened. — SPEEDWELL.

Flowers solitary and axillary, the subtending bracts leaf-like, and similar to the leaves.

Pedicels as long as the subtending bracts or longer: annual plants.

Corolla longer than the calyx: capsules nearly twice as wide as high.

1. *V. Tournefortii*.

Corolla not longer than the calyx: capsules barely broader than high.

Leaf-blades of an ovate type, toothed: calyx-lobes elliptic to lanceolate.

2. *V. agrestis*.

Leaf-blades orbicular to reniform, lobed: calyx-lobes ovate.

3. *V. hederacfolia*.

Pedicels shorter than the subtending bracts.

Annual: capsules notched or obcordate.

Foliage pubescent: capsules obcordate.

4. *V. arvensis*.

Foliage glabrous or glandular: capsules orbicular and slightly notched.

5. *V. peregrina*.

6. *V. serpyllifolia*.

Perennial: capsules merely retuse or truncate.

Flowers in axillary racemes: bracts small.

Foliage pubescent: species of dry soil.

7. *V. officinalis*.

Foliage glabrous or glandular: species of low grounds or brooks.

Leaf-blades broad: capsule swollen, many-seeded.

Stem-leaves with petioled blades: capsules mostly over 3 mm. long, 2-lobed.

8. *V. americana*.

Stem-leaves with sessile blades: capsules mostly less than 3 mm. long, shallowly notched.

9. *V. Anagallis-aquatica*.

Leaf-blades narrow: capsule flat, few-seeded.

10. *V. scutellata*.

1. V. Tournefortii C. C. Gmel. Stems branched, 1-4 dm. long: leaf-blades ovate to orbicular-ovate or oval-ovate, 8-15 mm. long, serrate: pedicels longer than the bracts: calyx-lobes elliptic to lanceolate, 4-5 mm. long: corolla blue, 9-11 mm. wide: capsules nearly reniform, 7-8 mm. wide, many-seeded. — Occasional, in cultivated grounds. Nat. of Eu. — Spr. and sum.

2. V. agrestis L. Stems 0.5-3 dm. long: leaf-blades ovate to suborbicular or deltoid, 5-15 mm. long, crenate or serrate: pedicels becoming as long as the bracts: calyx-lobes elliptic to elliptic-ovate, 3-5 mm. long: corolla 5-7 mm. wide: capsules orbicular and sharply notched, 7-8 mm. wide, 1-2-seeded. — Rare, in fields. Nat. of Eu. — Spr. — FIELD-SPEEDWELL.

3. V. hederacfolia L. Stems branched at the base, the branches reclining or decumbent, often matted, sparingly pubescent: leaf-blades reniform or orbicular-reniform, 0.5-1.5 em. long, 3-5-lobed, rounded or cordate at the base, rather long-petioled: pedicels as long as the leaves or slightly shorter: calyx-lobes ovate, 3-4.5 mm. long, acute: corolla 3-4 mm. wide, much shorter than the calyx: capsules depressed, swollen, slightly 2-lobed, 5-6 mm. broad, 2-4-seeded. — M. Common, in shaded banks along the Conestoga Creek. Nat. of Eu. — Spr. and sum. — IVY-LEAVED SPEEDWELL.

4. V. arvensis L. Stems 0.5-3 dm. long: leaf-blades ovate to oval, 5-12 mm. long, crenate or incised: pedicels shorter than the bracts: calyx-lobes oblong to oblong-lanceolate, 1-2.5 mm. long: corolla 1.5-2 mm. wide: capsules about 3 mm. wide. — Common, in waste places and cultivated grounds. Nat. of Eu. — Sum. — CORN-SPEEDWELL.

5. V. peregrina L. Annual, 0.5-4 dm. tall: leaf-blades oblanceolate to oblong or linear, 1-3 em. long, the lower ones, at least, toothed: calyx-lobes linear or slightly broadened upward: corolla 2-3 mm. wide: capsules 4 mm. wide,

glabrous. — Common, in cultivated grounds. — Sum. — PURSLANE-SPEEDWELL. NECKWEED.

6. *V. serpyllifolia* L. Perennial, spreading, 0.5–2.5 dm. long: leaf-blades suborbicular, oval, or oblong, 5–15 mm. long, entire or crenate: calyx-lobes oblong or oblong-cuneate, nearly glabrous: corolla 2–3 mm. wide: capsules 3 mm. wide, pubescent. — Common, in waste places. — Early sum. — THYME-LEAVED SPEEDWELL.

7. *V. officinalis* L. Perennial, creeping, 0.5–3 dm. long: leaf-blades oblong to oval, varying to ovate or obovate, 0.5–4 cm. long, serrate: calyx-lobes oblong, pubescent: corolla 5–8 mm. wide: capsules 3–3.5 mm. wide, truncate or retuse. — Common, in dry fields and open woods. — Sum. — COMMON-SPEEDWELL.

8. *V. americana* Schwein. Perennial, glabrous, 1–6 dm. tall: leaf-blades oval, oblong, or oblong-lanceolate, 1.5–5 cm. long, serrate: calyx-lobes oblong to oblong-lanceolate, 2.5–3 mm. long: corolla 4–5 mm. wide: capsules 3–3.5 mm. wide, 2-lobed. — Common, in streams and swamps. — Sum. — AMERICAN-BROOKLIME.

9. *V. Anagallis-aquatica* L. Perennial, glandular-pubescent above, 2–9 dm. tall: leaf-blades lanceolate to oblong, 2–12 cm. long, finely serrate or nearly entire: calyx-lobes lanceolate to ovate-lanceolate, 3–3.5 mm. long: corolla 4–5 mm. wide: capsules 2.5–3 mm. wide, minutely notched. — M. Occasional, in swamps and ditches. — *Limestones*. — Spr. and sum. — WATER-SPEEDWELL.

10. *V. scutellata* L. Perennial, the stem often stoloniferous at the base, glabrous: leaf-blades linear to linear-lanceolate or narrowly lanceolate, 1.5–5 cm. long, acuminate, entire or shallowly toothed, sessile: peduncles shorter than the leaves: pedicels filiform: calyx-lobes oblong to oblong-lanceolate, 2–2.5 mm. long, acute: corolla 6.5–9 mm. wide, surpassing the calyx: capsules reniform, notched at the apex, 4–4.5 mm. broad. — Susquehanna valley. Rare, in swamps near Collin's Ferry. — Sum. — MARSH-SPEEDWELL.

12. **LEPTANDRA** Nutt. Perennial, erect herbs. Leaf-blades elongate, toothed. Flowers in erect spike-like racemes. Calyx-lobes 4, narrow. Corolla tubular and somewhat salverform: lobes broad, much shorter than the tube. Stamens 2, exserted: filaments erect, glabrous. Capsule narrow.

1. *L. virginica* (L.) Nutt. Stems 3–18 dm. tall: leaf-blades oblong, elliptic, or lanceolate, 4–13 cm. long, finely serrate: calyx-lobes lanceolate or linear-lanceolate, 1–1.5 mm. long: corolla white or pink, 5–6 mm. long; lobes ovate: capsules oblong or oval, 3–4 mm. long. — Common, in swamps and damp meadows. — Sum. — CULVER'S-ROOT. CULVER'S-PHYSIC.

13. **DASYSTOMA** Raf. Annual, biennial, or perennial, simple or sparingly branched herbs. Leaf-blades entire, toothed, or pinnatifid. Flowers axillary. Calyx-lobes 5, mostly about as long as the tube or longer. Corolla funnelform: lobes shorter than the tube. Stamens 4, included: filaments pubescent. Capsule ovoid, oval, or elliptic. — FALSE-FOXGLOVE.

Annual or biennial: corolla pubescent or glandular without. 1. *D. Pedicularia*. Perennial: corolla glabrous without.

Stem pubescent: capsule narrow, pubescent, the body about half included in the calyx-tube.

Stem glabrous, sometimes glaucous: capsule turgid, glabrous, with only the abruptly narrowed base in the calyx-tube.

2. *D. flava*.

3. *D. virginica*.

1. *D. pedicularia* (L.) Benth. Stem 3–12 dm. tall, puberulent, or sparingly glandular-pubescent above: leaf-blades 2–6 cm. long, pinnatifid, the segments coarsely toothed or incised: calyx-lobes coarsely toothed: corolla 2.5–3 cm. long: capsules 12–15 mm. long. — Common, in woods and thickets. — Late sum.

2. *D. flava* (L.) Wood. Stems 3-12 dm. tall; leaf-blades lanceolate to oblong, 4-14 cm. long, repand or coarsely toothed, or rarely pinnatifid on the lower part of the stem; calyx-tube turbinate at maturity; corolla 3-4 cm. long; capsules ovoid-conic, about 15 mm. long. — Common, in woods and thickets. — Sum. — DOWNY FALSE-FOXGLOVE.

3. *D. virginica* (L.) Britton. Stems 8-15 dm. tall; leaf-blades ovate-lanceolate to lanceolate or linear-lanceolate, 9-20 cm. long, 1-2-pinnatifid; calyx-tube 5-6 mm. wide in anthesis; corolla bright-yellow, 3-4 cm. long; capsules oval or oval-ovoid, 10-15 mm. long. — S. Occasional, in woods near McSparan. — *Schists*. — Late sum. — SMOOTH FALSE-FOXGLOVE.

14. **AGALINIS** Raf. Annual or perennial, mostly slender herbs. Leaf-blades narrow or scale-like, entire. Flowers axillary. Calyx-lobes 5, mostly shorter than the tube, often minute. Corolla funnel-form, slightly 2-lipped; lobes shorter than the tube. Stamens 4, included; filaments pubescent. Style filiform. Capsule globular. [*Gerardia* L. in part.]

Flowers short-pedicelled: corolla-tube over 1 cm. long.

Corolla over 2 cm. long: larger anthers about 4 mm. long.

Corolla less than 2 cm. long: larger anthers about 3 mm. long.

Flowers filiform-pedicelled: corolla-tube less than 1 cm. long.

Corolla rose-purple; lobes rounded; bracts long.

Corolla pink; lobes notched; bracts short.

1. *A. purpurea*.

2. *A. paupercula*.

3. *A. tenuifolia*.

4. *A. decemloba*.

1. *A. purpurea* (L.) Pennell. Stems 2-7 dm. tall, smooth or slightly scabrous; blades of the upper cauline leaves linear, mostly less than 3 mm. wide; calyx-tube 3-4 mm. long; lobes about $\frac{1}{2}$ as long as the tube; corolla 2-2.5 cm. long; capsules 4-5 mm. long. — Common, on banks and in open woods. — Fall.

2. *A. paupercula* (A. Gray) Britton. Stems 1-5 dm. tall, smooth, sometimes with several stiff branches above; leaf-blades linear, scabrous; calyx-tube 3-4 mm. long; lobes about $\frac{1}{2}$ as long as the tube; corolla 1-1.5 cm. long; capsules 5-7 mm. long. — M. Common, in the Dillerville swamp, Lancaster. — *Limestones*. — Sum.

3. *A. tenuifolia* (Vahl) Raf. Plants darkening in drying; stems 1-6 dm. tall, smooth; leaf-blades linear, smooth or nearly so; calyx-tube campanulate in anthesis, 2-3 mm. long; corolla about 1 cm. long; capsules about 4 mm. long. — N. S. Common, in fields and open woods. — *Sandstones and shales schists*. — Fall.

4. *A. decemloba* (Greene) Small. Plants not darkening in drying; stems 2-7 dm. tall, often scabrous; leaf-blades linear-spatulate; calyx-tube turbinate in anthesis, 2-3 mm. long; lobes minute; corolla about 1 cm. long; capsules 3-4 mm. long. — S. Rare, on roadside bank near New Texas. — *Schists*. — Fall.

15. **BUCHNERA** L. Biennial or perennial, erect herbs. Leaf-blades usually toothed. Flowers spicate. Calyx-lobes 5, broad, much shorter than the tube. Corolla blue or white, salverform; tube narrow; limb oblique. Stamens mainly 4, included. Style short. Capsule ovoid.

1. *B. americana* L. Stems 3-10 dm. tall, hispid; blades of the stem-leaves oblong to lanceolate, 2-9 cm. long, commonly sharp-toothed; calyx-lobes $\frac{1}{2}$ to $\frac{3}{4}$ as long as the tube, the upper ones lanceolate, acuminate; corolla purple; tube villous; capsule ovoid. — S. Rare, on gravelly banks near Pleasant Grove. — *Schists*. — Sum. — BLUE-HEARTS.

16. **CASTILLEJA** Mutis. Annual or perennial, often partly parasitic herbs. Leaf-blades entire, toothed, or lobed. Flowers spicate or racemose.

Calyx tubular or spathe-like, laterally flattened: lobes unequal. Corolla very strongly 2-lipped: upper lip much longer than the minutely 3-lobed lower lip. Capsule equilateral.

1. *C. coccinea* (L.) Spreng. Stems 1-6 dm. tall: blades of the stem-leaves narrow, often 3-8 cm. long: bracts red or scarlet, or rarely yellow: calyx-lobes quadrate-oblong: corolla pale-yellow, about as long as the calyx: capsules narrowly oblong, 1-1.5 cm. long. — Occasional, in swamps. — Spr. and sum. — PAINTED-CUP.

17. *MELAMPYRUM* [Tourn.] L. Annual slender herbs. Leaf-blades entire, or toothed near the base. Flowers axillary or in leafy racemes. Calyx campanulate: lobes 4, about as long as the tube. Corolla whitish, 2-lipped: upper lip arched: lower lip 3-lobed. Style elongate. Capsule beaked. — Spr. and sum.

1. *M. lineare* Lam. Stem 1-3 dm. tall: leaves numerous; blades linear or linear-lanceolate, 1-4 cm. long: bracts ciliate-toothed near the base: upper calyx-lobes mainly shorter than the tube: corolla mostly less than 10 mm. long: filaments adnate to the lower part of the corolla-tube, much longer than the anthers: capsules long-beaked. — N. S. Common, in woods and thickets. — *Sandstones and shales, schists.* — Sum. — COW-WHEAT.

18. *PEDICULARIS* [Tourn.] L. Annual, biennial, or perennial, stout herbs. Leaf-blades pinnatifid to pinnately parted. Flowers spicate or racemose. Calyx of 5 equally or unequally united sepals: lobes shorter than the tube. Corolla strongly 2-lipped: upper lip helmet-like, laterally flattened: lower lip 3-lobed. Capsule oblique or curved, beaked. — LOUSEWORT.

Leaf-blades pinnately parted: capsule linear-lanceolate, thrice as long as the calyx.

1. *P. canadensis*.

Leaf-blades shallowly pinnatifid or toothed: capsules ovoid, little longer than the calyx.

2. *P. lanceolata*.

1. *P. canadensis* L. Stem 1-4 dm. tall: stem-leaves 2-5 cm. long: blades oblong to lanceolate: calyx 5-7 mm. long: corolla ochroleucous and tinged with red or purple, about 1.5 cm. long: capsules about 2 cm. long, long-beaked. — Common, in thickets and woods. — Spr. — WOOD-BETONY.

2. *P. lanceolata* Michx. Stems 3-12 dm. tall: stem-leaves 5-12 cm. long: blades oblong to lanceolate: calyx fully 10 mm. long: corolla straw-colored, about 2 cm. long: capsules about 1 cm. long, minutely beaked. — S. Rare, in swamps. — *Schists.* — Late sum.

FAMILY 11. ACANTHACEAE. ACANTHUS FAMILY.

Herbs or shrubs. Leaves alternate, opposite, or whorled: blades simple. Flowers perfect, irregular. Calyx of usually 5 partly united sepals. Corolla of 5 partly united petals, 2-lipped or sometimes essentially regular. Androecium of 4 didynamous, or of 2 equal stamens, one pair being abortive or obsolete. Gynoecium of 2 united carpels. Ovary 2-celled. Ovules commonly 2 in each cavity. Fruit a capsule, often with a stipe-like base, the valves opening elastically.

Corolla nearly regular: stamens 4.

1. *RUELLIA*.

Corolla 2-lipped: stamens 2.

2. *DIANTHERA*.

1. *RUELLIA* [Plum.] L. Perennial caulescent herbs, or shrubs. Leaf-blades entire or toothed. Flowers axillary or sometimes in terminal clusters.

Calyx 5-lobed, the lobes narrow. Corolla nearly regular. Capsules 6-20-seeded.

1. **R. strepens** L. Stems 2-12 dm. tall, glabrous or finely pubescent; leaf-blades ovate to oblong, 5-15 cm. long; corolla blue or nearly white, 5-6 cm. long; capsules 10-15 mm. long. — Rare, along the Conestoga Creek, near Lancaster. — *Limestoncs.* — Sum.

2. **DIANTHERA** [Gronov.] L. Perennial herbs. Leaf-blades entire or rarely toothed. Flowers on axillary peduncles. Calyx 4-5-lobed, the lobes narrow or slender. Corolla strongly 2-lipped: upper lip entire or 2-lobed; lower lip 3-lobed. Capsules mostly 4-seeded.

1. **D. americana** L. Stems 3-10 dm. tall; leaf-blades linear to linear-lanceolate or narrowly oblong, 5-15 cm. long; peduncles ascending, about as long as the leaves or longer; spikes 1-3 cm. long, continuous; calyx-lobes linear, 4-5 mm. long; corolla white, pink, or purplish; capsules 1.5-2 cm. long. — Common, in streams. — Sum. — WATER-WILLOW.

FAMILY 12. PINGUICULACEAE.¹ BLADDERWORT FAMILY.

Herbs, growing in water or in wet places. Leaves submersed and dissected, sometimes resembling rootlets and often bladder-bearing, or aerial, entire, or rarely wanting. Scapes naked or minutely scaly, one-many-flowered. Flowers irregular, perfect. Calyx of 2-5 herbaceous sepals. Corolla 2-lipped: tube spurred or saccate. Androecium of 2 stamens, adnate to the base of the corolla-tube on its upper side. Filaments flattened, twisted. Anthers confluent 1-celled. Gynoecium a single 1-celled pistil, with a free-central, usually globose placenta. Style thick. Stigma often 2-lipped, the lips unequal. Ovules numerous. Fruit a capsule, 2-valved or irregularly dehiscent. Seeds numerous.

1. **UTRICULARIA** L. Aquatic or terrestrial scapose herbs. Stems horizontal, creeping on the surface of the ground in wet places, or in shallow water, free-swimming. Leaves commonly finely dissected, bladder-bearing, often reduced, rarely wanting. Flowers solitary or racemose. Sepals 2, slightly united. Corolla 2-lipped, the lower lip produced into a spur at the base. Capsule commonly irregularly dehiscent, several- or many-seeded. — Sum. — BLADDERWORT.

Scapes solitary at the nodes of elongate, more or less free-swimming stems.

Scapes solitary or several together, the stems radiating from their bases and often more or less root-like.

1. *U. vulgaris*.

2. *U. gibba*.

1. **U. vulgaris** L. Stems submersed, leafy, 3-12 dm. long; leaves numerous, alternate; blades 2-3-pinnately dissected into filiform segments, usually bearing numerous bladders; bladders when fully developed 3-5 mm. long; scapes 1-3 dm. tall; racemes 5-10-flowered; pedicels recurving at maturity; corolla yellow, 12-15 mm. broad, the lower lip slightly 3-lobed; spur not appressed, horn-like, slightly curved, shorter than the lower lip; capsules many-seeded. — Susquehanna valley. In water.

2. **U. gibba** L. Stems radiating from the base of the scape or scapes, several cm. long, delicate, root-like; leaves scattered, sparingly divided; segments capillary, with few minute bladders; scapes 2-10 cm. tall; racemes 1-3-flowered, usually 2-flowered; pedicels very slender, erect or ascending; corolla yellow, 5-7 mm. broad; spur obtuse, shorter than the lower lip. — Susquehanna valley. In very shallow water.

¹ Contributed by Dr. John Hendley Barnhart.

FAMILY 13. **OROBANCHACEAE.** BROOM-RAPE FAMILY.

Parasitic, commonly perennial herbs, without green coloring matter. Leaves alternate, scale-like. Flowers perfect, or rarely dioecious, sometimes cleistogamous and complete on the same plant. Calyx of 4 or 5 partly united sepals, sometimes spathe-like. Corolla of 4 or 5 partially united petals, the limb irregular or 2-lipped. Androecium of 4 didynamous stamens partially adnate to the corolla. Gynoecium of 2, or rarely of 3, united carpels. Ovary 1-celled. Ovules mostly numerous. Fruit a capsule. Seeds wingless.

Flowers perfect and complete throughout.

Calyx irregular, spathe-like, the lower side split, the upper with 3 or 4 tooth-like lobes: stamens exerted. 1. **CONOPHOLIS.**

Calyx regular or nearly so, with 2-5 equal or unequal lobes: stamens included. 2. **THALESIA.**

Flowers various, cleistogamous on lower part of spike, complete but mostly sterile above. 3. **LEPTAMNIUM.**

1. **CONOPHOLIS** Wallr. Yellow or brownish herbs, with very stout stems and inflorescence. Leaves numerous. Flowers sessile, yellowish, crowded in the spike.

1. **C. americana** (L. f.) Wallr. Plants clustered, 1-2 dm. tall: leaves (scales) ovate to lanceolate, 10-12 mm. long: calyx 7-9 mm. long, erose-toothed: corolla yellowish or pale-yellow, 10-12 mm. long: capsules ovoid, 10-15 mm. long. — Rather common, in rich woods. — Spr. — SQUAW-ROOT. CANCER-ROOT.

2. **THALESIA** Raf. Pale or pink herbs, with short, mostly subterranean stems. Leaves few. Flowers solitary on long pedicels, often more deeply colored than the foliage.

1. **T. uniflora** (L.) Britton. Plants 5-16 cm. tall: leaves (scales) ovate to obovate, 5-10 mm. long: calyx 4-11 mm. long; lobes lanceolate, about as long as the tube: corolla cream-colored and purple-tinged, 14-18 mm. long; lobes oblong to obovate: capsules conic-ovoid, about 10 mm. long. — Rather common, in rich woods. — Spr. — BROOM-RAPE. CANCER-ROOT.

3. **LEPTAMNIUM** Raf. Dark-purplish or yellowish-brown herbs, with branching stems. Leaves very few. Flowers racemose or paniculate, paler than the stem, separated.

1. **L. virginianum** (L.) Raf. Plants 1-4 dm. tall: leaves (scales) few at the base of the plant: complete flowers larger than the cleistogamous ones: calyx 2.5-3 mm. long; lobes triangular to ovate-triangular, shorter than the tube: corolla 10-13 mm. long; upper lip notched; lobes of the lower lip acute: capsules 3-5 mm. long. — Common, under beech trees. — Spr. — BEECH-DROPS. CANCER-ROOT.

FAMILY 14. **BIGNONIACEAE.** TRUMPET-CREEPER FAMILY.

Shrubs, trees, woody vines, or rarely herbs. Leaves opposite, rarely alternate or whorled, often tendril-bearing: blades simple or pinnately compound. Flowers perfect, usually showy. Calyx of usually 2 more or less united sepals. Corolla 5-lobed, irregular, or 2-lipped. Androecium of 5 stamens with 1 or 3 of them reduced to staminodia, or of 4 didynamous stamens. Anthers with mostly divaricate sacs. Gynoecium of 2 united carpels. Ovary 1-celled, or 2-celled by the meeting of the placentae. Ovules numerous. Fruit a capsule. Seeds winged or appendaged.

Corolla highly colored: leaf-blades compound: vines or rarely herbaceous plants.

Corolla white and somewhat spotted: leaf-blades simple: trees. 1. **BIGNONIA.**

2. **CATALPA.**

1. **BIGNONIA** [Tourn.] L. Vines. Leaf-blades unequally pinnate: leaflets with toothed blades. Flowers clustered. Calyx tubular-campanulate, nearly equally 5-lobed. Corolla tubular-funnelform. Capsule stout, fusiform. Seeds membranous-winged.

1. **B. radicans** L. Stout vine: leaves many, 2-2.5 dm. long; leaflets 7-11, the blades oval, ovate, or elliptic, 2-6 cm. long, coarsely serrate: calyx 14-18 mm. long; lobes triangular to triangular-ovate: corolla red or orange, 5-9 cm. long; capsules fusiform, 10-18 cm. long.—S. On the Octoraro Creek.—*Schists*.—Sum.—TRUMPET-FLOWER. TRUMPET-CREEPER.

2. **CATALPA** L. Shrubs or trees, with scaly bark. Leaves deciduous: blades broad, membranous. Flowers paniculate. Calyx 2-lobed. Corolla campanulate, 2-lipped, the tube abruptly expanded into the throat. Capsule slender, elongate. Seeds fimbriate-winged.—CATALPA.

1. **C. Catalpa** (L.) Karst. Tree becoming 20 m. tall: leaf-blades ovate, 1-3 dm. long; calyx 8-12 mm. long; lobes abruptly pointed: corolla 2.5-3.5 cm. long; throat campanulate: capsules 1.5-4 dm. long.—Occasional, on roadsides and in thickets. Nat. of the West and South.—Sum.—BEAN-TREE. CIGAR-TREE. INDIAN CIGAR-TREE.

FAMILY 15. MARTYNIACEAE. UNICORN-PLANT FAMILY.

Annual or perennial, stocky herbs, with stout weak stems. Leaves opposite or rarely alternate: blades undulate or lobed. Flowers perfect, irregular, in racemes. Calyx of mostly 5 well-united sepals, oblique, the lobes short. Corolla of 5 partly united petals: tube often decurved: limb 5-lobed, oblique. Androecium of 4 didynamous stamens (or the posterior pair mere staminodia). Gynoecium 2-carpellary. Ovary 1-celled, the placentae parietal.

1. **MARTYNIA** L. Annual or perennial, very stout, herbs with clammy pubescence. Leaf-blades broad. Corolla declined, the limb oblique. Capsule 2-valved, the body crested, terminating in a curved or hooked beak.

1. **M. louisiana** Mill. Annual, densely viscid-pubescent: leaf-blades sinuate, 0.5-3 dm. wide, petioled: flowers not fragrant: calyx-lobes ovate, obtuse: corolla-lobes undulate: capsule stout, 8-15 cm. long, curved, separating into 2 elastically spreading valves, the beak longer than the body.—Occasional, in waste places and about gardens.—Nat. of the Mississippi valley.—Sum.—UNICORN-PLANT. RAM'S-HORN. PROBOSCIS-FLOWER.

Order PLANTAGINALES.

Annual or perennial herbs, or partially woody plants. Leaves wholly or mainly basal, or crowded on a simple or branched caudex: blades typically 1-several-ribbed. Flowers perfect, monoecious or dioecious, spicate. Calyx of 4 (3-5), partly united sepals. Corolla of 4 (3-5), partly united scarious and veinless petals. Androecium of 4 or 2 stamens, (or of 1 stamen). Gynoecium typically 2-carpellary. Ovary superior. Fruit capsular, usually a pyxis.

FAMILY 1. PLANTAGINACEAE. PLANTAIN FAMILY.

Herbs. Leaf-blades typically 1-several-ribbed. Calyx-lobes, and corolla-lobes, 4. Style and stigma elongate.

1. **PLANTAGO** [Tourn.] L. Caulescent or usually acaulescent herbs. Leaf-blades broad or narrow. Spikes usually elongate. Filaments partially adnate to the corolla-tube. — PLANTAIN.

Plants acaulescent: spikes terminating basal scapes.

Corolla-lobes erect, and converging over the top of the pyxis.

Corolla-lobes permanently spreading or reflexed.

Pyxis 2-4-seeded.

Plants annual: spike conspicuously long-bracted.

Plants perennial: spike inconspicuously short-bracted.

Pyxis many-seeded.

Pyxis conic to oblong-conic, circumscissile below the middle.

