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A

MANUAL OF THE

B O T A N Y

OF THE

NORTHERN UNITED STATES,

FROM NEW ENGLAND TO WISCONSIN AND SOUTH TO OHIO
AND PENNSYLVANIA INCLUSIVE,

(THE MOSSES AND LIVERWORTS BY WM. S. SULLIVANT,)

ARRANGED

ACCORDING TO THE NATURAL SYSTEM;

WITH AN INTRODUCTION, CONTAINING A REDUCTION OF THE GENERA
TO THE LINNÆAN ARTIFICIAL CLASSES AND ORDERS,
OUTLINES OF THE ELEMENTS OF BOTANY,
A GLOSSARY, ETC.

By ASA GRAY, M. D.,

FISHER PROFESSOR OF NATURAL HISTORY IN HARVARD UNIVERSITY.

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TO

JOHN TORREY, M. D.

CORRESP. MEMBER OF THE LINNEAN SOCIETY, ETC.,

THIS VOLUME IS DEDICATED

BY

THE AUTHOR,

IN GRATEFUL ACKNOWLEDGMENT

OF THE FRIENDSHIP WHICH HAS HONORED AND THE COUNSEL

WHICH HAS AIDED HIM FROM THE COMMENCEMENT OF

HIS BOTANICAL PURSUITS.

CAMBRIDGE, January 1, 1848.

ERRATA.

- Page 21, line 3 from bottom to read :— “Sepals 6, very thin and membranous, deciduous from the bud without expanding, subtended by 3 green early deciduous bracts.”
- “ 22, line 12 from bottom, transfer “pendulous” to the sentence preceding “Embryo.”
- “ 32, last line, for “marginèd” read “marginless.”
- “ 40, last line but one, add “Also, Chelsea; Massachusetts.”
- “ 41, last line but one, for “*Rhaphanistrum*” read “*Raphanistrum*.”
- “ 57, line 12 from top, for “opposite” read “alternate with.”
- “ 66, line 3 from top, make the same correction.
- “ 66, line 8 from top, for “*verticellàta*” read “*verticillàta*.”
- “ 117, to gen. char. of *Gillenia* add “petals convolute in the bud!”
- “ 149, line 3 from bottom, after “beaks” add “Seeds round-oval, wingless.”
- “ 197, line 4 from top, for “perfect” read “fertile.”
- “ 203, line 4 from bottom, for “*amethystinus*” read “*amethýstinus*.”
- “ 293, line 1, for “*DIÁNTHERA*” read “*DIANTHÈRA*.”
- “ 395, line 12 from top, after “Stamens” add 8.
- “ 410, line 11 from top, after “*stipules*” add “*monœcious flowers*.”
- “ 411, line 10 from top, for “*CARYA*” read “*CÁRYA*.”
- “ 514, line 11 from bottom, for “sepals” read “petals.”
- “ 632, line 4 from top, for “*D. marginàle*” read “*D. marginàlis*.”
- “ 650, line 14 from top, for “*Physcomitrium*” read “*Ptychomitrium*.”
- “ 650, line 6 from bottom, for “*areolæ*” read “areolation.”
- “ 657, line 3 from bottom, for “sometimes tufted and” read “the latter fleshy and sometimes.”
- “ 668, line 14, add “*shining*” after “*pointed*,” and erase “*shining*” in the line below.
- “ 678, line 9 from top, for “slight” read “slightly serrulate.”
- “ 686, line 8 from bottom, after “auricle” insert “sometimes.”
- “ 687, line 9 from top, after “auricle” insert “usually.”

P R E F A C E .

THIS work is designed as a compendious Flora of the Northern portion of the United States, arranged according to the Natural System, for the use of students and of practical botanists. It was intended to be comprised within the compass of a pocket volume, which might serve as a *vade-mecum* in herborizations, as well as a convenient manual of reference at home. But the volume has attained a somewhat unwieldy bulk, notwithstanding every effort at condensation, and the rigorous exclusion of all irrelevant matter, however interesting in itself, and of all synonymy not really essential. Perhaps I have been too scrupulous in the latter respect ; but it should be considered that all synonymes are useless to the beginner, — whose interests I have particularly kept in view, — while the greater part are needless to the instructed botanist, who has access to more elaborate works in which they are plentifully given. By discarding them, except in case of original or very recent changes in nomenclature, I have been able to avoid troublesome abbreviations and crabbed signs, to give greater fullness to the characters of the species, and especially of the genera (a point in which I conceive most works of this class are deficient), and also to add the derivation of the generic names.

It will be observed, that I have been compelled to be extremely

sparing in the citation of particular localities, and of the names of the botanists who have detected and kindly communicated rare or local plants. My restricted limits alone have debarred me from the pleasing duty of repeatedly making the acknowledgments which are justly due to many attentive and zealous correspondents throughout the country; and their daily increasing number renders this appropriate expression more difficult, except in extended treatises. Those who think, as many may, that I should have allowed myself wider latitude in this respect, will at least forgive any apparent ungraciousness, when they find that this volume, which it was firmly intended to restrict to 350 pages (and to have carried through the press last spring), has unavoidably extended to more than twice that size. Especially do I regret that this unexpected bulk has compelled the omission of the family of *Lichenes*, after they had very carefully been prepared expressly for this work, in compliance with my invitation, by the well-known Lichenologist of this country, MR. TUCKERMAN. Nothing but the apparent impossibility of including the whole within the covers of a single duodecimo volume, and the assured expectation that it will immediately be given to botanists in another way, has reconciled me to the exclusion of this important contribution.* In a second edition I still hope to give, by means of a supplementary volume, and through the aid of accomplished collaborators, not only the Lichens, but also the two remaining orders of the lower Cryptogamous Plants, namely, the *Algæ* or *Seaweeds*, and the *Fungi*.

The wide district which this compendious Flora embraces, although irregular in form, plainly belongs to one and the same

* This contribution, in a more extended form, will soon be published in the *Proceedings of the American Academy of Arts and Sciences*.

botanical region. With the exception of the small patches of alpine vegetation which crown the higher mountains of Northern New England and Northern New York ; of the sea-side plants, and of some appropriately Southern forms which not only reach Delaware and New Jersey (especially the Pine barrens), but also straggle northward coastwise, in diminishing numbers, quite to New Hampshire ; of a very few which belong to the Great Lakes ; and perhaps a larger number of Western prairie plants which extend into Ohio, Wisconsin, and Michigan, — with these exceptions, the vegetation is remarkably homogeneous for so large a district, and a very great proportion of the species are sporadic over the whole breadth. The peculiar plants, though few as to number of species, suffice to give a marked character to the confines on either side, which, however, soon blends insensibly into the general mass as we advance into the interior. Although I do not formally include Indiana, yet its botany apparently belongs quite as much to our Northern district as to the Western, that of the Upper Mississippi, to which Illinois clearly belongs. Those species for which no particular limit or geographical range is indicated may be expected to occur, at the stations they severally affect, throughout the whole district. By appending the words *southward*, *northward*, &c., I endeavour briefly to indicate, in a manner sufficiently precise for the purpose, the part of the country where a given species prevails, or the direction from which it may be supposed to have reached our district.

The more striking and distinctive points of the ordinal character are brought together and printed in italics in the first sentence of the description of each order, so that they may the more readily strike the student's attention. To abridge the labor of analysis as much as possible, I have given an easy synopsis of the genera under each order, whenever it comprises three or more of them ;

I have been particular to dispose the species of every extensive genus under sections or subgenera (§), subsections (*), and subordinate divisions (+, ++, &c.), founded on obvious characters; and, whenever there are two or more species under a division, I have italicized some of the leading distinctions (after the manner of Koch's *Flora Germanica*), so that they may at once catch the student's eye. The full-face type, in which the names of the genera and species are printed, affords a similar facility, by rendering them very conspicuous. To aid in their pronunciation, I have not only marked the accented syllable, but have followed Loudon's mode of indicating what is called the long sound of the vowel by the grave (`), and the short sound by the acute accent-mark (´). In respect to this, my friend, MR. FOLSOM, has obligingly rendered most important assistance.

The few abbreviations which require it are explained in the Introduction (on p. xxxix.).

Although our indigenous and naturalized plants only are described, yet I have generally mentioned the principal cultivated representatives at the close of their proper genus or family.

Finally, in order to render this Manual complete and sufficient in itself for the study of our plants, I have prefixed a concise Introduction to Botany, both Structural and Systematical, which, with the annexed Glossary and Index combined, should serve to convey the requisite elementary knowledge of the science, and to explain all the technical terms usually employed in botanical descriptions. Very many of these terms, however, are not used at all in the body of the work; for I have throughout endeavoured to smooth the beginner's way by discarding many an unnecessary technical word or phrase, and by casting the language somewhat in a vernacular mould, — perhaps at some sacrifice of brevity, but not, I trust, of the precision for which botanical language

is distinguished. Those who desire a more particular acquaintance with the structure, and especially the physiology of plants, may be referred to the author's *Botanical Text-Book* (second edition), or other detailed elementary works.

An artificial analysis of the Natural Orders or Families, founded on the easier and chiefly external characters, is appended, to aid the learner at the point where he is likely most to need assistance, namely, in referring an unknown plant to its proper order. Every successful attempt, however, will give him new power; and the thorough study, by this system, of half a dozen plants of different families will give more knowledge and insight into the science than can be acquired by ascertaining the names (which is nearly all that is done) of a hundred species by means of a facile, thought-saving, artificial classification. Still, as some artificial analysis which leads directly to the genera is a great convenience to the student in cases of difficulty, I have added a full *Conspectus* of the genera comprised in this work, reduced to the Classes and Orders of the Linnæan Artificial System, so generally in use until recently. The plan upon which this is constructed will be found to possess some advantages over an ordinary Linnæan arrangement, inasmuch as it provides for the exceptional cases, where different species of a genus actually present the characters of different artificial classes.

I am under very great obligation to my excellent friend, JOHN CAREY, Esq., for important assistance rendered throughout the progress of this work, and especially for the elaboration of the *Willows*, *Poplars*, and the vast and difficult genus *Carex*, which are wholly from his hand. I am equally indebted to my esteemed friend, MR. SULLIVANT, for the entire elaboration of the Orders *Musci* and *Hepaticæ*, which he has for a long time made the subject of special study and illustration. Through his labors, it may

be hoped that these beautiful but neglected tribes will become as familiar to botanists as our more conspicuous flowering plants now are. I have already mentioned my indebtedness to my friend, MR. TUCKERMAN, for his contribution of the still more obscure *Lichenes*, and my regret at being compelled to omit this order.

I have to thank a large number of correspondents for specimens and information kindly rendered in various ways, and especially my esteemed friends, MR. OAKES, of Ipswich (who is far more intimately acquainted with New England plants than any other botanist), and MR. OLNEY, of Providence, who have most cordially rendered me essential aid.

I have only to ask, that those who use this book will favor the author with information of the corrections, alterations, and additions that may appear to be necessary, in order that a future edition may be made more accurate and complete than the present.

HARVARD UNIVERSITY, CAMBRIDGE,
December 24th, 1847.

INTRODUCTION.

I. BRIEF OUTLINES OF BOTANY.

1. Plants in General.

1. THE vegetable kingdom consists of those beings (plants) which derive their sustenance from the air and earth, and create the food upon which animals live.

2. Plants of the higher grades bear proper flowers, which serve for the production of a seed, containing an embryo plantlet ready-formed; — wherefore they are called FLOWERING or PHÆNOGAMOUS Plants. The lower orders of plants exhibit a gradually simplified structure, both in their vegetation and fructification, and do not bear proper flowers (127) nor seeds in which there is any marked distinction of parts, or any embryo plantlet manifest antecedent to germination. They are, therefore, termed FLOWERLESS or CRYPTOGAMOUS Plants (the latter term denoting that their fructification is concealed or obscure).

3. Taking Phænogamous Plants as displaying the proper type and plan of vegetation, the following statements relate to them alone; the peculiarities of Cryptogamous Plants being separately explained, so far as needful, at the close.

4. Plants are anatomically composed, primarily, of CELLS; which are closed vesicles or little bladders of organic membrane. Aggregated together, and cohering more or less intimately by their contiguous surfaces, these form the honeycomb-like texture that vegetable matter displays under the microscope, and which constitutes CELLULAR TISSUE.

5. Of this all plants, at their earliest (embryo) state, are entirely composed. Indeed, the plant may be traced back by observation nearly or quite to a single cell; which cell, endowed with the power of propagation equally with the fully-developed plant, gives rise to other cells possessed of the same powers, and so forms the whole mass of the vegetable.

6. The delicate walls of the cells, although not perforated with visible pores (except sometimes as a secondary result), are, like all organic membrane, permeable to fluids. Through them the food of the plant is imbibed, — whether directly from the atmosphere in the form of air or vapor, or in a liquid form by the roots, — and transmitted throughout the vegetable: hence, plants receive their food in a fluid state only. The cells also contain the juices and the products of the plant, whether liquid or solid.

7. Besides the cellular tissue, all Phænogamous Plants contain more or less of two other kinds of tissue, viz. the *woody* and the *vascular* (vessels). These begin to be introduced when the plant develops from the seed (or sometimes before germination), and serve to give greater strength and toughness, and to facilitate the transmission of fluid. Both of them arise, however, in all their forms, from the transformation of cells, of which they are only modifications.

8. **WOODY TISSUE**, which makes up a large part of trees and shrubs, but also exists in herbs, consists of cells with firm and thickish walls, drawn out into tapering or slender tubes. Their diameter is usually much less than that of ordinary cells : from their tenuity and form, as well as from the appearance of the threads, which by their combination in bundles they often produce, they are likewise called **WOODY FIBRE**.

9. **VESSELS** are elongated cells of various kinds, usually of larger size than woody fibre, or tubes formed by the confluence of a row of cells, generally accompanied or surrounded by woody tissue. Their walls are commonly marked with lines, bands, or dots, or, in the **SPIRAL VESSEL**, strengthened by a coil of a delicate fibre adherent to the inside. The larger vessels, such as those which form the pores so apparent to the naked eye on the cross-section of many kinds of wood, are termed **DUCTS**. This name is also applied to most kinds of vessels in which the spiral fibre, if any, is incapable of being uncoiled by extension.

10. The cells and vessels are the **ORGANIC ELEMENTS**, the tissues or fabric of plants. They are fashioned into the **ORGANS**, or visible parts of the vegetable.

11. The organs of plants are of two sorts :— 1. those of *Vegetation*, which are concerned in growth,— by which the plant takes in the aerial and earthy matters on which it lives, and elaborates them into the materials of its own organized substance ; 2. those of *Fructification* or *Reproduction*, which are concerned in the propagation of the species.

2. Organs of Vegetation in General.

12. The organs of vegetation are the *Root*, *Stem*, and *Leaves*.

13. The **STEM** is the axis and original basis of the plant. It is made up of a succession of naked joints (**INTERNODES**), separated by leaf-bearing points (**NODES**), developed each from the apex of the preceding one.

14. The growing apex, generally furnished with rudimentary leaves, to be developed as it develops by the elongation of the internodes successively, is a **BUD**.

15. The first point of the stem preëxists in the embryo (i. e. in the rudimentary plantlet contained within the seed) : it is here called the **RADICLE**. Its elongation when the seed germinates in the soil commonly brings the budding apex to or above the surface, where the leaves which it bears or produces expand in the light and air. The growth which takes place from the opposite extremity downward, penetrating the soil and avoiding the light, forms the **Root**.

16. The plant, therefore, has a kind of polarity, and develops from the first in two opposite directions. viz. upwards to produce and continue the stem (or *ascending axis*), and downwards to form the root (or *descending axis*). The former is ordinarily or in great part aerial, the latter subterranean.

17. Accordingly, the essential organs of the plant, by an inherent and irreversible tendency, are developed in the media in which they are severally designed to live and act ;— the root in the soil, from the moisture of which it imbibes nourishment ; the stem with its leaves in the air, upon which these operate in vegetable digestion, and exposed to the light of the sun, whose influence is directly essential to this operation.

3. The Root.

18. The **ROOT** branches indifferently from any part ; but its branches and branchlets (**ROOTLETS**) are mere repetitions for the purpose of multiplying the absorbing points, which are chiefly the growing or newly formed extremities, sometimes termed **SPONGELETS**. It bears no other organs.

19. When the axis and its branches are slender and thread-like, the root is said to be *fibrous*. — All plants produce fibrous roots, but especially *annuals* (①), in which the plant flowers and fruits the first season, and perishes, root and all, as soon as the process is completed.

20. It frequently becomes distended and thickened, or *fleshy*, by the deposition of digested and organizable matter (in the form of *starch*, &c.) within its cells; this deposit forming a stock for future growth, on which new stems or shoots, &c., may feed, even when cut off from any external supply.

21. Roots of this sort assume a variety of forms, such as the *conical* root, which tapers regularly downwards from the base or crown (the part which joins the stem) to the apex, as in the carrot; the *spindle-shaped* or *fusi-form*, which tapers upwards as well as downwards, as the radish; and *turnip-shaped* or *napiform*, when the base is enlarged laterally so as to become much broader than long. These are particularly characteristic of *biennials* (②), which form such a root during their first year's growth, but do not flower until the second season, when they rapidly consume this stock, and die from exhaustion as soon as the process of flowering and fruiting is completed. In these cases the thickening takes place in the main trunk of the root, or *tap-root*.

22. In *perennial roots* (Ⓜ), viz. those which survive and produce flowering stems from year to year, as well as in those of many biennials, the accumulation often occurs, partly in its branches, forming *tuberous roots* when they are irregularly knobby, or *palmate* roots when several thickened branches proceed from a thicker base, somewhat like a hand with the fingers spread; or else wholly in a cluster of branches from a common base, forming *fasciculated* or *clustered* roots, as in the Dahlia, Pæony, and some Buttercups.

23. Roots not only spring from the root-end of the primary stem in germination, but also from any subsequent part of the stem under favorable circumstances, that is to say, in darkness and moisture, as when covered by the soil or resting on its surface.

24. They may even strike in the open air and light, as is seen in the copious aerial rootlets by which the Ivy, the Poison Ivy (p. 79), and the Trumpet Creeper (p. 291), climb and adhere to the trunks of trees or other bodies; and also in *Epiphytes* or *Air-plants*, of most warm regions, which have no connection whatever with the soil, but germinate and grow high in air on the trunks or branches of trees, &c.; as well as in some terrestrial plants, such as the Banian and Mangrove, that send off aerial roots from their trunks or branches, which finally reach the ground.

25. In *parasitic* plants, the roots fix themselves to or penetrate the surface of other plants, and take their nourishment from them: some, like the Mistletoe (p. 398), attaching themselves to the wood of the trunk or branches of trees; others (*root-parasites*), like the Beech-drops and the Orobanchaceæ (p. 289), to their roots under ground.

4. The Stem.

* Its External Modifications.

26. The STEM is sometimes *simple*, that is unbranched, and continued upwards by its growing apex (or *terminal bud*) only; but more commonly it becomes branched. All Phanogamous Plants necessarily have a stem. In those which are termed *acaulescent* or *stemless* in botanical description, it is merely subterranean or very short.

27. The BRANCHES spring from *lateral*, or *axillary buds*; which are new growing points appearing (usually singly) in the *axils* of the leaves, i. e. in the angle formed by the leaf or its stalk and the stem on the upper

side. They therefore spring from the nodes (13), — points which are sometimes strongly marked, as in a Reed or Grass-stem, but are often indicated only by their bearing a leaf, and sometimes a bud or a branch in its axil. The branches may again branch in a similar manner, and so on indefinitely. The latest and smaller ramifications are termed **BRANCHLETS**.

28. From the duration of the stem, vegetables are distinguished into, 1. **HERBS**, where the stem does not become woody and hard, but dies down to the ground at the close of the growing season, or after fructification: 2. **UNDERSHRUBS**, which have low, branching stems, with a woody and permanent base: 3. **SHRUBS**, which have woody stems, lasting from year to year, usually branching from the base, and not exceeding five times the height of a man: and 4. **TREES**, in which a single main trunk attains a greater height. Adjectively, stems of the first kind are termed *herbaceous*; of the second, *rather shrubby*; of the third, *shrubby*; while a tree-like shrub is said to be *arborescent*.

29. The peculiar, jointed stem of Grasses and Grass-like plants is called a **CULM**.

30. A stem or branch which is too weak to stand upright, but partly reclines or trails on the ground, is termed *decumbent*, or if entirely trailing, *procumbent*, *prostrate*, or *running*, or if it strike root from the under side as it advances, *creeping*. The precise application of various terms of direction may be sought in the Glossary.

31. A *climbing* stem is one that clings to neighbouring objects for support, and rises by such aid, whether by tendrils (38), as the Vine (p. 86), and Gourds (p. 144), by twisting leaf-stalks, as the Virgin's-Bower (p. 4), or by aerial rootlets, as in the Ivy, &c., already mentioned (24).