Pyxis ovoid, circumscissile at about the middle.

Plants caulescent: spikes terminating axillary peduncles.

1. *P. virginica*.

2. *P. aristata*.

3. *P. lanceolata*.

5. *P. major*.

6. *P. arenaria*.

4. *P. Rugelii*.

1. ***P. virginica*** L. Annual or biennial, very variable, glabrate to rather coarsely pubescent. Leaves basal, spreading or ascending, 1-15 cm. long; blades spatulate to obovate or elliptic, obtuse or acutish, entire or repand-denticulate, 3-5-nerved, narrowed into margined petioles or nearly sessile: scapes erect or ascending, 0.5-20 dm. tall, much surpassing the leaves: spikes dense, sometimes interrupted below: flowers dioecious: bracts linear-lanceolate to lanceolate: calyx-lobes oblong or ovate, 2-2.5 mm. long, obtuse, scarious-margined, surpassing the bracts: corollas various, those of staminate flowers with spreading lobes, those of pistillate flowers with lobes usually unequally erect after fertilization: pyxis ovoid or oval-ovoid, 1.5-2 mm. long, circumscissile at about the middle: seeds 2-4, 1.3 mm. long, golden-yellow. — Common, in old fields and on dry banks. — Spr. and sum.

2. ***P. aristata*** Michx. Annual, deep-green, glabrate to villous. Leaves nearly basal, 5-25 cm. long; blades linear, acuminate, entire and callous-tipped, narrowed into margined petioles, 3-5-nerved: scapes erect, solitary or several together, 10-15 cm. tall, rigid, surpassing the leaves: spikes dense, 2-15 cm. long, more or less pubescent but not woolly: bracts linear, puberulent, 1-3 cm. long, surpassing the flowers by many times their length: flowers perfect: calyx-lobes spatulate-oblong or cuneate, 2-2.5 mm. long, obtuse, the outer herbaceous, the inner widely scarious-margined: corolla glabrous; lobes ovate or orbicular-ovate, 2 mm. long, obtuse, cordate: pyxis slightly narrowed upward, 2.5-3 mm. long, slightly surpassing the calyx-lobes, circumscissile at the middle: seeds 2, 2-3 mm. long, dark-brown. — S. Rare, in fields. Nat. of the West. — Sum.

3. ***P. lanceolata*** L. Perennial, very variable, pubescent. Leaves basal, often numerous, 4-30 cm. long; blades linear-elliptic to broadly elliptic, acute and callous-tipped at the apex, or acuminate at both ends, 3-7-nerved, entire or denticulate, narrowed into margined petioles, which are dilated and hairy at the base: scapes erect or nearly so, 1-7 dm. tall, ridged: spikes cylindrical, dense, 1-8 cm. long, 6-8 mm. thick: bracts rhombic, 4-5 mm. long, the tips bent: flowers perfect: calyx-lobes 2-3 mm. long, broadly oblong to oval, obtuse, the 2 lower ones usually united, their midribs closely subparallel: corolla glabrous; lobes broadly lanceolate, 2-2.5 mm. long: pyxis oblong, 3 mm. long, slightly longer than the calyx-lobes, circumscissile at about the middle: seeds 2, fully 2 mm. long. — Common, in fields and waste places. Nat. of Eu. — Spr. and sum. — RIB-GRASS. ENGLISH-PLANTAIN. RIPPLE-GRASS.

4. ***P. Rugelii*** Decne. Perennial, bright-green, glabrous or minutely pubescent. Leaves basal, 5-40 cm. long; petioles flattened or channeled on the upper side, usually purple at the base; blades broadly ovate to oblong, longer than the petioles or sometimes shorter, 5-7-nerved, entire or shallowly toothed, cuneately or abruptly narrowed at the base: scapes erect or ascending, solitary or several together, often surpassing the leaves, 10-50 cm. tall: spikes 2-30 cm. long, sometimes broadly bracted at the base: bracts fully half as long as the calyx-lobes, acute: flowers perfect: calyx-lobes oblong, acute, 2-2.5 mm.

long, keeled, often scarious-margined: corolla glabrous; tube slightly surpassing the calyx; lobes spreading; pyxis conic or oblong-conic, 4-4.5 mm. long, circumscissile below the middle: seeds 4-9, 1.5-2 mm. long. — Common, in fields and waste places. — Spr. and sum.

5. *P. major* L. Perennial, bright-green, glabrous or sparingly pubescent. Leaves basal, 5-3.5 cm. long; petioles flattened or channeled on the upper surface, usually green at the base; blades ovate or oval, or rarely oblong, obtuse or acutish, 5-7-nerved, entire or coarsely toothed, rounded or cordate at the base: scapes erect, solitary or several together, surpassing the leaves, 8-40 cm. tall, rarely with several leaves under the spike, sometimes branched: spikes 4-20 cm. long, dense: bracts ovate, barely equalling the calyx-lobes: flowers perfect: calyx-lobes ovate to obovate, obtuse, not keeled, scarious-margined: corolla inconspicuous; tube about as long as the calyx; lobes spreading or reflexed: pyxis ovoid, about 3 mm. long, slightly surpassing the calyx-lobes, circumscissile at the middle: seeds 6-18, 0.7 mm. long. — Common, in fields and waste places. Nat. of Eu. — Spr. and sum. — COMMON-PLANTAIN.

6. *P. arenaria* W. & K. Annual, hirsute, 1-5 dm. tall: leaves numerous, mostly cauline, 2-8 cm. long; blades narrowly linear, often obscurely toothed: spikes axillary, or umbellately clustered, oblong or cylindric, 1-2 cm. long, dense: bracts with a broad body and a slender tip: calyx-lobes 3-4 mm. long, the anterior ones broadly spatulate, the posterior ones lanceolate: corolla glabrous; lobes lanceolate, 2-2.5 mm. long; pyxis oblong. — S. Rare, in fields. Nat. of Eu. — Sum.

Order SANTALALES.

Herbs, shrubs, or trees, mostly root- or tree-parasites. Leaves with expanded blades or scale-like. Flowers inconspicuous, perfect or imperfect. Calyx present, but often a mere border. Corolla present or wanting. Androecium of as many stamens as there are sepals or petals, or twice as many. Gynoecium of several united carpels: ovary more or less inferior. Fruit a drupe, a nut, or a berry.

Leaves opposite: fruit a berry: tree-parasite.

Fam. 1. LORANTHACEAE.

Leaves alternate: fruit a drupe or a nut: root-parasite.

Fam. 2. SANTALACEAE.

FAMILY 1. LORANTHACEAE. MISTLETOE FAMILY.

Green parasitic herbs or shrubs, growing mostly on woody plants. Leaves typically opposite, sometimes scale-like. Flowers monoecious or dioecious, regular. Calyx of minute sepals, or obsolete. Corolla of 2-6 more or less united petals. Androecium of 2-6 stamens. Gynoecium compound, often 2-carpellary, but the inferior ovary 1-celled. Fruit baccate.

1. *PHORADENDRON* Nutt. Shrubs. Leaves with flat leathery blades, or scale-like. Flowers mostly dioecious, spicate, the staminate with a stamen at the base of each broad petal, the pistillate with the ovary adnate to the hypanthium. Berry juicy.

1. *P. flavescens* (Pursh) Nutt. Branches pubescent, terete: leaf-blades mainly oval-spatulate: hypanthium globular during anthesis: berries white: seeds ovoid, fully 2 mm. in diameter. — S. Rare, on black-gum trees near Martie Forge. — Sum. — MISTLETOE. AMERICAN-MISTLETOE.

FAMILY 2. SANTALACEAE. SANDAL-WOOD FAMILY.

Herbs, shrubs, or trees, parasitic on the roots of other plants. Leaves opposite or alternate: blades entire. Flowers perfect, polygamous, or

dioecious, the staminate clustered, the pistillate often solitary. Calyx of 3-6 sepals. Corolla wanting. Androecium of 3-6 stamens opposite the sepals on the edge of the hypanthium. Gynoecium compound. Fruit mostly drupaceous.

1. **COMANDREA** Nutt. Herbs with long rootstocks. Leaves alternate: blades narrow. Flowers perfect, cymose. Style columnar: stigma capitate. Drupe crowned with the persistent calyx.

1. **C. umbellata** (L.) Nutt. Plants 2-4 dm. tall: leaf-blades oblong, oval, or oblong-lanceolate, 1-3.5 cm. long: sepals oblong-ovate, 2-2.5 mm. long: stamens $\frac{1}{2}$ as long as the sepals: drupe about 5 mm. in diameter. — Rather common, in thickets and on banks. — Spr. and sum. — BASTARD-TOADFLAX.

Order RUBIALES.

Herbs, shrubs, or trees. Leaves opposite, sometimes whorled. Flowers perfect or polygamous, axillary or cymose. Hypanthium present. Calyx of 2 or more, often small sepals. Corolla of 3 or more partially united petals. Androecium of as many stamens as there are petals or twice as many. Gynoecium 2-several-carpellary. Ovary wholly or partially inferior. Fruit a capsule, a berry, or a drupe.

Leaves with stipules adnate to the stem between the leaf-bases.

Fam. 1. RUBIACEAE.

Leaves without stipules, or if present the stipules are adnate to the petiole.

Fam. 2. CAPRIFOLIACEAE.

FAMILY 1. RUBIACEAE. Madder Family.

Herbs, shrubs, trees, or vines. Leaves opposite or whorled, with interpetiolar, sometimes foliaceous stipules. Flowers perfect or polygamous, regular or nearly so. Calyx of 3-6, or more, sepals surmounting the hypanthium, or obsolete. Corolla of 3-6, or more, more or less united petals. Androecium of as many stamens as there are petals and alternate with them. Gynoecium 2-several-carpellary. Fruit a capsule, a drupe, or a berry.

Cavities of the ovary with several or many ovules: seeds several or many.

1. HOUSTONIA.

Cavities of the ovary with a single ovule each: seed solitary.

Flowers in dense heads: shrubs or trees.

2. CEPHALANTHUS.

Flowers solitary or in an open inflorescence: herbs or undershrubs.

Ovule, or seed, with a basal attachment: flowers paired, the ovaries united.

3. MITCHELLA.

Ovule, or seed, with a lateral attachment: flowers not paired, the ovaries distinct.

Stipules relatively small or inconspicuous, more or less cleft.

4. DIODELLA.

Stipules foliaceous, usually resembling the leaves.

Sepals minute or obsolete: corolla rotate.

5. GALIUM.

Sepals prominent: corolla funnelform.

6. SHERARDIA.

1. **HOUSTONIA** L. Annual or perennial, erect or creeping herbs. Leaf-blades narrow or broad. Flowers in open or compact cymes. Sepals 4, commonly narrow. Corolla funnelform or salverform: tube long: lobes mostly shorter than the tube. Stamens 4: filaments adnate to above the middle of the corolla-tube. Style slender. Capsules seated on or in the hypanthium, flattened.

Peduncles and pedicels solitary: creeping plants: corolla salverform.

1. *H. caerulea*.

Peduncles and pedicels aggregated in cymes: erect plants: corolla funnelform.

2. *H. longifolia*.

1. **H. caerulea** L. Plants often in mats, slender, 2-15 cm. tall: leaf-blades oval, ovate or spatulate, 2-5 mm. long: corolla lilac, blue, or white, except the yellow eye; lobes 5-7 mm. long: capsules 3-4 mm. wide. — Common, in damp grassy places and meadows. — Spr. and sum. — **BLUETS.** INNOCENCE.

2. **H. longifolia** Gaertn. Plants 1-4 dm. tall, often tufted, stoutish: blades of the stem-leaves linear to linear-lanceolate or linear-oblong, 1-3 cm. long: sepals linear-subulate to lanceolate-subulate, 1.5-2 mm. long, slightly longer than the hypanthium: corolla pinkish or bluish; tube about 4 mm. long: capsules 2-2.5 mm. thick. — Susquehanna valley. Occasional, on rocky banks. — Sum.

2. **CEPHALANTHUS** L. Shrubs or trees. Leaf-blades thinnish. Flowers in capitate cymes. Sepals usually 4, rounded. Corolla with a long tube and usually 4 short lobes. Stamens usually 4: filaments adnate to the throat of the corolla: anthers oblong or nearly so. Nut-like fruits obpyramidal, in a firm globose head.

1. **C. occidentalis** L. Shrub or small tree: leaf-blades oblong, lanceolate, or ovate-lanceolate, 5-20 cm. long, short-petioled: flower-heads globose, 2.5-3.5 cm. thick: sepals about 0.5 mm. long: corolla white, about 10 mm. long; lobes ovate to oblong-ovate: nutlets 7-8 mm. long. — Common, in swamps and low thickets. — Sum. — **BUTTONBUSH.**

3. **MITCHELLA** L. Undershubs with creeping stems. Leaf-blades leathery. Flowers in pairs, the hypanthia coalescent. Sepals usually 4, short. Corolla with a relatively long tube and usually 4 short lobes. Stamens 4: filaments adnate to near the top of the corolla-tube: anthers oblong. Drupes paired.

1. **M. repens** L. Stem and branches matted, 1-4 dm. long: leaf-blades ovate to orbicular, or elliptic, 8-30 mm. long: sepals deltoid, less than 1 mm. long: corolla white or pinkish; tube 9-12 mm. long; lobes ovate to oblong: fruit globular, 7-10 mm. thick, red or white, aromatic. — Common, in damp woods or on shaded banks. — Spr. — **TWIN-BERRY.** PARTRIDGE-BERRY.

4. **DIODELLA** Small. Annual diffuse herbs. Leaf-blades soft-herbaceous. Flowers axillary. Sepals 4. Corolla with a relatively short thick tube and 4 broad lobes. Stamens 4: filaments adnate up to the top of the corolla-tube, the free portions very short: anthers oval or ovoid. Stigma capitate or 2-lobed. Capsular fruit crustaceous, lobed.

1. **D. teres** (Walt.) Small. Stem or branches 1-4 dm. long, spreading or creeping, pubescent: leaf-blades linear or narrowly linear-lanceolate, 1-4 cm. long: sepals 4, acute, 1.5-2 mm. long: corolla white or pinkish; tube 5-6 mm. long; lobes ovate to oblong-ovate: fruits obovoid, 2-3 mm. long. — N. S. Common, on dry sandy banks. — *Sandstones and shales, schists.* — Sum. — **BUTTON-WEED.**

5. **GALIUM** L. Perennial, or sometimes annual, weak spreading herbs. Leaves with blades and stipules about equal in size. Flowers in simple or branched cymes. Sepals usually obsolete. Corolla rotate, with 3-5 lobes. Stamens 3-5. Fruit globular or didymous. — **BEDSTRAW.** CLEAVERS.

Annual plants: fruits bristly.

Perennial plants: fruits smooth, glabrous, or bristly.

Corolla yellow.

Corolla white, greenish or purple.

Endosperm of the seed deeply lunate or annular in cross-section: leaves various.

Fruits uncinat-hispid.

Flowers few, borne in lax cymes: corolla greenish or greenish-white: leaf-blades broad.

Fruits pedicelled: mature carpel-bodies less than 2 mm. long.

Fruits sessile or nearly so: mature carpel-bodies over 2 mm. long.

Upper leaves with oblong or ovate-lanceolate blades: corolla-lobes 1.5-2 mm. long.

Upper leaves with lanceolate blades: corolla-lobes 2.5-3 mm. long.

Flowers numerous, borne in compact cymes: corolla bright white: leaf-blades narrow.

Fruits smooth or nearly so.

Endosperm shallow-lunate, or flat, sometimes nearly circular in cross-section.

Fruits glabrous or nearly so.

Stem retrorsely hispid: leaf-blades broad: bracts bristle-tipped.

Stem smooth or nearly so: leaf-blades narrow: bracts not bristle-tipped.

Fruits uncinat-hispid.

1. *G. Aparine*.

2. *G. Wirtgenii*.

3. *G. pilosum*.

4. *G. circaezans*.

5. *G. lanceolata*.

6. *G. boreale*.

7. *G. tinctorium*.

8. *G. asprellum*.

9. *G. concinnum*.

10. *G. triflorum*.

1. *G. Aparine* L. Plants reclining, 1-15 dm. long, the stems retrorse-scabrous or prickly: leaves, and stipules, with linear-spatulate blades 1-8 cm. long, the upper side with short stout hairs: corolla white; lobes ovate, 1-1.5 mm. long, acute: fruits 3-5 mm. thick, densely uncinat-hispid: endosperm nearly annular in cross-section. — Common, in cultivated and waste grounds. — Spr. and sum. — GOOSE-GRASS. CLEAVERS.

2. *G. Wirtgenii* F. Schultz. Plants 2-7 dm. tall, the stems smooth, with rather long internodes above: leaves, and stipules, with linear roughish blades 9-21 mm. long, soon deflexed: lower branches of the inflorescence very short: corolla yellow; lobes ovate, about 1.5 mm. long, glabrous: fruits scarcely 1 mm. broad, usually glabrous. — S. Rare, in fields. Nat. of Eu. — Sum. — YELLOW-BELSTRAW.

3. *G. pilosum* Ait. Plants 3-8 dm. tall, the stems hirsute, 4-angled above the swollen nodes: leaves, and stipules, with oval-ovate or elliptic blades 8-10 mm. long, sparingly pubescent, pellucid-punctate beneath: corolla greenish or purplish; lobes ovate to lanceolate, about 1.5 mm. long: fruits about 4 mm. thick, uncinat-hispid: endosperm lunate in cross-section. — Common, in fences and thickets. — Sum.

4. *G. circaezans* Michx. Plants 2-4 dm. tall, the stem glabrous or sparingly pubescent: leaves, and stipules, with elliptic-ovate or oval blades 15-30 mm. long, or more, sparingly pubescent: corolla greenish; lobes ovate, acute, less than 2 mm. long: fruits about 5 mm. thick, uncinat-hispid: endosperm lunate in cross-section. — Common, in woods and thickets. — Sum. — WILD-LIQUORICE.

5. *G. lanceolatum* Torr. Plants sparingly pubescent in parts: stem branched at the base, mostly 2.5-6 dm. tall: leaves, and stipules, shorter than the internodes, 30-75 mm. long; blades of the upper leaves lanceolate or ovate-lanceolate, acute or slightly acuminate, sparingly pubescent, especially on the veins beneath, 3-ribbed: flowers few, sessile on the spreading cyme-branches: corolla glabrous or nearly so, 3-5 mm. broad, greenish, becoming purple; lobes 4, slender-tipped: fruits as in *G. circaezans*. — Not very common, in rocky woods. — Sum. — WILD-LIQUORICE.

6. *G. boreale* L. Plants glabrous or nearly so: stems often tufted, 1 mm. tall or less, strict: leaves and stipules in 4's, mostly 1.5-4 cm. long; blades linear to linear-lanceolate, mostly obtuse, 3-ribbed, ciliolate, pale beneath:

flowers numerous, in a compact panicle: corolla white, 3.5-4.5 mm. broad; lobes acute or slightly acuminate: fruits 2-2.5 mm. broad, minutely bristly. — Not very common, in dry thickets and rocky hillsides. — Sum.

7. *G. tinctorium* L. Plants 1.5-2.5 dm. tall, the stem glabrous or nearly so: leaves and stipules mostly in 4's, with linear-lanceolate blades 15-25 mm. long: flowers 2 or 3 in terminal clusters: corolla white; lobes about 1 mm. long: fruits 1.5-2.5 mm. thick, smooth: endosperm annular in cross-section. — Common, in swamps and wet thickets. — Spr. and sum.

8. *G. asprellum* L. Plants reclining, the stems 3-16 dm. long, retrorsely scabrous or prickly: leaves and stipules in 6's, with oblong-spatulate to elliptic blades 1-2 cm. long, the margins and midrib scabrous: flowers very numerous: corolla white; lobes fully 1.5 mm. long: fruits about 2.5 mm. thick, smooth and glabrous. — Common, in thickets. — Spr. and sum. — ROUGH-BEDSTRAW.

9. *G. concinnum* T. & G. Plants glabrous or near so: stems diffusely spreading, mostly 1-3 dm. tall, slightly scabrous-angled: leaves and stipules in 6's, as long as the internodes or shorter, mostly 1-2 cm. long; blades linear or slightly broadened upward, acute, scabrous-margined, 1-nerved: flowers rather few, greenish-white, on slender-filiform pedicels: corolla 2-2.5 mm. broad; lobes 4: fruits 2-2.5 mm. in diameter, smooth. — W. S. Occasional, in thickets near streams and in rocky woods. — *Sandstones and shales, schists.* — Sum.

10. *G. triflorum* Michx. Plants reclining, sweet-scented in drying, the stems 3-10 dm. long, sparsely hispid or rarely glabrous: leaves and stipules in 6's, with broadly linear to elliptic blades 1-8 cm. long, the margins and midrib hispid: flowers relatively few, 3 together on the ultimate peduncles: corolla greenish or yellowish-white; lobes fully 1.5 mm. long: fruit about 3 mm. thick, uncinately-hispid: endosperm circular in cross-section. — Occasional, in thickets and woods. — Spr. and sum. SWEET-SCENTED BEDSTRAW.

6. *SHERARDIA* L. Annual, slender, caulescent herbs. Leaves opposite, with the stipules whorled: blades entire. Flowers subtended by involucre of united bracts. Sepals minute, shorter than the hypanthium. Corolla pink or blue, funnelform, 4- or 5-lobed. Filaments adnate up to the sinuses of the corolla-lobes. Fruit twin, of 2 indehiscent 1-seeded carpels.

1. *S. arvensis* L. Plants with slender diffuse finely pubescent branches: leaves, and stipules, 5-18 mm. long; blades obovate to elliptic or oblong, bristle-tipped: sepals deltoid, about 1 mm. long: corolla pink or blue, 3.5-4 mm. long; lobes lanceolate or ovate-lanceolate: fruits 2-2.5 mm. long. — S. Occasional, in fields. Nat. of Eu. — Sum. — FIELD-MADDER.

FAMILY 2. CAPRIFOLIACEAE. HONEYSUCKLE FAMILY.

Shrubs, trees, vines, or perennial herbs. Leaves opposite: blades entire, toothed, or pinnate. Flowers mostly perfect, in terminal or axillary cymes, or axillary. Calyx of mostly 4 or 5 minute or foliaceous sepals. Corolla of 4 or 5 partly united petals, often irregular. Androeium of 4 or 5 stamens: filaments partly adnate to the corolla-tube. Gynoeium 2-5-carpellary. Ovary inferior. Fruit baccate, drupaceous, or capsular.

Corolla rotate to urceolate: stigma 2-5-lobed, sessile.

Leaf-blades pinnate: drupe berry-like with 3-5 nutlets.

Leaf-blades simple: drupe with 1 nutlet.

Corolla tubular to tubular-campanulate, sometimes with a 2-lipped limb: style elongate.

Flowers axillary: herbs.

1. SAMBUCUS.

2. VIBURNUM.

3. TRIOSTEUM.

LANCASTER COUNTY FLORA 18.

Flowers in axillary or terminal clusters or open cymes: shrubs or vines.

Fruit baccate: seeds few.

Corolla regular or nearly so; tube short.

Corolla irregular; limb 2-lipped; tube elongate.

Flowers in pairs each of which terminates an axillary peduncle, accompanied by a pair of bracts and bractlets.

Flowers in whorls at or near the ends of the branches, the bracts and usually some of the upper leaves connate-perfoliate.

Fruit capsular: seeds numerous.

4. SYMPHORICARPOS.

5. NINTOGA.

6. LONICERA.

7. DIERVILLA.

1. SAMBUCUS [Tourn.] L. Shrubs or trees, with pithy stems. Leaf-blades pinnate. Flowers in thyrsoid or flat-topped cymes. Sepals minute. Anthers oblong or oval. Ovary 3-5-celled. Drupes with 3-5 nutlets. — Spr. — ELDER.

Cymes compact, rounded: fruits red.

1. *S. pubens*.

Cymes flat-topped: fruits purple to black.

2. *S. canadensis*.

1. S. pubens Michx. Shrub: leaflets 5-7, the blades lanceolate, oblong or oblanceolate, or nearly oval, 5-15 cm. long: cymes thyrsoid: corolla 4-5 mm. wide: drupes 4-6 mm. in diameter. — Susquehanna valley and banks of the Octoraro Creek. On shaded hillsides. — RED-BERRIED ELDER.

2. S. canadensis L. Shrub or small tree: leaflets 5-11, the blades oblong to ovate or oval, 3-14 cm. long, serrate with incurved teeth: cymes merely convex: corolla 5-6 mm. wide: drupes 4-6 mm. in diameter. — Common, in waste places, woods, and thickets. — COMMON-ELDER.

2. VIBURNUM [Tourn.] L. Shrubs or trees, the stems not pithy. Leaf-blades simple. Flowers in round-topped cymes. Sepals minute. Anthers oblong. Ovary 1-celled. Drupes with a single nutlet. — Spr. and early sum. — ARROW-WOOD.

Leaf-blades palmately veined or lobed.

1. *V. acerifolium*.

Leaf-blades pinnately veined.

Cymes manifestly peduncled.

Leaf-blades coarsely dentate.

Lower surface of the leaf-blades glabrous or merely tufted in the vein-axils.

Lower surface of the leaf-blades stellate-pubescent.

Leaf-blades entire or irregularly erose-crenulate.

Peduncle as long as the cyme or longer: leaf-blades shining above.

Peduncle shorter than the cyme: leaf-blades dull above.

2. *V. dentatum*.

3. *V. venosum*.

4. *V. nudum*.

5. *V. coccinoides*.

Cymes sessile or nearly so.

Leaf-blades prominently acuminate, serrate.

Leaf-blades obtuse or merely acute, serrulate.

6. *V. Lentago*.

7. *V. prunifolium*.

1. V. acerifolium L. Erect shrub: leaf-blades prominently 3-lobed, 4-10 cm. long: sepals reniform, about 0.5 mm. long: hypanthium glabrous or nearly so: corolla-lobes mostly reniform: drupes oval, 9-10 mm. long, black or purple-black. — Common, in woods and thickets.

2. V. dentatum L. Shrub: leaf-blades suborbicular, oval, or ovate, sharply dentate, 3-8 cm. long: corolla-lobes reniform: filaments much exceeding the corolla-lobes: drupes globose-ovoid, 5-6 mm. long, deep-blue or nearly black. — Common, in woods and thickets.

3. V. venosum Britton. Shrub: leaf-blades thickish, suborbicular, broadly ovate, or elliptic, crenate-dentate, 4-9 cm. long, dull: corolla 5-8 mm. wide: filaments slightly exceeding the corolla-lobes: drupes globose-ovoid, 6-7 mm. long, deep-blue. — E. S. Occasional, in swamps. — *Quartzite, schists*.

4. **V. nudum** L. Shrub: leaf-blades thick, oval, ovate, oblong, broadly lanceolate, or oblanceolate, undulate or obscurely toothed, 5-15 cm. long, shining; corolla 4.5-6 mm. wide: filaments much exceeding the corolla-lobes: drupes oval to subglobose, 6-10 mm. long, deep-blue. — E. S. Occasional, in swamps. — *Schists*. — WITHE-ROD.

5. **V. cassinoides** L. Shrub or small tree: leaf-blades thickish, ovate-elliptic, ovate-lanceolate or oblanceolate, undulate or crenate, 2.5-10 cm. long: corolla 4-5 mm. wide: filaments much exceeding the corolla-lobes: drupes ovoid or globose-ovoid, 6-9 mm. long, deep-blue or rarely pink. — S. Occasional, about swamps. — *Schists*. — WITHE-ROD.