32. A *twining* or *voluble* stem climbs by coiling itself spirally, as the Morning-Glory (p. 348).

33. A **STOLON** is a branch, the apex of which curves or falls to the ground and strikes root there, so as to acquire an independent existence by natural *layering*. Plants which spread or multiply in this way are said to be *stoloniferous*.

34. A **SUCKER** is a branch which springs from a main stem under ground, where it early strikes root.

35. A **RUNNER** is a prostrate, slender or thread-like branch, springing from near the surface of the soil, and striking root and producing a tuft of leaves (and consequently a new plant) at its apex; as in the Strawberry.

36. An **OFFSET** is a short and thick runner; as in the Houseleek.

37. A **SPINE** or **THORN** is an imperfectly developed, hardened and sharp-pointed branch, either simple, as in the Cockspur-Thorn, &c. (p. 128), or compound, as in the Honey Locust (p. 112).

38. A **TENDRIL** is a thread-like, leafless branch, often coiling spirally, by which many climbing plants fix themselves (31). But some tendrils belong to a leaf-stalk, as those of the proper Pea Tribe (p. 91).

39. There are likewise subterranean modifications of the stem, which from their position are popularly mistaken for roots, — such as

40. The **ROOTSTOCK** or **RHIZOMA**, a term which is applied in a general way (especially in this volume) to all the subterranean, elongated, root-like forms of stems or branches, especially to such as were called "creeping roots" by the older botanists. It is usually horizontal, sending off roots from the under side or the whole surface, and advancing from year to year (being always perennial) by the growth of the bud at its apex. It is further distinguished from a root by being marked with the scars or scaly bases of leaves, which roots, being never leaf-bearing, are entirely destitute of.

41. A **TUBER** is a portion of a subterranean stem, which is thickened by

the deposition of nutritive matter (20) commencing while in the state of bud, and usually involving a number of axillary buds (eyes), as in the Potato and Jerusalem Artichoke (p. 228). It differs from a rhizoma in being borne on a slender stalk.

42. A **BULB** is a thickened subterranean bud, formed of an extremely abbreviated stem (the plate), which is generally much shorter than broad, clothed externally with the more or less persistent bases of former leaves in the form of scales, inclosing an undeveloped part borne on its upper surface, and emitting roots from the lower. In the *scaly* bulb, the scales are separate and thickened, as in the Lily (p. 494); in the *coated* or *tunicated* bulb, they invest each other in concentric layers, as in the Onion (p. 493).

43. **BULBLETS** are small aerial bulbs, like buds with fleshy scales, borne in the axils of leaves, as in the Bulb-bearing Lily, or on the flower-stalks of some Onions (p. 493), from which they separate spontaneously and fall to the ground to strike root and grow.

44. The **CORM** or *solid bulb* is a simple and globular thickened subterranean stem, either quite naked, like that of the Indian Turnip (p. 446), or sometimes barely invested with a scaly or membranous coating derived from the bases of former leaves, as in the Crocus and Colchicum, where it approaches the proper bulb.

* * Its Internal Structure.

45. The stem of a Phænogamous Plant (2) is composed of a *cellular system* (cellular tissue, 4), into which a woody system (consisting of woody tissue and vessels, 7-9) is longitudinally introduced, more or less sparingly in herbs, and largely in shrubs and trees, the quantity increasing as the stem and branches grow.

46. There are two principal plans according to which the woody matter is arranged in the stem, and which characterize the two great classes of Phænogamous Plants.

47. In the first,—to which all the woody plants of the Northern United States (excepting the Greenbrier, p. 485), as well as a majority of the herbs, belong,—the woody matter is so arranged as to form a layer or hollow cylinder of wood, interposed between a central part of the original cellular system (the **PITH**), and an outer portion of it (the **GREEN BARK**). That part of the cellular tissue in which the woody matter is imbedded forms plates or rays (the **MEDULLARY RAYS** or *silver-grain*), more and more compressed and condensed as the woody matter increases in quantity, which run horizontally and connect the pith with the bark. The woody tissue thus introduced belongs chiefly to the wood proper, but partly to the bark, forming an inner fibrous layer of that substance, the **LIBER** or *Fibrous bark*. The section of a yearling stem of the kind accordingly exhibits,—

1. on the surface, the *Epidermis* or skin, which invests the whole plant, and consists merely of the outermost layer or layers of cells:
2. the *Green bark*, composed wholly of cellular tissue, the soft cells of which contain, like the same part in the leaves, the green matter of vegetation (**CHLOROPHYLL**, 54), which is generally produced in parts naturally exposed to the light):
3. the *Liber* or *fibrous inner bark*, composed partly of tough threads of woody tissue (the material of linen, hemp, &c.):
4. the *proper Woody Layer* of the stem, traversed by its cellular *Medullary Rays*: and
5. the entirely cellular *Pith* in the centre. (There are two parts more, which would demand notice in a detailed account, viz. the *Medullary Sheath*, which consists of an extremely delicate ring of spiral vessels (9), the earliest-formed part of the woody system, and which therefore lies immediately in contact with the pith, between it and the wood; and the *Corky Layer* of the bark, which is formed immediately under the epidermis, and which, soon becoming opaque and of a gray, ashen, or brownish color, covers and conceals from view the subjacent green layer on shrubs and trees.)

48. When such a stem lasts through the second year, it forms a second layer of wood, like the first, deposited between it and the bark, so as to inclose the former (while a new portion is also added to the *inside* of the liber); and this is repeated year by year as long as the stem lives and grows. The cross-section of such a stem, therefore, exhibits as many concentric rings of wood as the stem is years old at the point where the section is made. The annual layers being successively added to the exterior of those already existent, this mode of growth or structure is said to be *Exogenous* (increasing from without), and plants of the class are named **EXOGENOUS PLANTS**, or **EXOGENS** (viz. outside growers).

49. The bark of an Exogen is readily separable from the wood (there being no intermingling of the fibres of the two), more especially at the time the new growth is commencing in shrubs and trees, when an organizable mucilage (the **CAMBIUM**) is poured out between them, in which the new cells and woody tubes are developed. Into this the medullary rays of the preceding layer extend horizontally, and new ones are also formed, while the woody fibres and vessels are vertically interwoven.

50. The newer woody layers, through which the sap principally rises, constitute the **SAP-WOOD** or **ALBURNUM** (so named from its white or light color). As they become older, their tubes are gradually thickened, and the calibre diminished or even almost obliterated by the deposition of solid matter within, both of earthy materials derived from the soil, and of peculiar organic products, giving to the old wood of each species its peculiar color. This old wood is called the **HEART-WOOD**, or (from its greater solidity) the **DURAMEN**.

51. The wood of the Pine and its allies (*Coniferæ*, p. 438) is very homogeneous, on account of the nearly total absence of ducts or other vessels (except in the first layer); and the woody tubes, which are of unusually large size, are marked with a row of circular disks (which are spots where the wall is thinner) along two of their sides.

52. In the second plan (46), the woody system is collected into separate threads (or bundles of woody fibre and vessels), which are distributed vertically and irregularly through the whole extent of the cellular system; so that there is no central pith free from woody matter in the centre, no distinct bark at the surface, and nothing like a regular layer or hollow cylinder of wood between the two. But the cross-section, at the close of the first year's growth, shows the cut ends of the woody threads in the form of dots, interspersed throughout the uniform cellular tissue without apparent order, although commonly most crowded towards the circumference. In a longitudinal section these threads are distinctly traceable downwards along the stem, perhaps nearly parallel for a considerable distance; but sooner or later curving outwards more or less gradually, and tapering as they descend, they will be found most of them to terminate obliquely in the *false-bark* or *rind*. This shows why the bark of such stems is inseparable from the wood without laceration. Traced upwards, these threads are found to lose themselves in the frame-work of the leaves. A Palm-stem and a stem of the Greenbrier (p. 485) are woody examples of this sort. An Asparagus-shoot and a stalk of Indian Corn furnish fine herbaceous illustrations. Nor do such stems form concentric layers when they last from year to year; but the new woody threads as they descend are scattered among the others; chiefly, however, towards the centre, over which the terminal bud of the simple stem is directly situated, and where they find most room. Accordingly, contrary to the exogenous stem, the newest and softest wood is found towards the centre, while the oldest and hardest occupies the circumference. This mode of growth or structure is, therefore, said to be *Endogenous* (increasing from within), and the plants which present it are termed **ENDOGENOUS PLANTS**, or **ENDOGENS** (viz. inside growers).

53. The hollow stem (culm, 29) which most Grasses exhibit was origi-

nally solid and of the ordinary endogenous structure ; soon becoming hollow by the surface growing faster than the centre, except at the closed nodes, or joints, where the woody threads are complicately entangled.

5. The Leaves.

* Their Nature and Structure.

54. LEAVES are a contrivance for increasing the green surface of the plant, and exposing to the light and air the greatest practicable amount of the green matter of vegetation (chlorophyll, 47, which consists of innumerable rounded globules of a waxy nature, inclosed in the cells), upon which the light exerts its peculiar action (17). They are portions of the green cellular surface, usually expanded horizontally, and covered with the transparent skin, or EPIDERMIS, which invests and protects the surface generally (47), and which serves to protect the delicate subjacent tissue from the immediate action of the air.

55. In Phænogamous Plants, however, they never consist of a cellular system, or *parenchyma* (the green pulp) alone ; but a woody system (consisting of woody tissue and vessels, 8, 9) is introduced, just as in the stem (with whose woody system it is connected), to give needful strength and support, and to facilitate the transmission of fluid. This forms the framework or skeleton of the leaf, which usually divides the parenchyma into two strata, viz. an upper and an under layer.

56. The cells of the upper layer are generally more compactly arranged than those of the lower, which gives to the upper surface of the leaf its deeper green color. Those of the lower layer are commonly so loosely arranged as to leave many intervening air-cavities, or passages, communicating with each other more or less freely throughout the interior of the leaf.

57. To these the external air obtains access through numerous perforations or little slits in the skin of the lower surface, and sometimes of the upper also, which are called the STOMATA, or BREATHING-PORES. They are guarded by two cells, which, when straight and parallel, close the aperture, and, when curving outwards, open it ; thus controlling evaporation and the access of the external air. They incline to open in moist air, and to shut in dry.

58. The epidermis or skin of the leaf, as in other parts of the plant, may be furnished with hairs, bristles, &c., which in descriptions receive different names according to their size and strength. They are prolongations or productions of some of the cells of the epidermis. *Glandular Hairs and Glands* are similar in origin and structure, but usually more complex, and their cells elaborate an aromatic, or glutinous, or some other kind of liquid, or *excretion*. The principal terms employed for the various kinds of hairiness or *pubescence* may be sought in the Glossary. We call the surface *smooth* when destitute of hairiness and roughness, or, more specifically, *glabrous* when the absence of hairiness alone is indicated.

* * Their Conformation and Parts.

59. The expanded part of the leaf forms the LAMINA, LIMB, or BLADE. In many leaves the blade is expanded immediately on leaving the stem ; when they are stalkless or *sessile*. They are *clasping* (or *amplexicaul*), when the base embraces or nearly encircles the stem ; *perfoliate*, when the encircling base unites round on the opposite side so as to appear as if perforated by the stem, as in *Uvularia perfoliata* (p. 497) ; and *sheathing*, when the lower part enwraps the stem, as in Grasses (p. 567) and Sedges (p. 515) ; in which the distinction between the *sheath* and the blade usually is well marked. Sometimes a portion of the blade of a sessile leaf appears to run down along the stem underneath, when it is *decurrent*.

60. Frequently the blade is raised upon an unexpanded part, the LEAF-STALK, FOOT-STALK, or PETIOLE. This is sometimes provided with an appendage (STIPULE, 94) on each side at the base, either adherent to it (as in the Strawberry, p. 123), or separate (as in the Vetch, &c., p. 93). A leaf with all its parts, therefore, consists of the blade, the petiole, and a pair of stipules.

61. A leaf is *simple* when the blade is of one piece, however irregular, cut, or cleft; and *compound*, when it consists of two or more separate pieces, or smaller blades, called LEAFLETS.

62. A leaf, leaflet, or any flat organ, is called *entire* when the margin is continuous and even, without notches, clefts, or divisions.

63. If furnished with notches of no great depth, as compared with the size of the blade, it is in general terms said to be *toothed*. The principal special terms for distinguishing the varieties of tothing are the following: viz. *dentate*, or *toothed* proper, when the teeth are sharp and spreading; *crenate*, or *crenelled*, when they are broad and rounded; and *serrate* (saw-toothed), when more or less sharp and inclined forwards. The diminutives of these and similar appellations denote that the teeth are small in proportion or minute; as, *denticulate*, minutely toothed; *crenulate*, minutely crenate; and *serrulate*, serrate with minute teeth. The number of the teeth, as well as the kind, may be denoted by combining the proper numeral with the term, as *3-toothed*, *5-toothed*, *5-crenate*, &c. But if the teeth are themselves toothed, or of two sorts, we say *doubly toothed*, *doubly crenate*, &c.

64. A slightly sinuous or waved margin is said to be *repand*; a strongly sinuous margin, so as to make rounded and shallow lobes, *sinuate*. If the teeth are still deeper, irregular, and sharp, or with acute incisions, the leaf is said to be *incised* or *cut*.

65. When the blade is more deeply and definitely cut, the portions are called *lobes*, *segments*, or *divisions*; and the leaf is said to be *lobed*, as a general term, especially when the sinuses are rounded or blunt; or *cleft*, when cut to the middle or thereabouts as if by a sharp incision; or *parted*, when the sinuses reach almost to the base or axis; or *divided*, when they reach quite to the base or axis, so as to divide the blade into separate pieces. The last-named case brings us, by successive gradations, to a compound leaf (61). The number of lobes, &c., is expressed by prefixing the proper numeral, as *2-lobed*, *2-cleft*, *3-parted*, *3-divided*, &c. Other particular terms of incision, &c., only require to be explained in the Glossary.

66. So, likewise, of the terms which denote the shape, or general outline of the leaf, or of any other expanded body, which are very numerous and diversified, and furnish the readiest characters of species. The following are the more common and important: viz. *linear*, for a narrow leaf, with the two margins parallel: *lanceolate* or *lance-shaped*, for a narrow leaf tapering to each end, but especially towards the apex: *oblong*, when the breadth bears a greater proportion to the length: *oval*, broader still, but longer than broad, with the two ends equally rounded and of equal width: *elliptical*, like the last or narrower, especially with the ends acute: *ovate* or *egg-shaped*, viz. shaped like the section of a hen's egg, with the broader end at the base: *obovate*, the same inverted, or with the broader end at the apex: *cuneiform* or *wedge-shaped*, like the last, but the converging margins straight towards the base: *orbicular*, when the outline is circular or nearly so: *round* or *rotund*, approaching to circular.

67. Terms which relate both to outline and base or apex are, principally, *cordate* or *heart-shaped*, when the two sides at the base project backwards in a rounded form, like a heart as commonly delineated: *reniform* or *kidney-shaped*, like the last, but with the rounded outline broader than long: *auricled* or *auriculate* (*eared*), which is applied to any form of a leaf with a pair of small lobes at the base: *sagittate* or *arrow-shaped*, when narrow with a pair of narrow lobes at the base, not much divergent, like the figure

of an arrow-head : *hastate* or *halbert-shaped*, like the last or auricled, with the lobes widely diverging : *obcordate* or *inversely heart-shaped*, which is heart-shaped with the notched end at the apex.

68. Certain terms belong to the ends alone ; as *emarginate*, with a small notch at the end : *obtuse*, blunt : *acute*, terminating in an acute angle without much tapering : *acuminate* or *pointed*, tapering or drawn out into a point : *mucronate*, tipped with an abrupt slender point (*mucro*) : *apiculate*, tipped with an abrupt minute point, &c.

69. The real base of the leaf is always at the attachment of the petiole : but sometimes, from the extension of the posterior part of the leaf backwards and the union of the margins behind the point of attachment, the petiole seems to be fixed to some part of the lower surface, when it is *pelate* or *shield-shaped*, as in the Mandrake (p. 21), Water-Shield (p. 22), and Water-Lily (p. 23).

70. The general outline, incision, &c., stands connected, in a good degree, with the mode of distribution of the framework (*ribs*, *veins*), or the *Venation*.

71. There are two principal modes of venation, viz. :— 1. The *parallel-veined*, or *nerved*, where the woody system of the leaf (55) divides directly from the apex of the petiole into simple parallel ribs or veins (called *nerves* by the older botanists) which run to the apex without forking ; or sometimes they are given off from a prolongation of the petiole traversing the axis of the blade, and thence run parallel to the margins. This mode is nearly characteristic of Endogenous Plants (52, and p. 445). 2. The *reticulated* or *netted-veined*, where the ribs or veins branch and subdivide in various ways as they spread through the blade, and the branchlets run together or unite with one another (*anastomose*), so as to form a kind of network. Such leaves are specially said to be *veined* or *veiny* (in contradistinction to *nerved*), and are met with in almost all Exogenous Plants (48). The stronger primary divisions of the framework are termed *ribs* ; the smaller, *veins* ; the minuter ramifications, *veinlets*.

72. Reticulated or netted-veined leaves present two leading modifications, viz. :— 1. the *feather-veined* or *pinnately-veined*, where the woody system of the petiole is prolonged through the blade in a single rib (the *midrib*) from the sides of which the veins all spring, as in the Oak, Beech, Elm, Apple, &c. : 2. the *palmately-veined* or *radiated-veined*, where 3 or more ribs of about equal strength spring directly from the apex of the petiole, making the leaf *3-ribbed*, *5-ribbed*, &c., as in the Maple, Bass-wood, Currant, &c. When strong lateral ribs proceed from near the base of a midrib, the leaf is said to be *triple-ribbed*, *quintuple-ribbed*, &c., according to their number.

73. The particular mode of incision and division follows the distribution of the ribs and principal veins ; the primary incisions, *sinuses*, or reëntering angles being directed, in the pinnately-veined leaf, towards the midrib, in the palmately-veined, towards the base. Accordingly, the particular modifications of outline and lobing are accurately expressed by combining the terms of venation with those which denote the degree of division ; as *pinnately cleft* or *pinnatifid*, when the incisions of a feather-veined leaf reach about halfway to the midrib ; *pinnately parted*, when they almost reach it ; and *pinnately divided*, when they quite attain it (65). So, likewise, the terms *palmately cleft*, *palmately parted*, *divided*, &c., express the degree of the division of a radiated-veined leaf. By adding also the number of the lobes or divisions, the description is made still more complete, as *pinnately 5-parted*, *palmately 3-lobed*, &c., &c.

74. When a *pinnately-veined* leaf becomes *compound* (61), it will therefore necessarily be *pinnate*, that is, with the leaflets arranged along the sides of the midrib (as in the Rose), which then forms a *common petiole* (or *rachis*) ; while a *palmately veined* or radiated leaf becomes *palmately compound* or

digitate, that is, bears the leaflets all upon the apex of the petiole, as in the Horse-chestnut, Lupine, &c.

75. Of the first there are several subordinate modifications; as *odd-pinnate*, when the apex of the common petiole bears a terminal leaflet; *abruptly pinnate*, when there is no terminal leaflet; *interruptedly pinnate*, when the leaflets are unequal and irregular.

76. A pinnate leaf with its leaflets again pinnate becomes *2-pinnate* or *bipinnate*, that is *doubly* or *twice pinnate*, if again, *thrice pinnate*, &c.; and so correspondingly of the palmate mode. The primary divisions of a pinnately compound leaf are sometimes called *pinnæ*, and their divisions, *pinnules*.

77. A leaflet raised on a stalk of its own (*petiolule* or *partial petiole*) is *petiolulate*.

78. The number along with the arrangement of the leaflets may be expressed by a single phrase, as *pinnately 3-foliolate* or *5-foliolate*, &c., *palmately* or *digitately 3-foliolate* or *7-foliolate*, according to their number.

79. In a less precise way, a leaf with 3 leaflets is said to be *ternate*; with 5, *quinate*, &c.; but these terms are also used to express the number of leaves, or other organs which are borne together, as the three leaves of Trillium (p. 487). A leaf twice compound in this way is *2-ternate*, if again compound, *3-ternate*, &c.

80. A leaf several times divided, especially if irregularly or variably so, is said to be *decompound*.

81. Leaves are rarely *vertical*, that is, presenting their edges instead of their surfaces to the earth and sky. They are sometimes *erect*, presenting their apex to the zenith; and in such cases they are often *equitant* (as in Iris, p. 482), viz. with the blade folded together inwards, and the contiguous surfaces commonly grown together, except at the base where they embrace each other or the stem, so that it is only the real lower surface which is exposed to the air and light.

82. Among the more extraordinary forms are leaves which have assumed the forms of open tubes or *pitchers*, as in *Sarracenia* (p. 24).