6. **V. Lentago** L. Shrub or tree: leaf-blades ovate to obovate or rarely suborbicular, finely and sharply serrate, 4-10 cm. long: sepals mostly acute or acutish: corolla-lobes ovate: filaments twice as long as the corolla or nearly so: drupes oval, 10-12 mm. long, bluish-black. — S. Occasional, on banks of creeks. — *Schists*. — NANNYBERRY. SHEEPBERRY. WILD-RAISIN.

7. **V. prunifolium** L. Shrub or tree: leaf-blades thinnish, oval varying to ovate or obovate, or rarely suborbicular, finely, sometimes obscurely, serrulate, 2.5-5 cm. long: sepals obtuse: corolla-lobes suborbicular: filaments much less than twice as long as the corolla: drupes oblong, sometimes broadly so, 7-9 mm. long, bluish-black under the bloom. — Common, in thickets and woods. — BLACK-HAW.

3. **TRIOSTEUM** L. Herbs with simple stems. Leaf-blades entire, sometimes connate-perfoliate. Flowers axillary. Sepals foliaceous. Filaments adnate to the lower part of the corolla-tube. Anthers linear. Ovary 3-5-celled. Drupes leathery or fleshy. — Sum. — HORSE-GENTIAN. FEVERWORT.

Leaf-blades narrowed to the sessile or slightly connate-perfoliate bases.

Leaves over thrice as long as broad: corolla yellowish. 1. *T. angustifolium*.

Leaves less than thrice as long as broad: corolla dull-red. 2. *T. aurantiacum*.

Leaf-blades with broadly dilated connate-perfoliate bases. 3. *T. perfoliatum*.

1. **T. angustifolium** L. Stem hirsute or softly hispid, 3-9 dm. tall: blades of the upper leaves usually narrowly elliptic, varying to lanceolate or oblanceolate, 3-15 cm. long: sepals 8-10 mm. long: corolla 12-15 mm. long: drupes about 10 mm. long. — M. S. Occasional, on edges of thickets. — *Limestones, schists*.

2. **T. aurantiacum** Bicknell. Similar to *T. angustifolium* in habit: blades of the upper leaves ovate-oblong to oblong-lanceolate, 15-25 cm. long: sepals 12-20 mm. long: corolla 14-20 mm. long: drupes 12-14 mm. long. — S. Frequent, on rich hillsides along the Susquehanna. — *Schists*.

3. **T. perfoliatum** L. Stems softly pubescent: blades of the upper leaves ovate to broadly oval, 10-25 cm. long: sepals 11-15 mm. long: corolla 12-15 mm. long: drupes 8-12 mm. long. — Rather common, in rich soil. — WILD-COFFEE. TINKER'S-WEED.

4. **SYMPHORICARPOS** [Dill.] Ludwig. Shrubs with much branched stems. Leaf-blades entire, or lobed on shoots. Flowers in spikes or racemes. Sepals minute. Filaments adnate to the top of the corolla-tube. Anthers oblong. Ovary 4-celled. Drupe berry-like, fleshy, with 2 nutlets. — Sum. — SNOW-BERRY.

Style glabrous: drupes white: corolla pale.

1. *S. racemosus*.

Style pubescent: drupes red or purple: corolla dark.

2. *S. Symphoricarpos*.

1. **S. racemosus** Michx. Shrub 1-2 m. tall, the twigs and leaves glabrous: leaf-blades elliptic or suborbicular, 3-6 cm. long: flowers short-pedicelled: corolla white or pinkish, 6-7 mm. long: drupes 6-10 mm. long. — E. Rare, in thickets.

2. **S. Symphoricarpos** (L.) MacM. Shrub 1-2 m. tall, the twigs and leaves pubescent: leaf-blades ovate, oval, or elliptic, 1-4 cm. long, or rarely larger: flowers sessile or nearly so: corolla greenish-red, 2.5-3.5 mm. long: drupes 3-4 mm. long.—S. Occasional, in thickets. Nat. of the W.—CORAL-BERRY. INDIAN-CURRENT.

5. **NINTOOA** Sweet. Woody vines. Leaf-blades entire. Flowers in pairs terminating axillary peduncles, accompanied by 2 foliaceous bracts and 2 small bractlets, the hypanthia distinct. Sepals slender or subulate. Corolla relatively long: tube not gibbous: limb 2-lipped. Berries distinct.

1. **N. japonica** (Thunb.) Sweet. Diffusely creeping or climbing vine: leaf-blades oblong, ovate, or orbicular-ovate, 2-5 cm. long: corolla white or pink, becoming yellow; tube about 2 cm. long: stamens and style exserted: berries subglobose or oval, 4-6 mm. long, black.—Common, on roadsides and open banks, and in waste places. Nat. of Japan.—Sum.—JAPANESE-HONEYSUCKLE.

6. **LONICERA** L. Woody vines. Leaf-blades entire, or lobed on shoots. Flowers in sessile axillary clusters. Hypanthium short. Sepals minute. Corolla mostly 2-lipped: tube more or less gibbous at the base. Berries clustered.—Spr. and sum.—HONEYSUCKLE.

Corolla ringent, with a prominently 2-lipped limb: filaments adnate up to the lower lip: stamens and style long-exserted. 1. *L. dioica*.

Corolla trumpet-shaped, with an almost regular limb: filaments not adnate up to the base of the upper lobe: stamens and style slightly exserted. 2. *L. sempervirens*.

1. **L. dioica** L. A diffuse or twining vine, the twigs glabrous: leaf-blades oblong, ovate, oval, or obovate, 5-12 cm. long: corolla yellowish-green, tinged with purple; tube 10-12 mm. long.—M. Occasional, on rocky banks along the Conestoga Creek.—*Limestones*.

2. **L. sempervirens** Ait. A twining vine, the twigs glabrous: leaf-blades narrow or broad, mostly 3-9 cm. long: corolla scarlet or yellow, 3-4 cm. long, the lower lip slightly narrower than the lobes of the upper lip.—M. S. Occasional, on banks or creeks.—*Limestones, schists*.—TRUMPET-HONEYSUCKLE.

7. **DIERVILLA** [Tourn.] Mill. Shrubs. Leaves with mostly toothed blades. Flowers in dichotomous cymes. Hypanthium elongate. Sepals 5, narrow. Corolla unequally 5-lobed. Capsule elongate.

1. **D. Diervilla** (L.) MacM. Shrub 5-15 dm. tall, the twigs terete: leaf-blades oval to oblong-ovate, 3-15 cm. long: sepals 4-5 mm. long: capsules gradually long-beaked.—N. S. Frequent, in rocky woods.—*Sandstones and shales, schists*.—Spr. and sum.—BUSH-HONEYSUCKLE.

Order VALERIANALES.

Caulescent or rarely acaulescent, succulent, coarse or woody plants. Leaves opposite: blades entire, toothed, or divided. Flowers mainly perfect. Calyx of partly united sepals, pappus-like, or obsolete. Corolla of 2-5 partly united petals. Androecium of usually fewer stamens than there are petals. Gynoecium 1-3-carpellary. Ovary inferior, 2 of the carpels commonly abortive. Fruit an achene, or nut-like.

Gynoecium 3-carpellary, but with two of the cavities empty: flowers not in involucrate heads. Fam. 1. VALERIANACEAE.

Gynoecium 1-carpellary: flowers in dense involucrate heads. Fam. 2. MORINACEAE.

FAMILY 1. VALERIANACEAE. VALERIAN FAMILY.

Annual or perennial, caulescent, succulent herbs. Leaves opposite: blades entire or pinnately divided. Flowers in variously disposed cymes. Calyx of 3-5 sepals, or sometimes pappus-like, or obsolete. Corolla of 3-5 partially united petals: tube often swollen or spurred. Androecium of 1-4 stamens: filaments adnate to the corolla-tube. Gynoecium 3-carpellary but only 1 carpel fructiferous. Ovary inferior. Fruit a kind of leathery or crustaceous nutlet.

Sepals becoming bristle-like or awn-like: fruit 1-celled: tall herbs often with divided leaf-blades. 1. VALERIANA.

Sepals minute or wanting: fruit 3-celled: low herbs with undivided leaf-blades. 2. VALERIANELLA.

1. **VALERIANA** [Tourn.] L. Perennial heavy-scented herbs or vines. Leaf-blades entire, toothed, or pinnatifid. Flowers perfect, in compact cymes. Calyx with an inrolled limb which ultimately expands and develops 5-15 plumose bristles. Corolla funnelliform or salverform. Stamens 3 or fewer. Fruit 1-celled, the 2 abortive carpels appearing as 4 ridges.

1. **V. pauciflora** Michx. Plants 1 m. tall or less: blades of the basal leaves ovate or triangular-ovate, mostly toothed: bracts 4-8 mm. long: inflorescence congested: corolla pale-pink; lobes less than $\frac{1}{2}$ as long as the tube: fruit oblong, 5-6 mm. long.—M. S. Rather rare, in rich woods.—*Limestones, schists*.—Late spr.—VALERIAN.

2. **VALERIANELLA** [Tourn.] Mill. Annual, vernal, succulent herbs, the stems dichotomous. Leaf-blades entire, toothed, lobed, or pinnatifid. Flowers perfect, in clustered or corymbose cymes. Calyx shallowly lobed or obsolete. Corolla funnelliform. Stamens 3. Fruit with the abortive carpels more or less elongate.—Spr. and sum.—CORN-SALAD. LAMB'S-LETTUCE.

Corolla blue or purplish: fruits about twice as broad as thick: species introduced.

1. *V. Locusta*.

Corolla white: fruits about as broad as thick: species native.

Fruits with the fertile portion fully as wide as the sterile portion.

2. *V. radiata*.

Fruits with the fertile portion much smaller and narrower than the sterile portion.

Empty cavities dilated and divergent, forming a saucer-shaped body notched at both ends.

3. *V. patellaria*.

Empty cavities contiguous, with an oblong depression between them.

4. *V. Woodsiana*.

1. **V. Locusta** (L.) Betteke. Stems 1-4 dm. tall: blades of the stem-leaves oblong-lanceolate: corolla 2 mm. long: fruits about twice as long as thick.—N. M. Common, in thickets, meadows and waste grounds. Nat. of Eu.

2. **V. radiata** (L.) Dufr. Stems 2-7 dm. tall: blades of the upper stem-leaves oblanceolate to oblong or ovate: fruits obovoid-tetragonal.—M. S. Common, on moist banks and meadows.—*Limestones, schists*.

3. **V. patellaria** (Sulliv.) Krok. Stems 1-4 dm. tall: blades of the upper stem-leaves similar to those of *V. radiata*: empty carpels of the fruits with a saucer-shaped body notched at each end.—M. Frequent, in meadows and low grounds.—*Limestones*.

4. **V. Woodsiana** (T. & G.) Walp. In habit and leaves resembling *V. radiata*: fruits about 2 mm. long, with the fertile portions much smaller and narrower than the sterile, the cavities of this latter contiguous, with an oblong depression between them.—Occasional, in low grounds.

FAMILY 2. **MORINACEAE.** TEASEL FAMILY.

Annual or perennial, often prickly herbs, or woody plants. Leaves opposite: blades entire, toothed, or dissected. Flowers perfect, each subtended by an involucrel, commonly crowded on a receptacle and involucrete. Calyx a cup-like border or of several bristles. Corolla of 2-5 partially united petals, sometimes 2-lipped. Androecium of 2-4 stamens: filaments adnate to the corolla-tube. Gynoecium 1-carpellary. Ovary inferior. Fruit an achene crowned with a calyx.

1. DIPSACUS [Tourn.] L. Coarse prickly herbs. Leaf-blades often connate-perfoliate. Flower-heads globular or elongate. Involucral bracts rigid. Calyx cup-like, sometimes 4-lobed. Corolla tubular-funnelform. Ovary enclosed in the involucrel. Achenes 8-ribbed. — TEASEL.

1. D. sylvestris Huds. Biennial, 1-2.5 m. tall; blades of the stem-leaves lanceolate, entire: heads ovoid, 5-6 cm. long, the involucral bracts linear-lanceolate, rough: calyx fully 1 mm. long: corolla 11-13 mm. long: lobes 4, lilac, broadly ovate: stamens exserted: achenes about 5 mm. long. — N. M. Rather common, in waste places and fence corners. Nat. of Eu. — Sum. — WILD-TEASEL.

Order **ARISTOLOCHIALES.**

Herbs, shrubs, or vines. Leaves alternate: blades mostly cordate or hastate. Flowers perfect, often conspicuous. Hypanthium mostly adnate to the ovary. Calyx regular or very irregular. Corolla wanting or rudimentary. Androecium of as many stamens as there are calyx-lobes or more. Gynoecium of usually 6 united carpels. Fruit a capsule.

FAMILY 1. **ASARACEAE.** BIRTHWORT FAMILY.

Perennial herbs, shrubs, or vines. Leaves alternate: blades sometimes lobed, generally cordate. Flowers perfect, regular or very irregular. Calyx usually colored, the tube often bent or inflated. Androecium of 6-many stamens. Gynoecium of 4-6 united carpels. Ovary mostly inferior. Fruit capsular.

Acaulescent herbs: calyx regular, persistent: capsules fleshy.
Caulescent herbs or vines: calyx irregular, deciduous: capsules
dry.

1. **ASARUM.**2. **ARISTOLOCHIA.**

1. ASARUM [Tourn.] L. Acaulescent gingerous herbs. Leaves in pairs: blades not lustrous. Flower-stalks arising between the petioles. Hypanthium angled, pubescent. Sepals deciduous. Capsule inferior. Seeds turgid. — Spr. — WILD-GINGER.

Sepals lanceolate-acuminate, not reflexed, longer than the hypanthium.

1. *A. canadense.*

Sepals triangular, merely acute, reflexed, about as long as the
hypanthium.

2. *A. reflexum.*

1. A. canadense L. Leaf-blades reniform, 6-15 cm. wide, the sinus closed: hypanthium thinly pubescent: sepals abruptly acuminate, the tubular portions curving upward. — S. Occasional, on rocky hillsides along the Octoraro Creek. — *Schists.*

2. A. reflexum Bicknell. Leaf-blades reniform, 6-14 cm. wide, the sinus open: flowers smaller than those of the preceding species: sepals 8-10 mm. long, early reflexed, obtuse at the tip. — Common, in rich woods.

2. **ARISTOLOCHIA** [Tourn.] L. Caulescent herbs, shrubs, or vines. Leaves with narrow or broad blades. Flowers irregular, often S-shaped or resembling a "dutch pipe," the calyx usually coralloid. Hypanthium often ribbed. Ovary inferior. Styles united into an angled column. Capsules pendulous. — BIRTHWORT.

1. **A. Serpentaria** L. Plants dark-green, 1-4 dm. tall: leaf-blades oblong-lanceolate to oval-lanceolate or rarely lanceolate, 4-15 cm. long: flowers about 1 cm. long: hypanthium S-shaped, inflated at both ends: calyx-limb obtusely 3-lobed: capsule about 10 mm. in diameter. — Common, in woods. — Spr. — VIRGINIA-SNAKE-ROOT.

Order CAMPANULALES.

Herbs or rarely shrubs or trees. Leaves mainly alternate: blades simple, entire or divided. Flowers perfect, monoecious, or dioecious, sometimes irregular. Hypanthium well developed. Calyx of several distinct or partly united sepals. Corolla of several distinct or partly united petals. Androecium of 1-5 stamens. Anthers distinct or connate. Gynoecium of 1-several united carpels, the ovary wholly or partly inferior. Fruit capsular, baccate, or drupaceous.

Endosperm wanting: flowers monoecious or dioecious: plants mainly vines.

Fam. 1. CUCURBITACEAE.

Endosperm present: flowers perfect or mainly so.

Fam. 2. CAMPANULACEAE.

Corolla regular: anthers separate.

Corolla split on one side and otherwise more or less

Fam. 3. LOBELIACEAE.

irregular: anthers united around the style.

FAMILY 1. CUCURBITACEAE. GOURD FAMILY.

Vines, usually tendril-bearing. Leaves alternate: blades palmately or pedately veined, and commonly lobed. Flowers monoecious or dioecious. Calyx of 4 or 5, or rarely 6, distinct or partly united sepals. Corolla of 4 or 5, or rarely 6, distinct or partly united petals, sometimes adherent to the calyx. Androecium of 3 stamens (2 anthers 2-celled and 1 anther 1-celled), or rarely of 1, 2, 4, or 5 stamens. Filaments sometimes united. Anthers straight or bent. Gynoecium 1-several-carpellary. Styles united. Fruit a fleshy or partly dry berry (pepo).

Fruit bladder-like, dehiscent: ovary 2-3-celled: ovules few, erect or ascending.

1. MICRAMPELIS.

Fruit not bladder-like, indehiscent: ovary 1-celled: ovules solitary, pendulous.

2. SICYOS.

1. **MICRAMPELIS** Raf. Annual or perennial vines. Leaves with angulate or lobed blades. Flowers monoecious. Corolla rotate, relatively small. Pistillate flowers usually solitary, with staminodia. Ovary echinate. Stigmas lobed. Berry echinate, fibrous within, the rind tough. Seeds not filling the cavities. — MOCK-APPLE.

1. **M. lobata** (Michx.) Greene. Stem and branches tender: leaf-blades 4-15 cm. long, palmately 3-5-lobed, the lobes triangular-ovate to lanceolate: sepals 2-4 mm. long: corolla rotate, 7-9 mm. wide; lobes lanceolate: berries inflated, oblong to globose-oblong, 3-4.5 mm. long, bursting at the apex. — Susquehanna valley. Frequent, in thickets. — Sum. — WILD BALSAM-APPLE.

2. **SICYOS** L. Annual vines. Leaves with angulate or lobed blades. Flowers monoecious. Corolla rotate, relatively small. Pistillate flowers clus-

tered, without staminodia. Ovary bristly or prickly. Berry bristly. Seeds filling the cavity.

1. *S. angulata* L. Stems and branches viscid-pubescent: leaf-blades 6-15 cm. wide, 5-angled or 5-lobed, the lobes distinctly toothed: hypanthium flattish: sepals of the staminate flowers triangular, 3-5 mm. long: corolla rotate, white, striped with green, 10-12 mm. wide: berries clustered, ovoid, 1.5-2 cm. long. — Common, in waste places and thickets. — Sum. — NIMBLE-KATE. STAR-CUCUMBER.

FAMILY 2. CAMPANULACEAE. BELLFLOWER FAMILY.

Herbs or woody plants. Leaves alternate: blades entire, toothed, or lobed. Flowers perfect, regular, sometimes dimorphous. Calyx of 5 sepals, or fewer in cleistogamous flowers. Corolla of 5 partly united petals. Androecium of 5 distinct stamens. Gynoecium 2-5-carpellary, the ovary more or less inferior. Fruit capsular.

Corolla campanulate or funnellform: inflorescence racemose or paniculate.

1. CAMPANULA.

Corolla rotate: inflorescence spicate.

Style declined: flowers complete throughout.

2. CAMPANULASTRUM.

Style straight: flowers various, the earlier ones cleistogamous.

3. SPECULARIA.

1. **CAMPANULA** [Tourn.] L. Perennial or sometimes annual herbs. Leaf-blades entire to lobed. Flowers perfect, all alike and complete. Hypanthium relatively short in age. Corolla campanulate to funnellform. Stamens included. Capsules opening by lateral or basal perforations or valves. — BELLFLOWER.

Corollas over 12 mm. long.

Stem-leaves with linear blades: basal leaves with orbicular or ovate-orbicular blades: sepals subulate: capsules of a turbinate type. 1. *C. rotundifolia*.

Stem-leaves and basal leaves with ovate or ovate-lanceolate

blades: sepals lanceolate: capsules hemispheric. 2. *C. rapunculoides*.

Corollas less than 10 mm. long. 3. *C. aparinoides*.

1. **C. rotundifolia** L. Stems glabrous or nearly so, nearly 1 m. tall or less, diffuse: basal leaves with orbicular or ovate-orbicular, often toothed, long-petioled blades cordate at the base; stem-leaves linear, entire: sepals subulate, longer than the hypanthium: corolla blue or purplish-blue, 1.5-2.5 cm. long; lobes broadly ovate to reniform: capsules turbinate to obovoid-turbinate, 5-6 mm. long: seeds 1 mm. long. — M. S. Occasional, on rocky creek-banks. — *Limestones, schists, serpentine*. — Spr. — BLUEBELL. HAREBELL.

2. **C. rapunculoides** L. Stem sparingly pubescent or glabrous, 1 m. tall or less, commonly simple: leaf-blades ovate, ovate-lanceolate, or oblong-lanceolate, 4-11 cm. long, serrate or crenate-serrate, those of the lower leaves rounded or subcordate at the base, and long-petioled, those of the upper ones narrowed at the base and sessile or nearly so: sepals lanceolate, as long as the hypanthium or longer: corolla blue, 2.5-3 cm. long; lobes ovate to ovate-lanceolate, much shorter than the tube: capsules hemispheric, 5-7 mm. long, ribbed: seeds fully 1 mm. long. — S. Occasional, on roadsides and in fields. — Nat. of Eu. — Sum. — CREEPING-BELLFLOWER.

3. **C. aparinoides** Pursh. Stems 2-6 dm. long, prickly throughout: leaf-blades 1-3.5 cm. long, those of the upper leaves linear to lanceolate: sepals ovate to triangular-ovate, 1.5-2 mm. long: corolla white or pink, 5-8 mm. long: capsules globose-obovoid: seeds about 0.5 mm. long, smooth. — Common, in swamps and spring-runs. — Sum. — MARSH-BELLFLOWER.

2. **CAMPANULASTRUM** Small. Annual or biennial herbs. Leaf-blades toothed. Flowers perfect and complete. Hypanthium elongate in age. Corolla rotate. Stamens exerted. Capsule opening by subapical valves. Seeds flattish, broad, margined.

1. **C. americanum** (L.) Small. Plants 2–20 dm. tall, often widely branched: blades of the upper leaves usually lanceolate, 5–12 cm. long, acuminate: sepals linear-subulate, 6–10 mm. long: corolla blue or white; lobes 10–13 cm. long: capsules turbinate-clavate, 8–10 mm. long: seeds oval, about 1.5 mm. long. — Common, in thickets and open woods. — Sum.

3. **SPECULARIA** [Heist.] Fabr. Annual or biennial herbs. Leaf-blades toothed. Flowers dimorphous, the earlier ones with 3 or 4 sepals and undeveloped corollas, the later ones with 5 sepals and rotate corollas. Capsules prismatic. — VENUS'S LOOKING-GLASS.

Sepals of the showy flowers lanceolate: capsule short, broad. 1. *S. perfoliata*.
Sepals of the showy flowers linear: capsule elongate, narrow. 2. *S. Speculum*.

1. **S. perfoliata** (L.) A. DC. Stems 1–5 dm. tall: leaf-blades suborbicular to triangular-ovate: corolla blue, 10–15 mm. wide: capsules oblong-prismatic or obconic, 5–6 mm. long: seeds oval, about 0.5 mm. long. — Common, in fields and waste places. — Sum.

2. **S. Speculum** (L.) A. DC. Stems 1–4 dm. tall, glabrous or sparingly pubescent above: leaf-blades obovate, oblanceolate, oblong, or ovate-oblong, 1–3 cm. long, undulate-erisped, sessile: calyx of the petaliferous flowers with 5 narrowly linear sepals which are shorter than the hypanthium: corolla blue, about 2 cm. wide: capsules slender-fusiform, 1–1.5 cm. long: seeds oblong, fully 1 mm. long. — S. Rare, in fields near Wakefield. Nat. of Eu. — Sum.

FAMILY 3. LOBELIACEAE. LOBELIA FAMILY.

Herbs, or rarely trees, the sap often milky. Leaves alternate: blades entire, toothed, or parted. Flowers perfect, or rarely dioecious, irregular. Calyx of 5 sepals. Corolla more or less 2-lipped, the tube open on one side. Androecium of 5 stamens, the filaments sometimes cohering. Gynoecium mostly 2-carpellary, the ovary more or less inferior. Fruit capsular or baccate.

1. **LOBELIA** [Plum.] L. Annual or perennial herbs. Leaf-blades entire or toothed. Flowers in spikes, racemes, or panicles. Hypanthium mostly ribbed. Sepals entire or often glandular-toothed, sometimes with basal appendages. Corolla variously colored or white: upper lip 2-lobed: lower lip 3-lobed. Anthers in a ring around the style, 2 often smaller than the others. Ovary 2-celled. Capsule 2-valved.

Corolla red; tube over 2 cm. long: style and androecium over 3 cm. long.

Corolla blue or rarely white; tube less than 2 cm. long: style and androecium less than 3 cm. long.

Corolla, exclusive of the lower lip, over 10 mm. long.

Anthers glabrous at the tip: calyx-appendages long,

acute.

Anthers bearded at the tip: calyx-appendages short,

rounded.

Corolla, exclusive of the lower lip, less than 10 mm. long.

Flowers short-stalked: stem-leaves with relatively broad

blades.

Capsule partly inferior, 2.5–3 mm. long.

Capsule wholly inferior, 5–8 mm. long.

Flowers long-stalked: stem-leaves with very narrow

blades.

1. *L. cardinalis*.

2. *L. syphilitica*.

3. *L. puberula*.

4. *L. spicata*.

5. *L. inflata*.

6. *L. Kalmii*.

1. *L. cardinalis* L. Stems 3-12 dm. tall, simple: blades of the lower leaves oblong to oblong-spatulate, serrate or dentate: sepals linear to linear-subulate: corolla-lobes on either side of the cleft linear-oblancheolate: capsule hemispheric, short-beaked: seeds mostly over 1 mm. long.—Common, in moist places and on creek-banks.—Late sum.—CARDINAL-FLOWER.

2. *L. syphilitica* L. Stems 2-6 dm. tall, sparingly pubescent, often branched: leaf-blades oblanceolate to elliptic or lanceolate, 2.5-20 cm. long, coarsely serrate or sinuate-dentate: sepals bristly ciliate, acuminate from a broad base, each with large acute basal auricles: corolla light-blue, or rarely white; tube about 1.5 cm. long; lobes of the lower lip narrow, gradually pointed: seeds wrinkled.—Common, in meadows and along streams.—Fall.—GREAT-LOBELLIA.

3. *L. puberula* Michx. Stems 3-10 dm. tall, softly pubescent: leaf-blades oblanceolate to obovate, oblong, lanceolate, or ovate, 2-10 cm. long, finely toothed: sepals sometimes bristly, lanceolate, 7-9 mm. long, each with small rounded basal auricles: corolla bright-blue; tube about 1 cm. long; lobes of the lower lip broad, abruptly pointed: seeds tuberculate.—S. Frequent, in low grounds and thickets.—Schists.—Fall.

4. *L. spicata* Lam. Stems 1-12 dm. tall, pubescent, at least near the base: leaf-blades spatulate, obovate, or suborbicular at the base of the stem, oblanceolate to lanceolate above, 1-10 cm. long, crenate-dentate or nearly entire: sepals linear-subulate, 3-5 mm. long, not auricled at the base: corolla blue, 6-9 mm. long: capsules 2.5-3 mm. long.—Common, in moist fields and meadows.—Sum.

5. *L. inflata* L. Stems 1-10 dm. tall, pubescent: leaf-blades obovate to oval or ovate, 2-9 cm. long, crenate: sepals linear, 2.5-3.5 mm. long, entire: corolla lilac, 6-8 mm. long: capsules 5-8 mm. long, inflated.—Common, in dry soil and thickets.—Sum. and fall.—INDIAN-TOBACCO.

6. *L. Kalmii* L. Stems 1-5 dm. tall, glabrous: basal leaves with spatulate blades, upper cauline leaves narrowly linear, 1-4 cm. long, entire: flowers slender-pedicelled: hypanthium turbinate, becoming obovoid and 5-6 mm. long: sepals subulate or lanceolate-subulate, entire, 2.5-3 mm. long: corolla light-blue, about 1 cm. long: capsules 6-7 mm. long.—M. Rare, in the Dillerville swamp, Lancaster.—Limestones.—Sum.—BROOK-LOBELLIA.

Order CARDUALES.

Herbs, shrubs, or rarely trees. Leaves mainly alternate: blades entire, toothed, or divided. Flowers perfect, monoecious, or dioecious, few or many aggregated on a receptacle and surrounded with an involucre or the involucre rarely obsolete. Calyx 1 or 2 rows of bristles or scales, or a mere border or a crown, or obsolete, or wanting. Corolla of several more or less united petals or wanting. Androecium of usually 5 stamens, the anthers converging or united. Gynoecium mostly of 2 united carpels. Ovary inferior. Styles or stigmas mostly 2. Fruit an achene.

Flowers with tubular corollas, or those of the outer ones prolonged into ligules.

Stamens distinct, the anthers merely converging about the stigma.

Stamens united by their anthers, thus forming a tube around the stigma, except in *Kuhnia*.

Fam. 1. AMBROSIACEAE.

Fam. 2. CARDUAACEAE.

Flowers with each corolla prolonged into a ligule.

Fam. 3. CICHORIAEACEAE.

FAMILY 1. AMBROSIACEAE. RAGWEED FAMILY.

Annual or perennial herbs, or woody plants, often weedy. Leaf-blades entire, lobed, or divided. Flowers in inconspicuous heads, the bracts

of the pistillate heads distinct or sometimes united and accrescent into a bur. Fruit-producing flowers apetalous or with much reduced corollas. Achenes subtended by or enclosed in an involucre. Pappus wanting or obsolete.

Bracts of the staminate involucre distinct: pistillate involucre bur-like.

Bracts of the staminate involucre united: pistillate involucre not bur-like. 1. XANTHIUM.
2. AMBROSIA.

1. **XANTHIUM** [Tourn.] L. Coarse, sometimes spiny herbs. Leaf-blades toothed or lobed. Mature pistillate involucre copiously and evenly spiny.—Sum. and fall.—CLOTBUR. BURWEED. COCKLEBUR.

Leaf-blades much longer than broad: leaf-bases accompanied by 3-pronged spines: fruits usually 1-beaked or beakless. 1. *X. spinosum*.
Leaf-blades as broad as long or but little longer: leaf-bases without spines: fruits usually 2-beaked. 2. *X. americanum*.

1. **X. spinosum** L. Plants spiny, 2-12 dm. tall: leaf-lobes lanceolate, mostly 3-lobed, white- or pale-pubescent beneath: fruits 10-13 mm. long.—S. Rare, in waste grounds. Nat. of trop. Am.

2. **X. americanum** Walt. Plants glabrate or finely pubescent, 2-13 dm. tall: leaf-blades ovate to deltoid, 5-30 cm. long, rather coarsely toothed and more or less distinctly lobed: fruits oblong, 15-20 mm. long, thickly beset with slender hooked spines.—Common, in waste places and on roadsides.

2. **AMBROSIA** [Tourn.] L. Weed-like herbs, ours annual. Leaf-blades toothed, lobed, or divided. Mature pistillate involucre tuberculate or spiny near the top.—Sum. and fall.—RAGWEED.

Leaves opposite; blades palmately 3-5-lobed or merely toothed: receptacle naked.

Leaves alternate and opposite; blades 1-2-pinnatifid: receptacle chaffy. 1. *A. trifida*.
2. *A. elatior*.

1. **A. trifida** L. Stems hirsute or hispid, 8-15 dm. tall: leaf-blades deeply 3-5-lobed or sometimes merely toothed, 8-30 cm. long: pistillate heads clustered at the base of leaf-like bracts: fruits turbinate or obovoid, 8-10 mm. long, with several tubercles at the base of the beak.—Common, on roadsides and in moist soil.—GREAT-RAGWEED. HORSE-CANE.

2. **A. elatior** L. Stems hirsute, 3-18 dm. tall or diffuse: leaf-blades mainly bipinnatifid or pinnately parted, 3.5-12 cm. long: fruits 3-3.5 mm. long.—Common, in fields and waste places.—RAGWEED. ROMAN-WORMWOOD. HOGWEED.

FAMILY 2. CARDUACEAE. THISTLE FAMILY.

Herbs, or rarely shrubs or trees. Flowers borne in heads, the marginal ones commonly differing from the central ones in having a 1-sided more or less elongate corolla-limb. Pappus usually present, often conspicuous.

Stigmatic lines at the base of the stigma or below the middle.

Stigmas filiform or subulate, hispidulous.

Tribe I. VERNONIEAE.

Stigmas more or less clavate, papillose-puberulent.

Tribe II. EUPATORIEAE.

Stigmatic lines extending to the tip of the stigma or to the appendages.

Anthers without elongate appendages at the tip.

Anther-sacs tailed at the base.

Tribe IV. INULEAE.

Anther-sacs not tailed at the base.

Receptacle naked.

Bracts of the involucre well imbricate.

Stigmas of the perfect flowers with terminal appendages.	Tribe III. ASTEREAÆ.
Stigmas of the perfect flowers with truncate or hairy or papillose tips.	
Bracts of the involucre herbaceous.	Tribe VI. HELENIEAÆ.
Bracts of the involucre dry and scarious.	Tribe VII. ANTHEMIDEAÆ.
Bracts of the involucre little if at all imbricate, except when the broad outer ones overlap the inner.	
Receptacle chaffy.	Tribe VIII. SENECTIONEAÆ.
Bracts of the involucre herbaceous, sometimes foliaceous.	Tribe V. HELIANTHEAÆ.
Bracts of the involucre dry and scarious.	Tribe VII. ANTHEMIDEAÆ.
Anthers with elongate, cartilaginous, mostly connate appendages at the tip.	Tribe IX. CYNAREAÆ.

TRIBE I. VERNONIEAÆ.

Heads not glomerate and involucrate: pappus double: corollas regular.	1. VERNONIA.
Heads glomerate and involucrate: pappus single: corollas irregular.	2. ELEPHANTOPUS.

TRIBE II. EUPATORIEAÆ.

Achenes 3-5-angled, ribless.	
Erect herbs: involucre bracts more than 4.	
Receptacle flat: corollas white, pink, or purple.	3. EUPATORIUM.
Receptacle conic or hemispheric: corollas blue or violet.	4. CONOCLINIUM.
Climbing vines: involucre bracts 4 or fewer, or rarely more.	5. MIKANIA.
Achenes 8-10-ribbed or 8-10-striate.	
Heads spicate or racemose: corollas pink to purple: bracts of the involucre smooth or faintly striate.	6. LACINIARIA.
Heads corymbose: corollas pale: bracts of the involucre striate-nerved.	7. KUHNIA.

TRIBE III. ASTEREAÆ.

Heads with perfect, at least not dioecious, flowers: ray-flowers usually present.	
Ray-flowers with yellow corollas, (white in <i>Solidago bicolor</i>).	
Pappus, at least that of the disk-flowers, double, the outer series of scales or short-bristles, the inner of capillary bristles.	8. CHRYSOPSIS.
Pappus wholly of capillary bristles.	
Bracts of the involucre broad, longitudinally ribbed.	9. OLIGONEURON.
Bracts of the involucre narrow, not ribbed.	
Receptacle pubescent, fimbriate: ray-flowers more numerous than those of the disk.	10. EUTHAMIA.
Receptacle alveolate: ray-flowers fewer than those of the disk.	11. SOLIDAGO.
Ray-flowers with white or colored corollas, not yellow.	
Pappus a mere crown, or of 2-4 awns and short bristles.	12. BOLTONIA.
Pappus, at least in the disk, of numerous capillary bristles.	
Pappus mainly of a single series of bristles.	
Bracts of the involucre in 3-many-series.	
Ray with few flowers, the ligules inconspicuous: involucre narrow; bracts thick, firm.	13. SERICOCARPUS.
Ray with usually many flowers, the ligules conspicuous: involucre turbinate, hemispheric or globose; bracts thin, herbaceous.	
	14. ASTER.
Bracts of the involucre in 1 or 2 series.	
Heads conspicuous: ray-flowers several- numerous: ligules longer than the diameter of the disk.	15. ERIGERON.
Heads inconspicuous: ray-flowers few; ligules shorter than the diameter of the disk.	16. LEPTILON.
Pappus manifestly double, the bristles of the inner series longer than those of the outer.	
Involucre of 2-4 series of bracts: ligules of the ray white or nearly so: achenes broad: leaf-blades several-ribbed.	17. DOELLINGERIA.

- Involucre of 5-6 series of bracts: ligules of the ray violet, or rarely white: achenes narrow: leaf-blades 1-ribbed. 18. IONACTIS.
 Heads with dioecious flowers: ray-flowers wanting. 19. BACCHARIS.

TRIBE IV. INULEAE.

- Ray-flowers wanting: disk-flowers with white or whitish corollas: heads relatively small.
 Receptacle chaffy: involucre of few bracts. 20. GIFOLA.
 Receptacle naked: involucre of many bracts.
 Plants dioecious or polygamo-dioecious.
 Pappus-bristles of the staminate flowers thickened above: plants stoloniferous. 21. ANTENNARIA.
 Pappus-bristles not thickened: plants not stoloniferous. 22. ANAPHALIS.
 Plants not dioecious: flowers all fruit-producing. 23. GNAPHALUM.
 Ray-flowers present: corollas yellow: heads relatively large. 24. INULA.

TRIBE V. HELIANTHEAE.

- Disk-flowers perfect, but not fruit-producing.
 Achenes short, thick or turgid: pappus wanting. 25. POLYMNIA.
 Achenes obcompressed, 3-ribbed. 26. POLYMNIASTRUM.
 Achenes laterally compressed, closely striate.
 Achenes markedly flattened: pappus present, sometimes obsolete.
 Ray conspicuous: ligules yellow, spreading: heads mostly showy.
 Ray-flowers in 2 or 3 series: achenes falling away free. 27. SILPHIUM.
 Ray-flowers in 1 series: achenes adnate to 2 or 3 bractlets and falling away with them. 28. CHRYSOGONUM.
 Ray inconspicuous: ligules white or whitish, erect or nearly so: heads not showy. 29. PARTHENIUM.
 Disk-flowers fruit-producing. 30. HELIOPSIS.
 Corollas of the ray persistent on the achenes.
 Corollas of the ray deciduous, or wanting.
 Pappus a mere crown or a cup, or of few teeth, awns, or bristles.
 Achenes, at least those of the disk, not compressed: bractlets of the receptacle mostly concave or clasping.
 Bractlets of the receptacle mere chaffy subulate awns or bristles: ray-flowers with white ligules. 31. VERBESINA.
 Bractlets of the receptacle broad, concave or clasping. 32. RUDECKIA.
 Receptacle conic to columnar.
 Receptacle flat or convex.
 Achenes not much flattened, wingless, erect: leaves not decurrent. 33. HELIANTHUS.
 Achenes flattened, winged, widely spreading: leaves decurrent. 34. RIDAN.
 Achenes very flat: bractlets of the receptacle flat or at least not clasping.
 Pappus of 2 fimbriolate awns, scales of teeth, or a mere border or obsolete. 35. COREOPSIS.
 Pappus of 2-6 awns or teeth, upwardly or downwardly barbed or hispid. 36. BIDENS.
 Pappus of numerous scales. 37. GALINSOGA.

TRIBE VI. HELENIEAE.

- A single genus in our range. 38. HELENIUM.

TRIBE VII. ANTHEMIDEAE.

- Receptacle chaffy.
 Heads small: involucre not flattened, obovoid to campanulate: achenes flattened. 39. ACHILLEA.
 Heads large: involucre depressed, hemispheric: achenes terete or angled. 40. ANTHEMIS.
 Receptacle naked or sometimes merely pubescent. 41. CHRYSANTHEMUM.
 Ray-flowers normally present. 42. TANACETUM.
 Ray-flowers wanting.

TRIBE VIII. SENECTIONEAE.

Leaves opposite, sometimes mainly basal: pappus-bristles rigid. 43. *ARNICA*.

Leaves alternate: pappus-bristles soft.

Corollas white or pink: ray-flowers wanting.

Heads with various flowers, the marginal pistillate, those of the disk perfect. 44. *ERECHTITES*.

Heads with all flowers perfect.

Involucre of about 5 main bracts. 45. *MESADENIA*.

Involucre of 12-15 main bracts. 46. *SYNOSMA*.

Corollas yellow: ray-flowers usually present. 47. *SENECIO*.

TRIBE IX. CYNAREAE.

Achenes inserted on the receptacle by their bases, not oblique.

Receptacle not honeycombed, bristly.

Achenes pubescent, without a rim at the top. 48. *XERANTHEMUM*.

Achenes glabrous, with a rim at the top.

Bracts of the involucre with hooked tips: leaves with unarmed blades, not bristly. 49. *ARCTIUM*.

Bracts of the involucre not hooked: leaves spine-armed and often bristly.

Pappus-bristles plumose. 50. *CIRSIUM*.

Pappus-bristles not plumose. 51. *CARDUUS*.

Receptacle deeply honeycombed, not bristly. 52. *ONOPORDON*.

Achenes obliquely inserted on the receptacle. 53. *CENTAUREA*.

1. **VERNONIA** Schreb. Perennial caulescent herbs. Leaves alternate: blades mostly toothed, often narrow. Heads not involucre. Corolla-lobes lanceolate. Anther-appendages lanceolate to oblong. Pappus double, the outer series of scales or stout bristles, the inner of numerous capillary bristles.

1. **V. noveboracensis** (L.) Willd. Stems 1-3 m. tall: leaf-blades linear-lanceolate to elliptic-lanceolate, 8-20 cm. long, finely serrate or nearly entire: involucre hemispheric, about 6 mm. high; bracts ovate to ovate-lanceolate, with filiform tips arising abruptly from the body, which in the inner bracts about equal the tip in length: corolla about 10 mm. long: achenes 4-4.5 mm. long. — Common, in low grounds and thickets. — Sum. — IRON-WEED.

2. **ELEPHANTOPUS** [Vail.] L. Perennial scapose or caulescent herbs. Leaves alternate: blades shallowly toothed. Heads involucre. Corolla-lobes linear-lanceolate. Anther-appendages deltoid to ovate. Pappus single, of several rigid bristles terminating scale-like bases.

1. **E. carolinianus** Willd. Stems 3-9 dm. tall, rather hirsute: leaf-blades oblong, elliptic, or oval, 5-15 cm. long, crenate-serrate or repand; inner bracts of the involucre 8-10 mm. long, acute: achenes 3.5-4 mm. long. — Lower Susquehanna valley and adjacent parts. Frequent, in thickets. — *Schists*. — Sum. — ELEPHANT'S-FOOT.

3. **EUPATORIUM** [Tourn.] L. Perennial or rarely annual herbs, or shrubs. Leaves alternate or opposite: blades entire, toothed, or dissected. Heads borne in corymbs. Involucre campanulate to cylindric. Corolla-lobes ovate or triangular. Anther-appendages ovate. Achene angled. Pappus of capillary bristles. — Sum. — THOROUGHWORT.

Leaves opposite or alternate, or rarely in 3's in 1 or 2 narrow-leaved species.

Leaf-blades manifestly petioled.

Leaf-blades acuminate: corollas less than 3.5 mm. long.

Leaf-blades obtuse or abruptly acute: corollas over 4 mm. long.

Leaf-blades sessile or essentially so, or connate-perfoliate: heads less than 9-flowered.

Leaf-blades neither connate-perfoliate nor connate-clasping.

1. *E. urticaefolium*.

2. *E. aromaticum*.

- Base of the leaf-blade not broader than the rest of the blade or gradually narrowed.
 Leaf-blades linear, entire or shallowly and irregularly toothed.
 Leaf-blades lanceolate, oblong, ovate, or oval, markedly toothed.
- Base of the leaf-blade broadly rounded, cordate, truncate, or broadly cuneate.
 Leaf-blades crenate, crenate-serrate or crenate-dentate: involueral bracts narrow, acute, acuminate or apiculate.
 Branches of the inflorescence alternate: leaf-blades coarsely few-toothed.
 Branches of the inflorescence opposite: leaf-blades more finely and evenly toothed.
 Leaf-blades about as broad as long, truncate or subcordate at the base.
 Leaf-blades manifestly longer than broad, rounded or broadly cuneate at the base.
 Leaf-blades sharply serrate: involueral bracts broad, obtuse.
- Leaf-blades connate-perfoliate: heads over 9-flowered.
 Leaves whorled in 3's to 6's: blades relatively broad.
 Leaf-blades crenate, the teeth somewhat apiculate: corollas about 5 mm. long.
 Leaf-blades serrate: corollas about 7 mm. long.
3. *E. hyssopifolium*.
 4. *E. Torreyanum*.
 5. *E. verbenaeifolium*.
 6. *E. rotundifolium*.
 7. *E. pubescens*.
 8. *E. sessilifolium*.
 9. *E. perfoliatum*.
 10. *E. trifoliatum*.
 11. *E. purpurcum*.
1. ***E. urticaefolium*** Reichard. Stems 4-12 dm. tall, puberulent or glabrate: leaf-blades thin, ovate or rarely ovate-lanceolate, 4-12 cm. long, acuminate, coarsely serrate: bracts of the involucre linear, ciliolate at the apex, the inner 3-3.5 mm. long: corollas 3 mm. long: anthers longer than the filaments: achenes 2-2.5 mm. long. — Common, in woods and thickets. — WHITE-SNAKEROOT.
2. ***E. aromaticum*** L. Stems 3-15 dm. tall, puberulent or minutely pubescent: leaf-blades thickish, ovate to ovate-lanceolate, 2-10 cm. long, obtuse or acute, crenate: bracts of the involucre linear, ciliate, the inner 4-4.5 mm. long: corollas 4.5-5 cm. long, ciliate: achenes 2.5-3 mm. long. — M. S. Rare, in thickets. — *Quartzite, serpentine*.
3. ***E. hyssopifolium*** L. Stems 3-8 dm. tall, puberulent: leaf-blades linear, 2-6 cm. long, sometimes undulate: bracts of the involucre oblong to linear or linear-lanceolate, ciliate, mostly obtuse, the inner 5-5.5 mm. long: corollas 3.5-4 mm. long: achenes 2.5-3 mm. long. — Susquehanna valley. Occasional, in thickets. — *Schists*.
4. ***E. Torreyanum*** Short. Stems 4-12 dm. tall, finely pubescent: leaf-blades broadly linear to oblong-lanceolate, coarsely serrate to lacinate: bracts of the involucre mainly oblong to linear-oblong, ciliate, the inner 5-5.5 mm. long: corollas 3 mm. long: achenes 3 mm. long. — Lower Susquehanna valley. Rare, on wooded hillsides. — *Schists*.
5. ***E. verbenaeifolium*** Michx. Stems 6-12 dm. tall, finely pubescent: leaf-blades ovate to lanceolate, 2-12 cm. long, serrate: bracts of the involucre abruptly short-pointed, the inner mostly linear-oblong, 4-4.5 mm. long: achenes about 2 mm. long. — M. S. Frequent, in moist grounds or swamps. — *Schists, quartzite*.
6. ***E. rotundifolium*** L. Stems 3-12 dm. tall, tomentulose: leaf-blades suborbicular to orbicular-ovate, 2-4 cm. long, crenate or crenate-dentate: intermediate bracts of the involucre acuminate, the inner ones 5.5-6 mm. long: corollas about 3 mm. long: achenes fully 2 mm. long. — S. Occasional, in swamps. — *Schists*.
7. ***E. pubescens*** Muhl. Stems 3-15 dm. tall, canescent-tomentulose: leaf-blades ovate, 2-10 cm. long, serrate or incised-serrate: intermediate bracts of the involucre abruptly pointed, the inner ones 5.5-6 mm. long: corollas about 3 mm. long: achenes 2-2.5 mm. long. — S. Common, in thickets. — *Schists*.

8. **E. sessilifolium** L. Stems 4-15 dm. tall, tomentulose above: leaf-blades lanceolate, 8-25 cm. long, crenate-serrate, connate-perfoliate: bracts of the involucre obtuse, the inner 4.5-5 mm. long: corollas 3 mm. long: achenes 3-3.5 mm. long. — Common, in thickets and open woods. — UPLAND-BONESET.

9. **E. perfoliatum** L. Stems 3-12 dm. tall, tomentulose above: leaf-blades lanceolate, 8-25 cm. long, crenate-serrate, connate-perfoliate: inner bracts of the involucre acuminate, 6-6.5 mm. long: corollas 4 mm. long: achenes 2 mm. long, or mostly shorter. — Common, in meadows and thickets. — BONESET.

10. **E. trifoliatum** L. Stems 8-21 dm. tall, glabrous or sparingly pubescent, often purple: leaf-blades lanceolate to oblong-lanceolate, 15-20 cm. long, crenate: outer bracts of the involucre puberulent, the inner usually not ciliolate: corollas about 5 mm. long: achenes 4-4.5 mm. long. — S. Frequent, in moist thickets and woods. — *Schists*.

11. **E. purpureum** L. Stems 9-34 dm. tall, sometimes sparingly pubescent: leaf-blades narrowly oblong, ovate-lanceolate, oval, or ovate, 9-30 cm. long, serrate: outer bracts of the involucre glabrous or nearly so, the inner ciliate: corollas about 7 mm. long: achenes 5.5-6 mm. long. — Common, in moist soil or meadows. — JOE-PYE WEED.

4. **CONOCLINIUM** DC. Perennial herbs. Leaves opposite: blades toothed or parted. Heads in open or compact corymbs. Involucre campanulate or hemispheric. Corolla narrowly funnellform: lobes deltoid to ovate. Androecium mostly included: anther-appendages ovate, obtuse. Achene angled. Pappus of a few capillary bristles.

1. **C. coelestinum** (L.) DC. Stems 2-9 dm. tall, appressed-pubescent: leaf-blades ovate to deltoid-ovate, or rarely triangular-lanceolate, 3-12 cm. long, crenate or serrate-crenate: inner bracts of the involucre linear-subulate, 2.5-3 mm. long: corollas barely 3 mm. long: achenes barely 1.5 mm. long. — M. S. Common, in moist places and thickets. — *Limestones, schists*. — Sum. — MIST-FLOWER.

5. **MIKANIA** Willd. Perennial vines. Leaves opposite: blades of a hastate or deltoid type, mostly toothed. Heads in corymbs. Involucre cylindrical. Corolla with a campanulate throat: lobes lanceolate to triangular-ovate. Androecium exserted: anther-appendages ovate. Achenes angled. Pappus of many capillary bristles.

1. **M. scandens** (L.) Willd. Plants finely pubescent or nearly glabrous: leaf-blades deltoid-ovate to hastate, 5-8 cm. long, undulate or angulately lobed: bracts of the involucre 5-5.5 mm. long, acuminate or abruptly pointed: corolla about 4 mm. long: achenes 2-2.5 mm. long. — S. Occasional, in thickets and swamps. — *Schists*. — Sum. — CLIMBING HEMP-VINE.

6. **LACINIARIA** Hill. Perennial, typically simple herbs with thick root-stocks. Leaves alternate, often numerous: blades narrow, entire. Heads in spikes, racemes, panicles, or rarely in cymes. Involucre ovoid to cylindrical or turbinate. Corolla-throat narrow-funnelform, much longer than the slightly narrower tube: lobes lanceolate. Anther-appendages entire or notched. Achenes short, ribbed. Pappus of many barbellulate or plumose bristles. — BUTTON-SNAKEROOT. BLAZING-STAR.

Bracts of the involucre with broad appressed tips: involucre few-flowered.

1. *L. spicata*.

Bracts of the involucre with narrow spreading tips: involucre many-flowered.

2. *L. squarrosa*.

1. *L. spicata* (L.) Kuntze. Stems 6-15 dm. tall, sometimes sparingly hirsute: blades of the lower leaves linear: intermediate bracts of the involucre oblong-ovate: inner bracts 8-9 mm. long, broadly linear: corollas 6.5-7.5 mm. long; lobes glabrous. — S. Frequent, in low grounds. — *Schists, serpentine*. — Fall.

2. *L. squarrosa* (L.) Hill. Stems 1-4 dm. tall, pubescent: blades of the lower leaves linear: inner bracts of the involucre 15-22 mm. long, acuminate: corollas 24-27 mm. long; lobes pubescent within. — S. Rare in thickets. — *Schists*. — Sum.

7. **KUHNIA** L. Perennial pubescent herbs. Leaves alternate: blades narrow, resinous-dotted. Heads in open or compact clusters. Involucres narrow-cylindric. Corolla narrowly funnelliform, the tube and throat scarcely distinguishable: lobes triangular to lanceolate. Anther-appendages ovate, obtuse. Achenes columnar, striate. Pappus of many capillary bristles.

1. *K. eupatorioides* L. Stems 5-10 dm. tall: leaf-blades 2-10 cm. long, narrowed at the base and sessile or nearly so: inner bracts of the involucre linear, 5-7 mm. long: corollas about 6 mm. long: achenes 4-5 mm. long. — M. Common, on rocky banks of the Conestoga near Lancaster. — *Limestones*. — Sum. and fall. — FALSE-BONESET.

8. **CHEYSOPSIS** Nutt. Biennial or perennial pubescent herbs. Leaves alternate: blades narrow or broad, mostly entire. Heads solitary or in a terminal corymb. Involucres ovoid to turbinate, the bracts narrow. Ray-flowers with conspicuous ligules. Disk-corollas with a narrow funnelliform throat. Anther-appendages lanceolate. Stigmas subulate. Achenes flattened. Pappus double, of numerous bristles.

1. *C. mariana* (L.) Nutt. Stems cobwebby-villous, 1-6 dm. tall: blades of the cauline leaves spatulate to elliptic or oblong: inner bracts of the involucre narrowly linear, somewhat acuminate, 8-9 mm. long: filaments shorter than the anthers: disk-corollas 8-9 mm. long: ligules oblong, 6-9 mm. long. — S. Rather common, in dry soil. — *Schists*. — Fall. — GOLDEN-ASTER.

9. **OLIGONEURON** Small. Perennial herbs, pubescent at least in the inflorescence. Leaves alternate: blades entire or nearly so. Heads in a terminal corymb. Involucres campanulate, several-flowered: bracts broad, rounded at the apex, the inner much longer than the outer. Ray-flowers few: corollas with a very long tube and a yellow ligule. Disk-corollas with a funnelliform throat and a shorter tube: lobes lanceolate. Filaments nearly as long as the anthers or longer. Stigmas oblong or ovate-oblong. Achenes stout, ribbed. Pappus of many capillary bristles.

1. *O. rigidum* (L.) Small. Stems 4-15 dm. tall, rough-pubescent: leaf-blades thick, those of the upper stem-leaves oblong to ovate, 2-13 cm. long, closely pubescent, shallowly toothed or essentially entire: bracts of the involucre pubescent, the outer ovate: disk-corollas 5.5-6.5 mm. long: achenes 12-15-ribbed. — W. S. Common, in dry soil. Nat. of w. N. A. — Fall.

10. **EUTHAMIA** Nutt. Perennial herbaceous plants. Leaves alternate: blades elongate, herbaceous. Heads many, in corymbs. Involucres narrow, few-several-flowered: bracts various, the outer ones linear or nearly so. Ray-flowers few: corolla with a slender tube and a very small ligule. Disk-corollas with a funnelliform throat, and tube of about equal length: lobes lanceolate. Anthers as long as the filaments or longer. Stigmas lanceolate. Pappus of capillary bristles.

1. *E. graminifolia* (L.) Nutt. Plants 13-14 dm. tall: leaf-blades linear, mainly over 4 mm. wide: heads in dense clusters: involucre campanulate, the inner bracts 3.5-4 mm. long: achenes pubescent. — Common, in fields and thickets. — Late sum.