* * * Their Arrangement, Duration, &c.

83. The point of attachment of a leaf or other organ is termed its *insertion*. As to general position, leaves are said to be *radical* (or *root-leaves*) when they are inserted at or beneath the surface of the ground, as if from the root; those that spring from the aerial ascending stem are *cauline*; those from a branch, *raméal*; those next the flowers, *floral* or *bracts*.

84. As to succession, those which preëxist in the seed are called *seminal* or *seed-leaves*, of which the first or original pair, usually very different from the *ordinary* leaves which succeed, are the *cotyledons*; while the earliest succeeding are *primordial*. In most woody plants of cool climates the last leaves of the season form *bud-scales*.

85. As to relative situation, there are 3 principal modes, viz.:—1. *alternate*, when they grow one from each node (13), and follow one above another in two or more ranks; 2. *opposite*, when in pairs, or two from each node, in which case the bases of the two are always exactly opposed to each other; 3. *verticillate* or *whorled*, where three (*ternately*), four (*quaternately*), or more leaves grow together in a ring or *whorl* around the stem.

86. Opposite or whorled leaves are sometimes united by their bases (*connate*), either slightly, or so confluent as to seem like a single leaf perforated through the centre by the stem (*connate-perfoliate*), as the upper pairs of some Honeysuckles (p. 171).

87. Alternate leaves are sometimes *2-ranked*, or *distichous* ($\frac{1}{2}$), where the second leaf is on exactly the opposite side of the stem from the first, the third exactly over the first, the fourth over the second, and so on, as in

Iris (p. 482) and all Grasses. They are often 3-ranked or *tristichous* ($\frac{1}{3}$), as in White Hellebore (p. 500), and in Sedges (p. 535), when the fourth comes over the first, the fifth over the second, the sixth over the third, and so on. In the next case, which prevails in Exogens, they are 5-ranked or *quincuncial* ($\frac{2}{5}$), the spirally ascending line drawn to connect the insertions of adjacent leaves making two revolutions round the stem to reach the sixth leaf, which stands over the first, the seventh standing over the second, the eighth over the third, and so on, the angular distance between any two leaves in succession being two-fifths of the circumference. In the case next in order the leaves are 8-ranked ($\frac{3}{8}$), as in the Plum, the ninth leaf being over the first, and three turns round the stem being made to reach it. Next they are 13-ranked ($\frac{5}{13}$), as in the Ailanthus (p. 78), and the fourteenth leaf covers the first, five turns round the stem being made to reach it.

88. The pairs of opposite leaves follow similar orders of arrangement.

89. When the pairs cross each other exactly at right angles, so as to form four straight ranks of leaves (as in the Mint Family, p. 313), they are said to be *decussate*.

90. Only one leaf springs from the same point. *Fascicled* or *clustered* leaves, which often appear to form an exception (as in the Pine, p. 439, and Larch, p. 442), are those of a whole branch, developed without any obvious elongation of the internodes so as to separate them.

91. As to duration, leaves are *caducous* or *fugacious*, when they decay or fall very soon after expansion; *deciduous* when they fall comparatively early or at the close of the season; and *persistent*, when they last the whole year round or longer, as in *Evergreens*.

92. The leaves of most Exogens separate from the persistent stem by a joint formed at the insertion, leaving a clean scar; such are *articulated* with the stem; while in most Endogens the dead leaves separate only by decaying away.

93. The mode in which the leaves are packed away in the bud is named their *VERNATION* or *PRÆFOLIATION*; of which there are several ways; such as the *conduplicate*, when each leaf is infolded together lengthwise, as in the Beech, Magnolia, &c.; the *plicate* or *plaited*, when each leaf is several times folded (into plaits), as in the Maple, Vine, &c.; the *involute*, when the edges are rolled inwards towards the midrib, as in the Violet; the *revolute*, when they are rolled backwards, as in Azalea; the *convolute*, when the leaf is rolled up around the bud from one of its edges, as in the Fig; and the *circinate*, when spirally rolled up from the apex downwards, as in the Sundew (p. 49), and in True Ferns (p. 620).

* * * * Stipules.

94. The *STIPULES* (59) often form the principal scales or coverings of the bud, although falling away when the leaves expand, as in the Oak Family, the Magnolia Family (p. 17), &c. This is perhaps the principal use they subserve, except when they remain, become green and foliaceous, and act like leaves.

95. Leaves furnished with these appendages are said to be *stipulate*; destitute of them they are *exstipulate*. Leaflets when furnished with similar appendages, as in the Bean (p. 95), are *stipellate*.

96. Stipules are sometimes *adnate* or adherent to the petiole, one on each side, as in the Rose, Strawberry, and Clover. Sometimes they unite instead by their opposite margins on the other side of the branch, as in the Plane-tree (p. 433); or uniting by both margins they form a sheath (*ochrea*), as in the Buckwheat Family (p. 385).

6. The Organs of Reproduction

97. Consist of the FLOWER and the parts developed from it, viz. the FRUIT and the SEED. The result is the production of an EMBRYO, or new plantlet.

98. Flowers, like branches, are evolved from buds. Flower-buds are formed in the same situations as leaf-buds, and in no other, viz. at the apex of the stem or branch, and in the axils of the leaves. Their arrangement is governed, therefore, by that of the leaves. Flower-stalks are merely the ultimate ramification of the stem. In the early state, flower-buds are undistinguishable from leaf-buds; and the most conspicuous parts of the flower are so obviously analogous to leaves that they are called, in common language, the leaves of the flower. Indeed, all the organs of reproduction are formed on the same plan as those of vegetation, and their development follows the same general laws. The parts of the blossom belong essentially either to the stem (or *axis*), or to the leaves.

99. The arrangement of the flowers upon the stem or branch constitutes

7. The Inflorescence.

100. The flower may rest directly in the axil or on the apex of the stem, without any stalk, when it is *sessile*. Or it may be supported by a flower-stalk (*peduncled*), which is named the PEDUNCLE.

101. The simplest case of inflorescence is where the flower is *solitary*, or single; either at the summit of the stem (as in the Tulip, &c.), when it comes from a terminal bud, or from the axil of a leaf (as in the leafy-stemmed Violets, p. 45), when it comes from an axillary bud.

102. There are accordingly two principal modes of inflorescence; first, where all the flowers spring from axillary buds, the terminal bud going on to continue the stem or axis until it is exhausted, as in Speedwell (p. 302), &c.: second, where the flowers all terminate (first) the main stem, and (then) the branches, or spring from terminal buds, as in the Pink Family (p. 55), St. John's-worts (p. 51), Gentian Family (p. 356), &c. In the first mode the inflorescence is *indefinite*, since the flowering stems may continue to elongate without limit, except from exhaustion or want of nourishment. The second is *definite*, the flowering stem or branch being in each case arrested by the formation of a terminal flower. The indefinite or axillary mode may be first considered.

103. The leaves from the axils of which blossoms appear are frequently quite like those of the rest of the plant, when the flowers are said to be *axillary*. Oftener the floral leaves are reduced in size and different in shape and appearance from the others, when they receive the name of *bracts*, and the flowers usually more obviously form a cluster, to which different names are applied according to its shape, &c.

104. Thus, a SPIKE is formed when the flowers are sessile, or nearly so, in the axil of the bracts along an elongated common peduncle; as in the Plantain (p. 278), Vervain (p. 311), &c.

105. A RACEME, when the flowers thus disposed are supported each on a secondary stalk of their own, as in the Currant, Mignonette, &c.

106. The main axis, in such cases, is the common peduncle; and the part of it along which the flowers are actually borne is sometimes distinguished as the RACHIS. The separate peduncle of each flower is distinguished as the PEDICEL.

107. It necessarily follows (13, 14) that the flowers at the base of such an inflorescence are the oldest, and that they will expand in regular succession from the base to the apex.

108. A CORYMB differs from the raceme only in the greater proportion-

ate length of the lower pedicels, so that the open cluster becomes broader than long and flat-topped or convex, as in the Hawthorn (p. 128).

109. An **UMBEL** further differs only in having the rachis (106) so short that the pedicels seem to spring all from the same point or nearly, and are mostly equal in length, as in the Primrose and Dodecatheon (p. 281). The bracts in this and the following case, being brought into a whorl (85) or cluster round the stem, form collectively the **INVOLUCRE**, as in the Primrose, Flowering Cornel (p. 168), &c.

110. A **HEAD** (or *Capitulum*) is the same as an umbel with the pedicels all shortened, so as to bring the flowers into a solid rounded mass, or the same as a spike with a very short axis, as in the Clover (p. 106) and Teasel (p. 183).

111. In these contracted or depressed forms, the older or lower flower-buds (107) will obviously occupy the margin or circumference, and they will expand in regular order from the circumference to the centre. Hence the indefinite inflorescence is sometimes said to be *centripetal*.

112. Of the spike and head there are one or two particular forms; such as the **SPADIX**, which is merely a fleshy spike (as in the Calla and Indian Turnip, p. 446), or head (as in the Skunk-Cabbage, p. 447), usually enveloped by a hooded bract (called the **SPATHE**).

113. The **AMENT**, or **CATKIN**, is the peculiar scaly spike of the Birch, Alder, Hazel, Willow, Poplar, and other *amentaceous* trees, &c.

114. The *compound flower* of the older botanists, so familiar in the Sun-flower and all *Compositæ* (p. 184), is merely a head: the calyx-like scales (bracts) which subtend it form the involucre, and the broad or depressed rachis is commonly termed the *receptacle*.

115. The bracts often borne on the peduncle or its branches are distinguished by the name of **BRACTLETS** or **BRACTEOLAS**. A stalk which bears them is *bracteolate*.

116. From their axils branchlets in the form of flower-stalks may again arise, and so the inflorescence become compound. When, in such cases, the secondary division imitates the primary, there arises a *compound spike*, *compound raceme* (as in *Smilacina racemosa*, p. 491), or *compound umbel* (as in the Parsley and all that family, p. 153), &c.

117. The secondary or partial umbels are called **UMBELLETS**. A secondary involucre is termed an **INVOLUCEL**.

118. If the lower branches of a raceme are branched irregularly, more or less, a **PANICLE** is produced. A compact, pyramidal or oblong panicle is called a **THYRSUS**, as in the Lilac.

119. In the *definite*, or second principal mode of inflorescence, where the flower-buds are all terminal (102), the main axis is first terminated by a blossom, which arrests its growth. This gives a *solitary terminal* flower, as in the Tulip, many Gentians, &c. Further development can take place only by the production of axillary branches; which can spring from the primary peduncle only when it is furnished with bracts from whose axils they may arise. They are most likely to spring from the axils of the upper leaves. If the leaves and bracts are opposite (85), which is more commonly the case in definite inflorescence, and a flower-stalk, or a branch terminated by a flower, springs one from each axil of the upper pair, a 3-flowered inflorescence is produced, in which the central (terminal) blossom is earliest, and the two lateral (axillary) later, to appear and develop. The order of flowering is therefore from the apex downwards, or *descending* (the reverse of the indefinite forms), or, if the three blossoms are on a level, from the centre outwards, or *centrifugal*.

120. When the pair of leaves or bracts of the lateral branches or peduncles gives rise to new flower-stalks in the same way, a 7-flowered centrifugal

gal inflorescence results ; in which the central flower necessarily expands first, the central ones of each branch next, and then the lateral ones. These may in turn develop each a lateral pair of flowers, and so on. This mode of inflorescence is also termed *cymose* ; a *CYME* being the general name for a flower-cluster of the kind, whether simple or compound.

121. Sometimes this evolution is gradual, the successive branches shooting forth after the expansion of the primary flower, so that the whole process may be directly traced, as in many Chickweeds (p. 62) : on the other hand, all the numerous flower-buds of a compound cyme are frequently fully formed before any of them open, as in the Laurestinus and other Viburnums (p. 174), the Elder (p. 173), &c.

122. A contracted cyme, with the flowers nearly sessile, is called a *FASCICLE*, or if much crowded, like a head (from which it is at once distinguished by the central flowers being the first to open), it is named a *GLOMERULE*.

123. The regularity and symmetry of the cyme are often interfered with by the non-evolution of some of the flowers ; thus becoming one-sided, and sometimes closely imitating some form of centripetal inflorescence. The most ambiguous cases of the kind occur in some alternate-leaved plants, such as Stone-crops (p. 146), where the whole cyme, or its branches (from the continued evolution of the branch on one side only), would always be mistaken for a raceme, were it not that the *apparently* lateral flowers are not in the axils of the bracts, but on the opposite side of the axis, or nearly so, thus showing that they are terminal.

124. The case of a whole flower-cluster borne on a peduncle *opposite a leaf*, as in the Grape and entire Vine Family (p. 85) and in the Poke (p. 385), is evidently of the same sort : that is, an originally terminal peduncle becomes lateral by the production of a branch from the axil of the leaf below ; this branch assuming the direction of the main stem so as to continue it, turning the terminal peduncle to one side. The tendril of the Vine occupies the same position, and becomes lateral in the same way.

125. The centripetal and centrifugal modes of evolution are sometimes combined in the same plant. Thus, the heads of all Compositæ (p. 184) open their flowers centripetally, while the heads themselves are developed more or less regularly in the centrifugal mode. The reverse is seen in the Mint Family (p. 313), where the stems elongate indefinitely by the terminal bud, developing axillary clusters in the centripetal mode, but the clusters themselves are cymes, expanding their flowers centrifugally. The leaves being opposite, the pair of contracted small cymes (or *cymules*) when sessile forms an apparent whorl (*VERTICILLASTER*). But truly whorled flowers only occur when the leaves are whorled, as in Hippuris (p. 140).

126. A peduncle which rises from beneath or near the surface of the soil is called a *SCAPE*.

8. The Flower.

* Its Component Parts, Structure, &c.

127. The *FLOWER* consists of two kinds of organs, viz. :— 1st, the leaves of the blossom, or *FLORAL ENVELOPES* ; and 2nd, the *ESSENTIAL ORGANS*, inclosed and protected by the former in the bud, and which ordinarily bear no resemblance to leaves. All the parts are arranged on a short axis (the *RECEPTACLE* or *TORUS*), like leaves on a branch, usually in successive whorls. The flower is therefore a sort of branch, with the internodes very much shortened and inconspicuous.

128. A *complete* flower is furnished with two sets of floral envelopes, viz. an outer (the *CALYX*), and an inner (the *COROLLA*), and with two kinds of essential organs, of which the outer are the *STAMENS*, and the inner or central the *PISTILS*.

129. The CALYX or flower-cup is commonly green and leaf-like, but not always so : the leaves of which it consists are named the SEPALS.

130. The COROLLA, or inner row of floral envelopes, is commonly of delicate texture, and colored (that is, of some hue other than green), so that it forms the most showy part of the blossom : its several parts or leaves are called the PETALS.

131. When the leaves of the flower consist of one row only, that row is considered as the calyx, whatever its color or texture ; excepting where the real calyx has become obliterated, or concealed by adhesion with some other organ, as in most Umbelliferæ (p. 153), when the envelope which appears may be shown to belong to the corolla. A flower which is incomplete from the want of the corolla is *apetalous*.

132. The floral envelopes are collectively termed the PERIANTH, which name, however, is seldom used except in cases where the calyx and corolla are not satisfactorily distinguishable, or where the existence of both sets is uncertain, as in the Lily (p. 494), and Lily-like plants.

133. Nor is the calyx, any more than the corolla, an essential part of the flower : both are often wanting, as in the Willow (p. 424), and the Lizard's-tail (p. 401) ; when the flower is *naked*, or *achlamydeous*.

134. The leaves of the flower, whether sepals or petals, are more frequently than ordinary leaves (86) *united*, or grown together by their contiguous margins in various degrees, so as to form a cup or tube, which appears as if *lobed*, *parted*, *cleft*, or *toothed* (65), according to the degree of the union of the component parts. A calyx with the sepals thus combined is said to be *monosepalous* or *monophyllous* ; a corolla in the same way is *monopetalous* (or *gamopetalous*) ; and the degree of division, the number of parts, &c., are expressed by the same terms as in lobed leaves.

135. To designate a calyx or corolla with unconnected (or *distinct*) sepals or petals, the terms *polyphyllous* or *polysepalous*, and *polypetalous*, are used ; or their number may be directly expressed, as *trisepalous* or *tripetalous*, when there are three, or *5-sepalous*, *5-petalous*, and so on.

136. The mode in which the sepals or petals are applied to each other in the bud, constitutes the *ÆSTIVATION* or *PÆFLORATION*. The leading modes are, the *valvate* or *valvular*, where the parts meet by their edges without any overlapping, as in the calyx of the Mallow Family (p. 67) and the Linden (p. 71), the petals of the Vine (p. 85), &c. : the *induplicate*, which is a variety of the last, with the edges rolled inwards, as in the calyx of Clematis (p. 4) : the *convolute*, *contorted*, or *twisted* (forms that are all alike, except in degree), where each petal or sepal has one edge within and the other without, and consequently overlaps the next on one side while it is overlapped by its neighbour on the other, as the petals of Mallow, St. John's-wort (p. 51), and Flax (p. 72) : the *imbricated*, where two of them have both edges exterior in the bud, so as to inclose the others ; of which the *quincuncial* or *spirally imbricated* is the regular and principal form when the parts are five in number ; as in the calyx-lobes of the Rose, the petals of the Cherry (p. 115), &c. In this case, the first and second are wholly external, the fourth and fifth wholly internal, while the third has one edge covered by the first, and the other overlapping the contiguous edge of the fifth ; and a line traced from the first to the adjacent edge of the second, and so on to the fifth, describes a regular spiral.

137. Frequently the petals, and rarely the sepals, are contracted below into a stalk-like base (the *claw*), when they are *unguiculate*, as in the corolla of the Mustard Family (p. 30) ; the expanded part, like the blade of the leaf, being distinguished as the *lamina* or *limb*.

138. The calyx or corolla is *regular* when the parts are uniform in size and shape, as in the *cruciform* (cross-shaped) corolla of the Cruciferæ

(p. 30); and *irregular* when the parts are dissimilar, as in the peculiar *papilionaceous* (butterfly-like) corolla of the Pulse Family (p. 90).

139. Among the forms of the regular monopetalous corolla are, the *bell-shaped* or *campanulate*, which enlarges gradually from a rounded base to the open and spreading border: the *funnel-shaped* or *infundibuliform*, where a longer tube enlarges gradually below, but expands widely at the summit, as in the Morning-Glory: the *tubular*, which is more or less cylindrical throughout and elongated: the *salver-shaped* (or *hypocrateriform*), where the limb or border spreads abruptly at right angles with the summit of the slender tube, as in the Primrose (p. 281) and Phlox (p. 344): and the *wheel-shaped* (or *rotate*), which is like the last, but with the tube much shorter than the limb, as in the Bittersweet (p. 354). The principal irregular form which has received a distinct name is the *labiate* or *2-lipped*, where the petals are unequally united so as to form an upper and a lower lobe or *lip*, as in the Mint Family (p. 313). It is *ringent* or *gaping*, when the lips are spreading and the throat open; and *personate* or *masked* when closed by the approximation of the lips, or by a protuberance of the lower one, called the palate, as in the Snapdragon and Toad-Flax (p. 296).

140. A flower which possesses both kinds of the essential organs is *perfect*. When the stamens and pistils occupy separate flowers, these are *diclinous* or separated; and either *monœcious*, when both the stamen-bearing (*staminate* or *sterile*) and the pistil-bearing (*pistillate* or *fertile*) flowers are borne by the same individual plant (as in the Oak Family, p. 412); or *diœcious*, where they are borne on different individuals (as in the Willow Family, p. 424, and the Hemp, p. 435).

141. The STAMENS, or fertilizing organs (sometimes collectively termed the ANDRŒCIUM), arise from the receptacle next within or above the petals.

142. A stamen consists of two parts; the stalk or FILAMENT, and the usually knob-like body borne on its apex, the ANTHÉR. The latter is analogous to the blade of a leaf; the former to the leaf-stalk, and, like it, is often wanting; when the anther, the essential organ of the stamen, is *sessile* (59).

143. The anther is normally composed of 2 hollow lobes, placed side by side, or is *2-celled*; each lobe or cell corresponding to the side of a leaf, and the prolonged apex of the filament to which they are fixed (the CONNECTIVE) corresponding to the midrib. The minute, dust-like grains which fill the interior constitute the POLLEN, which, discharged from the cells of the anther as they open (commonly lengthwise by a slit or chink down the outer side), falls upon the stigma (149), and serves to fertilize the ovary (179).

144. The anther appears to be fixed to the filament in three principal ways. Sometimes its base rests directly on the apex of the filament, as in *Menispermum* (p. 19), when it is *innate*, or *erect*: sometimes it is attached by a point to the apex of the filament on which it lightly swings, as in the Lily, when it is *versatile*: or occasionally the cells occupy one side of a connective which is a continuous prolongation of the filament, to one side of which the anther is apparently adherent by its whole length; and hence it is *adnate*, — either to the face next the pistil, when it is *introrse* (turned inwards), as in *Magnolia* (p. 17), or to the face towards the petals, when it is *extrorse* (turned outwards), as in *Liriodendron* (p. 18).