11. **SOLIDAGO** L. Perennial caulescent herbs. Leaves alternate: blades various, mostly toothed. Heads relatively small, paniculate or thyrsoid. Involucres campanulate, turbinate, or cylindric, few-several-flowered. Bracts various, the inner narrow, at least relatively so, and much longer than the outer. Ray-flowers few: corollas with a slender tube and a yellow or rarely white ligule. Disk-corollas with a funnellform or campanulate throat and a tube nearly or quite as long: lobes lanceolate. Anthers nearly or quite as long as the filaments. Stigmas mostly lanceolate. Pappus of 1 or 2 series of rough capillary bristles. — GOLDENROD.

- Heads in axillary short or raceme-like clusters subtended by leaf-like bracts.
- Stem and branches terete: stem-leaves with relatively narrow, shallowly toothed, blades. 1. *S. caesia*.
- Stem and branches angled: stem-leaves with relatively broad, deeply toothed, blades. 2. *S. flexicaulis*.
- Heads in a terminal inconspicuously bracted panicle or thyrsus.
- Tips of the involucre bracts, at least some of them, spreading or recurved. 3. *S. squarrosa*.
- Tips of the involucre bracts erect or appressed.
- Inflorescence nearly equilateral, the branches erect or ascending: heads not secund on the branches.
- Bracts of the involucre decidedly obtuse.
- Achenes glabrous.
- Stems copiously pubescent.
- Achenes columnar: ray-flowers with white ligules. 4. *S. bicolor*.
- Achenes dilated upward: ray-flowers with yellow ligules. 5. *S. hispida*.
- Stems glabrous or merely puberulent. 6. *S. speciosa*.
- Achenes pubescent. 7. *S. racemosa*.
- Bracts of the involucre acute or acutish. 8. *S. puberula*.
- Inflorescence 1-sided, the branches spreading or recurved: heads secund.
- Leaf-blades pinnately veined, not 3-ribbed.
- Internodes of the stem prominently angled below the leaves. 9. *S. patula*.
- Internodes of the stem terete or essentially so.
- Stem manifestly pubescent, rarely only in lines.
- Ray-flowers 3 or 4: leaves glabrous; blades entire, narrow. 10. *S. odora*.
- Ray-flowers 6-9: leaves pubescent; blades toothed, broad. 11. *S. rugosa*.
- Stem glabrous, at least below the inflorescence.
- Branches of the inflorescence pubescent.
- Ray-flowers mostly 6-8: involucre cylindric, few-flowered: achenes pubescent. 12. *S. ulmifolia*.
- Ray-flowers mostly 3-5: involucre campanulate, many-flowered: achenes glabrous. 13. *S. arguta*.
- Branches of the inflorescence glabrous.
- Involucre less than 5 mm. high. 14. *S. juncea*.
- Involucre over 5 mm. high. 15. *S. neglecta*.
- Leaf-blades manifestly 3-ribbed.
- Stem glabrous. 16. *S. serotina*.
- Stem pubescent.
- Cauline leaves with relatively long blades, acuminate or attenuate. 17. *S. canadensis*.
- Cauline leaves with relatively short blades, obtuse or merely acute. 18. *S. nemoralis*.

1. *S. caesia* L. Stems 3-11 dm. tall, glabrous: blades of the upper cauline leaves spatulate to broadly linear or linear-lanceolate, 6-14 cm. long, serrate, glabrous: inner bracts of the involucre linear-lanceolate, 3-3.5 mm. long. — Common, in woods and on banks. — Fall.

2. *S. flexicaulis* L. Similar to *S. caesia* in habit: blades of the cauline leaves elliptic, sometimes narrowly so, 2.5–3 cm. long, sharply serrate, pubescent about the veins beneath, except sometimes in age: inner bracts of the involucre linear-oblong, 4–4.5 mm. long. — Common, on the river hills and along creeks. — Fall.
3. *S. squarrosa* L. Stems 4–15 dm. tall, usually somewhat pubescent above: blades of the lower cauline leaves oval to ovate, coarsely toothed and 1–2 dm. long, of the upper smaller and shallowly toothed or undulate: inner bracts of the involucre oblong: disk-corollas with lanceolate lobes. — Frequent, in woods along the Octoraro Creek. — *Schists*. — Sum.
4. *S. bicolor* L. Stems 2–12 dm. tall, pale-hirsute: blades of the lower cauline leaves obovate, oval, elliptic or spatulate, shallowly crenate-serrate and 1–2 dm. long, of the upper smaller and elliptic, oblong, or oblanceolate: inner bracts of the involucre oblong, 3.5–4 mm. long, obtuse: disk-corollas 3.5–4 mm. long. — Common, in woods and thickets — Late sum.
5. *S. hispida* Muhl. Similar to *S. bicolor* in habit, the stems often densely hirsute: inner bracts of the involucre broadly linear, 4–4.5 mm. long: disk-corollas 4.5–5 mm. long. — N. Frequent, on dry hillsides. — *Sandstones and shales*. — Late sum.
6. *S. speciosa* Nutt. Stems 7–19 dm. tall, glabrous, at least below: blades of the lower cauline leaves elliptic to oval and 1–2 dm. long, of the upper smaller and mainly elliptic to elliptic-lanceolate, all shallowly toothed: inner bracts of the involucre linear-spatulate, 5–6 mm. long: disk-corollas 3.5–4 mm. long. — N. Occasional, on hillsides. — *Sandstones and shales*. — Fall.
7. *S. racemosa* Greene. Stems tufted, 1–4.5 dm. tall, glabrous: blades of the cauline leaves spatulate to linear, 2–8.5 cm. long or smaller above, acute or acuminate, shallowly serrate or entire: inner bracts of the involucre linear-cuneate to nearly linear, 4–5 mm. long, acute or acutish: achenes pubescent. — Lower Susquehanna valley. Occasional, on rocky islands. — *Schists*. — Fall.
8. *S. puberula* Nutt. Stems 3–9 dm. tall, puberulent: blades of the lower cauline leaves spatulate to oblanceolate and appressed-serrate or crenate-serrate, of the upper oblanceolate to elliptic or linear-elliptic: inner bracts of the involucre linear-lanceolate, 3.5–4 mm. long, acute: achenes glabrous. — N. S. Not very common, in dry places. — *Sandstones and shales, schists*. — Fall.
9. *S. patula* Muhl. Stems 6–15 dm. tall, glabrous: blades of the lower cauline leaves spatulate to elliptic or oblong and serrate, of the upper oblong to oblanceolate or elliptic, all scabrous above: inner bracts of the involucre linear, 4.5–5 mm. long: disk-corollas about 4 mm. long. — Frequent, in moist grounds and meadows. — Fall.
10. *S. odora* Ait. Stems 5–13 dm. tall, minutely pubescent: blades of the lower cauline leaves linear-spatulate to linear-oblong, of the upper lanceolate to linear-lanceolate or linear, all entire: inner bracts of the involucre narrowly linear-lanceolate, glabrous, 4–5 mm. long. — Lower Susquehanna valley. Common, in thickets. — *Schists*. — Late sum.
11. *S. rugosa* Mill. Stems 3–22 dm. tall, pubescent: blades of the lower cauline leaves spatulate to oblong or elliptic, of the upper elliptic, lanceolate, or oblong-ovate, all sharply toothed: inner bracts of the involucre linear or oblong-linear, 4.5–5 mm. long, the intermediate ones lanceolate. — Common, on dry banks and in thickets. — Fall.
12. *S. ulmifolia* Muhl. Stems 5–12 dm. tall, glabrous: blades of the lower cauline leaves spatulate, elliptic or oblong, of the upper elliptic-lanceolate or oblong-lanceolate, all serrate: inner bracts of the involucre linear, 4–4.5 mm. long, or rarely shorter. — Common, in thickets and open woods. — Fall.

13. *S. arguta* Ait. Stems 3–12 dm. tall, glabrous: blades of the lower cauline leaves spatulate to oblong, elliptic, oval, or ovate, of the upper mainly elliptic and more finely serrate than those of the lower leaves: inner bracts of the involucre linear-spatulate, 4.5–5 mm. long, the intermediate ones linear. — Common, in woods and on banks. — Fall.

14. *S. juncea* Ait. Stems 4–15 dm. tall, glabrous: blades of the lower cauline leaves spatulate to oblong or elliptic and shallowly serrate, of the upper mainly elliptic or sometimes linear-lanceolate, or nearly linear and finely serrate or merely undulate: inner bracts of the involucre narrowly linear, 4–5 mm. long. — Common, in moist soil and open woods. — Sum.

15. *S. neglecta* T. & G. Stems 8–18 dm. tall, usually glabrous at least below: blades of the lower cauline leaves spatulate, of the upper elliptic or elliptic-lanceolate, shallowly toothed, or merely undulate above: inner bracts of the involucre linear, 4–4.5 mm. long, obtuse, ciliolate. — S. Rare, in swamps. — *Schists*. — Fall.

16. *S. serotina* Ait. Stems 6–25 dm. tall, glabrous: blades of the lower cauline leaves oblanceolate to narrowly oblong or elliptic, of the upper elliptic, oblong, or oblong-lanceolate and serrate: inner bracts of the involucre narrowly linear-lanceolate, about 3.5 mm. long. — Common, in moist places and thickets. — Fall.

17. *S. canadensis* L. Stems 6–25 dm. tall, pubescent: blades of the lower cauline leaves oblong or elliptic or broadened upward, of the upper oblong-lanceolate to lanceolate and sharply serrate or nearly entire: inner bracts of the involucre narrowly linear, 3–3.5 mm. long. — Common, in waste places and thickets. — Fall.

18. *S. nemoralis* Ait. Stems 1–9 dm. tall, pubescent: blades of the lower cauline leaves mainly spatulate and appressed-serrate, of the upper oblanceolate to narrowly elliptic and less prominently toothed or entire: inner bracts of the involucre narrowly linear, 3.5–4 mm. long. — Common, in fields and on roadsides. — Fall.

12. **BOLTONIA** L'Her. Perennial tall herbs. Leaves alternate: blades entire, sessile or decurrent. Heads many, widely paniced. Involucres broadly campanulate to hemispheric, many-flowered: bracts narrow or sometimes partly dilated. Ray-flowers often numerous: corollas with a short tube and narrow ligules. Disk-corollas with a narrowly funnelform throat and short tube: lobes triangular. Anthers as long as the filaments or longer. Achenes flattened, broadest above the middle, the margins sometimes winged. Pappus a series of short scales usually accompanied by 2–4 bristles.

1. *B. asteroides* (L.) L'Her. Plants 1–2 m. tall: blades of the upper leaves oblong to linear, 3–12 cm. long: outer bracts of the involucre linear-lanceolate, 2–3 mm. long, the inner slightly longer: ligules linear, white or pale, 5–6.5 mm. long: disk 6–12 mm. wide: corollas about 2 mm. long, the throat about as long as the tube. — Susquehanna valley. Common, on low islands and sandy or gravelly shores. — Sum.

13. **SERICOCARPUS** Nees. Perennial low herbs. Leaves alternate: blades entire or toothed. Heads in corymbs. Involucres campanulate to cylindric, several-flowered: bracts broad, or the inner ones sometimes rather narrow. Ray-flowers several: corollas with a long tube and a narrow, white or pink ligule. Disk-corollas with a narrowly funnelform throat and a long tube: lobes lanceolate. Anthers slightly longer than the filaments or shorter: ap-

pendages lanceolate. Achenes flattened, 1-nerved. Pappus of numerous scabrous bristles. — Sum. — WHITE-TOPPED ASTER.

Leaf-blades entire, those of the cauline leaves narrow: inner involueral bracts obtuse. 1. *S. linifolius*.
 Leaf-blades toothed, those of the cauline leaves broad: inner involueral bracts acute. 2. *S. asteroides*.

1. *S. linifolius* (L.) B.S.P. Stems glabrous or nearly so, 2-7 dm. tall: blades of the upper leaves linear, 2-6 cm. long: involueres 4-6 mm. long; inner bracts often erose at the green tips: disk-corollas 4-5 mm. long: ligules 5-6 mm. long: pappus whitish. — S. Occasional, on dry banks. — *Schists*.

2. *S. asteroides* (L.) B.S.P. Stems pubescent, 3-8 dm. tall: blades of the upper leaves ovate, oblong-ovate, or lanceolate, 1.5-4 cm. long: involueres 6-9 mm. long; inner bracts broadly linear, rough-edged above: disk-corollas 5-6 mm. long: ligules whitish, 6-8 mm. long: pappus brownish. — Common, in woods and thickets.

14. **ASTER** [Tourn.] L. Perennial, or rarely annual, branching caulescent herbs. Leaves alternate: blades narrow or broad, entire or toothed, those of the rootstock, base of the stem and upper parts of the plant often very different. Radical leaves often appear from rootstocks remote from the flowering plant. Heads radiate, in corymbs, racemes or panicles, or rarely solitary. Involueres hemispheric, campanulate, cylindric, or turbinate: bracts in several series, with erect, spreading or recurved tips. Ray-flowers pistillate, with white, pink, purple, blue, or violet ligules. Disk-flowers perfect: corollas yellow, becoming red, brown, or purple: lobes 5, broad. Achenes slightly flattened, nerved or ribbed. Pappus of numerous bristles in one, or rarely two, series. — **ASTER**.

Blades of the basal and lower cauline leaves relatively broad, of an ovate or cordate type, and with long petioles, the upper cauline essentially similar, but shorter-petioled or even sessile.

Upper cauline leaves various, but the blades not cordate-clasping: petioles of the lower leaves not dilated-clasping.

Ray-corollas with white, pink, or violet ligules.

Ligules white or occasionally pinkish, usually 2-toothed: pubescence not glandular.

Involueres not cylindric; bracts broadly obtuse or rounded at the apex: basal leaves few, with small blades, or wanting.

Blades of most of the leaves of an ovate-lanceolate type; blades of the branch-leaves mostly short. 1. *A. divaricatus*.

Blades of most of the leaves of an oblong-lanceolate type; blades of the branch-leaves elongate.

2. *A. tenebrosus*.

Involueres cylindric: bracts tapering to the blunt apex: basal leaves numerous, with large blades.

3. *A. Schreberi*.

Ligules violet, usually 3-toothed: pubescence glandular.

Ray-corollas with blue or purple ligules.

4. *A. macrophyllus*.

5. *A. cordifolius*.

Upper cauline leaves with clasping blades or clasping dilated petioles.

6. *A. undulatus*.

Blades of the basal and lower cauline leaves relatively narrow, and with more or less contracted petiole-like bases, the upper cauline with sessile or clasping blades.

Blades of the cauline leaves clasping by auriculate-cordate bases.

Stem and branches conspicuously pubescent, often rough-pubescent.

Cauline leaves with entire blades.

Stem and branches rough-pubescent: involueres campanulate.

Leaves rough-pubescent: stem widely branched above.

7. *A. patens*.

Leaves soft-pubescent: stem narrowly branched above.

8. *A. phlogifolius*.

- Stem and branches hirsute: involucre hemispheric.
- Cauline leaves, at least the lower ones, with toothed blades.
- Stem and branches glabrous, or inconspicuously pubescent above.
- Leaves with sharply serrate blades.
- Leaves abruptly contracted into broad petiole-like bases, which are often dilated near the stem.
- Leaves tapering to the base.
- Leaves with entire blades, or sometimes with an occasional sharp tooth.
- Blades of the cauline leaves with merely sessile or essentially sessile blades.
- Ray-corollas with violet ligules: leaf-blades short and broad.
- Ray-corollas with white, or sometimes pink or purplish, ligules.
- Flower-heads scattered: peduncles elongate, conspicuously scaly.
- Flowers-heads racemose or paniculate: peduncles not copiously scaly.
- Involucral bracts obtuse: stem, branches, and leaves, rough-pubescent.
- Involucral bracts acute or merely obtusish: stem, branches, and leaves, glabrous or softly pubescent.
- Flower-heads in secund racemes or panicles.
- Blades of the cauline leaves oblong to lanceolate, serrate or dentate.
- Blades of the cauline leaves linear to linear-lanceolate, minutely back-toothed.
- Flower-heads not in definitely secund racemes or panicles.
- Cauline leaves with linear entire blades.
- Cauline leaves with broader toothed blades.
- Heads less than 16 mm. across the ligules.
- Heads over 16 mm. across the ligules.
- Ligules of the ray mostly white: leaf-blades thinish.
- Ligules of the ray bluish-violet: leaf-blades firm.
9. *A. Norac-Angliae*.
10. *A. puniceus*.
10. *A. puniceus*.
11. *A. prenanthoides*.
12. *A. laevis*.
13. *A. Radula*.
14. *A. dumosus*.
15. *A. multiflorus*.
16. *A. latriflorus*.
17. *A. vimineus*.
18. *A. cricoides*.
19. *A. Tradescanti*.
20. *A. paniculatus*.
21. *A. salicifolius*.

1. *A. divaricatus* L. Stems tufted, 4-6 dm. tall, assurgent, flexuous, terete, glabrate at maturity: leaf-blades thin, smoothish, slender-petioled, ovate-lanceolate, closely and saliently dentate with sharp teeth. incurved-acuminate, the basal sinus moderately large, broad and deep: leaves of the inflorescence typically small, sessile, short, ovate-acute to short-oval, nearly entire: corymb broad, flattish, repeatedly and widely forked, the slender branches long, divergent: heads 18-25 mm. broad: young involucre short-cylindric; bracts broad, ciliate, the rounded or subtruncate tips with a broad green spot: ray-flowers chiefly 6-9; ligules white, or rarely roseate or slightly crimson: disk turning reddish-brown — Common, in thickets and on hillsides.

2. *A. tenebrosus* Burgess. Stems glabrate, striate, wide-branched: leaf-blades large, very thin and smooth, broadly oblong and conspicuously cut with coarse remote acuminate curvesscent teeth, then abruptly long-acuminate and entire; most leaves with a broad rounded sinus and slender petiole; those of the inflorescence prolonged, lanceolate, subentire and sessile: inflorescence broadly corymbose, often proliferously branched: outer involucral bracts green, acute, elongate-triangular, the others linear, obtusish: rays long, usually 9-12: disk pale-yellow, turning purplish-brown. — Resembles *A. divaricatus*, but is larger and thinner in all its parts, and with a different leaf-form. — N. Occasional, on wooded hillsides. — *Sandstones and shales*.

3. *A. Schreberi* Nees. Stems 7-11 dm. tall, often purple-tinged, with elongate internodes: radical leaves, usually in wide colonies; blades reniform-ovate

to triangular-ovate. 8-17 cm. long, with a somewhat square basal sinus, thin but firm, with scattered hairs above, pubescent on the veins beneath, the teeth rather coarse, sharp; upper stem-leaves with ovate-oblong to lanceolate blades and short-winged petioles, or the uppermost ones sessile, acuminate; inflorescence glabrous or sparingly pubescent, flattish or irregularly convex: heads about 1 cm. high; peduncles rather long and slender; involueral bracts mostly obtuse, green-tipped; ray-flowers about 10; ligules 8-11 mm. long, white or pink.—S. Occasional, in thickets along the Octoraro Creek.—*Schists*.—Sum.

4. *A. macrophyllus* L. Stems 6-9 dm. tall, reddened, angular: radical leaves developed in large colonies, usually 3 to each rootstock, larger and coarser than the similarly shaped lower cauline leaves (which are developed a subsequent year from the same rootstock); blades broad, cordate with a large irregular sinus, rough above, harsh, thick, the teeth broad, curved, somewhat crenate: upper stem-leaves with oblong blades and short broadly winged petioles, those of the uppermost sessile, acute; inflorescence strigose and glandular, broadly corymbose, irregular: heads 15-30 mm. broad; peduncles short, rigid, thickish; involueral bracts conspicuously green-tipped, the outer acute, the inner oblong, obtuse; ray-flowers about 12-16; ligules 10-14 mm. long, chiefly lavender, sometimes violet, or rarely pale; disk turning reddish-brown.—S. Occasional, on wooded hillsides and in thickets.—*Schists*.

5. *A. cordifolius* L. Stems 3-15 dm. tall, glabrous or nearly so, much-branched and bushy: leaf-blades thin, rough, more or less pubescent, sharply serrate, acuminate, those of the basal and lower cauline leaves slender-petioled, broadly ovate-cordate, 5-12 cm. long, those of the upper cauline leaves short-petioled or sessile, ovate or lanceolate: heads very numerous, small, 12-18 mm. broad, handsome: involuere turbinate to cylindrical; bracts oblong-linear, obtuse or obtusish, green-tipped, appressed; ray-flowers 10-20; ligules 6-8 mm. long, blue or violet, sometimes pale, rarely white; pappus whitish.—Common, in woods and thickets.

6. *A. undulatus* L. Stems stiff, 3-10 dm. tall, closely rough-pubescent, divaricately branched above: leaf-blades usually thick, rough on both sides when dry, pubescent beneath, dentate, undulate or entire, acute or acuminate, those of the radical leaves small, orbicular to ovate, soft-downy; the lower cauline leaves ovate, with cordate base, 5-12 cm. long, the naked petioles expanding into a clasping base at least in some leaves; middle cauline leaves similar, lanceolate or oblong; upper cauline leaves sessile or clasping, chiefly lance-oblong; branch-leaves subulate, small and abruptly reduced: heads numerous, racemose and somewhat secund on the spreading branches, 16-20 mm. broad: involuere broadly turbinate; bracts linear-oblong, slightly pubescent, acute or acutish, their broad green tips appressed; ray-flowers 8-15; ligules usually pale-violet, 6-10 mm. long; pappus whitish.—Common, on dry banks and in woods.

7. *A. patens* Ait. Stems 3-9 dm. tall, slender, rough, divergently branched: leaf-blades sessile, ovate-oblong or oval, rough-pubescent, thick and somewhat rigid, strongly auriculate-clasping at the broad base, entire, acute, or the lower ones obtuse, 2.5-7.5 cm. long, those of the branches much smaller and bract-like, their margins rough-ciliate: heads 25 mm. broad or more, solitary at the ends of the branches: involuere campanulate; bracts linear-oblong, finely pubescent or scabrous, often somewhat glandular, their green acute tips spreading; ray-flowers 20-30; ligules purplish-blue or deep-violet, 8-12 mm. long; pappus tawny.—Common, in dry soil.

8. *A. phlogifolius* Muhl. Similar to *A. patens* in habit but when well developed much taller, more slender and soft: leaves larger; blades lanceolate to oblong-lanceolate, entire, thin or membranous, acuminate at the apex, strongly auriculate-clasping at the base, roughish above, pubescent beneath, usually

narrowed below the middle, sometimes 15 cm. long: heads usually numerous, 3-5 cm. broad, panicle or somewhat racemose on the branches: involucre campanulate; bracts lanceolate, glabrate, rather loose, with herbaceous tips: ray-flowers numerous; ligules purple-blue. — Resembles *A. patens*; but softer and taller; heads larger; inflorescence narrow; leaves elongate. — S. Occasional, in thickets and open woods. — *Schists*.

9. **A. Novae-Angliae** L. Stems stout, 6-25 dm. tall, hispid, corymbosely branched above, very leafy: leaf-blades oblong-lanceolate, entire, acute, pubescent, 5-12 cm. long, each clasping by an auriculate base: heads numerous, 3-5 cm. broad, clustered at the ends of the branches: involucre hemispheric; bracts linear-subulate, somewhat unequal, green, spreading, pubescent and more or less glandular-viscid: ray-flowers 40-50; ligules linear, 10-16 mm. long, violet-purple (typically a royal-purple, rarely replaced by rose-color or white): pappus becoming reddish-white. — Lower Susquehanna valley and along tributary creeks. — *Schists*.

10. **A. puniceus** L. Stems 9-25 dm. tall, usually stout, purplish, broadly corymbose or racemose above, hispid with hairs arising from a reddened tubercular base: leaf-blades lanceolate to oblong-lanceolate, 7-15 cm. long, acuminate, sessile and clasping by a broad or narrowed base, sharply serrate (or some upper ones entire), usually very rough above, pubescent on the midrib beneath: heads generally numerous, 2-4 cm. broad: involucre nearly hemispheric; bracts linear or oblong, attenuate, in about 2 series, glabrous or ciliate, green, loose, spreading, nearly equal, sometimes broadened: ray-flowers 20-40; ligules light-violet (sometimes purplish or pale), 10-14 mm. long, showy: pappus nearly white. — Common, in swamps and along streams.

11. **A. prenanthoides** Muhl. Stems 3-6 dm. tall, glabrous or pubescent in lines above, flexuous, much branched: leaf-blades thin, oblong to ovate-lanceolate, 7-15 cm. long, sharply and coarsely serrate, scabrous above, glabrous or nearly so beneath, acuminate, abruptly narrowed below into a broad-margined entire petiole, the base dilated and auriculate-clasping: heads usually numerous, 25 mm. broad or more: involucre hemispheric; bracts linear, acute, green, spreading, in 3 or 4 series, the outer shorter: ray-flowers 20-30; ligules violet, 8-12 mm. long: pappus tawny: achenes pubescent. — Unlike other asters in its leaf-form, characteristically a suborbicular base and an ovate-acuminate end, connected by a strap-like middle. — Lower Susquehanna valley and along tributary creeks. — *Schists*.

12. **A. laevis** L. Stems 6-12 dm. tall, usually stout, glabrous, often glaucous, branched or simple: leaf-blades thick and almost leathery, very smooth, entire or with an occasional sharp tooth, slightly rough-margined, the upper all sessile and strongly cordate-clasping, oblong-lanceolate, oblanceolate or ovate, acute or obtusish, 2-10 cm. long; those of the basal and lower cauline leaves gradually narrowed into winged petiolar bases, those of the branches often small and scale-like: heads usually numerous, about 25 mm. broad: involucre campanulate; bracts rigid, acute, appressed, broadly green-tipped, in several series: ray-flowers 15-30; ligules blue or violet: pappus tawny: achenes glabrous or nearly so. — Remarkable among asters for its smooth, cool, polished surfaces. — Not very common, in damp soil and thickets.

13. **A. Radula** Ait. Stems 3-14 dm. tall, glabrous, or puberulent above, simple or sparingly corymbose: leaves relatively few; blades oblong, varying to lanceolate or oblanceolate, 3-7 cm. long, rough and often rugose above, finely pubescent beneath, serrate, sessile: heads showy, 3.5-4.5 cm. broad: involucre hemispheric; bracts linear or somewhat broader and dilated near the apex, finely pubescent, the tips often recurving in age: ray-flowers 20-30; ligules violet or rose-purple: achenes glabrous: pappus whitish. — S. Occasional, in swamps. — *Schists*.

14. *A. dumosus* L. Stems 3-9 dm. tall, glabrous or very nearly so, paniculately much-branched: leaf-blades firm, those of the stem linear or linear-lanceolate, 2-7 cm. long, entire, acute or obtusish, roughly margined, often reflexed, those of the branches very numerous, small and scale-like, those of the basal leaves spatulate, dentate: heads 8-14 mm. broad, terminating the usually divergent slender branches and branchlets, usually numerous: involucre broadly campanulate; bracts linear-subulate, appressed, in about four series, obtuse, with green spatulate tips tapering at the apex: ray-flowers 15-30; ligules white (rarely pale-pink or pale-violet), 4 mm. long: pappus white: achenes minutely pubescent.—S. Occasional, on rocky banks of streams.—*Schists*.