145. Sometimes the anther-cells, instead of opening by a longitudinal slit, discharge their pollen through a pore or small chink at the apex; as in most of the Heath Family, p. 256, in the Potato, p. 354, &c. Rarely they open by *valves*, hinged above and uplifted like trap-doors, either a single one to each cell, as in the Barberry (p. 20) and Benzoin (p. 394), or a pair of them, as in the *Sassafras* (p. 394).

146. The number of the stamens is adjectively expressed by Greek numerals, or the proper adjectives, prefixed to *androus*; as *monandrous*, with a single stamen; *diandrous*, with 2; *triandrous*, with 3; *tetrandrous*, with 4; *pentandrous*, with 5; *hexandrous*, with 6; *heptandrous*, with 7; *octandrous*, with 8; *enneandrous*, with 9; *decandrous*, with 10; *dodecandrous*, with 12; and *polyandrous*, when more numerous or *indefinite*.

147. The stamens, like the leaves of the flower (134), may unite or grow together; either by their anthers (*syngenesious*, as in *Compositæ*, p. 184, and *Lobelia*, p. 253), or by their filaments. If the filaments unite into one mass, tube, or ring, the stamens are *monadelphous* (in one brotherhood), as in the Mallow Family; if into two, *diadelphous*, as in most of the Pulse Family (p. 90); if in three, *triadelphous*, &c.; if in several, *polyadelphous*. When uncombined they are *distinct*.

148. The PISTILS, or seed-bearing organs (collectively termed the GYNÆCIUM), to whose protection and perfection all the other parts of the blossom are in some way subservient, are placed within or above the stamens, and therefore occupy the centre or summit of the flower. When there is only one, it seems to terminate the axis or receptacle (127).

149. A pistil is distinguished into three parts, viz. the hollow portion below, which becomes the pod or fruit, and is named the OVARY (or by Linnæus the *Germen*); a prolongation usually from the apex of the ovary, of various form, oftener thread-shaped or columnar, called the STYLE; and the termination or some other part of the style denuded of its epidermis, either knob-shaped or otherwise, termed the STIGMA. The style is often absent, when the stigma is *sessile* (142) on the apex of the ovary. These two parts are essential to the pistil; the stigma to receive the pollen by which the OVULES, or rudiments of seeds inclosed within the ovary, are fertilized.

150. The only exception to this statement is furnished by the GYMNO-SPERMOUS (or Naked-seeded) Plants, such as the Pine Family (p. 438), which produce flowers of the greatest possible simplicity, the pistil consisting of an open scale, *ovuliferous* (bearing ovules) on some part of its upper surface, upon which the pollen acts directly, without the intervention of a stigma; and the seeds consequently are not contained in a pod.

151. The number of the pistils is adjectively expressed by Greek numerals, &c., prefixed to *gynous*, e. g. 1, *monogynous*, 2, *digynous*, 3, *trigynous*, and so on to *polygynous*, when they are numerous or indefinite, as in the corresponding case in stamens (146).

152. The pistil is frequently truly single or solitary, as in the Baneberry (p. 15), Pulse Family, &c.; but often what appears to be a single pistil consists in fact of two, three, or more, with all their parts united, as in the Lily and Tulip, where the *compound pistil* they bear consists of three *simple pistils* confluent into one.

153. The pistils, although often *distinct* or separate (as in Larkspur, p. 13), are more frequently united than any of the other parts of the flower. The union occurs in every degree, from the connection merely of their bases, as in many Saxifrages (p. 148), to the complete coalescence of the ovaries while the styles are distinct (as in *Aralia*, p. 166), to the partial union of these, or to their complete union, with that of the stigmas also, as in the Lily, the Dogwood (p. 167), Honeysuckle (p. 171), &c. The number of the cells, or cavities, in such ovaries indicates the composition; the ovary of a simple pistil being normally 1-celled.

154. Not only do homogeneous parts of the flower unite (134, 147, 153), but adjacent sets of organs are liable to grow together in a greater or less degree. When parts of a different nature are not united, they are said to be *free*. When the sepals, petals, and stamens are all *free* from the pistils and from each other, but exhibit their real origin or insertion (127)

in successive sets, one within and above the other, as in a Buttercup (p. 8), Poppy (p. 26), &c., these organs are said to be *hypogynous*. When, on the other hand, the petals and stamens are *inserted into the calyx*, that is, cohere below with it (usually through the intervention of a ring or Disk which lines its base), as in the Cherry, Strawberry, &c., they are *perigynous*. The same term is employed when all these parts likewise cohere with the base of the ovary, as in many Saxifragæ, Heuchera (p. 149), &c. When all these parts adhere to or are incorporated with the surface of the ovary quite to its summit, as in Umbelliferæ (p. 153), Dogwood (p. 167), also in the Fuchsia, and all the Evening Primrose Family (p. 134), so that these organs seem to spring from the top of the pod or fruit instead of beneath it, they are termed *epigynous*.

155. Rarely the stamens further cohere with the style itself, when the flower is *gynandrous*, as in the Orchis Family (p. 463).

* * Its Symmetry.

156. A flower is perfectly *symmetrical* when the several whorls, or sets of organs, which compose it are equal in number, or are multiples of the fundamental number. The flower of Tillæa (p. 146) is entirely and obviously symmetrical, the sepals, petals, stamens, and pistils being uniformly 3, or in some specimens 4. So is that of Sedum (Stone-Crop, &c., p. 146), where the parts are in fives, but the stamens are doubled, or, in other words, there are 2 whorls of them, which may be distinguished by some inequality in the length or time of the maturity of the two sets. Penthorum, the next genus (p. 147), is like the last, only the petals are usually wanting (*suppressed*), and the 5 pistils are partially united into one. The Lily (p. 494) is also symmetrically constructed on the *ternary* plan, viz. with all its parts in threes; the 6-leaved perianth (132) consisting of 3 outer (*sepals*) and 3 inner parts (*petals*); the stamens 6, or two sets; while the apparently single pistil consists of three wholly coherent into one. On the other hand, the flower of Cruciferæ (p. 30) is *unsymmetrical* as to the stamens, which are 6, while the sepals and petals are only 4.

157. The number of the component parts of the whole flower, or of any set, is designated by the terms *binary* (in twos), *ternary* (in threes, as in most Endogens), *quaternary* (in fours), *quinary* (in fives, the prevalent mode in Exogens), &c.; or sometimes by Greek numerals prefixed to *-merous*, as *dimerous*, of 2 parts; *trimerous*, of 3; *tetramerous*, of 4; *pentamerous*, of 5; *hexamerous*, of 6, and so on. These and the like terms are frequently written with Arabic numerals, as *3-merous*, *4-merous*, &c.

158. In the *typical* or *normal* symmetrical flower, the organs of each set successively *alternate* (85) with each other; that is, the petals stand over the intervals between adjacent sepals; the stamens, or the outer whorl of them, over the intervals between the petals (or the lobes of the corolla if monopetalous), and consequently opposite, or before, the sepals; and so on. This regular alternation of parts is to be taken for granted in botanical descriptions, unless otherwise expressed. The exceptions to this rule, when they occur, almost universally run uniformly through the family, as in Berberidaceæ (p. 20), Rhamnaceæ (p. 84), where the stamens stand opposite the petals; and in Primulaceæ (p. 230), where they are opposite the lobes of the corolla, which amounts to the same thing.*

159. That sepal, petal, or other part which, in an axillary flower (10), lies next the bract, or outwards as to the axis of the stem or branch, is termed the *anterior* or *inferior* (*lower*); those which are on the opposite side, viz. next the main axis, are *posterior* or *superior* (*upper*); those which

* For particular explanations and more extended illustrations of the plan, structure, symmetry, and modifications of the flower, the student is referred to the Botanical Text-Book, 2d ed., pp. 184-218.

occupy the sides, or stand more or less at right angles to the plane of the axis and the bract, are *lateral*. Thus, the two lips of the corolla of Labiate plants (p. 313) are *superior* and *inferior* (upper and lower). Thus, in the Pea and all the Pulse Family, where the flower is 5-merous, the odd sepal is *inferior*, or next the bract, while the sinus or notch between the two *superior* exactly corresponds to the axis of the inflorescence, and the two remaining sepals are *lateral*. And, since the petals alternate with the sepals, the odd petal (*standard*, p. 90, note) is *superior*, the two lower (forming the *keel*) are *inferior*, and the two remaining (*wings*) *lateral*. This will render sufficiently clear the application of these terms in other cases. It must be noted, however, that what was called an "*inferior flower*" or "*inferior calyx*," &c., in the earlier botanical language, still to some extent in use, merely designates a flower with the calyx, &c., free from the ovary (154), or not adherent; and the term *flower* or *calyx superior* is equivalent to *calyx adherent* to the ovary, the free portion in such case appearing as if it constituted the whole of the calyx and surmounted the ovary.

*** * * Internal Structure of the Pistil, &c.**

160. When the pistils are very numerous, the receptacle is commonly prolonged or otherwise enlarged for their insertion; as in *Anemone cylindrica* (p. 5), *Ranunculus* (p. 8), the Strawberry (p. 123), &c. In the Rose (p. 126) the receptacle is expanded in a different way, so as to become hollow, and line the urn-shaped fleshy calyx-tube which forms the rose-hip, bearing the inclosed pistils over the whole inner (upper) surface.

161. In *Geranium* (p. 73), the receptacle is prolonged far beyond the 5 ovaries into a beak, to which the styles cohere. In *Nelumbium* it expands into a large top-shaped body, into the upper face of which the pistils are immersed.

162. In *Magnolia* and *Liriodendron* (p. 17), the numerous pistils, which partly cover each other, or are imbricated, in many rows on an elongated receptacle, cohere by their contiguous parts (the inner side of each to the back of the next above) into a common mass.

163. To form a proper *Compound Pistil*, however, the component simple pistils unite in a whorl or ring, all being in one plane, in a manner which is well illustrated by the Mallow (p. 69) and its allies. Rightly to understand the structure and modifications of the compound *ovary*, the nature of the simple pistil must first be more particularly indicated.

164. A *simple pistil* is correctly represented as a transformed leaf, curved or folded inwards so that the two edges are brought into contact and cohere, thus forming a closed sac or cell, the *ovary*; while a prolongation of the apex of such a leaf produces the *style*, if any; and its apex, or some marginal portion of the prolongation, forms the *stigma*. The simple pistil, formed thus of a single leaf, whether separate, or when forming one of the components of a compound leaf, is named a CARPEL.

164.² In a whorl of simple pistils, accordingly, the line which represents the united margins of the *carpellary leaf*, of which each theoretically is composed, is on the inner side, or next the axis. This line is called the *Inner* or *Ventral Suture* (seam). A similar line down the back, answering to the midrib of the *carpellary leaf*, is called the *Outer* or *Dorsal Suture*.

165. It is to the *ventral suture* alone, or some part of it, with rare exceptions, or to something formed of it, that the ovules (173, or bodies which are to become the seeds) are attached. This is plainly seen in the most natural, normal carpels of the Larkspur, Columbine, or *Caltha* (pp. 11-13), where the ovules occupy the whole ventral suture in two rows, one for each margin of the transformed leaf. In the Buttercup (p. 8), the single ovule occupies the very base of this suture; in *Anemone*, its apex.

166. The line or ridge which bears the ovules, and often projects more

or less into the cell, is called the PLACENTA. Each placenta consists of, and often separates into, two parts; one belonging to each margin of the transformed leaf.

167. It is apparent, therefore, that when the carpels of a whorl combine to form a compound pistil by the cohesion of the contiguous parts, the compound ovary so produced will have as many cells as there are carpels in its composition, and the placentæ will all meet in the axis, or around it; or, in other words, the ovules will be borne from the internal angle of each cell. It is obvious, also, that the *partitions* (or *dissepiments*) of the compound ovary consist of the contiguous and united sides of the carpels, and that each is double, or of two layers.

168. Although a simple carpel has no proper dissepiment, yet the presence of a partition is no absolute proof that an ovary is compound; since a spurious partition is sometimes formed by the inflexion of, or a growth from, the dorsal suture; as in the simple carpel of *Astragalus* (p. 103), and in the compound ovary of *Flax* (p. 72) and *Blueberry* (p. 261), which in this way show twice as many cells as there are component carpels.

169. Nor, on the other hand, can a 1-celled ovary be inferred to be simple on that account. The more or less distinct styles, or the numerous stigmas, or the number of the placentæ, indicate the composition. A one-celled compound ovary may arise in either of the following ways.

170. The partitions which actually exist at a very early stage may vanish, by the more rapid growth of the exterior, so as entirely or nearly to disappear before the flower opens, forming a *free central placenta*; as in most of the Pink Family (p. 55).

171. Or, the compound ovary may arise as if from the union of a whorl of 2, 3, or more *open* carpellary leaves, the margin of one uniting with the contiguous margin of the adjacent leaf to form a placenta or ovuliferous line, without any introflexion at all (as in the *Prickly Poppy*, p. 26, the *Violet*, p. 43, and *Sundew*, p. 49), or with more or less introflexion, though not so as to reach the centre (as in the *Poppy*, p. 26, many *St. John's-worts*, p. 53, &c.). The placentæ, being in such cases borne on, or projected from, the *parietes* or walls of the ovary (instead of from the centre), are said to be *parietal*.

172. The number of carpels which make up a compound ovary, of whatever sort, is expressed by the terms *di*-(2-)*carpellary*, *tri*-(3-)*carpellary*, *tetra*-(4-)*carpellary*, *penta*-(5-)*carpellary*, and so on. To express the degree of union of the styles, we may either say, style *cleft*, *parted*, &c., describing according to the appearance, as if an originally solid body had been split, &c.; or, more properly, styles *united at the base*, *to the middle*, *to the summit*, &c., thus adapting the language to the actual state of the case.

* * * * Ovules; Fertilization.

173. OVULES (149) at first appear like minute granulations, or pulpy excrescences of the placenta; but before the flower opens they have generally acquired their regular form and structure.

174. The ovule is commonly raised on a stalk of its own, the FUNICULUS. It ordinarily consists of two coats, an outer, the PRIMINE, and an inner, the SECUNDINE, which are developed around the base of a cellular mass, the NUCLEUS, so as at length to inclose it. The coats are, however, open at the apex, the mouth or orifice (FORAMEN, MICROPYLE) of the outer being called the EXOSTOME; of the inner, the ENDOSTOME. The base, or extremity where the coats and the nucleus join and are fixed to the stalk, through which it draws its nourishment from the placenta, forms the CHALAZA.

175. In the *orthotropous* ovule, which is the simplest form of all, the whole organ remains straight, as the name denotes, with the chalaza or real

base next the placenta with which funiculus directly connects it, while the orifice or apex is at the opposite extremity; of which the Cistus Family (p. 47) affords good examples.

176. In the *campylotropous* or curved ovule, the whole curves round on itself in the course of its unequal growth, so as to become more or less kidney-shaped, and to bring the apex round in proximity to the chalaza. Those of the Mignonette (p. 42), Mustard Family (p. 30), and Pink Family (p. 55) are of this sort.

177. In the *anatropous* or inverted form, which is the most common case (of which the Violet affords a good example), the ovule is straight, as in the orthotropous, but has become bodily inverted on its stalk in an early period of its development, so that the orifice or real apex, brought down by the side of the stalk, points to the placenta, while the chalaza occupies the opposite extremity, or the apparent apex. The portion of the stalk which lies in contact with the side of the ovule coheres to it, and receives the name of the *RAPHE*. This remains firmly thus attached in the seed; so that the *HILUM*, or scar left on the seed when it separates from the stalk, is next the orifice or true apex, and quite at the opposite end from the chalaza; instead of being at the chalaza, as in the preceding kinds.

178. A modification of the last, called the *amphitropous* form, is precisely like it, except that the stalk adheres only halfway down to form a raphe, and the free part of the stalk then diverges, so that the ovule stands across its apex, with the hilum equidistant between the chalaza at one end and the orifice at the other.

179. The ovules are fertilized through the agency of the pollen (143). The pollen-grains that fall upon the stigma, or some of them, soon emit, through some part of their thickish outer coat, a delicate prolongation of the thin and extensile inner coat, in the form of a slender tube, filled with the fluid which the grain contains, and with the minute molecular matter that floats in it: this tube penetrates the stigma and imbeds itself deeply in the loose tissue of the style. Shortly after, similar tubes or threads, generally supposed to be prolongations of these, are found in the placenta, whence they have often been traced into the orifice of the ovule, or into contact with the projecting apex of the nucleus; in which the nascent embryo (15, 209) subsequently appears, first as an apparently single cell or vesicle of cellular tissue, suspended by a thread-like chain of smaller cells. This primary cell soon gives rise to a mass of minute cells, which, as they increase and grow, are at length fashioned into the ultimate and specific form of the embryo. The *RADICLE* or *root-end* of the embryo is always that extremity by which it was at first suspended: consequently it always points towards the orifice of the ovule, or the *MICROPYLE*.

180. The fertilized ovule becomes the *seed*; and the ripened and full-grown seed-bearing ovary forms

9. The Fruit.

181. The *FRUIT* consists of the matured ovary (the *PERICARP* or *Seed-vessel*) and its contents, along with any other parts that may be incorporated with it; such as an adherent calyx, which in the apple and pear, becoming greatly thickened and fleshy, makes up the principal bulk of the fruit, and in the quince forms the whole edible mass.

182. Sometimes a calyx becomes fleshy or berry-like without adhering at all to the pericarp itself, as in the Creeping Wintergreen (p. 264): sometimes it is the receptacle alone which becomes pulpy and edible, as in the Strawberry (p. 123). The organizable nutritive matter often accumulates largely in the pericarp, which, becoming soft or juicy as it ripens, forms a *berry*. Often there is no accumulation farther than what is immediately required for the seeds, when the walls of the pericarp remain leaf-like, or

in ripening become membranaceous, coriaceous, or crustaceous, forming a dry fruit; such as a *pod*, when it splits, or otherwise opens at maturity, and a *nut*, *achenium*, &c., when it does not. Sometimes the outer layer of the pericarp enlarges and softens, while the inner hardens like a nut, when a *drupe* or *stone-fruit* is the result, such as the plum and peach.

183. Besides the changes in size, form, and texture to which the ovary is subject as it matures into the pericarp, it is also liable to some changes from the abortion or obliteration of parts. Thus, the ovary of the Oak and Beech has 3 cells and 2 ovules in each; while the acorn and beech-nut are only one-celled and one-seeded; five ovules and two of the cells being obliterated during the growth of the fruit. The same thing occurs in the Horsechestnut, but in a less degree, since 2 or 3 seeds often ripen, and the abortive ones, or traces of them, as well as of the original partitions, may always be found in the ripe fruit.

184. On the other hand, the cells are sometimes multiplied in fruiting, as in the Stramonium (p. 353), where a 2-celled ovary becomes 4-celled by a false partition, and in Desmodium (p. 98) and such like pods, in which a set of cross divisions is formed.

185. Of simple fruits (produced by a single flower), the following are the principal kinds.

186. A **FOLLICLE** is a pod (183) formed of a single carpel which opens at maturity along the ventral suture; as in the Larkspur and Columbine (p. 13).

187. A **LEGUME**, the proper pod of the Pulse Family (p. 90), differs from the follicle in opening by both sutures, thus splitting into 2 pieces, or *valves*, each of which is half a carpel. The name is given, in practice, to every form of the fruit of the Pulse Family, whether opening by valves or not. A pod of the sort which is divided transversely into several joints (in the mode mentioned at the close of paragr. 184) is called a **LOMENT**, or a *lomentaceous pod*.

188. A **CAPSULE** is the general name for any sort of pod formed of a compound ovary (163), especially when opening by regular *valves*; or, in other words, is *dehiscent*.

189. Regular **DEHISCENCE** takes place by the opening through one or both sutures (164), and often also by the disjunction of carpels that have been united.

190. When a capsule splits through the partitions, the dehiscence is *septicidal*. This separates it into its constituent carpels, which then usually open by the ventral suture at their inner angle for the discharge of the seeds. The separable carpels, or the lobes of a pod, the carpels of which are united at the centre only, are sometimes called **COCCI**, and the pod, *dicoccous*, *triccous*, &c., to express the number of carpels.

191. When the dehiscence of a capsule occurs by the dorsal suture of each carpel, thus opening directly into the back of each cell, it is said to be *loculicidal*. The partitions, remaining intact, are borne each on the middle of a valve; while in the septicidal mode the half-partitions remain attached to the margins of the valves.

192. The 1-celled capsule with parietal placentæ may dehisce either *loculicidally* through the dorsal sutures, when the placentæ will occupy the middle of the valves, or by the disjunction of the united margins of the carpels, when each valve will answer to an entire carpel, and bear the half-placentæ and seeds on both margins.

193. Sometimes the valves fall away from the partitions, leaving them adherent in the centre, as in the Morning-Glory (p. 349), — a modification of either of the two preceding modes, which is termed *septifragal*.

194. Not unlike this is the case where the valves separate from the pa-

rietal placentæ of a 1-celled pod, leaving these as a slender framework, or *replum*, as in many of the Poppy Family (p. 25).

194. A **SILIQUE** is a pod like the last, of 2 carpels and 2 valves separating from the 2 parietal placentæ, only that there is an anomalous partition stretching between the placentæ and rendering the pod 2-celled. It belongs exclusively to the Mustard Family (p. 30). When short, or not much longer than broad, it is called a **SILICLE**.

195. Some capsules burst irregularly, as in *Campanula* and *Lobelia*, or open by pores only, as in the Poppy.

196. A few open by a circular transverse line (*circumscissile*), the top separating like a lid or cover; as in Purslane (p. 66) and Pimpernel (p. 284). Such a pod is named a **PYXIS**, or **PYXIDIUM**.

197. A **PEPO** is the peculiar fleshy fruit of the melon, cucumber, &c. (Its structure is briefly described on p. 144.)

198. A **POME** (as the apple, pear, &c., 181) is a fruit chiefly composed of a thickened fleshy calyx-tube, involving the carpels in the centre; as described on pp. 114, 128, 129.

199. A **BERRY** is a fruit which becomes pulpy or juicy throughout, as the currant, gooseberry, and grape (182).

200. These fleshy or pulpy fruits of course do not split open, that is, are **INDEHISCENT**. This is also the case with the following kinds.

201. A **DRUPE** or *Stone-fruit* (like the peach and cherry) has the outer part (*Exocarp* or *Sarcocarp*) fleshy or pulpy, while the inner (the stone or *Putamen*, *Endocarp*) becomes crustaceous or bony, like a nut. The name strictly belongs to 1-2-seeded fruits of the sort formed of a simple pistil, but is also applied to those which are 2-celled or more, as in the Dogwood (p. 167).

202. An **ACHENIUM** is a small and dry indehiscent pericarp, containing a single seed, as in the Buttercup (p. 2), Cinquefoil (p. 121), and various other seed-like fruits, called "naked seeds," by the earlier botanists. The true seed, however, lies loose within, attached by its seed-stalk. The achenium in the Composite Family often bears the limb of the calyx, in the form of a crown of scales, bristles, hairs, &c.; which is called the **PAPPUS** (p. 184).

203. A **CARYOPSIS**, or *grain*, is like an achenium, except that the thin walls of the pericarp cohere inseparably with the whole face of the seed; as in wheat, rye, and the grains of Grasses generally.

204. A **UTRICLE** is like an achenium, but with thin and membranous walls, and more or less inflated.

205. A **NUT** is a hard and dry, crustaceous or bony, 1-celled and 1-seeded fruit, as the acorn, hazel-nut, chestnut, &c., usually resulting from a compound ovary of 2 or more cells and ovules, all but one of which are obliterated in the course of growth.

206. A **SAMARA**, or *key*, is an achenium or a sort of nut, with a winged apex or margins, as in the fruit of the Ash (p. 373) and Elm (p. 399); also of the Maple (p. 80), which consists of 2 united at the base.

207. There are besides *collective* or *multiple* fruits, resulting from the combination of several flowers into an aggregate mass. These are, in fact, masses of inflorescence ripened; as the pine-apple and mulberry (p. 434), which are fruited spikes, with the flowers crowded on an axis; and the fig, where the flowers and fruits (minute achenia) line the interior of a hollow receptacle, formed of the apex of the flower-stalk.

208. A **STROBILE**, or **CONE**, is the peculiar, scaly-imbricated, collective fruit of Pines, Firs, &c. (described on pp. 438, 439).

10. The Seed.

209. The SEED is the matured ovule, with the EMBRYO, or initial plantlet (15, 97), formed within it. It consists of a NUCLEUS (174), inclosed ordinarily by two integuments.

210. The exterior seed-coat (the TESTA) is commonly much thicker than the inner. It varies greatly in texture and in form: it is sometimes expanded into a wing for facilitating dispersion by the wind, as in Catalpa (p. 291), and many other plants with dehiscent pods (but in no indehiscent fruits): and sometimes it is furnished with a tuft of long hairs or down (*coma*) to effect the same purpose, as in Willow-herb (p. 135) and Silk-weed (p. 366).

211. Seeds are occasionally furnished with an extraneous covering, more or less complete, which does not preëxist in the ovule, but is subsequently formed by a growth from the apex of the FUNICULUS (174) or seed-stalk: this forms an ARIL, of which the *mace* of the Nutmeg is an example, and also the scarlet pulpy envelope of the seeds of *Celastrus* (p. 83) and its allies.

212. The scar left where the seed-stalk separates from the seed is the HILUM (177). The orifice or *foramen* of the ovule (174) leaves a trace which is named the MICROPYLE in the seed. The RAPHE of the ovule (177) bears the same name in the seed, where it is equally conspicuous; in the *anatropous* form appearing as a line or ridge down the inner side of the seed, but in the *amphitropous* only half the length, joining the hilum with the chalaza (173). *Orthotropous* and *campylotropous* seeds, like the ovules from which they result, have no raphe, their hilum being at the chalaza (175, 176).

213. The NUCLEUS of the seed, or part contained in the integuments, consists either of the embryo alone (as in the almond, and all the Rose Family, the Pulse Family, &c.), or of this body and a mass of starch and other nutritive matter accumulated around it, and intended for the nourishment of the plantlet in germination (222). This substance, the flowery part of the seed, is called the ALBUMEN, or PERISPERM. Such seeds are termed *albuminous*.

214. Seeds which are destitute of albumen (*exalbuminous*) have of course an embryo so large as to fill the whole interior; and which is provided either with well-developed leaf-like cotyledons (218), as in the Maple (p. 80), or else with a store of nourishing matter in the thickened cotyledons themselves (as in the pea and bean, chestnut, &c.), on which the germinating plantlet feeds.

215. The albumen is not always *farinaceous*, or *mealy* (as in Grasses, Buckwheat, &c.): it is often fleshy in consistence, or hard and *horny* or *corneous* (as in Coffee), or softer and even *mucilaginous* (as in *Convolvulus*, p. 347), or gorged with oil (*oily*), as in Poppy-seeds. Although generally homogeneous, yet in the nutmeg, and in the seeds of the Custard-Apple Family (p. 18), it is variegated or thrown into folds, or *ruminated*.

216. In Water-Lilies, &c. (p. 23), the embryo is separately inclosed in a peculiar little sac within or at the end of the albumen.

217. The EMBRYO (15, 209) varies very much in size, form, and in position with respect to the albumen when this is present. It is generally surrounded by and in the axis of the albumen; but it often rests on some part of its surface (as wheat, and all Grass-seeds, p. 567), or is coiled like a ring around it (as in the Purslane Family, and many others with albuminous *campylotropous* seeds).

218. The embryo is the essential part of the seed: to its production, protection, and support, all the other parts, not only of the seed, but also of the fruit and flower, are subservient. It becomes a plant simply by the

evolution of its parts ; it accordingly possesses, in a rudimentary state, all the essential organs of vegetation, as has already been shown (12-17). The preëxisting first joint (internode) of the axis is the RADICLE, and the *seed-leaves* it bears are the COTYLEDONS.

219. The embryo of Endogenous Plants (p. 445) bears a single cotyledon (or only one seed-leaf on its primary node, 13), or is *monocotyledonous*. That of Exogenous Plants (p. 1) bears two opposite cotyledons, and is therefore *dicotyledonous*, or rarely 3 or more in a whorl (*polycotyledonous*), as in Pines (p. 439).

220. In large embryos, the rudiment of the second node, with its leaf or leaves, is sometimes apparent or more or less conspicuous anterior to germination : this growing apex, or bud, is named the PLUMULE.

221. Whatever be the form and nature of the seed, the radicle lies adjacent to its organic apex, or micropyle (179), towards which the root-end (the extremity opposite to the cotyledons) invariably points. It is accordingly next the hilum in anatropous seeds, but remote from it, at the opposite end, in orthotropous seeds. Considered with respect to the pericarp, the radicle is *superior* when it is directed towards the apex of the fruit ; *inferior* when it points towards its base, &c.

222 The GERMINATION, or development of the embryo from the seed, and its establishment as an independent individual plant, completes the cycle of vegetable life, and brings us round to the point at which this account began.

223. The conditions requisite to germination are a certain amount of heat (according to the nature of the species), moisture, darkness, and a free communication with the air. Seeds are in the most favorable condition for germination, therefore, when loosely covered with soil, which excludes the light while it freely admits the air, and is moistened by showers and warmed by the rays of the sun. The water which is slowly absorbed softens all the parts of the seed, and serves to dissolve the starch and other nutritive matter contained in the cotyledons or accumulated in the surrounding albumen (a portion of which is decomposed and converted into carbonic acid and water with the evolution of heat, while the remainder is usually brought into the more soluble forms of dextrine, sugar, &c.); the enlarging embryo bursts its envelopes ; the radicle is protruded, and, taking a downward direction, fixes itself in the soil ; while the budding end elongates in the opposite direction to elevate the plumule above the surface, when the leaves expand in the air and light (12-17).

224. In most Exogens, the cotyledons are brought to the surface in germination and expand in the air, as in the Maple, Beech, and Bean. But when greatly thickened and gorged with nourishing matter deposited in their tissue, they remain under ground (as in the Oak, Horsechestnut, Pea, &c.), the plumule alone rising above the surface, and its *primordial* leaves being the earliest to expand. So, likewise, the single cotyledon in Endogens always remains subterranean.

225. In the Mangrove, &c., and also in some casual cases, the embryo germinates while the fruit is still attached to the parent stem ; or is, as it were, *viviparous*.

11. Cryptogamous or Flowerless Plants.

226. Cryptogamous Plants of the highest grade, such as Ferns, Horsetails, and Club-mosses, do not essentially differ from Phænogamous Plants (2) in anatomical structure and in their vegetation ; except that their stems grow from the apex only, and have no particular provision for subsequent increase in diameter : hence they have been named ACROGENS, or *Point-growers* (p. 618).

227. Their organs of reproduction are so diverse in different families

that they have not been referred to any common type, but have to be separately defined and described under each family. What are called their flowers and fruit are not constituted on the plan of those organs as characterized in the foregoing sections: they have no stamens and pistils, but bear organs of simpler kinds analogous to these. Their seeds do not arise from ovules, have no manifest integuments distinct from the nucleus, and contain no ready-formed embryo, nor can any particular growing point be detected antecedent to germination. To distinguish them from true seeds they are called *SPORES*.

228. The bodies comprised under this name are widely various, with little obvious agreement in any positive character, except that they all germinate and give rise to new plants. Some of them are masses of cellular tissue of considerable size, and are probably analogous to the nucleus of an ovule: others, like the powder of Club-mosses (p. 636), resemble pollen, and indeed are formed in much the same manner; while those of the lowest and simplest plants (such as Fungi), are apparently reduced to simple cells (although endowed with specific character), and obey the ordinary laws of cellular development (4, 5).

229. The lower Cryptogamous Plants are humble vegetables, composed of cellular tissue alone, without any woody tissue or vessels. Still, the general type of vegetation (12-17) is displayed in their higher forms; as in *ANOPHYTES* (p. 641), the class to which the Mosses belong. These grow upwards by a distinct axis, or stem, emit roots downward, and bear distinct leaves; excepting a few where the leaves and stem are confluent into a *FROND* (pp. 641, 678). They all produce two sorts of reproductive organs, which are analogous to stamens and pistils, and therefore designated as *STAMINIDIA* and *PISTILLIDIA*.

230. In the lowest grades of plants, there is still further simplification of the organs of reproduction; which in many are reduced merely to spores formed of single cells, imbedded in the tissue or budding forth from the surface or extremity of other cells: while, as to vegetation, there is no longer any manifest distinction of organs, or, at least, no distinction into root, stem, and leaves. Indeed, a great part of these plants exhibit no lengthened axis, but incline rather to spread centrifugally in all directions equally, or in one plane, so as to form a *THALLUS* or bed of vegetable matter; from which this class receives the name of *THALLOPHYTES*.

231. There are three principal kinds or orders of *Thallophytes*: one, living in air (either terrestrial or fixed to rocks, trees, &c.), and receiving moisture from the rain and dews, the *LICHENES*; another living in water, the *ALGÆ* (*Sea-weeds*, &c.); both furnished with chlorophyll (1, 54, though often of other hues than green), and therefore capable of assimilating and living (as they do) directly on air and water; while the third, the multifarious order of *FUNGI* (*Mushrooms*, *Moulds*, &c.) are destitute of chlorophyll and accordingly of the power of proper vegetable digestion, and therefore live parasitically upon the juices of other plants or animals, or upon their decaying remains or products.

232. Having been unable to include the *Thallophytes* in the following Flora, it is unnecessary to describe their organs here, or to define the numerous peculiar terms employed in characterizing them. The special terms used in the higher orders of Cryptogamous Plants are mostly explained in the character of the orders to which they respectively belong, or in the synopsis which follows them.

12. Classification and Nomenclature.

233. Living beings are presented to our view as *INDIVIDUALS* alone. Among these some are so essentially alike in every part that we involuntarily apply to them the same name, or say that they are of the same species. Under the name of *SPECIES* we assemble those individuals which

we observe to spring, or from their close resemblance infer to have originated, from a common stock, and which preserve their characteristics when propagated from seed.

234. VARIETIES are casual or minor deviations from the common type of the species, not of sufficient moment or constancy to be at all incompatible with the idea of a common origin, and not permanent from generation to generation by seed, when left in a state of nature. RACES are varieties which, under the long-continued influence of cultivation or domestication, have become so far fixed that they transmit their characteristics by seed, so long as carefully kept by themselves. HYBRIDS are crosses (usually sterile) between allied species.

235. GENERA, or kinds, are ideal assemblages of nearly related species, viz. of those which, notwithstanding specific differences, agree with each other closely in structure and appearance. Thus, the different species of Rose constitute the *genus* Rosa; and the Apple, Pear, Crab, &c., belong to a common genus, PYRUS. (A genus may indeed comprise but a single known species, if its characteristics are so peculiar that it cannot with propriety be deemed to belong to any recognized genus.) SUBGENERA are sections of genera so well marked in character that they have claims to rank as genera. For example, the genus *Cimicifuga*, p. 16, is made to comprise, in addition to the true *Cimicifuga*, the subgenus *Macrotys*; and *Pyrus*, the Pear-genus (p. 129), includes the subgenera *Malus* (for the Apple and Crab-apples), *Adenorachis* (for the Chokeberry), and *Sorbus* (for what are called the Mountain-Ashes).

236. An indication of the particulars in which a genus differs from related genera, given in botanical language, constitutes the *Generic Character*. A similar enumeration of the points (*characters*) which serve for distinguishing kindred species forms their *Specific Characters*.

237. Each genus bears a fixed substantive *generic name*, of one word. Examp. from p. 4 et seq. ATRAGENE, CLEMATIS, PULSATILLA, ANEMONE, HEPATICA. Each species bears a specific name, of one word, usually an adjective, and in agreement with the generic name. Examp. *Atragene Americana* (American Atragene), *Anemone nemorosa* (Wood Anemone), *A. cylindrica*, *A. Virginiana*, *A. multifida*, &c. The botanical name of a plant consists of the generic name followed by that of the species, as in the examples just given. The generic name evidently answers to the *surname* and the specific to the *baptismal* name of a person.

238. To express the various degrees of relationship among genera themselves, and for convenience and precision in arrangement, those genera which are most alike are associated in higher groups, and these groups combined into fewer and still higher groups, with more comprehensive characters, and so on, until the highest generalization comprehends the whole kingdom (animal or vegetable). This series of divisions is more or less numerous according to circumstances; and the names of the divisions follow the subjoined sequence, beginning with the highest:—

KINGDOM (Vegetable or Animal),

SERIES,

CLASS,

SUBCLASS,

ORDER or FAMILY,

SUBORDER,

TRIBE,

SUBTRIBE,

GENUS,

SUBGENUS,

SPECIES,

VARIETIES.

239. Of these the Class, Order, Genus, and Species are of fundamental importance; the others are intercalations, or higher generalizations.

240. In respect to genera and species all classifications in botany agree; but in arranging the genera, orders, &c., two unlike modes, with partly different aims, have been pursued; giving rise one to an *artificial*, the other to a *natural* arrangement.

241. The object of the latter is to arrange plants as far as practicable according to their relationship, bringing those genera into the same group which nearest resemble each other in the most numerous and most important points; so that the full classification shall actually embody and express, in a properly subordinated form, the whole knowledge of the structure of plants, including the characteristics of every part. For the history of the received NATURAL METHOD, the student must consult fuller treatises. It essentially consists in the association of kindred genera into *Natural Orders* or *Families*, under a small number of Classes, based upon still more general agreement in structure.

242. In the particular form adopted in this work, the student will perceive that the Vegetable Kingdom, taken as a whole, is primarily divided into two great *Series*, in view of the presence or absence of *proper flowers* and *seeds*, as defined in paragr. 2, 209, &c., viz. the higher Series of PHÆNOGAMOUS or FLOWERING PLANTS (p. 1); and the lower, of CRYPTOGRAMOUS or FLOWERLESS PLANTS (p. 618).

243. The former is likewise divided into two *Classes*, characterized as well by the different structure of the essential part of the seed, viz. the embryo (218, 219), or initial plantlet, as by that of the stem and foliage of the developed plant (48, 52, 71); viz. Class I. DICOTYLEDONOUS or EXOGENOUS PLANTS, the distinguishing characters of which are assembled on p. 1; and Class II. MONOCOTYLEDONOUS or ENDOGENOUS PLANTS, equally characterized on p. 445.

244. The first of these classes is most naturally divided into two subclasses, in view of the structure of the pistil. In a small, but remarkable portion of the class, with flowers of the simplest sort, the pistil consists of an open scale, bearing naked ovules, which are fertilized by the pollen directly (150, as in the Pine Family, p. 438): the greater part, like all the rest of Phænogamous Plants, bear the ovules in closed pistils, which are fertilized through the stigma. The latter constitute the *Subclass* I. ANGIOSPERMÆ (which means, bearing seeds in a pod), p. 2; the former, the *Subclass* II. GYMNASPERMÆ (or naked-seeded plants), p. 438. The second class does not present this, nor any equivalent diversity.

245. The three *Divisions* of the first and principal subclass, viz. the POLYPETALOUS, MONOPETALOUS, and APETALOUS, form no proper part of the Natural Method, but are used as easy and convenient artificial divisions for breaking up the long series of orders into three parts. The distinctions, too, are not entirely absolute and constant.

246. The lower great Series, comprising Class III. ACROGENS, Class IV. ANOPHYTES, and Class V. THALLOPHYTES, is based upon the peculiarities just explained (226-231); the former of these is defined on p. 618, the ensuing, on p. 461.

247. Next are the NATURAL ORDERS or FAMILIES, with the *Ordinal Characters*, or enumeration of the principal points in which the plants embraced accord with each other and differ from the neighbouring families. The technical names of the orders are generally (but not always) adjective prolongations in ACEÆ of the name of a characteristic genus, as RANUNCULACEÆ (p. 2) from the genus *Ranunculus*, for the Crowfoot Family; PAPAVERACEÆ (p. 25) from *Papaver*, the Poppy, for the Poppy Family; MALVACEÆ, for the Mallow Family, &c.;— meaning *Plantæ Malvaceæ*, or Mallow-plants, *Plantæ Papaveraceæ*, or Poppy-plants or Poppy-like plants, and so on.

248. Suborders are divisions of orders, of the highest rank ; they are to orders what subgenera are to genera (235). Their names are formed like those of orders, but without the termination in *aceæ*, when that can be avoided.

249. TRIBES are sections of orders of lower rank than suborders, and are named in a similar way, as *Tribe CLEMATIDÆ*, and the rest, under the Order Ranunculaceæ, p. 2. (See also Rosaceæ, p. 112, both for suborders and tribes.) In the larger families *SubTRIBES* are introduced, as divisions of a still lower grade than tribes.

250. To assist the learner in practically arriving at the leading characteristics of the orders, while ascertaining the order to which an unknown plant belongs, an artificial analytical key to the orders is appended (p. lxviii.).

251. The object of an artificial classification (240) is to furnish a convenient mode for ascertaining the genus and name of an unknown plant, by the use of whatever set of characters will most readily answer the purpose, without regard to their relative importance, or to any agreement in other respects.