15. *A. multiflorus* Ait. Stems 3-20 dm. tall, strict, much-branched and bushy, the branches ascending or spreading: leaf-blades rigid, linear, entire, mostly obtuse, sessile or slightly clasping at the base, strigose or glabrate, those of the cauline leaves 1-2.5 cm. long, those of the branches very small and crowded: heads 6-8 mm. broad, densely crowded, nearly sessile: involucre turbinate, 4-6 mm. high; bracts coriaceous, pubescent, in 3 or 4 series, their short green tips obtuse or mucronate, spreading: ray-flowers 10-20; ligules white, 3-4 mm. long: pappus becoming brownish-white.—Common, in thickets and on banks.

16. *A. lateriflorus* (L.) Britton. Stems 3-15 dm. tall, puberulent or nearly glabrous, slender, divergently branched, often bushy: basal leaves few; blades ovate, short-petioled; cauline leaves numerous; blades broadly lanceolate or oblong-lanceolate, 5-12 cm. long, mostly acuminate, serrate, those of the branches smaller, oblong or linear-oblong: heads 6-10 mm. broad, racemously unilateral on the branches, short-peduncled or sessile, usually numerous and crowded: involucre turbinate; bracts linear-oblong, obtuse or acutish, in about 4 series, their short green tips appressed or slightly spreading: ray-flowers numerous; ligules short, whitish or pale-purple, rounded at the apex: disk-flowers purple: pappus white.—Lower Susquehanna valley. Occasional, on islands and shores.

17. *A. vimineus* Lam. Stems 6-15 dm. tall, glabrous or nearly so, slender, divergently branched: cauline leaves linear-acuminate, 7-12 cm. long, regularly minutely hack-serrate, slightly narrowed at the sessile base, those of the branches much smaller: heads very numerous, 6-10 mm. broad, generally densely racemose-secund, short-peduncled: involucre broadly turbinate; bracts linear, acute or acutish, green-tipped, appressed: ray-flowers numerous; ligules about 4 mm. long, narrowly linear, white, often roseate in fading: pappus white.—M. Occasional, in moist grassy places.—*Limestones*.

18. *A. ericoides* L. Stems 3-9 dm. tall, glabrous or very nearly so, paniculately branched, usually bushy, the branches racemose, and the branchlets often somewhat secund: leaf-blades firm or rigid, those of the basal leaves spatulate, obtuse, dentate, narrowed into margined petioles, glabrous or ciliate, those of the cauline leaves narrowly linear, acute, entire, 2-7 cm. long, those of the branches linear-subulate, numerous: heads usually very numerous, 8-12 mm. broad: involucre campanulate to hemispheric; bracts coriaceous, closely appressed, lanceolate or linear-lanceolate, abruptly acute or acuminate, green-tipped, in about 3 series: ray-flowers 15-25; ligules white or purplish-tinged: pappus white.—Common, in fields and waste places.

19. *A. Tradescanti* L. Stems 6-15 dm. tall, slender, paniculately branched, the branches usually ascending and often pubescent in lines: cauline leaves numerous; blades linear-lanceolate or lanceolate, 7-15 cm. long, acuminate, narrowed to the sessile base, glabrous or nearly so on both sides, commonly thin, sharply serrate in the middle with low teeth, or sometimes entire: heads very numerous, racemose but not secund on the branches, 10-16 mm. broad: involucre hemispheric to broadly turbinate, 4-6 mm. high; bracts linear, acute, appressed, green-tipped, in 4 or 5 series: ray-flowers numerous; ligules white

or nearly so, 4-6 mm. long: pappus white. — Susquehanna valley. Occasional, on islands and shores.

20. *A. paniculatus* Lam. Stems 6-25 dm. tall, glabrous or nearly so, paniculately much branched: leaf-blades lanceolate to oblong-lanceolate, 7-15 cm. long, acuminate at the apex, narrowed to a sessile or slightly clasping base, glabrous, thin, roughish-margined, those of the cauline leaves sparingly serrate in the middle, or sometimes very nearly entire, the upper and those of the branches gradually smaller: heads numerous, 16-20 mm. broad: involucre nearly hemispheric, 6-8 mm. high; bracts narrowly linear-lanceolate, acute or acuminate, appressed, green-tipped, in 4 or 5 series: ray-flowers numerous; ligules white (or faintly tinged with violet), 6-8 mm. long: pappus white or nearly so. — Common, in moist thickets and ditches.

21. *A. salicifolius* Lam. Stems 6-15 dm. tall, rather slender, paniculately much branched, usually very leafy, glabrous, or somewhat pubescent above: leaf-blades somewhat firm, lanceolate or linear-lanceolate, 5-10 cm. long, rough-margined, acute or acuminate, narrowed and sessile or slightly clasping at the base, entire or sparingly dentate with low teeth, glabrous or nearly so, those of the lower leaves sometimes with petiole-like bases, those of the branches gradually smaller: heads numerous, 16-25 mm. broad: involucre broadly turbinate; bracts linear-oblong, appressed, in 4 or 5 series, their green tips acute or obtusish: ray-flowers numerous; ligules violet, or violet-purple, or sometimes white, 6-8 mm. long: pappus white. — M. Occasional, in waste places and on roadsides. — *Limestones*.

15. **ERIGERON** L. Annual, biennial, or perennial caulescent herbs. Leaves alternate, sometimes mostly basal: blades entire or toothed. Heads solitary or numerous, conspicuously radiate. Involucres broad, many-flowered: bracts narrow, the inner broader than the outer ones. Ray-flowers numerous: corollas with a slender tube and a narrow pink, violet, purple, or white ligule. Disk-corollas with a funnellform throat and a usually shorter tube: lobes deltoid. Anthers as long as the filaments or longer. Stigma short. Pappus of numerous capillary bristles or bristles and scales. — FLEABANE.

Plants perennial by offsets or stolons: pappus single.

Ray-flowers less than 100; ligules rather wide: inflorescence simple.

1. *E. pulchellus*.

Ray-flowers over 100; ligules very narrow: inflorescence compound.

2. *E. philadelphicus*.

Plants annual or biennial: pappus double.

Larger involucre bracts longer than the ligules: upper stem-leaves with sharply toothed blades: ray-flowers with pink ligules.

3. *E. annuus*.

Larger involucre bracts shorter than the ligules: upper stem-leaves with entire blades: ray-flowers with white ligules.

4. *E. ramosus*.

1. *E. pulchellus* Michx. Stems 1-5 dm. tall, villous or hirsute-villous: blades of the basal leaves obovate, spatulate or elliptic: outer bracts of the involucre finely pubescent; inner bracts acuminate, 5-5.5 mm. long: ray-flowers 50-65; ligules violet or bluish-purple: disk-corollas 4-4.5 mm. long. Common, on shaded banks. — Spr. — ROBIN'S-PLANTAIN.

2. *E. philadelphicus* L. Stems 1-12 dm. tall, softly hirsute: blades of the basal leaves spatulate to oblong, coarsely toothed: outer bracts of the involucre minutely hispidulous; inner bracts acute, 2.5-3 mm. long: ray-flowers 100 or more; ligules pink or rose-purple: disk-corollas 1.5-2 mm. long. — Common, in low pastures. — Spr. and sum.

3. *E. annuus* (L.) Pers. Stems 3-12 dm. tall, loosely pubescent: blades of the basal leaves oval, oblong, or lanceolate, coarsely toothed or incised: bracts of

the involucre with few long hairs: ligules of the ray pink, purplish or rarely white: disk-corollas less than half the length of the larger involucre bracts.—Common, in fields and thickets.—Sum.—DAISY-FLEABANE. SWEET-SCABIOUS.

4. **E. ramosus** (Walt.) B.S.P. Stems 2–10 dm. tall, appressed-pubescent: blades of the basal leaves spatulate to oblong, shallowly toothed: bracts of the involucre with many short hairs: ligules of the ray white or rarely pale-pink: disk-corollas over half the length of the larger involucre bracts.—Common, in fields and on roadsides.—Sum.—DAISY-FLEABANE.

16. **LEPTILON** Raf. Annual or biennial herbs. Leaves alternate: blades narrow, entire or sparingly toothed. Heads several or numerous, inconspicuously radiate or discoid. Involucres usually campanulate or cylindric, few-flowered: bracts very narrow, the inner much longer than the outer ones. Ray-flowers few: corollas with a very slender tube and a minute ligule. Disk-corollas with a campanulate or a cylindraceous throat and a long tube: lobes deltoid. Pappus of many brittle capillary bristles in 1 series.

1. **L. canadense** (L.) Britton. Stems 3–20 dm. tall, paniculate above, glabrate or sparingly hirsute: leaf-blades spatulate to linear or nearly so, ciliate near the base: longer bracts of the involucre 3–3.5 mm. long: disk-corollas 2.5–3 mm. long.—Common, in fields and waste places.—Sum. and fall.—HORSE-WEED. BUTTER-WEED.

17. **DOELLINGERIA** Nees. Perennial relatively tall herbs. Leaves alternate: blades relatively broad, veiny, entire or nearly so. Heads in a terminal corymb. Involucres campanulate to hemispheric, several-many-flowered: bracts various, the inner scarcely wider than the outer but much longer. Ray-flowers few or several: corollas with a long tube and a white or cream-colored ligule. Disk-corollas with a funnellform throat and a long tube: lobes lanceolate. Pappus of 2 distinct series, the outer series of short bristles or scales, the inner of elongate capillary bristles.—WHITE-TOPPED ASTER.

Ligules narrow, less than 2 mm. wide: achenes thick, ribless, less than 1 mm. wide: involucre of rather lax slightly overlapping bracts
 Involucre bracts acute or acutish, the inner linear, ciliate at the tip. 1. *D. umbellata*.
 Involucre bracts obtuse, the inner oblong, ciliate. 2. *D. humilis*.
 Ligules broad, over 3 mm. wide: achenes much flattened, ribbed, over 1 mm. wide: involucre of firmer much overlapping bracts. 3. *D. infirma*.

1. **D. umbellata** (Mill.) Nees. Stems 6–25 dm. tall, corymbose above: blades of the upper leaves membranous, elliptic, usually narrowly so, or linear-lanceolate, usually acuminate: inner bracts of the involucre 3–4 mm. long: pappus soft.—N. S. Common, on shaded banks and in thickets.—Late sum.

2. **D. humilis** (Willd.) Britton. Similar to *D. umbellata* in habit, but more stocky: blades of the upper leaves shorter, firm, elliptic, ovate, or oval, acute: inner bracts of the involucre 4–5 mm. long: pappus soft.—S. Occasional, in swamps.—*Schists.*—Fall.

3. **D. infirma** (Michx.) Greene. Stems 4–12 dm. tall, often widely branched: blades of the upper leaves elliptic to oval, varying to broadest above or below the middle, short-acuminate: inner bracts of the involucre 3–4 mm. long: disk-corollas 3–4 mm. long: pappus rigid.—S. Occasional, on dry banks. *Schists.*—Late sum.

18. **IONACTIS** Greene. Perennial low rigid herbs. Leaves alternate: blades narrow, entire. Heads few in a corymb or rarely solitary, conspicuously radiate. Involucres campanulate to turbinate, many-flowered: bracts

narrow, the inner ones several times longer than the outer. Ray-flowers several, with bright-colored elongate ligules. Disk-corollas yellow, with a slender tube and a longer funnelliform throat, the lobes deltoid. Pappus of slender bristles in 2 indistinct series, the outer bristles the shorter.

1. *I. lineariifolia* (L.) Greene. Stems tufted, 1.5-6 dm. tall, rough-pubescent: leaf-blades linear-spatulate to linear, 1.5-3 cm. long, scabrous-margined: inner bracts of the involucre narrowly linear, 6-8 mm. long: ligules bright-violet or rarely white, 8-15 mm. long.—Rather common, in dry soil or on rocky banks.—Fall.

19. **BACCHARIS** L. Perennial herbs or shrubs. Leaves alternate: blades leathery, entire or toothed. Heads dioecious, often clustered, discoid. Involucres ovoid to campanulate, many-flowered: bracts of the staminate involucres smaller than those of the pistillate. Corollas various, those of the staminate with a funnelliform throat and a long tube: lobes lanceolate, those of the pistillate flowers filiform. Pappus of the staminate flowers shorter than that of the pistillate.

1. *B. halimifolia* L. Shrub 9-40 dm. tall, resinous: leaf-blades suborbicular to oblong or linear-elliptic, some of them, at least, coarsely toothed: pistillate involucres about 6 mm. long; inner bracts oblong-spatulate.—S. Rare, in swamps.—*Serpentine*.—Fall.—Not recently collected.—GROUNDSEL-TREE. GROUNDSEL-BUSH.

20. **GIFOLA** Cass. Annual caulescent herbs resembling *Gnaphalium*. Leaves alternate: blades narrow, entire. Heads discoid, in small dense, sometimes proliferous, clusters. Involucres narrow, sessile: bracts scarious, in several series. Receptacle subulate to conic, chaffy. Pistillate flowers marginal, fruit-producing, with filiform corollas and rudimentary or no pappus. Perfect flowers central, few, with tubular corollas and hair-like pappus. Anthers sagittate at the base. Achenes terete or slightly flattened.

1. *G. germanica* (L.) Dumort. Plants silvery-pubescent, 5-35 cm. tall, the stem or branches usually proliferous above: leaves numerous, erect; blades lanceolate to linear, 1-2 cm. long, acute: involucres 3-3.5 mm. high; bracts ovate-lanceolate to oblong-lanceolate, acuminate or cuspidate: achenes about 0.8 mm. long.—Rare, in dry soil. Nat. of Eu.—Sum.—HERBA-IMPIA. COTTON-ROSE.

21. **ANTENNARIA** Gaertn. Perennial woolly stoloniferous herbs. Leaves alternate, those of the short caudex different from those of the flowering stem: blades entire. Heads in a terminal cluster, or rarely solitary. Involucres turbinate to campanulate, many-flowered: bracts with petaloid tips, those of the staminate involucres larger than those of the pistillate. Flowers dioecious or polygamo-dioecious. Pappus-bristles united at the base.—Spr.—EVERLASTING. LADIES'-TOBACCO.

Plants with prostrate stolons which are conspicuously leafy only at the tips: blades of the basal leaves cuneate to cuneate-spatulate. 1. *A. neglecta*.

Plants with assurgent stolons which are conspicuously leafy throughout.

Basal leaves relatively small, mainly less than 5 cm. long; blades 1-nerved, spatulate to obovate.

Basal leaves relatively large, mainly over 5 cm. long; blades 3-5-nerved, oblong or obovate.

2. *A. nudoica*.

3. *A. plantaginifolia*.

1. *A. neglecta* Greene. Stolons prostrate at the tip, scaly except at the tip: flowering stems 4 dm. tall or less: blades of the basal leaves cuneate to cuneate-

spatulate, 2.5–4.5 cm. long; heads capitate or ultimately racemose: outer bracts of the pistillate involucre linear: stigmas crimson. — Common, on dry banks and in fields.

2. *A. neodioica* Greene. Stolons ascending at the tip, copiously leafy: flowering stems 4 dm. tall or less: blades of the basal leaves spatulate to obovate, 1–3 cm. long: heads corymbose: outer bracts of the pistillate involucre oblong: stigmas pale. — Common, on dry banks.

3. *A. plantaginifolia* (L.) Richards. Basal leaves 3–5 cm. long; blades oblong or obovate: flowering stems 15–50 cm. tall, or shorter on the staminate plants: heads corymbose: outer bracts of the staminate involucre 5–5.5 mm. long, narrowed above: styles crimson. — Common, in dry soil and open woods.

22. **ANAPHALIS** DC. Perennial, erect herbs. Leaves alternate: blades narrow, entire. Heads in a terminal corymb. Involucres broad, turgid, many-flowered: bracts pearly-white, obtuse. Flowers dioecious, the staminate with a slender or filiform corolla. Pappus-bristles of the fruit-producing flowers distinct, that of the sterile flowers not thickened at the apex. — EVERLASTING.

1. *A. margaritacea* (L.) Benth. & Hook. Plants woolly, 2–8.5 dm. tall: leaf-blades linear or nearly so, 5–15 cm. long, attenuate: involucres pearly white; outer bracts oblong, the inner spatulate: staminate corollas 3.5–4 mm. long. — N. S. Not very common, in dry soil. — *Quartzite, schists.* — Sum.

23. **GNAPHALIUM** L. Annual, biennial, or perennial herbs. Leaves alternate: blades entire, sometimes decurrent. Heads in open or glomerate cymes, panicles, or corymbs. Involucres ovoid to cylindric, several-many-flowered: bracts various, the inner longer and usually narrower than the outer. Pistillate flowers marginal: corollas filiform. Perfect flowers central: corollas with a cylindric-funneliform throat and a slender tube: lobes ovate to deltoid. Anthers mostly longer than the filaments. Pappus a series of capillary bristles. — Sum. — CUDWEED. EVERLASTING.

Pappus-bristles distinct, falling away separately.

Plants erect, tall: inflorescence corymbose or paniculate: achenes glabrous.

1. *G. obtusifolium*.

Plants diffuse, low: inflorescence capitate: achenes puberulent.

2. *G. uliginosum*.

Pappus-bristles united at the base, falling away together: achenes hispidulous.

3. *G. purpureum*.

1. *G. obtusifolium* L. Annual, 2–6 dm. tall: cauline leaves 2–10 cm. long; blades oblong-linear to linear, the upper surface glabrous or glabrate: heads corymbose-paniculate: involucre 6–7 mm. high; inner bracts glabrous. — Common, in fields and thickets.

2. *G. uliginosum* L. Plants 0.5–3 dm. tall, lanate: leaf-blades spatulate or oblanceolate to linear, mostly 1–3 cm. long, entire: heads in terminal capitate clusters which are subtended by leaf-like woolly bracts: involucres 2–2.5 mm. high; bracts oblong-ovate to linear, acute. — S. Occasional, in dry or sandy soil. — *Schists.* — LOW-CUDWEED.

3. *G. purpureum* L. Plants white-woolly or silvery, 1–4 dm. tall: leaf-blades spatulate to linear, 2–8 cm. long: heads in sessile axillary clusters, these in virgate panicles: outer bracts of the involucre oblong. — Common, in sandy soil.

24. **INULA** L. Perennial, often large herbs. Leaves alternate: blades broad, toothed. Heads in open panicles or corymbs, usually showy. Involucres hemispheric or campanulate, many-flowered: bracts usually narrow and

elongate. Ray-flowers often numerous: corollas with a long tube and a narrow yellow ligule. Disk-corollas with a cylindrical-funnelform throat and a long tube: lobes lanceolate. Anthers longer than the filaments. Pappus of several capillary scabrous bristles.

1. **I. Helenium** L. Plants 5–20 dm. tall, pubescent: blades of the cauline leaves oblong-lanceolate to ovate, mainly 9–20 cm. long: inner bracts of the involucre 15–17 mm. long: ligules of the ray 2–3 cm. long: achenes 4–5 mm. long. — Occasional, on roadsides and in fence rows. Nat. of Eu. — Sum. — ELECAMPANE.

25. **POLYMNIA** L. Perennial widely branched herbs. Leaves opposite or mainly so: blades broad, pinnately veined. Heads inconspicuously radiate. Involucre small, double, the outer series of bracts loose, the inner ones variously shaped. Ray-flowers inconspicuous, the corollas with pubescent tubes and white, greenish, or pale-yellow, wide ligules. Disk-flowers with long abortive ovaries, the corollas with broadly funnelform throats and relatively long, ciliate lobes. Stigma stout, thickened under the tip. Anther-body broader than the appendage. Achenes slightly obcompressed, not oblique, 3-ribbed. Pappus wanting.

1. **P. canadensis** L. Stems 5–15 dm. tall; leaves 1–2 dm. long; blades oblong, oval, or ovate: intermediate bracts of the involucre short-acuminate: ligules greenish or whitish, inconspicuous, or obsolete: achenes about 3 mm. long, obtuse-angled. — Susquehanna valley. Rare, in rich soil. — Sum. — LEAF-CUP.

26. **POLYMNIASTRUM** Small. Perennial large herbs. Leaves opposite: blades very broad, palmately veined. Heads conspicuously radiate. Involucre large, the outer series of bracts foliaceous, the inner narrower. Ray-flowers conspicuous, the corollas with pubescent tubes and yellow narrow ligules. Disk-flowers with short abortive ovaries, the corollas with cylindrical throats and short, ciliate lobes. Stigma slender, not thickened under the tip. Anthers shorter than the filaments, the body narrower than the appendage. Achenes somewhat laterally compressed, oblique, finely striate.

1. **P. Uvedalia** (L.) Small. Stems 1–3 m. tall; leaves 1–5 dm. long; blades 3–5-lobed or angled: outer bracts of the involucre ovate to elliptic, 9–14 mm. long: ray-flowers with yellow ligules 15–20 mm. long: achenes 5–6 mm. long. — Susquehanna valley, and along tributary streams. Occasional, in shaded places. — Sum. — LEAF-CUP.

27. **SILPHIUM** L. Perennial, usually large, caulescent herbs, often resinous. Leaves alternate or opposite: blades entire, toothed, or 1–2-pinnately parted, sometimes connate-perfoliate. Heads radiate. Involucres campanulate or hemispheric, many-flowered: bracts broad, in few series. Receptacle flat or nearly so, with numerous bractlets subtending the disk-flowers. Ray-flowers pistillate, fruit-producing: corollas with a very short tube: ligules yellow or rarely white. Disk-corollas with a very short tube, a long throat and broad lobes. Achenes flat and broad, 2-winged. Pappus wanting or of 2 small awns confluent with the wings of the achene.

1. **S. trifoliatum** L. Plants 1–2 m. tall, the stem smooth and glabrous: leaves mostly whorled in 3's; blades lanceolate to linear-lanceolate, 8–11 cm. long, remotely serrate or nearly entire: heads often numerous: involucre campanulate; bracts oblong-lanceolate to ovate and oblong, the inner ones obtuse: ligules

yellow, 2-2.5 cm. long: achenes obovate or oblong-obovate, 8-10 mm. long, narrowly winged.—Lower Susquehanna valley. Rare, in sandy soil.—*Schists*.—Sum.—ROSEN-WEED.

28. CHRYSOGONUM L. Perennial depressed small herbs. Leaves opposite: blades toothed. Heads erect. Involucre hemispheric: bracts distinct, the outer foliaceous. Ligules of the ray-corollas yellow. Disk-flowers with short abortive ovaries and corollas with a very short tube and funnellform throat. Filaments less than half as long as the anthers. Style glabrous. Achenes wingless. Pappus a half cup-shaped crown.

1. C. virginianum L. Stems hirsute: leaf-blades oblong, ovate or oval, 2-5 cm. long, long-petioled: involucre hirsute; outer bracts 7-10 mm. long: ligules of the ray mostly 9-11 mm. long: achenes 4-4.5 mm. long.—S. Rare, on hillsides along the Octoraro Creek.—*Schists*.—Spr. and sum.

29. PARTHENIUM L. Perennial or annual herbs, or shrubs. Leaves alternate: blades toothed, pinnatifid, or dissected. Heads inconspicuously radiate. Involucre depressed to globular: bracts appressed, broad. Ray-flowers usually 5: ligules small or minute, white or whitish. Lobes of the disk-corollas ovate, ciliate. Anthers longer than the filaments. Achenes flattened. Pappus of 2 or 3 scales, or awns.

1. P. Hysterophorus L. Plants annual, 3-8 dm. tall: leaf-blades oblong to ovate in outline, the segments linear, oblong or ovate: involucre saucer-like, 4-5 mm. broad: disk-corollas 1-1.5 mm. long, or slightly more: achenes obovoid, 1.5-2 mm. long.—S. Rare, in fields. Nat. of the s. w. U. S. and Mex.—Sum.

30. HELIOPSIS L. Perennial, or rarely annual, caulescent, tall herbs. Leaves opposite: blades broadest below the middle, toothed. Heads radiate, solitary or in open corymbs. Involucres campanulate to hemispheric: bracts short, in 2 or 3 series. Receptacle convex or conic, chaffy. Ray-flowers pistillate, fruit-producing, enveloped in the bractlets: corollas with a very short tube and a long throat. Achenes 3-4-angled. Pappus a low crown, 1-4 teeth, or wanting.—Sum.—OX-EYE.

Leaf-blades smooth: pappus wanting, or of 2-4 short teeth. 1. *H. helianthoides*.
Leaf-blades rough: pappus crown-like, or of 1-3 sharp teeth. 2. *H. scabra*.

1. H. helianthoides (L.) B.S.P. Stem and branches smooth and glabrous or nearly so: leaf-blades thinnish, ovate to lanceolate, 8-20 cm. long, sharply serrate: heads showy, the rounded disk usually over 1 cm. high: involucral bracts inconspicuously pubescent: ligules bright-yellow, 2-4 cm. long: achenes nearly 4 mm. long.—Common, on banks and in meadows.

2. H. scabra Dunal. Stem and branches scabrous-hispidulous: leaf-blades thick, deltoid to ovate or broadly lanceolate, 5-15 cm. long, serrate: heads very showy, the conic disk 1.5-2 cm. high: involucral bracts cinereous-pubescent: ligules bright-yellow, 2-4 cm. long: achenes nearly 5 mm. long.—M. Occasional, in fields and thickets. Nat. of w. N. A.

31. VERBESINA L. Annual diffuse herbs. Leaves opposite: blades narrow, entire or sparingly toothed. Heads small, inconspicuously radiate. Involucres hemispheric or campanulate: bracts broad, those of the outer series scarcely larger than those of the inner. Ray-flowers several: ligules white, inconspicuous. Disk-flowers several: corollas with a short tube and a longer

funnel-form throat: lobes deltoid. Anthers oblong, longer than the filaments, the appendages ovate. Stigmas broad. Achenes stout, 3-4-angled, or somewhat flattened in the disk. Pappus wanting or a mere toothed crown.

1. *V. alba* L. Stem and branches 2-9 dm. long, finely pubescent: leaf-blades elliptic, oblong, or lanceolate, or narrower, 3-10 cm. long, sessile: involucre broadly campanulate, the larger bracts about 4.5 mm. long: achenes about 2.5 mm. long.—Not very common, along streams and in low grounds. Sum.

32. **RUDEBECKIA** L. Perennial or rarely annual or biennial often pubescent herbs. Leaves alternate: blades entire, toothed, or pinnatifid. Heads erect. Involucre hemispheric or depressed, many-flowered: bracts spreading or reflexed, often unequal. Receptacle conic or convex. Ray-flowers several: ligules yellow, rarely discolored or crimson, spreading or drooping. Disk-flowers crowded: corollas with a short tube and a longer throat: lobes deltoid or ovate. Anthers longer than the filaments. Achenes 4-angled, flat-topped. Pappus merely a low crown or obsolete.—CONE-FLOWER.

Leaf-blades deeply lobed, cleft or divided: disk cylindric or conic, yellowish or gray.

Leaf-blades entire or toothed: disk ovoid or globular, purple or dark-brown.

Stigma-tips subulate.

Involucre of narrow bracts much shorter than the ligules of the ray-flowers.

Involucre of foliaceous bracts as long as the ligules of the ray-flowers or longer.

Stigma-tips obtuse.

1. *R. laciniata*.

2. *R. hirta*.

3. *R. Brittonii*.

4. *R. fulgida*.

1. *R. laciniata* L. Stems 6-20 dm. tall, glabrous or nearly so: blades of the upper leaves less deeply lobed than those of the lower, or merely cleft: bracts of the involucre oblong to lanceolate: ligules of the ray 2-4 cm. long: disk becoming cylindric or long-conic.—Common, in thickets and open waste places.—Late sum.

2. *R. hirta* L. Stems 3-7 dm. tall, hirsute or hispid: blades of the upper leaves oblong, elliptic, or lanceolate, or nearly linear: bracts of the involucre linear-lanceolate or linear-oblong: ligules of the ray 20-35 mm. long: disk 10-18 mm. wide.—Common, in fields and on roadsides. Nat. westward.—Sum.—YELLOW-DAISY. BLACK-EYED SUSAN.