252. The only Artificial System which has attained a general celebrity and currency is that founded by Linnæus, on the number, proportion, position, &c., of the stamens and pistils ; the *classes* upon the stamens, and the *orders* in great part upon the pistils. It is therefore employed as the basis of the extended Artificial Key to the Genera comprised in this work ; a tabular synopsis of the classes being prefixed (p. lii.).

* * * SIGNS USED IN THIS WORK.

① An annual plant.

② A biennial plant.

⌞ A perennial plant.

? A mark of doubt.

! A mark of affirmation or authentication.

1°, 2', 3". To save space, the signs of degrees (°) are used for feet ; of minutes (') for inches ; of seconds (") for lines, a line being the twelfth part of an inch.

The following signs are common, but have not been used in this work, viz :— ♂ A staminate plant or flower : ♀ A pistillate plant or flower : and ♀ A perfect flower, or a plant that bears them.

PRINCIPAL ABBREVIATIONS OF THE NAMES OF AUTHORS.

<i>Adans.</i>	=	Adanson.	<i>Beauv.</i>	=	Palisot de Beauvois.
<i>Ait.</i>		Aiton.	<i>Benth.</i>		Bentham.
<i>Andr.</i>		Andrews.	<i>Bernh.</i>		Bernhardi.
<i>Arn.</i>		Arnott.	<i>Bieb.</i>		Bieberstein.
<i>Auct.</i>		(auctorum), of au-	<i>Bigel.</i>		Bigelow.
<i>Aubl.</i>		Aublet. [thors.	<i>Brid.</i>		Bridel.
<i>Bart.</i>		Barton.	<i>Brongn.</i>		Brongniart.
<i>Bartl.</i>		Bartling.	<i>Cass.</i>		Cassini.

<i>Cav.</i>	=	Cavanilles.	<i>Nutt.</i>	=	Nuttall.
<i>Cham.</i>		Chamisso.	<i>Pav.</i>		Pavon.
<i>Chav.</i>		Chavannes.	<i>Pers.</i>		Persoon.
<i>DC.</i>		De Candolle.	<i>Pluk.</i>		Plukenet.
<i>Desf.</i>		Desfontaines.	<i>Plum.</i>		Plumier.
<i>Dew.</i>		Dewey.	<i>Poir.</i>		Poiret.
<i>Dill.</i>		Dillenius.	<i>R. Br.</i>		ROBERT BROWN.
<i>Ehrh.</i>		Ehrhart.	<i>Raf.</i>		Rafinesque.
<i>Ell.</i>		Elliott.	<i>Rich.</i>		Richard.
<i>Endl.</i>		Endlicher.	<i>Richards.</i>		Richardson.
<i>Engelm.</i>		Engelmann.	<i>Rœm.</i>		Rœmer.
<i>Gærtn.</i>		Gærtner.	<i>Salisb.</i>		Salisbury.
<i>Gmel.</i>		Gmelin.	<i>Schimp.</i>		Schimper.
<i>Good.</i>		Goodenough.	<i>Schk.</i>		Schkuhr.
<i>Grev.</i>		Greville.	<i>Schlecht.</i>		Schlechtendal.
<i>Griseb.</i>		Grisebach.	<i>Schrad.</i>		Schrader.
<i>Gronov.</i>		Gronovius.	<i>Schreb.</i>		Schreber.
<i>Hedw.</i>		Hedwig.	<i>Schult.</i>		Schultes.
<i>Hoffm.</i>		Hoffmann.	<i>Schw. or Schwein.</i>		Schweinitz.
<i>Hook.</i>		Hooker.	<i>Schwægr.</i>		Schwägrichen.
<i>Hornsch.</i>		Hornschuch.	<i>Scop.</i>		Scopoli.
<i>Huds.</i>		Hudson.	<i>Soland.</i>		Solander.
<i>Jacq.</i>		Jacquin.	<i>Spreng.</i>		Sprengel.
<i>Juss.</i>		JUSSIEU.	<i>Steud.</i>		Steudel.
<i>L. or Linn.</i>		LINNÆUS.	<i>Sulliv.</i>		Sullivant.
<i>Lag.</i>		Lagasca.	<i>Tayl.</i>		Taylor.
<i>Lam.</i>		Lamarck.	<i>Torr.</i>		Torrey.
<i>Lamb.</i>		Lambert.	<i>Torr. & Gr.</i>		Torrey and Gray.
<i>Ledeb.</i>		Ledebour.	<i>Tourn.</i>		Tournefort.
<i>L'Her.</i>		L'Heritier.	<i>Trin.</i>		Trinius.
<i>Lehm.</i>		Lehmann.	<i>Tuck. or Tuckerm.</i>		Tuckerman.
<i>Lestib.</i>		Lestibudois.	<i>Vaill.</i>		Vaillant.
<i>Lindenb.</i>		Lindenberg.	<i>Vent.</i>		Ventenat.
<i>Lindl.</i>		Lindley.	<i>Vill.</i>		Villars.
<i>Michx.</i>		Michaux (the elder).	<i>Wahl.</i>		Wahlenberg.
<i>Michx. f.</i>		F. A. Michaux (the younger).	<i>Walt.</i>		Walter.
<i>Mill.</i>		Miller.	<i>Web.</i>		Weber.
<i>Mitch.</i>		Mitchell.	<i>Willd.</i>		Willdenow.
<i>Mont.</i>		Montagne.	<i>Wils.</i>		Wilson.
<i>Muhl.</i>		Muhlenberg.	<i>Wulf.</i>		Wulfen.
<i>Nees.</i>		Nees von Esenbeck.			

II. GLOSSARY OF BOTANICAL TERMS,

COMBINED WITH AN

INDEX

TO THE FOREGOING OUTLINES OF BOTANY.

*** The numbers refer to the paragraphs of the preceding part; except those with p. prefixed, which refer to the pages of the body of the volume.

- A, and Ana, in composition; destitute of; as Apetalous, without petals.
- Abbreviations, p. xxxix.
- Abnormal; different from the customary structure.
- Abortive; imperfectly developed, imperfect.
- Acaulescent, 26.
- Accumbent; lying against any thing; applied to the radicle when it lies against the edge of the cotyledons; p. 30.
- A'cerose; needle-shaped.
- Achenium, 202.
- Achlamýdeous, 133.
- Acicular; bristle-shaped.
- Acine (Acinus); each separate grain of a collective fruit, like the raspberry.
- Acotylédonous; destitute of cotyledons.
- A'crogens, 226.
- Aculeate; prickly.
- Acuminate; pointed, 68.
- Acute, 68.
- Adelphia; a fraternity.
- Adherent; sticking to, or growing fast to, as
- Adnate, 96, 144.
- Aerial roots, 24.
- Æstivation, 136.
- Aggregate; collected together.
- Alate; winged.
- Albumen, 213.
- Albuminous, 213.
- Albuminum, 50.
- Alternate, 85.
- Alvéolate; honeycomb-like, as the receptacle of many Compositæ.
- Ament, 113.
- Amentaceous; in, or bearing aments.
- Amorphous; having no definite form.
- Amphitropous, 178, 212.
- Ampléxicaul, 59.
- Anástomose, 71.
- Anátropous, 177, 212.
- Ancípital; 2-edged.
- Andrœ'cium, 146.
- Andrógynous; both kinds of flowers in the same inflorescence.
- Androus, refers to stamens, 146.
- Angiospérmous; the seeds in a pod.
- Anisómerous; unsymmetrical.
- Annótinous; a year old.
- Annual; lasting a year, 19.
- A'nnular, and } in a ring.
- A'nnulate, }
- A'nnulus, p. 642.
- A'nophytes, 229.
- Anterior, 159.
- Anther, 142.
- Antheridia, p. 642.
- Anthésis; the act or time of expansion in a flower.
- Apétalous, 131.
- Apículate, 68.
- Apocárpus; having the carpels distinct.
- Apóphysis, p. 642.
- Appendiculate; furnished with appendages.
- Appressed; lying flat against.
- Aráchnoid; cobweb-like.
- Arborescent; tree-like, 28.
- Arcuate; curved like a bow.

- Arèolæ ; little spaces, circumscribed by meshes.
 Aril, or Arillus, 211.
 Aristate ; awned.
 Arrow-shaped, 67.
 Articulated ; jointed, 92.
 Artificial arrangement, 240, 251.
 Ascending ; rising upwards with a curve or obliquely.
 Assurgent ; same as ascending.
 Auriculate, or Auricled, 67.
 Awn ; a slender prolonged tip, or beard.
 Awned ; furnished with an awn.
 Axil, 27.
 Axile ; belonging to the axis.
 Axillary, 103.
 Axis ; the stem, or any centre round which parts are arranged.

 Baccate ; berry-like.
 Barbs ; stiff hooked hairs.
 Bark, 47, 49.
 Beaked ; tipped with a conspicuous point.
 Bearded ; beset with bristly hairs.
 Bell-shaped, 182, 199.
 Berry, 182, 199.
 Bi, in composition, twice, as
 Bicarinate ; 2-keeled.
 Biennials, 21.
 Bifid ; 2-cleft.
 Bifarious ; 2-ranked.
 Bifurcate ; 2-forked.
 Bilabiate ; 2-lipped, 139.
 Binate ; in twos, twin.
 Bipinnate, &c., 76.
 Biplicate ; in 2 folds.
 Biserial ; in 2 sets or rows.
 Biserrate ; twice serrate.
 Biternate, 79.
 Bladdery ; thin and inflated.
 Blade, 59.
 Brachiate ; pairs of branches spreading nearly at right angles.
 Bracted, or Bracteate ; furnished with bracts.
 Bracteolate, 115.
 Bracteoles, or Bractlets, 115.
 Bracts, 84, 103.
 Branches, 27.
 Branchlets, 27.
 Breathing-pores, 57.
 Bristles, 58.
 Bristle-pointed ; tipped with a bristle.
 Bud, 14.
 Bulb, 42, 44.
 Bulblets, 43.
 Bulbous ; bulb-like, or bulb-bearing.
 Bullate ; as if blistered.

 Caducous ; dropping off very early, 91.
 Cæ'spitose ; growing in turf or tuft.
 Calcarate ; bearing a spur.
 Calicine ; belong to a calyx.
 Callus, p. 568.
 Calýculate ; with an accessory outer calyx.
 Calýptra ; the hood of Mosses, p. 642.
 Calyx, 129.
 Cambium, 49.
 Campánulate ; bell-shaped, 139.
 Campylótropous, 176, 212.
 Canaliculate ; channelled, grooved down one side.
 Canéscent ; grayish-white with short hairs.
 Capillaceous } shaped like a slender
 Capillary } thread or strong hair.
 Capitate ; shaped like a head, globular.
 Capitellate ; a diminutive of the last.
 Capitulum, 110.
 Carina ; a keel.
 Carinate ; keeled.
 Carpel, 164.
 Carpellary, 164, 172.
 Carpophore ; fruit-stalk ; p. 153.
 Caruncle ; a protuberance or appendage at the hilum of a seed.
 Caryophyllaceous ; a flower like a Pink.
 Caryópsis ; a grain, 203.
 Catkin, 113.
 Caudate ; with a tail.
 Caudex ; the axis of a plant, especially when root-like, or scaly, and erect.
 Caudicle ; the little stalk which attaches the pollen of Orchis, &c., to the stigma, p. 464.
 Cauline, belonging to stem, 84.
 Cells, cellulæ, 4.
 Cellular tissue, 4.
 Centrifugal, 119.
 Centripetal, 111.
 Céphalous ; headed, or head-bearing.
 Cérnuous ; nodding.
 Chaff, p. 185.
 Chaffy ; chaff-bearing.
 Chaláza, 174.
 Channelled ; hollowed out like a gutter.
 Character ; a phrase containing the essential marks of a species, genus, &c., 236, 247.
 Chartaceous ; with the texture of writing-paper.
 Chlóróphyll, 47, 54.
 Cilia ; hair-shaped appendages.

- Ciliate; fringed with hairs on the margin.
 Cinereous; ash-gray.
 Circinate, 93.
 Circumscissile, 196.
 Circumscription; the general outline.
 Cirrhose; tendril-like or tendril-bearing.
 Clasping, 59.
 Class, 239, 243.
 Classification, 233.
 Clavate; club-shaped.
 Claw, and Clawed, 137.
 Cleft, 65, 134.
 Climbing, 31.
 Club-shaped; gradually thickening upward from a slender base.
 Coadunate; coalescent.
 Coarctate; crowded; drawn close together.
 Coccus, pl. Cocci, 190.
 Cochleate; coiled like a short spiral shell.
 Collateral; side by side.
 Collective Fruits, 207.
 Colored, 130.
 Columella; a solid axis of a pod; p. 642.
 Column; the stamens or stamens and pistils combined; pp. 67, 464.
 Coma; a tuft of hairs.
 Commissure; the face by which 2 carpels cohere, p. 153.
 Complete flower, 128.
 Complicate; folded up upon itself.
 Compound flower, 114.
 leaf, 61.
 pistil, 151, 163.
 Compressed; flattened lengthwise.
 Conduplicate; folded together so that the sides are applied face to face; 93.
 Cone (or strobile), 208.
 Conglomerate; clustered into a mass.
 Conical, 21.
 Conjugal; paired.
 Connate; united from the first, 86.
 Connate-perfoliate, 86.
 Connective, 143.
 Connivent; converging together.
 Continuous; the reverse of jointed or divided.
 Contorted, 136.
 Contracted; little spreading.
 Convolute, 93, 136.
 Cordate; heart-shaped, 67.
 Coriaceous; of the consistence of leather.
 Corm, 44.
 Corneous; horn-like in texture, 215.
 Corniculate; bearing a small horn.
 Cornute; horned.
 Corolla, 130.
 Coronate; crowned.
 Corticate; furnished with a harder rind.
 Corymb, 108.
 Costate; ribbed.
 Cotyledons, 84.
 Creeping, 30.
 Cremocarp; the seed-like double fruit of Umbelliferae.
 Crenate, 63.
 Crénulate, 63.
 Crested; bearing an elevated ridge, like the crest of a helmet.
 Cristate; crested.
 Cruciform, 138, and p. 30.
 Cryptogamous Plants, 2, 226.
 Cucullate; hooded.
 Cuculliform, p. 642.
 Culm, 29, 53.
 Cunèiform or Cuneate, 66.
 Cupule; the cup of an acorn.
 Cut, 64.
 Cyathiform; cup-shaped, top-shaped and hollow.
 Cymbiform; boat-shaped.
 Cyme, 120.
 Cymose, 120.
 Cymule, 125.
 Decandrous, 146.
 Deciduous; falling off, 91.
 Declined; bent downwards.
 Decompound, 80.
 Decumbent; reclining on the ground, but ascending towards the apex.
 Decurrent; prolonged below the insertion, 59.
 Decussate, 89.
 Dehiscence, 189.
 Deltoid; triangular, like the Greek Δ .
 Dentate; toothed, 63.
 Denticulate, 63.
 Depressed; flattened from above downwards; low, and spreading horizontally.
 Di, in composition; two.
 Diadelphous, 147.
 Diandrous, 146.
 Dichlamýdeous; having both calyx and corolla.
 Dichotomous; 2-forked.
 Declinous, 140.
 Dicotylédonous, 219.
 Didymous; double or twin.
 Didýnalous; when of 4 stamens 2 are shorter.

- Diffuse ; spreading widely or loosely.
Digitate ; fingered, 74.
Digynous, 151.
Dimerous, 157.
Dimidiate ; halved.
Diœcious, 140.
Dipétalous ; of 2 petals.
Diphýllous ; of 2 leaves.
Disciform ; disk-shaped, flat and circular.
Discoid, p. 184.
Disk, 154, p. 184.
Dissected ; deeply cut into fine lobes.
Dissépiments, 167.
Distichous, 87.
Distinct ; unconnected, 135, 153.
Diváricate ; widely diverging.
Divided, 65.
Divisions, 65.
Dodecandrous, 146.
Dorsal ; borne on the back.
Dorsal suture, 164.
Downy ; clothed with fine soft hairs.
Drupaceous ; drupe-like.
Drupe, 182, 201.
Ducts, 9.
Durámen, 50.
- E, Ex, in composition ; destitute of.
Eared ; having 2 small rounded lobes at the base, 67.
Ebrácteate ; destitute of bracts.
Ebrácteolate ; destitute of bractlets.
E'chinate ; beset with rigid prickles.
Elaters, p. 678.
Elliptical, 66.
Emarginate ; with a notch at the apex.
Embryo, 15, 97, 217.
E'mersed ; rising out of the water.
E'ndocarp, 201.
E'ndogen, Endogenous, 52.
E'ndostome, 174.
Enneandrous, 146.
Entire, 62.
Ephemeral ; lasting but a day.
E'picarp ; the outer layer of a pericarp.
Epidermis ; the skin, 47.
Epígynous, 154.
Epipétalous ; growing on petals.
E'piphytes, 24.
E'quitant, 81.
Erose ; eroded ; minutely toothed as if gnawed.
Etiolated ; blanched.
Exalbuminous, 213.
Excurrent, running out beyond.
E'xocarp, 201.
E'xogens, Exogenous, 48.
E'xostome, 174.
- Exserted ; projecting out beyond the orifice.
Extipulate, 95.
Extrorse ; turned outward, 144.
- Falcate ; plane and curved, with parallel edges, like a scythe or sickle.
Family, 241, 247.
Farinaceous ; mealy, 215.
Fascicle, 122.
Fascicled, 90.
Fasciculated, 22.
Fastigate ; flat-topped, applied to a cluster.
Favose ; honeycombed.
Feather-veined, 72.
Fertile, 140.
Fertilization, 179.
Fibrous, 19.
Filament, 142.
Filiform ; slender and thread-like.
Fimbriate ; fringed on the margin.
Fistulous ; a cylindrical body, hollow.
Flabélliform ; fan-shaped ; plaited like a fan.
Flagélliform ; long, slender, and supple, like a lash.
Fleshy, 20.
Flexuous ; bent or curved right and left alternately.
Floccose ; covered with loose cottony tufts.
Floral envelopes, 127.
Floral leaves, 84.
Florets ; the separate small flowers of a cluster or head.
Floriferous ; flower-bearing.
Flower, 98, 127.
Flower-bud, 98.
Flowering Plants, 2.
Flowerless Plants, 2, 226.
Foliaceous ; leaf-like in texture.
Foliate ; with leaves.
Folliolate ; applied to leaflets, as 3-folliolate, &c.
Follicle, 185.
Forámen, 174.
Fovéolate ; pitted.
Free ; not adherent to any other organ.
Free central placenta, 170.
Frond ; stem and leaf confluent together, 229, and p. 641.
Fruit, 181.
Fugacious ; falling away very early.
Funiculus, 174.
Funnel-shaped, 139.
Fúrcate ; forked.
Fúsiform, 21.

- Galea; a helmet, the arched upper lip of some forms of 2-labiate corolla.
- Galeate; with a galea.
- Gamopétalous, &c., 134.
- Géminate; in pairs.
- Genera, genus, 235.
- Generic character, &c., 236.
- Germ; the growing point of a bud.
- Germen, 149.
- Germination, 222.
- Glabrous, 58.
- Glands, of leaves, &c., 58.
- Glands, of the flower, are any processes of the disk, or honey-bearing appendages.
- Glandular; gland-bearing.
- Glaucous; covered with a whitish fine powder, or *bloom*, that rubs off.
- Glochidiate; beset with hook-pointed bristles.
- Glómerate; densely clustered.
- Glomerule, 122.
- Glumaceous; glume-bearing.
- Glume, p. 567.
- Grain, 203.
- Gymnospermous, 150.
- Gynæcium, 148.
- Gynandrous, 155.
- Gynobase; an elevation of the torus bearing the pistils in Rue, &c.
- Gynophore; a special stalk of the ovary.
- Gynous, 151.
- Habit; the general appearance of a plant.
- Habitat; the situation where a plant naturally grows.
- Hairs, 58.
- Halbert-shaped, 67.
- Hastate, 67.
- Head, 110.
- Heart-shaped, 67.
- Heart-wood, 50.
- Helmet; see Galea.
- Heptandrous, 146.
- Herbaceous, 28.
- Herbs, 28.
- Heterótropous; same as Amphitropous.
- Hexámerous, 157.
- Hexandrous, 146.
- Hilum, 177, 212.
- Hirsute; hairy with long and slender and tolerably distinct hairs.
- Hispid; bristly; covered with long and stiff hairs.
- Homógamous; all the flowers of a head alike.
- Hooded; arched or rolled inwards, like a cowl.
- Hybrid, 234.
- Hypocratériform, 139.
- Hypogæous; growing under ground.
- Hypógynous, 154.
- Imbricated, or Imbricative, 136. Said generally of parts which overlie each other so as to cover the edges, or break joints.
- Incised, 64.
- Incumbent; lying upon; said of an embryo with the radicle folded down upon the back of one of the cotyledons, p. 31.
- Indefinite, 146.
- Indehiscent, 200.
- Individuals, 233.
- Induplicate; folded in, 136.
- Indusium, p. 620.
- Inferior, 159.
- Inflorescence, 99.
- Infundibuliform, 139.
- Innate, 144.
- Innovations; new shoots from the apex.
- Insertion, 83.
- Internodes, 13.
- Introrse; turned inwards, 144.
- Invólucel, 117.
- Involucellate; with an involucel.
- Involúcrate; furnished with an Invólucré, 109.
- Involute; rolled inwards, 93.
- Irregular, 133.
- Isómerous; equal in the number of parts.
- Jointed; separating across by an articulation.
- Keel, 159.
- Keeled; furnished with a projecting ridge along the under side, like the keel of a boat.
- Key, 206.
- Kidney-shaped, 67.
- Labéllum; the lip in Orchideæ, p. 464.
- Lábiate, 139.
- Lacíniate; slashed; deeply and irregularly cut.
- Lamélla; a thin plate.
- Lámina, 59, 137.
- Lanate, Lanuginous; woolly; clothed with long, curled and matted or interwoven hairs.
- Lánceolate; lance-shaped, 66.

- Lateral, 159.
 Leaf, 54.
 Leaflet, 61.
 Leaf-stalk, 60.
 Légume, 187.
 Lenticular; resembling a double convex lens.
 Liber, 47.
 Ligulate; strap-shaped, long and narrow, p. 184.
 Ligule, p. 567.
 Limb, 59, 137.
 Line; the twelfth part of an inch.
 Linear, 66.
 Linnæan Artif. System, 180.
 Lips; the pieces of a 2-labiate (2-lipped) corolla.
 Lobes and Lobed, 65, 134.
 Loculicidal, 191.
 Lodicule, p. 567.
 Loment, Lomentaceous, 187.
 Lunate; crescent-shaped.
 Lunulate; a diminutive of lunate.
 Lyrate; lyre-shaped; pinnatifid with the upper lobes much larger than the lower.

 Mammilar; conical, with a rounded apex.
 Marcéscant; withering-persistent.
 Marginal; relating to the margin.
 Medullary Rays, 47.
 Sheath, 47.
 Membranous, or Membranaceous; the texture or thinness of membrane.
 Méricarp, p. 153.
 Merous, 157.
 Micropyle, 174, 179.
 Midrib, 72.
 Mitriform; mitre-shaped, p. 642.
 Monadélphous, 147.
 Monándrous, 146.
 Moniliform; necklace-like; cylindrical, contracted at regular intervals.
 Mono-, in composition; single.
 Monochlamýdeous; having but one floral envelope.
 Monocotylédonous, 219.
 Monœ'cious, 140.
 Monógynous, 151.
 Monopétalous, 134.
 Monophýllous, 134.
 Monosépalous, 134.
 Mùcronate, 68.
 Múltifid; cleft into many segments.
 Multiple fruits, 207.
 Mùricate; beset with hard projecting points.

 Mùticous; pointless.

 Naked, 133.
 Nápiform, 21.
 Natant; swimming.
 Natural arrangement, 240.
 orders, 241, 247.
 Navicular; shaped like a little boat.
 Nectaríferous; honey-bearing.
 Nectary; a name formerly applied to any honey-bearing part of the flower, or any petal of anomalous form.
 Nerved, Nerves, 71.
 Notted-veined, 71.
 Node, 13, 27.
 Nodose, Nódulose; knotty, as if jointed.
 Nomenclature, 237.
 Normal; the ordinary, or pattern structure.
 Nucleus, 174, 213.
 Nucules; nutlets, or the stones of a small drupe.
 Nut, 205.
 Nutant; nodding.

 Ob-; a prefix signifying inversion.
 Obcompressed; flattened before and behind, instead of laterally.
 Obcórdate, inversely heart-shaped, 67.
 Oblique; unequal-sided.
 Oblong, 66.
 Obòvate, 66.
 Obtuse, 68.
 Obverse; same as ob.
 O'chrea, 96.
 Octándrous, 146.
 Offset, 36.
 Oophorídium, pp. 639, 640.
 Opaque; the reverse of shining.
 Operculum; a lid, p. 642.
 Opposite; placed directly before, or on the opposite side of, 85.
 Orbicular, 66.
 Order, 239.
 Ordinal character, 247.
 Organic Elements, 10.
 Organs of Reproduction, 11, 97.
 Vegetation, 11.
 Orthótropous, 175, 212.
 Oval, 66.
 Ovary, 149.
 Ovate, 66.
 Ovoid; a solid oval.
 Ovule, 149, 173.
 Ovulíferous, 150.

 Paleæ; chaff or scales; the inner bracts of Grasses, p. 567.

- Paleaceous ; chaffy.
 Palmate, 22.
 Palmately lobed, &c., 73, 74.
 Palmately veined, 72.
 Panduriform ; fiddle-shaped.
 Panicle, 118.
 Paniculate ; paniced.
 Papilionaceous, 138, and p. 90.
 Papillöse ; covered with papillæ, or small soft excrescences or pimples.
 Pappus, 202.
 Parallel-veined, p. 71.
 Paraphyses, p. 642.
 Parasitic, 25.
 Parenchyma, 55.
 Parietal, 171.
 Parted, 65, 134.
 Partitions, 167.
 Pectinate ; pinnatifid, with slender close segments, like the teeth of a comb.
 Pedate ; palmately divided, with the lateral lobes themselves cleft ; like a bird's foot.
 Pedicel, 106.
 Pedicelled ; on a pedicel.
 Peduncle, 100.
 Peduncled, 101.
 Peltate ; shield-like, 69.
 Pentamerous, 157.
 Pentandrous, 146.
 Pepo, 197.
 Perennial, 22.
 Perfect flower, 140.
 Perfoliate, 59.
 Périanth, 132.
 Péricarp, 181.
 Perichæth, Perichæthial, p. 642.
 Perigynium, p. 536.
 Perigynous, 154.
 Périsperm, 213.
 Péristome ; p. 642.
 Persistent ; remaining adherent, 91.
 Personate, 139.
 Pétaloid ; petal-like.
 Pétals, 130.
 Pétiole, 60.
 Pétioled, or Petiolate ; on a petiole.
 Pétiolule, 77.
 Petiolulate, 77.
 Phanérogamous ; same as Phænógamous, 2.
 Phyllodium ; a leaf formed of a dilated petiole.
 Phyllous ; relating to leaves.
 Piliiferous ; hair-tipped.
 Pilose ; clothed with soft hairs.
 Pinnæ, 76.
 Pinnate, 74, 75.
 Pinnately lobed, &c., 73, 74.
 Pinnately veined, 72.
 Pinnatifid, 73.
 Pinnules, 76.
 Pistil, 148.
 Pistillate, 140.
 Pistillidia, 229.
 Pith, 47.
 Pitted ; with small shallow depressions.
 Placenta, 166.
 Plane ; flat.
 Plicate ; plaited, 93.
 Plumose ; feather-like ; plume-bearing.
 Plumule, 220.
 Pod, 182-188.
 Pointed, 68.
 Pollen, 142.
 Pollen-tube, 179.
 Polliniferous ; bearing pollen.
 Poly-, in composition ; many.
 Polyadelphous, 147.
 Polyandrous, 146.
 Polycéphalous ; many-headed.
 Polycotylédonous, 219.
 Polygynous, 151.
 Polypétalous, or sepalous, 135.
 Pome ; the apple-fruit, 192.
 Posterior, 159.
 Præfloration, 136.
 Præfoliation, 93.
 Præmorse ; as if bitten off.
 Prickles ; elevations or sharp processes of the surface stouter than bristles.
 Prickly ; furnished with prickles ; like a Rose-stem.
 Primine, 174.
 Primordial, 84.
 Prismatic ; prism-shaped.
 Process ; any extension or projection of the surface.
 Procumbent ; lying along the ground, 30.
 Prostrate, lying flat on the ground, 30.
 Pruinose ; a surface covered with mealy grains.
 Pubescence ; hairiness in general.
 Pubescent ; hairy with soft hairs.
 Pulvérulent ; powdery.
 Punctate ; dotted.
 Pungent ; with a sharp and rigid point.
 Putamen, 201.
 Pyramidal ; pyramid-shaped.
 Pyrena ; the stone of a drupaceous fruit, which may be 1-pyrenous, 2-pyrenous, &c.
 Pyriform ; pear-shaped ; a solid enlarging from the base to the apex.

Pyxis, Pyxidium, 196.

Quaternate ; growing in fours.

Quinate ; in fives, 79.

Quincuncial, 87, 136.

Quintuple-ribbed, 72.

Raceme, 105.

Racemose ; in a raceme, or like it.

Races, 234.

Rachis, 74, 106.

Radiate ; diverging from a common centre ; or forming apparent rays at a circumference.

Radiated-veined, 72.

Radical, 84.

Radicant ; rooting.

Radicle, 15, 179, 218.

Rameal, belonging to a branch.

Ramose ; branching.

Ramulose ; twiggy.

Raphe, 177, 212.

Raphides ; minute crystals in plants.

Ray, Ray-flower, p. 194.

Receptacle (of flower), 127, 162.

(of inflorescence), 114.

Reclined ; falling gradually downward or to one side.

Recurved ; curved backwards.

Reflexed ; bent strongly backwards.

Refracted ; bent very suddenly and strongly backwards.

Regular, 138.

Reniform ; kidney-shaped.

Repand, 64.

Repent ; creeping.

Replum, 194.

Resupinate ; appearing as if inverted.

Reticulated, 71.

Retroflexed ; same as reflexed.

Retorse ; backwards.

Retuse ; with a round notch at a blunt end.

Revolute, rolled backwards, 93.

Rhizoma, 40.

Rhomboid ; oval, a little angular in the middle ; approaching to

Rhombic ; lozenge-shaped.

Ribs and Ribbed, 71.

Rimose ; marked by chinks or cracks.

Ringent, 139.

Root, 15, 18.

Root-leaves, 84.

Rootlets, 18.

Rootstock, 40.

Rosaceous ; with 5 regular spreading petals, like those of the rose.

Rostellate, tipped with a small beak.

Rostrate ; beaked.

Rosulate or Rosular ; in a rosette.

Rotate ; wheel-shaped, 139.

Round, Rotund, 66.

Rugose ; wrinkled.

Ruminated, 215.

Runcinate ; lyrate, with sharp lobes projecting backwards.

Runner, 35.

Running, 30.

Sagittate, 67.

Silver-shaped, 139.

Samara, 206.

Sapwood, 50.

Sarcocarp, 201.

Sarmentaceous ; bearing runners.

Scabrous ; rough to the touch.

Scales, p. 184.

Scandent ; climbing.

Scape, 126.

Scarious ; thin, membranous, dry, and colorless.

Scobiform ; like fine saw-dust.

Scorpioid ; an inflorescence rolled up (circinate) from the apex, unrolling as the flowers expand.

Scrobiculate ; marked by little depressions.

Scutelliform ; shield-like, but small and oval.

Secund ; all turned to one side.

Secundine ; 174.

Seed, 209.

Seed-leaves, 84.

Segments, 65.

Semi-, in composition, half ; as, for example,

Semilunar ; half-moon-shaped.

Seminal ; belonging to the seed.

Sempervirent ; evergreen.

Sepals, 129.

Separated flower ; one with stamens or pistils only.

Septicidal, 190.

Septifragal, 193.

Septum ; a partition.

Sericeous ; silky.

Serotinous ; late in the season.

Serrate, 63.

Serrulate, 63.

Sessile, 59, 100, 142.

Seta ; a bristle or bristle-like body.

Setaceous ; bristle-form.

Setose ; beset with bristles.

Sheath, 59.

Sheathing, 59.

Shield-shaped, 69.

Shrubs and Shrubby, 28.

Silicle, 194.

Siliqua, 194.

- Silky ; clothed with soft and shining appressed hairs.
 Silver-grain, 47.
 Simple, 61.
 Sinuate, 64.
 Sinus, 73.
 Smooth, 58.
 Solitary, 101.
 Sorus ; a fruit-dot of Ferns.
 Spadix, 112.
 Span (measure) ; 9 inches.
 Spathaceous ; spathe-like.
 Spathe, 112.
 Spatulate ; oblong, tapering downward, the summit rounded and dilated, like a spatula.
 Species, 232.
 Specific character, &c., 237.
 Spicate ; spiked.
 Spike, 104.
 Spindle-shaped, 21.
 Spine, 37.
 Spinescent ; spine-like.
 Spinose ; bearing spines, spinulose ; ciliate with minute spines.
 Spongelets, 18.
 Sporangium ; a spore-case, p. 620.
 Spores, Sporules, 227.
 Spur ; a hollow extension of some part of the flower.
 Squamate ; furnished with scales.
 Squamellate ; bearing small narrow scales.
 Squamulæ ; minute scales, or those of the second rank.
 Squarrose ; covered with leaves, &c., which spread at right angles or more with the stem.
 Stamens, 140.
 Staminate, 140.
 Staminidia, 229.
 Standard, 159.
 Stellate ; star-shaped ; said of narrow divisions spreading from a common centre.
 Stem, 13, 26.
 Stem-leaves, 84.
 Stemless, 26.
 Sterile, 140.
 Stigma, 149.
 Stigmatic, or Stigmatose ; relating to the stigma.
 Stipe, or Stipes ; a stalk of a Fern, of a pod, &c.
 Stipellate, 95.
 Stipitate ; raised on a stipe or stalk.
 Stipulate, 95.
 Stipule, 94.
 Stolon, 33.
 Stoloniferous, 33.
 Stómata, 57.
 Stone-fruit, 182, 201.
 Striate ; streaked with longitudinal lines.
 Strict ; very straight or upright.
 Strigose ; covered with close-pressed rigid hairs or bristles.
 Strobilaceous ; like a
 Strobile, 208.
 Stróphiolate ; bearing a
 Stróphiolle ; a tubercle at the hilum of some seeds.
 Struma ; a cushion-like swelling ; a protuberance at the base of the pod of some Mosses.
 Style, 140.
 Stylopodium ; the thickened base of some styles.
 Sub-, a qualifying prefix, signifying somewhat ; as *subrotund*, somewhat round ; *subcordate*, slightly heart-shaped, &c.
 Subgenera, 235.
 Submersed ; buried under water.
 Suborder, 248.
 Subtribes, 249.
 Subulate ; awl-shaped, i. e. linear, very narrow, and taper-pointed from a broadish base.
 Sucker, 34.
 Suffrutescent ; slightly shrubby.
 Sulcate ; grooved.
 Superior, 159.
 Supra-axillary ; appearing above an axil.
 Sutural ; belonging to a
 Suture, 164.
 Symmetrical, 156.
 Syncarpous ; the pistils combined into a compound ovary.
 Syngenesious, 147.
 Synonymes ; names of the same meaning.
 Tail-pointed, bearing a very slender prolongation at the apex.
 Tap-root, 21.
 Tendril, 38.
 Terete ; cylindrical or tapering, but round.
 Terminal ; proceeding from the apex.
 Ternate, 79.
 Testa, 210.
 Tetrádynamic ; having 6 stamens, of which 2 are shorter, p. 30.
 Tetrámerous, 157.
 Tetrándrous, 146.
 Thálamus ; a name for the receptacle of the flower.
 Thállophytes, 230.

- Thallus, 230.
 Theca ; a spore-case.
 Three-ranked, 87.
 Thorn, 37.
 Throat ; the orifice of a monopetalous corolla, &c.
 Thyrsiform, or Thyrsoid, like a Thyrsus, 118.
 Toméntose ; woolly with short downy hairs.
 Toothed, 63, 134.
 Top-shaped ; inversely conical.
 Torus, 127.
 Trapeziform ; having 4 sides, the opposite ones not parallel.
 Tree, 28.
 Triadélphous, 147.
 Triándrous, 146.
 Tribes, 249.
 Trichótomous ; triple-forked.
 Tricóccous, 190.
 Tridéntate ; 3-toothed.
 Trifid ; 3-cleft.
 Trifóliate ; 3 leaves together.
 Trifóliolate ; 3 leaflets together.
 Trigónous ; 3-angled and 3-sided.
 Trigynous, 151.
 Trimerous, 157.
 Triple-ribbed, 72.
 Triquétrous ; sharply 3-angled, the sides concave.
 Trístichous, 87.
 Tritérnate, 79.
 Tróphosperm ; a synonyme for the placenta.
 Trumpet-shaped ; tubular, dilated at the apex.
 Truncate ; as if cut off transversely.
 Tube ; the united part of a calyx or corolla.
 Tuber, 41.
 Tuberos, 22.
 Tubular, 139.
 Twining, 32.
 Twisted, 136.
 Two-ranked, 87.

 Umbel, 109.
 Umbellet, 117.
 Umbilicate ; depressed in the centre.
 Umbilicus ; the hilum of a seed.
 Umbonate ; bossed.
 Unarmed ; destitute of spines, prickles, &c.

 Uncinate ; hooked.
 Undershrubs, 28.
 Undulate ; wavy.
 Unguiculate, 137.
 Unilateral ; one-sided.
 Unjugate ; 1-paired.
 Unsymmetrical, 150.
 Urcéolate ; urn-shaped.
 Utricle, 204.

 Vagina ; a sheath.
 Vaginate ; sheathed.
 Vaginula, p. 642.
 Valvate, or Valvular, 136.
 Valves, 188.
 Variety, 234.
 Vascular tissue, 7, 9.
 Veinlets, 71.
 Veins and Veiny, 71.
 Velútinous ; velvety ; clothed with a pile of short soft hairs.
 Venation, 70.
 Venose ; veiny.
 Ventral suture, 164.
 Véntricose ; swelling out on one side.
 Vernation, 93.
 Verrucose ; warty.
 Versatile, 144.
 Verticil ; a whorl.
 Verticillate, 85.
 Verticilláster, 125.]
 Vessels, 9.
 Véxillum ; the standard of a papilionaceous corolla.
 Villous, or Villose ; clothed with long and soft shaggy hairs.
 Viviparous, 221.
 Virgate ; wand-shaped.
 Vittæ, p. 153.
 Voluble, 32.

 Wedge-shaped, 66.
 Wheel-shaped, 139.
 Whorled, 85.
 Winged ; furnished as if with wings.
 Wings, 159.
 Wood, 47, 149.
 Woody tissue or fibre, 7, 8.
 Woolly ; clothed with long matted hairs.

* * Two adjective terms combined by a hyphen denote a form or quality intermediate between the two : as, *ovate-lanceolate*, between *ovate*

and lanceolate : *linear-lanceolate*, between linear and lanceolate : *cylindrical-oblong*, intermediate between these two forms : greenish-white, &c.

A dash (-) between two words or figures, as "Stigmas 1-3," denotes that the stigmas are from one to three in number; "Cells 8-20-seeded," that the seeds vary from 8 to 20 in each cell.

SYNOPTICAL VIEW OF THE LINNEAN ARTIFICIAL CLASSES.

- 1. MONANDRIA.
- 2. DIANDRIA.
- 3. TRIANDRIA.
- 4. TETRANDRIA.
- 5. PENTANDRIA.
- 6. HEXANDRIA.
- 7. HEPTANDRIA.
- 8. OCTANDRIA.
- 9. ENNEANDRIA.
- 10. DECANDRIA.
- 11. DODECANDRIA.
- 12. ICOSANDRIA.
- 13. POLYANDRIA.
- 14. DIDYNAMIA.
- 15. TETRADYNAMIA.
- 16. MONADELPHIA.
- 17. DIADELPHIA.
- 18. POLYADELPHIA.
- 19. SYNGENESIA.
- 20. GYNANDRIA.
- 21. MONGECIA.
- 22. DICECIA.
- 23. POLYGAMIA.
- 24. CRYPTOGAMIA.

Stamens 1

" 2

" 3

" 4

" 5

" 6

" 7

" 8

" 9

" 10

" 11-19

" 20 or more, adherent to the calyx

" 20 or more, not adherent to the calyx

two long and two short stamens

four long and two short stamens

by their filaments in a single set

by their filaments in two sets

by their filaments in more than two sets

by their anthers

in the same individuals

in different individuals

some of the flowers perfect, others separated,

in the same, or two or three different individuals

of equal length:

unconnected with each other, and

of unequal length:

the stamens separate from the pistils,

both found in the same flower,

stamens and pistils manifest,

PLANTS having

the stamens adherent to the pistil

in separate flowers,

the stamens and pistils concealed, or none

III. A REDUCTION OF THE PLANTS DESCRIBED
IN THIS WORK TO THE CLASSES AND
ORDERS OF THE LINNÆAN ARTIFICIAL
SYSTEM.*

CLASS I. MONANDRIA.

ORDER **Monogynia**. Style or stigma 1.

* Flowers not glumaceous.