3. *R. Brittonii* Small. Stems 5-8 dm. tall, hispid or hirsute-hispid: blades of the upper leaves mostly ovate to oblong-ovate, rather coarsely toothed or shallowly crenate: bracts of the involucre oblong to lanceolate: ligules of the ray 25-35 mm. long.—Lower Susquehanna valley. Rare, on wooded hillsides.—*Schists*.—Sum.

4. *R. fulgida* Ait. Stems 3-7 dm. tall, hirsute or somewhat hispid: blades of the lower leaves lanceolate, oblong-lanceolate, or cuneiform, remotely toothed or entire: bracts of the involucre linear to linear-lanceolate: ligules of the ray 9-15 mm. long: disk 1-1.5 cm. wide.—S. Occasional, in thickets, low grounds and swamps.—*Schists*.—Fall.

33. **HELIANTHUS** L. Annual or perennial herbs. Leaves alternate or opposite: blades entire or toothed. Heads erect or nodding. Involucre cylindric, hemispheric, or saucer-shaped: bracts narrow or broad, the tips usually lax. Ray-flowers several or many: ligules yellow or rarely purple, usually conspicuous, very rarely obsolete. Disk-flowers crowded: corollas yellow or purple, with a very short tube abruptly dilated into the longer throat: lobes ovate or deltoid. Stigmas slender. Achenes flattened and somewhat

4-angled, embraced by the bractlets. Pappus of 2 awns or scales, sometimes accompanied by smaller awns, all deciduous. — Fall. — SUNFLOWER.

Leaf-blades petioled or with petiole-like bases.

Main stem smooth and glabrous.

Bracts of the involucre much surpassing the top of the disk.

Bracts of the involucre about equalling the top of the disk. 1. *H. decapetalus*.

2. *H. strumosus*.

Main stem pubescent.

Leaf-blades prevailingly ovate or ovate-lanceolate.

3. *H. tuberosus*.

Leaf-blades prevailingly lanceolate.

Leaves mostly alternate; blades narrowed at the base; achenes narrow, cuneate-oblong.

4. *H. giganteus*.

Leaves mostly opposite; blades obtuse at the base; achenes broad, obovoid.

5. *H. ambiguus*.

Leaf-blades sessile and partly clasping.

6. *H. divaricatus*.

1. **H. decapetalus** L. Stems 5–16 dm. tall, glabrous below the inflorescence; leaf-blades membranous, ovate to oblong-lanceolate, 8–20 cm. long, coarsely serrate; bracts of the involucre linear to linear-lanceolate, 1.5–2 cm. long; ligules of the ray 2.5–3 cm. long; disk about 1.5 cm. broad. — Common, in moist thickets and along streams.

2. **H. strumosus** L. Stems 6–18 dm. tall, glabrous or nearly so to the inflorescence; leaf-blades ovate to lanceolate or oblong-lanceolate, 8–20 cm. long, whitish beneath; bracts of the involucre lanceolate to oblong-lanceolate, the inner ones scarcely dilated; ligules of the ray 2.5–4 cm. long; disk 1.5–2 cm. broad. — Common, on dry banks and in thickets.

3. **H. tuberosus** L. Stems 6–30 dm. tall, scabrous to hirsute; leaf-blades ovate to lanceolate, 8–20 cm. long, shallowly or coarsely toothed; bracts of the involucre linear to linear-lanceolate, the inner 12–21 mm. long; ligules of the ray 2.5–4 cm. long; disk 15–20 mm. broad. — Common, in rich soil, waste places and fence-rows.

4. **H. giganteus** L. Stems 9–30 cm. long, scabrous and hispidulous at least above; leaf-blades lanceolate to oblong-lanceolate or linear-lanceolate, 5–15 cm. long, toothed or nearly entire; bracts of the involucre lanceolate or elliptic-lanceolate, the inner 13–18 mm. long; ligules of the ray 1.5–2 cm. long; disk 10–15 mm. broad; achenes cuneate-oblong, 1.5–2 mm. wide. — Common, in low grounds. — JERUSALEM-ARTICHOKE.

5. **H. ambiguus** (T. & G.) Britton. Similar to *H. giganteus* in habit, but less harshly pubescent; leaves mostly opposite; blades lanceolate, rounded at the base; bracts of the involucre attenuate, reflexed at maturity; achenes obovoid, 2.5–3 mm. wide. — S. Rare, in thickets near Pleasant Grove. — *Schists*.

6. **H. divaricatus** L. Stems 3–12 dm. tall, commonly smooth and glabrous; leaf-blades lanceolate or ovate-lanceolate, sessile or nearly so; bracts of the involucre lanceolate or oblong-lanceolate, 8–10 mm. long; disk 10–15 mm. broad. — N. S. Frequent, in thickets. — *Sandstones and shales, schists*.

34. **RIDAN** Adans. Perennial rather coarse tall herbs. Leaves alternate or opposite; blades usually toothed and decurrent. Heads several or numerous. Involucre narrow; bracts few, spreading or recurving, becoming lax. Ray-flowers few; ligules yellow or white, or wanting. Disk-corollas with a funnellform throat rather abruptly contracted into the shorter tube; lobes lanceolate. Filaments slightly shorter than the anthers. Pappus of 2 more or less spreading awns, accompanied by 2 or 3 smaller awns, or scales.

1. **R. alternifolia** (L.) Britton. Plants 6–25 dm. tall; leaf-blades oblong or elliptic, 9–30 cm. long; disk-corollas 5 mm. long; achene-body with ciliate wings. — Common, in moist thickets and on roadsides.

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35. **COREOPSIS** L. Annual or ours perennial herbs. Leaves various. Heads conspicuously radiate. Involucres campanulate to hemispheric: bracts distinct or nearly so, the outer narrow. Ray-flowers several: corollas with yellow, discolored, or pink ligules. Disk-corollas with a funnelliform throat and a stout tube. Filaments mostly shorter than the anthers. Achenes with entire or pinnate wings, or wingless. — TICKSEED.

1. **C. tripteris** L. Plants 8–30 dm. tall, glabrous or nearly so: leaf-blades deeply 3–5-divided, the divisions elliptic-lanceolate or lanceolate, or those of the upper leaves entire: outer involueral bracts linear, 2–3 mm. long: ligules elliptic-oblong, yellow: achenes elliptic-oblong, 5–6 mm. long. — Lower Susquehanna valley. Frequent, on the river-shore and islands. — *Schists.* — Late sum.

36. **BIDENS** L. Annual or biennial, or rarely perennial herbs. Leaves opposite, or the upper sometimes alternate: blades entire, toothed or divided. Heads erect or nodding. Involucres double, the outer bracts foliaceous, the inner appressed. Ray-flowers few, with white or yellow ligules, or wanting. Disk-corollas with a short tube and a longer throat: lobes mostly deltoid. Achenes flat, terete, or 4-angled. Pappus of 2–4 rigid, barbed awns. — BUR-MARIGOLD.

Achenes spindle-shaped, gradually tapering above: ligules of the ray-flowers nearly white or yellowish-white. 1. *B. bipinnata.*

Achenes flattened, broadest above the middle: ligules of the ray-flowers yellow.

Rays inconspicuous and caducous or wanting.

Leaves usually undivided: pappus-awns 3 or 4.

Disk-corollas pale, 4-lobed: achene-margins strongly, retrorsely barbed throughout: involucre long. 2. *B. comosa.*

Disk-corollas orange, 5-lobed: barbs of the achene-margins few, directed both ways: involucre short. 3. *B. connata.*

Leaves 3–5-divided: pappus-awns 2. 4. *B. frondosa.*

Rays showy or conspicuous.

Leaf-blades undivided: pappus-awns 2–4, retrorsely barbed.

Outer involueral bracts exceeding the disk, foliaceous: ray-flowers with ligules twice the length of disk or less: achenes dilated at the summit. 5. *B. cernua.*

Outer bracts rarely exceeding the disk: ray-flowers with ligules 2–4 times the length of disk: achenes not dilated above.

Leaf-blades pinnately divided: pappus-awns 2 or none. 6. *B. lacris.*

7. *B. trichosperma.*

1. **B. bipinnata** L. Stem glabrous or nearly so, 4-angled, branched and rather slender, 3–17 dm. high: primary leaf-segments thin, deltoid, the ultimate one lanceolate, incised or lobed: outer involueral bracts 7–10, linear, shorter than the acute inner ones: rays few, the ovaries awnless and glabrous, the ligules yellowish-white or nearly white, about equalling the disk, mostly entire: disk-corolla 5-lobed: stamens included: achenes spindle-shaped, in fruit much longer than the involucre, the outer slightly shorter; awns 3–4, yellow, retrorsely barbed. — Common, in waste ground and thickets. — Fall.

2. **B. comosa** (A. Gray) Wiegand. Stem pale throughout, stout, 3–8 dm. high, glabrous, the branches short, stout: leaves undivided, 8 cm. long, elliptic-lanceolate, regularly serrate, acute, each attenuate into a margined petiole, or the upper sessile: heads large: peduncles short and stout: outer bracts of the involucre 6–8, often 2–5 times the length of the disk, erect: rays wanting: disk-corollas funnelliform, pale-yellow, 4-lobed: stamens included: achenes large and flat, 8–10 mm. long, 3 mm. wide, brown or olive, nearly smooth and glabrous, the 3 long awns retrorsely barbed. — M. Occasional, in wet places. — *Limestones.* — Fall.

3. *B. connata* Nutt. Stem tall, sparingly branched, 3-14 dm. high, glabrous, bright-green: leaf-blades undivided or some of the lower deeply parted, lanceolate to elliptic, acuminate, tapering to the petiole, coarsely and saliently serrate: heads medium: outer bracts of the involucre 4-5, linear-spatulate, rarely exceeding the disk, glabrous: rays rarely present, the ligules one-half longer than the disk, the ovaries awnless, and hairy: disk-corollas campanulate above, 5-lobed, orange: achenes 4-6 mm. long, rather narrow and thick, nearly black, covered with yellowish warts; some or all marginal barbs erect: awns 4, slender, with erect or retrorse barbs. — N. M. Frequent, in swamps and low grounds. — *Sandstones and shales, limestone.* — Fall. — SWAMP BEGGAR-TICKS.

4. *B. frondosa* L. Stem slender, bushy-branched, nearly glabrous, 5-10 dm. high or more: leaf-blades pinnately 3-divided or rarely 5-divided, the segments lanceolate, serrate with sharp spreading teeth, acuminate: heads not large: outer bracts of the involucre 6-8, subequal, spatulate, sparsely ciliate, usually exceeding the disk: rays usually present, golden-yellow, the ligules equalling the disk, the ovaries hairy and with 2 short retrorsely barbed awns: disk-corollas orange, 5-lobed: stamens exerted: achenes black, 6 mm. long, 3.25 mm. wide, euneate, flattish, sparsely hairy and often tuberculate, the barbs on the margins erect, those on the 2 awns either erect or reflexed. — Common, in waste places and fields. — Fall.

5. *B. cernua* L. Stem low, pale-green, 2-7 dm. high, nearly glabrous, the branches very short, decreasing down the stem: leaf-blades undivided, 6-16 cm. long, lanceolate or linear-lanceolate, more or less connate by the broad bases, acuminate, serrate, with coarse distant teeth: heads very large, broader than high, nodding in fruit: outer bracts of the involucre 7-8, unequal, exceeding the disk and spreading: rays usually present, bright-yellow, the ligules about one-half longer than the disk, the ovaries glabrous except the margin, and awnless: disk-corollas orange, 5-lobed: achenes narrowly euneate, slightly dilated at the summit, 4-angled, the margins retrorsely barbed and tuberculate, the awns 4, slender, retrorsely barbed. — Common, along streams and wet soil. — Fall.

6. *B. laevis* (L.) B.S.P. Stem glabrous, 5-10 mm. high, the branches all toward the summit of the stem, slender, ascending: leaf-blades undivided, 7-13 cm. long, elliptic-lanceolate, serrate with small inconspicuous teeth, acute, contracted toward the sessile base: heads medium, nearly globular, erect or nodding in fruit: outer bracts of the involucre 7-8, rarely longer than the disk: rays very large, the ligules 2-3 cm. long, golden-yellow, the ovaries as in the last: disk-corollas orange, 5-lobed: achenes euneate, neither dilated nor contracted at the top, not tuberculate, the margins and 2-4 awns retrorsely barbed. [*B. chrysanthemoides* Michx.] — M. Occasional, in moist soil. — *Sandstones and shales, and limestone.* — Sum.

7. *B. trichosperma* (Michx.) Britton. Stem tall and glabrous, much branched, 6-15 dm. high: leaf-blades pinnately divided, with 4-8 narrowly lanceolate, serrate or incised, acute or acuminate segments: heads 4-6 cm. broad: outer bracts of the involucre linear-spatulate, rarely ciliate, equalling the disk: rays several, the ligules bright-yellow, 12-25 mm. long, the ovaries bidentulate at the summit: disk-corollas deep-yellow, 5-lobed: stamens exerted: achenes narrowly euneate, slightly strigose-ciliate above; awns 2, about equalling the breadth of the achene, erect-barbed. [*Coreopsis trichosperma* Michx.] — Susquehanna valley. — Late sum.

37. *GALINSOGA* R. & P. Annual, tender herbs. Leaves opposite: blades toothed. Heads radiate. Involucre campanulate or hemispheric: bracts relatively broad. Ray-flowers 4 or 5: corollas with a pubescent tube and broad white ligule. Disk-corollas with a campanulate throat and a tube of about

the same length. Anthers oblong. Achenes nearly or quite as long as the corollas. Pappus of the ray of several bristles or wanting, of the disk of lacerate or fimbriate bristles.

1. *G. parviflora* Cav. Plants 1-7 dm. tall, often branched; leaf-blades ovate to ovate-lanceolate, 2-5 cm. long, petioled; involucre 2-2.5 mm. high; outer bracts ovate, obtuse; ligules white, 1-1.5 mm. wide; disk-corollas about 1.5 mm. long; achenes less than 2 mm. long.—Common, in cultivated grounds and waste places. Nat. of S. Am.—Sum.

38. **HELENIUM** L. Annual, biennial, or perennial, bitter herbs. Leaves alternate: blades entire, toothed, or pinnatifid, often decurrent. Heads solitary, few, or numerous. Involucre flattish: bracts spreading or reflexed. Receptacle conic, oblong, or subglobose. Ray-flowers several, the corollas with cuneate ligules. Disk-corollas with broadly ovate lobes. Achenes ribbed. Pappus of 5-8 acuminate or awn-tipped scales.

1. *H. autumnale* L. Plants 2-9 dm. tall; leaf-blades oblong to elliptic, or slightly broadest above the middle or below it, 3-12 cm. long, rather prominently toothed; involueral bracts linear-lanceolate or narrower, 5-7 mm. long; ligules 10-20 mm. long; disk yellow; corollas 3 mm. long.—Common, in swamps and low grounds.—Fall.—SNEEZEWEED.

39. **ACHILLEA** [Vaill.] L. Perennial herbs. Leaves alternate: blades toothed, pinnatifid, or dissected. Heads small, corymbose. Involucre campanulate to obovoid: bracts broad, firm. Ray-corollas with ligules mostly broader than long. Achenes flattened and callous-margined. Pappus wanting.

1. *A. Millefolium* L. Plants 2-9 dm. tall, villous and cottony; leaves 5-22 cm. long; blades twice or thrice pinnately parted; heads crowded: inner bracts of the involucre oblong, 3.5-4.5 mm. long, ciliate; ray-flowers 4 or 5, the ligules 3-4 mm. wide, white or pink; achenes 1-1.5 mm. long.—Common, on banks and in meadows and fields. (Eurasia.)—Sum.—MILFOIL. YARROW.

40. **ANTHEMIS** [Mich.] L. Annual, biennial, or perennial herbs. Leaves alternate: blades pinnatifid or dissected. Heads relatively large, mostly scattered. Involucre hemispheric: bracts relatively long. Ray-corollas with elongate ligules. Achenes not flattened. Pappus often crown-like.—Sum.—CHAMOMILE.

Leaf-blades 3-pinnately dissected: achenes with tuberculate sides. 1. *A. Cotula*.
Leaf-blades 1-2-pinnately parted: achenes with smooth sides. 2. *A. arvensis*.

1. *A. Cotula* L. Annual, ill-scented; leaf-blades thrice pinnately dissected, the segments very slender; disk-flowers near the center of the receptacle with bractlets; corollas mostly 2.5 mm. long; achenes tuberculate-roughened; pappus wanting.—Common, in waste places and on roadsides. Nat. of Eu.—MAY-WEED. DOG-FENNEL.

2. *A. arvensis* L. Annual or biennial, not ill-scented; leaf-blades once or twice pinnately parted, the segments relatively coarse; disk-flowers all with bractlets; corollas mostly 2 mm. long; achenes smooth-sided; pappus a narrow border.—Occasional, in fields and on roadsides. Nat. of Eu.—CORN-CHAMOMILE.

41. **CHRYSANTHEMUM** [Tourn.] L. Annual or perennial herbs. Leaves alternate: blades toothed, incised, or dissected, the segments coarse. Heads solitary or clustered. Involucre saucer-shaped or hemispheric: bracts

rather narrow, but mostly broadened upward. Ray-corollas with ligules longer than wide. Filaments adnate to the corolla-tube. Achenes terete or angled. Pappus a scaly cup, or wanting. — Sum. — DAISY.

Ray conspicuous; ligules linear; heads few or solitary. 1. *C. Leucanthemum*.
Ray inconspicuous; ligules oval or obovate; heads numerous. 2. *C. Parthenium*.

1. **C. Leucanthemum** L. Plants 2-9 dm. tall, glabrous or nearly so; leaf-blades spatulate to linear, 2-10 cm. long, serrate or pinnatifid; inner bracts of the involucre 5.5-6.5 mm. long, obtuse; ray-flowers numerous; ligules white or pink, 1-2.5 cm. long; disk yellow; pappus obsolete. — Common, in fields and waste places. Nat. of Eu. — WHITE-DAISY. OX-EYE DAISY.

2. **C. Parthenium** (L.) Pers. Plants 2-7 dm. tall; leaf-blades broad, those of the lower ones at least, twice pinnately parted, the divisions incised; inner bracts of the involucre 2.5-3 mm. long, acute; ligules white, 3-5 mm. long; disk cream-colored; pappus a toothed crown. — M. Frequent, on roadsides and about gardens. Nat. of Eu. — FEVERFEW.

42. **TANACETUM** L. Perennial or sometimes annual herbs. Leaves alternate; blades pinnately dissected or divided. Heads corymbose. Involucre hemispheric or saucer-shaped; inner bracts longer than the outer. Filaments partly adnate to the corolla-tube. Achenes angled or ribbed. Pappus a crown-like border.

1. **T. vulgare** L. Plants 3-10 dm. tall, acrid-aromatic; leaf-blades 5-20 cm. long, with the ultimate segments sharply toothed; involucre 6-8 mm. wide, the inner bracts 4-5 mm. long; corollas yellow; achenes about 2 mm. long. — Common, on roadsides and about gardens. Nat. of Eu. — Sum. — TANSY.

43. **ARNICA** L. Perennial herbs. Leaves typically opposite; blades entire or toothed. Heads solitary or several. Involucre mostly turbinate or campanulate, or broader in age; bracts nearly equal, narrow. Ray-flowers with yellow ligules. Corollas of the disk-flowers tubular, the lobes very short. Achenes ribbed. Pappus a single series of slender bristles.

1. **A. acaulis** (Walt.) B.S.P. Plants 2-10 dm. tall, hirsute; leaves mainly basal and spreading on the ground; blades oblong to oval or ovate, 5-12 cm. long, shallowly toothed or nearly entire; bracts of the involucre 9.5-11 mm. long, acute; ligules 1.5-2.5 cm. long; achenes 4 mm. long. — S. Rare, in low grounds near New Texas. — *Schists.* — Sum.

44. **ERECTITES** Raf. Annual herbs. Leaves alternate; blades toothed or pinnatifid. Heads corymbose or paniculate. Involucres narrow and somewhat swollen at the base; bracts narrow, flat. Disk-corollas with triangular-lanceolate or deltoid lobes shorter than the narrow throat. Filaments longer than the anthers. Achenes ribbed. Pappus of many white bristles.

1. **E. hieracifolia** (L.) Raf. Plants 2-20 dm. tall, watery; leaf-blades spatulate-oblong to lanceolate, 5-20 cm. long, coarsely toothed, incised, or pinnatifid; involucre 12-15 mm. long; bracts narrowly linear; corollas 8-9 mm. long; achenes about 1.5 mm. long. — Common in clearings and fields. — Sum. — FIREWEED.

45. **MESADENIA** Raf. Perennial herbs. Leaves alternate; blades undulate, toothed or somewhat lobed. Heads corymbose. Involucres cylindric to cylindric-ovoid; bracts sometimes winged or keeled. Disk-corollas with linear or linear-lanceolate lobes longer than the campanulate throat. Filaments filiform. Achenes ribbed, glabrous. — Sum. — INDIAN-PLANTAIN.

Leaves green; blades repand-dentate; stems furrowed, green. 1. *M. reniformis*.
Leaves glaucous; blades angulate-lobed; stem terete, glaucous. 2. *M. atriplicifolia*.

1. *M. reniformis* (Muhl.) Raf. Stems 9-30 dm. tall; blades of the cauline leaves reniform, 10-60 cm. wide; involueral bracts 8-11 mm. long; achenes about 5 mm. long. — Susquehanna valley. Occasional, in woods and thickets. — *Schists*. — GREAT INDIAN-PLANTAIN.

2. *M. atriplicifolia* (L.) Raf. Stems 9-20 dm. tall; blades of the cauline leaves ovate to triangular, or narrower above, angulate-lobed or sharply and coarsely toothed; involueral bracts 8-11 mm. long; achenes 4-4.5 mm. long. — Occasional, in thickets. — PALE INDIAN-PLANTAIN.

46. **SYNOSMA** Raf. Perennial herbs. Leaves alternate; blades triangular to hastate, toothed. Heads corymbose. Involucre nearly cylindrical; bracts narrow. Disk-corollas with lanceolate lobes shorter than the funnel-form throat. Filaments enlarged below the anthers. Achenes ribbed, glabrous.

1. *S. suaveolens* (L.) Britton. Plants 6-15 dm. tall; leaves numerous; blades hastate, 8-20 cm. long, serrate or dentate-serrate; larger bracts of the involucre 10-11 mm. long; corollas 11-12 mm. long; achenes slender, 7-8.8 mm. long. — M. S. Frequent, in thickets and on shaded banks. — *Limestones, schists*. — Sum.

47. **SENECIO** [Tourn.] L. Annual or perennial herbs. Leaves alternate; blades entire, toothed, pinnatifid, or pinnately parted. Heads solitary or many. Involucre campanulate to cylindrical; bracts flat. Disk-corollas yellow with a funnel-form throat and triangular or ovate lobes. Filaments often enlarged below the anthers. Achenes 5-10-ribbed, pubescent or papillose. — Spr. — SQUAW-WEED. RAGWORT. RAGWEED. GROUNDSEL.

Blades of the basal leaves cordate or subcordate at the base. 1. *S. aureus*.
Blades of the basal leaves narrowed at the base.

Blades of the basal leaves prevailingy spatulate; achenes glabrous. 2. *S. obovatus*.

Blades of the basal leaves prevailingy oblong; achenes pubescent. 3. *S. Balsamitae*.

1. *S. aureus* L. Plants 3-7 dm. tall; blades of the basal leaves 2-12 cm. long, rounded at the apex; involucre 6-7 mm. long; bracts linear, fully 1 mm. wide; ligules narrow, 5.5-7.5 mm. long. — Common, in low grounds and swamps.

2. *S. obovatus* Muhl. Plants 1-5 dm. tall; blades of the basal leaves spatulate to obovate, coarsely toothed or some of them lyrate-pinnatifid; involucre 4-5 mm. long; bracts narrowly linear or subulate-linear; ligules 5-7 mm. long. — N. M. Frequent, in thickets and dry hillsides. — *Sandstones and shales, limestones*.

3. *S. Balsamitae* Muhl. Plants 2-6 dm. tall; blades of the basal leaves oblong to oblong-spatulate, toothed; involucre 4-5 mm. long; bracts narrowly linear or nearly linear; ligules 4-6 mm. long; achenes about 3 mm. long. — Common, in dry soil and thickets and on roadsides.

48. **XERANTHEMUM** L. Annual herbs. Leaves alternate; blades narrow, entire. Heads erect. Involucre campanulate to cylindrical; bracts firm, in several series, the outer short and appressed, the inner ones elongate, spreading, resembling ligules of a ray. Marginal-corollas 2-lipped. Central-corollas with a short tube and an elongate throat; lobes mostly narrow. Achenes narrow. Pappus of 5, or rarely of more, elongate scales.

1. *X. annuum* L. Plants mostly 3-10 dm. tall, the stem and branches floccose; leaf-blades linear-spatulate to linear, more copiously pubescent beneath

than above: outer bracts of the involucre obovate, apiculate, inner bracts linear-elliptic or elliptic-spatulate to spatulate, 18-25 mm. long, white or pink, acute or apiculate: corollas of the central flowers 4-5 mm. long; lobes lanceolate.—S. Occasional, in fields and on roadsides. Nat. of Eu.—Sum.—IMMORTELES. EVERLASTING.

49. **ARCTIUM** L. Biennial herbs. Leaves alternate: blades often ample, mainly entire or repand. Heads solitary in the axils or clustered, not conspicuous. Involucre with many narrow bracts, each hooked at the tip. Filaments glabrous. Pappus of short, rigid or scale-like, bristles.

1. **A. minus** Schk. Plants 4-16 dm. tall: leaf-blades ovate, those of the lower cauline leaves 2-4.5 dm. long, all undulate or shallowly toothed: inner bracts of the involucre mostly 7-8 mm. long: corollas purplish: achenes about 4 mm. long.—Common, in waste places and on roadsides. Nat. of Eu.—Sum.—BURDOCK. CLOTBUR.

50. **CIRSIUM** [Tourn.] Hill. Annual, biennial, or perennial herbs. Leaves alternate: blades toothed, lobed, or pinnatifid, usually spiny. Heads erect, often showy. Involucre with the outer bracts, at least, spine-tipped or spiny-margined. Filaments mostly pubescent. Pappus of elongate capillary plumose bristles in several series.—Sum. and fall.—THISTLE.

Flowers dioecious: heads small: involucre about 1 cm. thick. 1. *C. arvense*.
Flowers perfect: heads large: involucre about 2 cm. thick or more.

Heads not involucre, but sometimes approximate to one or few leaves.

Bracts of the involucre not spine-tipped, the outer ones often cuspidate.

Bracts of the involucre, at least the outer ones, spine-tipped.

Spines of the involucre bracts appressed or erect.

Spines of the involucre bracts spreading.

Inner bracts of the involucre narrow, with flattened soft tips.

Leaf-blades, except those near the heads, merely toothed.

Leaf-blades 1-2-pinnatifid.

Inner bracts of the involucre as well as the outer, spine-tipped.

Heads involucre, completely surrounded by a whorl of copiously spine-armed bracts.

2. *C. muticum*.

3. *C. odoratum*.

4. *C. altissimum*.

5. *C. discolor*.

6. *C. lanceolatum*

7. *C. horridulum*.

1. **C. arvense** (L.) Scop. Plants often forming mats: stems 2-10 dm. tall, glabrous or nearly so: leaf-blades spatulate, oblong, or lanceolate in outline, pinnatifid, 4-16 cm. long, rigidly spine-armed, pubescent beneath or sometimes nearly glabrous: outer bracts of the involucre acute, the inner ones narrowly linear, short-acuminate, 9-12 mm. long: corollas mostly 12-15 mm. long.—Common in fields and pastures, and on roadsides. Nat. of Eu.—CANADA-THISTLE.

2. **C. muticum** Michx. Stems 8-25 dm. tall, angled, lanuginous or glabrate: leaf-blades oblong to oblong-ovate, 1-2-pinnatifid, mainly 17-40 cm. long, rather weakly spine-armed: outer bracts of the involucre obtuse or cuspidate, the inner ones narrowly linear, short-acuminate, 27-29 mm. long: corollas mostly 28-30 mm. long.—Rather common, in meadows and fields, and on roadsides.—SWAMP-THISTLE.

3. **C. odoratum** (Muhl.) Petrak. Stems 3-10 dm. tall, tomentulose: leaf-blades oblanceolate, 1-2-pinnatifid: outer bracts of the involucre lanceolate, slender-tipped, the inner bracts 45-55 mm. long: corollas 50-55 mm. long.—Not very common, in fields and low grounds.—PASTURE-THISTLE.

4. **C. altissimum** (L.) Spreng. Stems 9-30 dm. tall, downy: blades of the basal or lower cauline leaves oblong to elliptic, or broadest above or below the middle, densely white-tomentose beneath: outer bracts of the involucre with tips

about $\frac{1}{2}$ as long as the body, the inner bracts 28–30 mm. long: corollas 37–40 mm. long. — Not very common, in thickets and fields.

5. *C. discolor* (Muhl.) Spreng. Similar to *C. altissimum* in habit, but seldom over 20 dm. tall: leaf-blades mainly oblong-lanceolate to ovate-lanceolate, densely white-tomentose beneath: outer bracts of the involucre with tips about as long as the body, the inner bracts 25–28 mm. long: corollas 33–35 mm. long. — Rather common, in thickets and on roadsides.

6. *C. lanceolatum* (L.) Hill. Stems 8–15 dm. tall, pubescent: leaves crowded; blades lanceolate, 1–2-pinnatifid, grayish-woolly beneath: outer bracts of the involucre gradually narrowed into slender tips, the inner bracts very narrowly linear and attenuate: corollas 32–35 mm. long. — Common, in fields and on roadsides. Nat. of Eu. — COMMON-THISTLE.

7. *C. horridulum* Michx. Stems 3–11 dm. tall, woolly: leaf-segments with spreading spines: inner bracts of the involucre 40–45 mm. long: corollas 40–43 mm. long, yellow: anthers mostly shorter than the filaments. — M. S. Occasional, in low grounds, swamps and pastures. — *Limestones, schists.* — YELLOW-THISTLE.

51. **CARDUUS** [Tourn.] L. Herbs resembling *Cirsium* in habit, usually annual or biennial, the stems spiny-winged by the decurrent leaves. Heads often nodding. Involucre ovoid to globose, many-flowered, its bracts narrow, in many series, often partly reflexed. Filaments papillose-pubescent. Pappus of many naked or merely roughened bristles. — PLUMELESS-THISTLE.

1. *C. nutans* L. Biennial, pubescent: leaf-blades mostly 1–2 dm. long, pinnatifid or bipinnatifid, copiously spiny-margined, scarcely paler beneath than above, or sometimes pale-pubescent: head solitary, nodding: involucre hemispheric, 2–2.5 cm. long; bracts narrow, mostly lanceolate, the outer minutely spine-tipped and reflexed, the inner with softer lax tips and erect: corollas purple or white, 16–20 mm. long: achenes about 3 mm. long, truncate, curved. — S. Rare, in fields. Nat. of Eu. — Spr. and sum. — MUSK-THISTLE.

52. **ONOPORDON** [Vaill.] L. Annual or biennial, caulescent, coarse herbs, with winged stems and branches. Leaves alternate: blades sinuate or pinnatifid, spinescent, conspicuously decurrent. Heads large, erect. Involucre ovoid, globular, or depressed: bracts numerous, narrow, mostly spine-tipped. Receptacle honeycombed, not bristly. Corollas mostly purple: throat shorter than the slender tube: lobes narrow. Achenes short, slightly broadened upward. Pappus longer than the achene, the bristles not plumose.

1. *O. Acanthium* L. Plants 1.5 m. tall or less, lanate: stem-wings spiny like the leaf-margins: leaf-blades mostly 1–2.5 cm. long, lanate on both sides: involucre 3–4 cm. wide; bracts firm, the inner 2–3 cm. long, the outer shorter, reflexed: achenes narrowly obovoid, 4.5–5 mm. long, wrinkled. — M. Rare, in fields and wate places. Nat. of Eu. — Sum. — SCOTCH-THISTLE. COTTON-THISTLE.

53. **CENTAUREA** L. Annual (ours), or perennial, herbs. Leaves alternate: blades entire, toothed, or pinnatifid. Heads relatively small. Involucre with irregularly toothed or fimbriate outer bracts, the intermediate ones, at least, often armed with spines. Anthers sagittate at the base, with appendages at least $\frac{1}{2}$ as long as the sacs. Achenes flattened or 4-angled. Pappus of scales or bristles in several series, or obsolete. — Sum. — STAR-THISTLE.

Bracts of the involucre, or some of them, with an elongate apical spine.

Bracts of the involucre not spine-armed.

Bracts entire or sparingly lacerate.

Bracts, or some of them, regularly pectinate at the tip.
Stem and leaves white-floccose; blades of the lower leaves entire.

Stem and leaves inconspicuously pubescent; blades of the lower leaves pinnatifid.

1. *C. solstitialis*.

2. *C. Jacea*.

3. *C. Cyanus*.

4. *C. maculosa*.

1. *C. solstitialis* L. Plants 3-6 dm. tall, with woolly stems: blades of the stem-leaves oblong-lanceolate or linear, entire or merely toothed: involucre ovoid or subglobose, about 1.5 cm. long; bracts various, the intermediate ones with long, slender, yellow spines: corollas yellow.—S. Occasional, in fields. Nat. of Eu.

2. *C. Jacea* L. Plants 8 dm. tall or less, with sparingly pubescent stems: leaf-blades entire or toothed, often remotely so: involucre subglobose, 1-1.5 cm. long; bracts various, the outer paler, contracted near the middle, the others brown, constricted above the middle, all more or less lacerate near the tips: corollas 15 mm. long, or the outer ones larger, rose-purple.—S. Occasional, in fields. Nat. of Eu.

3. *C. Cyanus* L. Plants 1 m. tall or less, with glabrous or sparingly floccose stems: leaf-blades (or segments) narrowly linear: involucre ovoid, 11-14 mm. long; outer and middle bracts deltoid, ovate, or lanceolate, with the scarious margins sharp-toothed; inner bracts linear or linear-lanceolate: corollas 11-13 mm. long, or the outer ones larger, pink, blue, or violet: achenes about 3 mm. long.—M. S. Occasional, in fields. Nat. of Eu.

4. *C. maculosa* Lam. Plants 1 m. tall or less, with floccose stems: leaf-blades pinnatifid, or the larger ones pinnately parted and with pinnatifid segments: involucre ovoid, about 1 cm. long; outer and middle bracts ovate, firm-pointed, ciliate at the dark tips; inner bracts narrowly linear: corollas 13-15 mm. long, or the outer ones larger, whitish, pink, or purplish: achenes about 2 mm. long.—S. Occasional, in fields. Nat. of Eu.

FAMILY 3. CICHORIACEAE. CHICORY FAMILY.

Annual, biennial, or perennial herbs, or partially woody plants. Leaves alternate: blades entire, toothed, or parted. Flowers perfect, all alike, borne in heads. Corolla ligulate, the 1-sided limb mostly 5-lobed at the apex. Stigmas unappendaged. Achenes smooth, papillose, or spiny.

Pappus of simple hair-like bristles.

Achenes smooth or merely papillose.

Achenes cylindrical or prismatic.

Heads, or ligules, pale, cream-colored, or purple, nodding.

Heads, or ligules, yellow, orange, or red, erect.

Pappus of white bristles: involucrel bracts in 1 row.

Pappus of tawny bristles: involucrel bracts in more than 1 row.

Achenes flattened.

Achenes narrowed at the top or beaked.

Achenes thin or flat, each prolonged into a slender, often filiform beak.

Achenes thick, beakless, sometimes with a mere neck.

Achenes truncate at the top.

Achenes tuberculate or spinulose, or with spine-like processes.

Pappus of scales, or scales and bristles, or wanting.

Pappus at least in part of plumose bristles.

Receptacle naked.

Plume-branches of the pappus not interwebbed.

Plume-branches of the pappus interwebbed.

Receptacle chaffy.

1. NABALUS.

2. CREPIS.

3. HIERACIUM.

4. LACTUCA.

5. MULGEDIUM.

6. SONCHUS.

7. LEONTODON.

8. PICRIS.

9. TRAGOPOGON.

10. HYPOCHAERIS.

Pappus of scales, or of both scales and plumeless bristles, or wanting.

Ligules yellow or orange.

Annual plants: achene of a turbinate type: pappus-scales large, accompanied by as many bristles.

Perennial plants: achene of an oblong type: pappus-scales minute, accompanied by more numerous bristles.

Ligules white, pink, blue, or purple.

11. KRIGIA.

12. CYNTHIA.

13. CICHORIUM.

1. NABALUS Cass. Perennial caulescent herbs. Leaf-blades toothed, lobed, pinnatifid, or divided. Heads nodding. Involucre cylindric or nearly so: main bracts nearly equal in length. Achenes oblong to columnar. — Sum. and fall. — RATTLESNAKE-ROOT. WHITE-LETTUCE.

Involucres slender, about 2 mm. thick, 5-7-flowered, light-green: pappus light straw-colored.

1. *N. altissimus*.

Involucres stout, 3-6 mm. thick, 8-16-flowered, deep-green, glaucous, or purple.

Pappus cinnamon-brown: corollas mostly whitish.

2. *N. albus*.

Pappus straw-colored or light-brown: corollas mostly purplish.

Larger bracts of the outer involucre lanceolate: pappus surpassing the inner involucre bracts.

3. *N. serpentarius*.

Larger bracts of the outer involucre ovate or triangular-ovate: pappus and inner involucre bracts about equal in length.

4. *N. trifoliatum*.

1. N. altissimus (L.) Hook. Stems 9-21 dm. tall, glabrous, glaucous: leaf-blades denticulate, or lobed or divided and with denticulate or lobed divisions: involucre less than 3 m. thick, the outer bracts of the involucre deltoid to ovate, 1-2 mm. long, the inner ones 9-10 mm. long, light-green, glabrous: ligules greenish or yellowish. — N. S. Not very common, in low thickets. — *Sandstones and shales, schists*.

2. N. albus (L.) Hook. Stems 3-16 dm. tall, glabrous, glaucous: leaf-blades, or the divisions, coarsely toothed: outer bracts of the involucre ovate, 2-3 mm. long, the inner ones 10-12 mm. long, dark-green, glabrous: ligules dull-white or cream-colored. — Common, in woods and thickets.

3. N. serpentarius (Pursh) Hook. Stems 3-12 dm. tall, glabrous: larger leaf-blades pinnately lobed: inner bracts of the involucre 9-11 mm. long, often ciliate at the tip: pappus straw-colored. — S. Rather common, in thickets. — *Schists*. — LION'S-FOOT.

4. N. trifoliatum Cass. Stems 8-26 dm. tall, glabrous: larger leaf-blades pedately lobed: inner bracts of the involucre 9-11 mm. long, wholly glabrous: pappus light-brown. — S. Common, in woods. — *Schists*. — GALL-OF-THE-EARTH.

2. CREPIS L. Annual or biennial herbs, resembling *Hieracium*, with glabrous or sparingly pubescent foliage. Leaves alternate: blades mostly repand or pinnatifid. Heads few-many-flowered, paniculate or corymbose. Involucres narrow: bracts usually in a single row or in several rows. Corollas yellow. Achenes narrow. Pappus of white soft hairs.

1. C. tectorum L. Plants usually branched at the base, 2-4 dm. tall, sparingly pubescent: leaf-blades oblong, lanceolate, or linear-lanceolate in outline, runcinate-pinnatifid, usually sagittate-auriculate at the base: involucre 9-10 mm. high; bracts hirsute-hispid, acute: corollas 10-11 mm. long: achene-body oblong or somewhat fusiform, about 2 mm. long, ribbed. — S. Occasional, in alfalfa fields. Nat. of Eu. — Fall. — HAWKSBEARD.

3. HIERACIUM L. Perennial caulescent or scapose herbs. Leaf-blades entire or toothed. Heads erect. Involucres usually narrow: main bracts unequal in length. Achenes oblong, fusiform, or columnar. — HAWKWEED.

Stems regularly leafy to the broad, more or less effuse panicle: leaf-blades not of a spatulate type.

Stems more or less scape-like, corymbose or narrowly cylindrical-paniculate above: leaves mainly basal, or on the lower part of the stem, some of the lower blades of a spatulate type.

Achenes columnar.

Longer involucrel bracts glabrous or nearly so.

Stems nearly naked, glabrous: peduncles glabrous or sparingly glandular-pubescent.

Stems leafy and pubescent at least below: peduncles densely glandular-pubescent.

Longer involucrel bracts copiously pubescent.

Achenes fusiform or constricted below the summit.

1. *H. paniculatum*.

2. *H. venosum*.

3. *H. marianum*.

4. *H. scabrum*.

5. *H. Gronovii*.

1. *H. paniculatum* L. Plants often glaucescent, 3-12 dm. tall, the stem villous at the base: leaf-blades linear-elliptic to broadly elliptic: involucrel bracts 4-5.5 mm. high, the longer bracts pubescent mainly near the tip. — Common, in woods and thickets. — Late sum.

2. *H. venosum* L. Stems scape-like, 3-6 dm. tall, glabrous, corymbosely branched above: leaves mainly basal, or 1 or 2 on the stem; blades obovate or spatulate, 5-15 cm. long, commonly purple-veined, undulate or repand-denticulate, more or less villous on the veins beneath: peduncles slender, often slightly glandular-pubescent: involucrel bracts 6-8 mm. long; inner bracts linear, tapering to the apex: achenes columnar, about 3 mm. long. — Common on banks and in open woods. — Sum. — RATTLESNAKE-WEED. POOR-ROBIN'S PLANTAIN.

3. *H. marianum* Willd. Stems rather stout, 5-10 dm. tall, softly hirsute below, more or less widely branched into a corymbose panicle: leaves basal, and few or several along the stem; blades spatulate to oblong-obovate or nearly oblong, 6-20 cm. long, ciliate, undulate or repand-denticulate: peduncles densely glandular-pubescent: involucrel bracts 6-7 mm. long; inner bracts narrowly linear-lanceolate, glabrous or slightly pubescent: achenes columnar, 2.5 mm. long. — M. Occasional, on banks and in open woods. — Limestones. — Spr.

4. *H. scabrum* Michx. Stems 3-9 dm. tall, hirsute-hispid below, paniculately branched and glandular-hirsute above, leafy to the inflorescence: leaf-blades thickish, spatulate to obovate or oblong, 3-12 cm. long, undulate or repand-denticulate: panicle commonly elongate: peduncles rather rigid: involucrel bracts 5-6 mm. long; inner bracts narrowly linear-lanceolate: achenes columnar, 2-2.5 mm. long. — Common, in woods and on roadsides. — Fall.

5. *H. Gronovii* L. Stems 3-10 dm. tall, more or less pubescent with slender hairs, paniculately branched above, leafy below, rather naked near the panicle: leaves commonly hirsute; blades spatulate to oblong, oval or obovate, 4-15 cm. long, undulate or repand: panicle ample or sometimes much reduced: peduncles glandular-pubescent: involucrel bracts 5-7 cm. long; inner bracts linear or narrowly linear-lanceolate: achenes fusiform, 3-3.5 mm. long. — Common, on gravelly banks and in woods. — Sum. and fall.

4. **LACTUCA** L. Annual, biennial, or perennial herbs, the stems stout. Leaf-blades mostly relatively broad, entire, toothed, or pinnatifid, sometimes spiny-margined. Heads erect. Involucrel bracts cylindrical to ovoid. Achenes flattened, slender-beaked. — Sum. and fall. — LETTUCE. WOOD-LETTUCE. WILD-LETTUCE.

Heads mostly less than 12-flowered: achene-bodies several-nerved.

Leaf-blades pinnatifid.

Leaf-blades merely toothed.

Heads mostly more than 12-flowered: achene-bodies 1-nerved.

Leaf-blades entire or nearly so: achene-body mostly less than 3 mm. long.

Leaf-blades, except those of the upper leaves, pinnatifid: achene-body mostly over 3 mm. long.

1. *L. Scariola*.

2. *L. virosa*.

3. *L. sagittifolia*.

4. *L. canadensis*.

1. **L. Scariola** L. Stem nearly or quite glabrous, 4–15 dm. tall; leaf-blades oblong to lanceolate in outline, pinnatifid, bright-green: inner bracts of the involucre 8–10 mm. long, linear-oblong; outer corollas 8–9 mm. long; achene-body abruptly narrowed at the apex. — S. Rare, on roadsides. Nat. of Eu. — PRICKLY-LETTUCE.

2. **L. virosa** L. Stem hirsute below, 6–20 dm. tall; leaf-blades oblanceolate to oblong, merely denticulate, glaucous; inner bracts of the involucre 12–15 mm. long, narrowly linear; outer corollas 11–12 mm. long; achene-body gradually narrowed at the apex. — Rather common, in waste places and on roadsides. Nat. of Eu.

3. **L. sagittifolia** Ell. Stems 9–30 dm. tall, glabrous: blades of the stem-leaves 8–30 cm. long, irregularly dentate: involucre 10–20 mm. long, the inner bracts narrowly linear or nearly so; ligules yellow or reddish: achene-body 2.5–3 mm. long, longer than the beak. — Susquehanna valley. Frequent, on shaded banks.

4. **L. canadensis** L. Stems 9–30 dm. tall, glabrous or nearly so: blades of the stem-leaves 10–30 cm. long, sinuate-pinnatifid: involucre 10–12 mm. long, the inner ones linear-lanceolate: ligules yellow: achene-body 3–4 mm. long, about as long as the beak. — Common, in fields and on roadsides. — WILD-LETTUCE. HORSE-WEED.

5. **MULGEDIUM** Cass. Herbs resembling *Lactuca* in habit. Achenes thick, beakless. — Sum. and fall. — LETTUCE. BLUE-LETTUCE.

Pappus bright-white: blades of the stem-leaves neither auriculate nor clasping.

Leaf-blades toothed: achene-body not narrowed into a neck. 1. *M. villosum*.

Leaf-blades pinnatifid: achene-body narrowed into a slender neck.

Pappus brown: blades of the stem-leaves auriculate and clasping.

2. *M. floridanum*.
3. *M. spicatum*.

1. **M. villosum** (Jacq.) Small. Stems 9–20 dm. tall; blades of the stem-leaves irregularly dentate, 8–20 cm. long; inner bracts of the involucre linear-lanceolate; ligules blue: achenes 4 mm. long. — N. Frequent, in open woods and thickets. — *Sandstones and shales*.

2. **M. floridanum** (L.) DC. Stems 10–30 dm. tall; blades of the stem-leaves lyrate-pinnatifid, 2–45 cm. long; inner bracts of the involucre linear: ligules blue: achenes 6–7 mm. long. — Common, in thickets and on banks.

3. **M. spicatum** (Lam.) Small. Stems 9–35 dm. tall; blades of the stem-leaves lobed or pinnatifid (merely denticulate in *M. spicatum integrifolium*): ligules white, yellowish, or bluish: achenes 4–5 mm. long. — Rather common, in thickets and open woods.

6. **SONCHUS** [Tourn.] L. Annual or perennial tall caulescent herbs. Leaf-blades entire, toothed, or pinnatifid, sometimes spiny margined. Heads erect. Involucre ovoid or subglobose. Achenes flattened. Pappus deciduous. — Spr.—fall. — SOW-THISTLE.

Leaf-auricles rounded: achenes smooth and 3-ribbed.

1. *S. asper*.

Leaf-auricles acute: achenes transverse-wrinkled and striate.

2. *S. oleraceus*.

1. **S. asper** (L.) All. Stems 2–15 dm. tall; leaf-blades with rigid-tipped teeth: achenes 2–2.5 mm. long, margined, ribbed and smooth. — N. M. Common, in fields and on roadsides. — Nat. of Eu.

2. **S. oleraceus** L. Stems 1–18 dm. tall; leaf-blades more divided than in *S. asper*, with soft-tipped teeth: achenes 2.5–3 mm. long, scarcely margined, striate and transverse-wrinkled. — Common, in waste places and fields. Nat. of Eu.

7. LEONTODON L. Perennial low caulescent herbs. Leaf-blades sinuate-toothed or runcinate-pinnatifid, or rarely entire. Heads solitary. Involucre thick, scaly. Achenes not much flattened. Pappus persistent. — Spr.-fall. — DANDELION.

Inner involucre bracts unappendaged; achenes brown or olive-green.

Inner involucre bracts appendaged at the tip; achenes red 1. *L. Taraxacum*.

or red-brown. 2. *L. erythrospermum*.

1. L. Taraxacum L. Leaf-blades sinuate or coarsely pinnatifid, often lyrate, the lobes broad: heads 3-5 cm. wide, the ligules orange-yellow: involucre bracts green, the outer ones long, reflexed: achene-body bluntly spinulose near the top: pappus white. — Common, nearly everywhere. Nat. of Eu.

2. L. erythrospermum (Andrz.) Eichw. Leaf-blades pinnatifid or pinnately divided, runcinate, the lobes narrow: heads 2-3 cm. wide, the ligules light-yellow: involucre bracts glaucous, the outer ones short, ascending or spreading: achene-body sharply spinulose near the apex: pappus dirty-white. — M. Occasional, on lawns and in waste places. Nat. of Eu.

8. PICRIS L. Annual or biennial caulescent coarse herbs. Leaves alternate: blades entire or sinuate, often partially clasping. Heads many-flowered, loosely corymbose. Involucres rather broad: bracts in several series and of different shapes. Corollas yellow. Achenes stout, with rough ribs. Pappus of more or less plumose hairs. — Fall.

Outer bracts of the involucre narrow: achenes scarcely if at all beaked: pappus-
bristles slightly plumose. 1. *P. hieracioides*.

Outer bracts of the involucre ovate: achene long-beaked: 2. *P. echioides*.
pappus-
bristles copiously plumose.

1. P. hieracioides L. Stems somewhat hispid: leaf-blades mostly lanceolate or linear, sinuate: outer bracts of the involucre linear, smaller and narrower than the inner: corollas 9-11 mm. long; tube glabrous: achenes oblong, beakless or nearly so: pappus slightly plumose. — S. Occasional, in fields near Wakefield. Nat. of Eu.

2. P. echioides L. Stems hirsute: leaf-blades spatulate to oblong or lanceolate, entire or undulate: outer bracts of the involucre ovate, longer and broader than the inner: corollas 14-15 mm. long; tube pubescent: achenes oblong, beaked: pappus copiously plumose. — S. Occasional, in fields. Nat. of Eu. — OX-TONGUE.

9. TRAGOPOGON [Tourn.] L. Biennial or perennial erect caulescent, rather coarse herbs. Leaf-blades narrow, long-attenuate, often sheathing at the base. Heads erect. Involucres relatively narrow: bracts elongate, often surpassing the disk. Achenes terete or 5-angled, the inner at least slender-beaked.

1. T. porrifolius L. Stems 4-15 dm. tall: leaf-blades clasping or sheathing at the base: peduncles gradually enlarged upward: bracts of the involucre linear-lanceolate, 30-40 mm. long: achenes slender-fusiform, 3.5-4 cm. long. — N. M. — Frequent, in fence-rows and on roadsides. Nat. of Eu. — Sum. — SALSIFY. OYSTER-PLANT.

10. HYPOCHAERIS L. Perennial or rarely annual, scapose herbs, the scapes often minutely scaly. Leaf-blades entire, toothed, or pinnatifid. Heads showy, erect, long-peduncled. Involucres cylindric to campanulate: bracts in several unequal series, the outer ones very small, the inner ones with dorsal

crests near the apex. Corollas yellow. Stigmas slender, filiform-clavate. Achenes fusiform, the inner ones, at least, slender-beaked. Pappus single, the bristles plumose.

1. *H. radicata* L. Plants perennial, 2-6 dm. tall: leaves mostly 4-17 cm. long, hirsute; blades spatulate in outline, coarsely toothed or pinnatifid: heads 2.5-4 cm. wide: corollas with very narrow ligules: achenes fusiform, the bodies 3-3.5 mm. long, spinulose, those of the inner ones at least shorter than the filiform beaks.—S. Occasional, in wet pastures. Nat. of Eu.—Spr. and sum.

11. **KRIGIA** Schreb. Annual herbs. Leaves mainly basal: blades narrow, toothed or pinnatifid. Heads slender-peduncled. Involucre narrow: bracts narrow, reflexed at maturity. Corollas light-yellow. Achenes decidedly broadened upward. Pappus of 5 scales about $\frac{1}{2}$ as long as the achene and also of 5 or 10 bristles.

1. *K. virginica* (L.) Willd. Plants 0.3-4 dm. tall: leaf-blades spatulate to nearly linear, 2-12 cm. long: involucre mostly less than 7 mm. long: corollas 6-7 mm. long: achenes fully 1.5 mm. long, finely ribbed.—Common, in open sandy places.—Spr.—DWARF-DANDELION.

12. **CYNTHIA** D. Don. Perennial herbs. Leaves mainly basal: blades narrow or broad, entire, repand, or pinnatifid. Heads long-peduncled. Involucre stout: bracts narrow, reflexed at maturity. Corollas bright-yellow. Achenes not broadened upward. Pappus of 10-15 minute scales and more numerous bristles.

1. *C. virginica* (L.) D. Don. Plants 1-7 dm. tall: leaf-blades spatulate, oblong or oval, not elongate, entire or repand or slightly lyrate-pinnatifid: involucre mostly over 8 mm. long: corollas 10-12 mm. long: achenes 2 mm. long, coarsely ribbed.—N. Occasional, in meadows.—*Sandstones and shales*.—Sum.—CYNTHIA.

13. **CICHORIUM** [Tourn.] L. Perennial rigid herbs. Leaf-blades toothed or pinnatifid, or crisped. Heads sessile or nearly so. Involucre firm or rigid: outer bracts spreading, the inner erect. Achenes 5-ribbed or 5-angled. Pappus of 2 or 3 rows of scales.—CHICORY. SUCCORY.

1. *C. Intybus* L. Tap-root elongate, tough. Stem 3-15 dm. tall, rigidly wide-branched: blades of the stem-leaves oblong to lanceolate, pinnatifid, toothed, or entire: involucre 10-12 mm. long; bracts lanceolate to linear, the outer glandular-ciliate: corollas sky-blue or white: ligules 10-20 mm. long: achenes 2-2.5 mm. long.—Common, in fields and on roadsides. Nat. of Eu.—Sum.—COMMON-CHICORY. BLUE-SAILORS.

LIST OF GENERA AND SPECIES PUBLISHED IN THIS FLORA.

Zosterella Small. (Diminutive of *Zostera*, referring to the habit of the type species.)

Zosterella dubia (Jacq.) Small. *Commelina dubia* Jacq.

Arsenococcus Small. (Greek, male-berry, referring to the common name of the plant.)

Arsenococcus lignustrinus (L.) Small. *Vaccinium lignustrinum* L.

Agalinis decimloba (Greene) Small. *Gerardia decimloba* Greene.

Diodella teres (Walt.) Small. *Diodia teres* Walt.

Polymniastrum Small. (Latin, referring to the relationship to the genus *Polymnia*.)

Polymniastrum Uvedalia (L.) Small. *Polymnia Uvedalia* L.

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