HIPPURIS. Perianth adherent to the ovary, the border entire. Page
140

SALICORNIA. Perianth bladderly, free from the ovary. 337

** Flowers glumaceous (Sedges).

HEMICARPHA, and species of CYPERUS, ERIOPHORUM, FIMBRISTYLIS (Cyperaceæ). 515

ORDER **Digynia**. Styles or sessile stigmas 2.

* Flowers glumaceous (Grasses).

CINNA. Spikelets 1-flowered, herbaceous. 579

UNIOLA. Spikelets several-flowered, coriaceous. 601

ANDROPOGON. Spikelets 1½-flowered. Panicles silky. 617

** Flowers not glumaceous.

CALLITRICHE. Fruit 4-lobed, 4-celled, naked. 402

BLITUM. Fruit 1-celled (achenium) in a berry-like calyx. 379

CLASS II. DIANDRIA.

ORDER **Monogynia**. Style or stigma 1.

* Flowers not glumaceous: corolla none.

FRAXINUS. Fruit a samara or key. Leaves pinnate. 373

** Flowers with a calyx and corolla.

+Of separate petals.

CHIONANTHUS. Petals 4, long and linear. Stamens very short. 372

CIRCÆA. Petals 2, inversely heart-shaped. Stamens slender. 139

++Corolla monopetalous, regular.

LIGUSTRUM. Corolla 4-lobed. Fruit a berry. 372

+++Corolla monopetalous, 2-lipped or irregular.

LABIATÆ. Fruit 4 achenia in the base of the calyx. 313

* This Synopsis is designed, not only to exhibit the Linnæan arrangement, but also to serve as an artificial key to the genera, which, at the outset, the student will occasionally need. To render it sufficient for this purpose, the genera are repeated under different classes and orders, when the species vary in respect to these technical characters, or might be referred with about equal correctness to either of two or three classes, as *Asclepias*, *Lobelia*, &c. A Conspectus of the Classes, with their characters, is given on the opposite page. The numbers at the end of the lines refer to the page where the genera stands in the body of the work.

SCROPHULARIACEÆ. Nos. 10-15. Fruit a 2-celled membranous short pod.	295
DIANTHERA. Fruit a short woody pod: seeds wingless.	293
CATALPA. Fruit a very long pod: seeds many, winged.	291
LENTIBULACEÆ. Pod 1-celled: placenta central. Anthers 1-celled.	285
* * * Flowers glumaceous.	
CYPERACEÆ. Nos. 1, 2, 9, 10, 13, 14.	515
ORDER Digynia . Styles or sessile stigmas 2.	
* Flowers glumaceous.	
GRAMINEÆ. Nos. 1, 10, 22, 28, 48, 57.	567
* * Flowers not glumaceous.	
BLITUM. Petals none. Calyx berry-like or fleshy.	379
ANYCHIA. Petals none. Calyx of 5 sepals. Seed 1.	65
ELATINE. Petals and sepals 2 or 3. Seeds several.	55
ORDER Tetragynia . Styles or sessile stigmas 4.	
RUPPIA. Calyx and corolla none. Ovaries 4.	454
CLASS III. TRIANDRIA.	
ORDER Monogynia . Style or sessile stigma 1.	
* Perianth adherent to the ovary (ovary inferior).	
+ Corolla 5-lobed. Leaves veiny.	
FEDIA. Border of the calyx tooth-like and naked, or obsolete.	182
VALERIANA. Border of the calyx unrolling and plumose in fruit.	182
++ Perianth 6-parted. Leaves equitant, nerved.	
LACHNANTHES. Stamens exerted. Perianth regular. Stigma 1.	481
IRIS. Stamens under the 3 petal-like stigmas.	482
* * Perianth free from the (superior) several-seeded pod.	
+ Perianth tubular, petaloid.	
HETERANTHERA. Stamens dissimilar. Leaves kidney-shaped.	510
SCHOLLERA. Stamens similar. Leaves linear.	510
++ Perianth of more or less separate parts.	
COMMELYNA. Calyx and corolla separate, irregular. Stigmas single.	511
XYRIS. Calyx and corolla separate, irregular. Stigmas 3.	513
JUNCUS. Perianth 6-parted, entirely glumaceous, regular.	505
* * * Proper perianth none, or bristle-like. Fruit 1-seeded, seed-like.	
Bracts glumaceous.	
CYPERACEÆ generally (and one or two Grasses).	515
ORDER Digynia . Styles or sessile stigmas 2.	
* Flowers inwrapped in glumaceous bracts.	
GRAMINEÆ generally.	567
* * Flowers not glumaceous.	
ANYCHIA. Calyx 5-parted. Utricle 1-seeded.	65
ORDER Tri-Tetragynia . Styles or sessile stigmas 3-4.	
STELLARIA. Pod 1-celled, several-seeded at the base.	61
MOLLUGO. Pod 3-celled, 3-valved, many-seeded, free.	66
LECHEA. Pod partly 3-celled, 6-seeded, free from the calyx.	48
PROSERPINACA. Nut 3-celled, 3-seeded, adherent to the calyx.	139

CLASS IV. TETRANDRIA.

ORDER **Monogynia**. Style or sessile stigma 1.

* Calyx free from the ovary : petals separate or none.

SMILACINA § MAIANTHEMUM. Perianth 4-parted, spreading. Flowers racemed.	491
ORONTIUM. Sepals distinct. Flowers spiked on a scape.	448
AMMANNIA. Calyx bell-shaped, 4-toothed. Flowers axillary.	132
SANGUISORBA. Calyx constricted at the throat, 4-lobed. Flowers in close spikes.	118

* * Calyx free from the ovary. Corolla monopetalous.

FRASERA. Corolla deeply 4-parted, wheel-shaped, gland-bearing.	362
BARTONIA. Corolla deeply 4-cleft, not gland-bearing. Calyx 4-parted.	358
OBOLARIA. Corolla 4-cleft. Calyx of 2 leaf-like sepals.	363
ERYTHRÆA. Corolla tubular, salver-form. Leaves opposite.	357
PLANTAGO. Corolla salver-form or bell-shaped. Flowers spiked. Leaves radical.	278

* * * Calyx adherent to the ovary or its base.

+ Corolla 4-petalous, or none.

CORNUS. Calyx-limb minute, 4-toothed. Drupe 2-celled, 2-seeded.	167
LUDWIGIA. Calyx 4-lobed. Pod 4-celled, many-seeded.	137

++ Corolla monopetalous, 5-lobed.

LINNÆA. Calyx 5-cleft. Flowers in pairs. Stamens unequal.	170
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+++ Corolla monopetalous, 4-lobed.

DIODIA. Flowers axillary. Pod separating into 2 pieces, 2-seeded.	178
HEDYOLIS. Flowers single or clustered. Pod many-seeded (often partly free).	179
MITCHELLA. Flowers united in pairs. Berry double.	179
CEPHALANTHUS. Flowers in a naked head. Pod 2-4-seeded.	179
DIPSACUS. Flowers in an involucrate chaffy head. Fruit 1-seeded.	183

ORDER **Digynia**. Styles or sessile stigmas 2.

* Corolla polypetalous.

HAMAMELIS. Petals 4, strap-shaped. Pod 2-beaked, crustaceous.	152
---	-----

* * Corolla monopetalous.

GALIUM. Corolla 4-3-parted, wheel-shaped. Fruit 2-lobed, 2-seeded.	176
CUSCUTA. Corolla bell-shaped. Pod 2-celled, 2-4-seeded.	350
GENTIANA. Corolla funnel-form, spurless. Pod 1-celled, many-seeded.	358
HALENIA. Corolla 4-spurred below.	361

ORDER **Tri-Pentagynia**. Styles or sessile stigmas 3-5.

* Pistils separate, free from the calyx.

RUPPIA. Calyx and corolla none. (Stamens really but 2.)	454
POTAMOGETON. Calyx 4-sepalled. Petals none. Fruit 4 nutlets.	454
ALCHEMILLA. Calyx 4-cleft. Petals none. Styles lateral.	118
TILLÆA. Sepals, petals, and several-seeded pods 3-4.	146

* * Pistils combined into one, free from the calyx.

SAGINA. Pod 1-celled, several-seeded, 4-5-valved.	63
ILEX. Drupe berry-like, 4-celled, 4-seeded. Calyx minute.	275

CLASS V. PENTANDRIA.

ORDER **Monogynia**. Style or stigma 1.

* Petals separate or none.

+ Herbs : calyx free : petals none.

SUÆDA. Calyx succulent. Stigmas 2-5. Utricle 1-seeded.	377
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GLAUX. Calyx-lobes petal-like. Stigma 1. Pod few-seeded.	284
PARONYCHIA. Sepals dry or scarious, awn-pointed. Style 2-cleft. Utricle 1-seeded.	65
++ Herbs : calyx adherent : petals none.	
COMANDRA. Calyx-lobes petal-like. Fruit 1-celled, 1-seeded.	397
+++ Herbs : calyx free : petals conspicuous.	
LYTHRUM. Petals on the cylindrical calyx, regular.	132
IMPATIENS. Sepals and petals colored alike, irregular. Stigma sessile.	76
VIOLACEÆ. Sepals green : petals rather irregular. Style club shaped.	43
CLAYTONIA. Petals regular, distinct from the 2 sepals. Stamens opposite them. Style 3-lobed.	67
++++ Shrubs : stamens opposite the petals, alternate with the calyx-lobes.	
RHAMNACEÆ. Calyx conspicuous. Upright shrubs : no tendrils.	84
VITACEÆ. Calyx minute and truncate, climbing by tendrils.	85
+++++ Shrubs : stamens alternate with the petals.	
++ Leaves 3-foliolate.	
PTELEA. Fruit 2-celled, 2-seeded, flat and winged (samara).	78
++ ++ Leaves simple and undivided : calyx free or nearly so.	
CELASTRACEÆ. Stamens on a disk. Seeds few, in pulpy arils.	83
ITEA. Stamens on the base of the calyx. Pod 2-celled, many-seeded.	151
AQUIFOLIACEÆ. Stamens on the base of the petals. Drupe 4-6-seeded.	275
LEDUM. Stamens hypogynous. Pod 5-celled, many-seeded.	271
++ ++ ++ Leaves simple, palmately lobed ; calyx adherent.	
RIBES. Stamens on the calyx. Fruit a many-seeded berry.	142
* * Corolla monopetalous, superior (calyx adherent).	
+ Stamens free from the corolla : leaves alternate.	
CAMPANULACEÆ. Corolla 5-lobed, regular. Pod 3-celled, many-seeded.	255
++ Stamens on the corolla : leaves opposite.	
CAPRIFOLIACEÆ. Stipules none. Fruit a berry or pod.	169
* * * Corolla monopetalous, inferior (free from the ovary).	
+ Stamens on the corolla opposite its lobes.	
PRIMULACEÆ. Pod 1-celled, several-seeded in the centre.	280
++ Stamens hypogynous, alternate with the lobes of the corolla.	
ERICINEÆ. Pod several-celled, many-seeded.	257
++++ Stamens on the corolla alternate with the lobes.	
++ Pod or berry 2-3 celled ; the cells several-seeded.	
SPIGELIA. Corolla valvate in the bud. Leaves opposite, entire.	181
VERBASCUM. Corolla imbricated. Leaves alternate.	296
POLEMONIUM. Corolla convolute in the bud. Leaves alternate, pinnate.	343
DIAPENSIACEÆ. Corolla convolute. Leaves entire, small. Anthers opening across.	346
SOLANACEÆ. Corolla plaited or infolded-valvate in the bud.	352
+++ Pod 2-3-celled, 2 large seeds in each cell.	
CONVOLVULACEÆ. Corolla bell shaped or funnel-shaped, plaited or convolute.	347
++ ++ ++ Pod 3-celled, one seed in each cell.	
PHLOX. Corolla salver-shaped ; the lobes convolute in the bud.	344
++ ++ ++ ++ Fruit 4 seed-like nutlets around the style.	
BORAGINACEÆ. Corolla 5-lobed, regular.	334

++ ++ ++ ++ ++ Pod 1-celled with 2 parietal placentæ.

HYDROPHYLLACEÆ. Leaves alternate, lobed or compound. Corolla convolute or imbricated. 340

MENYANTHIDEÆ. Leaves alternate. Corolla valvate-induplicate in the bud. 362

GENTIANEÆ. Leaves opposite, simple, entire. Corolla convolute. 356

ORDER **Digynia**. Styles or sessile stigmas 2 (only).

* Corolla monopetalous, free (inferior).

+ Stigmas separate : style short or none : seeds naked.

GENTIANEÆ. Pod 1-celled, with 2 parietal placentæ. 356

++ Stigma forming one mass : but the styles and pods (follicles) separate : seeds with a silky tuft at the end.

APOCYNUM. Pollen powdery : anthers merely converging. 364

ASCLEPIADACEÆ. Pollen in (waxy) masses : anthers united with the stigma. 365

* * Corolla polypetalous.

+ Calyx-tube partly adherent to the many-seeded 2-horned pod, bearing the petals.

HEUCHERA. Pod 1-celled. Seeds marginless. 149

SULLIVANTIA. Pod 2-celled. Seeds wing-margined. 149

++ Calyx-tube wholly adherent to the 2-seeded fruit, its minute limb and the stamens epigynous. (Flowers in umbels.)

UMBELLIFERÆ. Fruit dry, splitting into seed-like carpels. 153

PANAX. Fruit a berry like drupe. (Styles often 3.) 166

* * * Corolla none. (Calyx free. Fruit 1-seeded.)

+ Ovary 1-celled, 1-ovuled.

CHENOPODIACEÆ. Utricle inclosed in the calyx : stam. at the base. 375

SCLERANTHUS. Utricle in the calyx-tube : stamens on its throat. 65

POLYGONUM. Achenium lenticular. Stipules a tubular sheath. 386

CELTIS. Drupe globular. Leaves rough. 400

++ Ovary 2-celled, an ovule in each cell.

ULMUS. Fruit flat, winged (a samara), 1-seeded. Leaves rough. 399

ORDER **Trigynia**. Styles or sessile stigmas 3.

* Corolla none.

AMBRINA. Utricle partly inclosed in the green calyx. 379

POLYGONUM. Achenium triangular. Calyx petal-like. 386

* * Corolla monopetalous. (Fruit a drupe or berry.)

VIBURNUM. Leaves simple. Drupe flattish, 1-celled, 1-seeded. 174

SAMBUCUS. Leaves pinnate. Fruit berry-like, 3-seeded. 173

* * * Corolla polypetalous.

RHUS. Drupe dry, hairy, 1 celled, 1-seeded. 78

STAPHYLEA. Pod 3 celled, inflated, few-seeded. 83

HYPERICUM. Pod 1-celled, with 3 parietal many-seeded placentæ. 52

SPERGULARIA. Pod 1-celled, many-seeded on a central placenta at the base. 64

ORDER **Tetra-Decagynia**. Styles or sessile stigmas 4-10.

* Styles or sessile stigmas 4-10, on one compound ovary.

+ Pod 1-celled, many-seeded : placentæ parietal.

PARNASSIA. Stigmas 4, sessile. Sterile stam. clustered at the base of the fertile. 50

DROSERA. Styles 3 or 5, 2-parted and so apparently 6 or 10.	49
++ Pod 1-celled, several-seeded : placentæ central at the base.	
ALSINEÆ. Leaves opposite, entire. Styles 3-5.	60
+++ Pod 1 celled, 1-seeded, indehiscent.	
STATICE. Calyx funnel-form, scarious. Petals long-clawed.	279
++++ Pod more or less 10-celled, 10-seeded.	
LINUM. Sepals, petals, stamens, and styles 5.	72
* * Pistils 5 or more, entirely separate.	
ZANTHORHIZA. Sepals and petals hypogynous, distinct.	14
SIBBALDIA. Petals and stamens on the 5-10-cleft calyx.	119
CLASS VI. HEXANDRIA.	
ORDER Monogynia. Style or sessile stigma 1.	
* Calyx or perianth free from the ovary (inferior).	
+ Ovary 1-celled, 1-few-ovuled from the base.	
BERBERIDACEÆ. Anthers opening by uplifted valves.	20
NAUMBURGIA. Anthers opening lengthwise. Sepals and petals 6.	283
ORONTIUM. Anthers opening lengthwise. Sepals 6: petals none.	448
++ Ovary 4-6-celled, a 4-6-seeded drupe in fruit.	
PRINOS. Calyx (minute) and corolla each mostly 6-parted.	276
+++ Ovary 2-3-celled.	
++ Calyx and corolla different in color and texture.	
LYTHRUM. Petals and stamens on the throat of the cylindrical calyx.	132
FLÆRKEA. Petals and stamens nearly hypogynous. Fruit 3 achenia.	77
TRADESCANTIA. Petals and stamens regular, hypogynous. Pod 2-3-celled.	512
COMMELYNA. Petals and stamens irregular, hypogynous. Pod 2-3-celled.	511
++ Calyx and corolla forming a colored petal-like 6-merous perianth.	
= Perianth irregular, funnel-form.	
PONTEDERIA. Fleshy persistent base of the perianth inclosing the 1-seeded fruit.	509
== Perianth regular. Flowers on a lateral spadix.	
ACORUS. Sepals distinct, concave. Utricle 1-few-seeded.	448
=== Perianth regular. Flowers not on a spadix.	
LILIACEÆ. Anthers introrse. Style single, not splitting into 3.	489
HÆMODORACEÆ. Anthers introrse. Style splitting into 3 on the pod.	480
UVULARIÆ. Anthers extrorse.	496
++ ++ Calyx and corolla forming a glumaceous 6-merous perianth.	
JUNCACEÆ. Anthers introrse. Pod 3-valved, 3-many-seeded.	503
* * Perianth adherent to the ovary (superior).	
AMARYLLIDACEÆ. Perianth 6-parted, petal-like. Pod 3-celled.	479
ORDER Digynia. Styles or sessile stigmas 2.	
OXYRIA. Sepals 4. Fruit flat, 2-winged.	391
POLYGONUM. Sepals 5. Fruit lenticular.	386
ORDER Trigynia. Styles or sessile stigmas 3.	
* Calyx 5-parted, petal-like.	
POLYGONUM. Achenium triangular: sepals all alike.	386

* * Calyx or perianth 6-parted, all colored alike or nearly so.	
+ Achenium inclosed by the 3 inner converging veiny sepals.	
RUMEX. Achenium triangular. Outer sepals smaller, spreading.	391
+ + Berry naked, 1 - 3-celled, 1 - few-seeded.	
SMILAX. Perianth deciduous. Leaves alternate, veiny.	485
MEDEOLA. Perianth very deciduous. Leaves in 2 whorls.	488
+ + + Pod naked, 3 - 6-celled, splitting into as many 1-seeded carpels.	
TRIGLOCHIN. Perianth deciduous, in 2 rows. Stigmas sessile.	458
+ + + + Pod naked, 3-celled, often 3-horned, or 3 separate carpels.	
SCHEUCHZERIA. Perianth persistent. Pods separate, 1 - 2-seeded.	459
MELANTHACEÆ. Pods united more or less completely into one, several-seeded.	495
* * * Sepals 3, green, and very different from the 3 petals.	
TRILLIUM. Berry ovate, 3-angular, 3-celled, many-seeded.	487
ORDER Polygynia . Styles or sessile stigmas numerous.	
ALISMA. Sepals 3, green : petals 3. Ovaries many, 1-seeded.	459

CLASS VII. HEPTANDRIA.

ORDER **Monogynia**. Style or sessile stigma 1.

ÆSCULUS. Petals free from the 5-lobed calyx. Leaves compound.	81
LYTHRUM. Petals on the cylindrical 7-toothed calyx. Leaves simple.	132
TRIENTALIS. Corolla and calyx deeply 7-parted, spreading.	282

ORDER **Di-Tetragynia**. Styles or sessile stigmas 2 - 4.

POLYGONUM. Ovary 1-celled, forming an achenium in fruit.	386
ULMUS. Ovary 2-celled, forming a flat samara in fruit.	399
SAURURUS. Ovaries 3 - 4, separate. Calyx and corolla none.	401

ORDER **Polygynia**. Styles or sessile stigmas many.

ECHINODORUS. Sepals 3 : petals 3. Ovaries crowded in a head.	460
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CLASS VIII. OCTANDRIA.

ORDER **Monogynia**. Style or sessile stigma 1.

* Corolla polypetalous, free.

JEFFERSONIA. Sepals 4 : petals 8. Pod 1-celled, opening across.	21
HYPOPITYS. Sepals and petals each 4 - 5, fleshy. Pod 4 - 5-celled.	274

* * Corolla of 4 petals on the summit of the adherent calyx-tube.

RHEXIA. Anthers opening by terminal pores. Pod 4-celled.	131
ONAGRACEÆ. Anthers opening lengthwise. Pod 4-celled.	134

* * * Corolla monopetalous, on the adherent calyx.

VACCINIEÆ. Anthers opening by terminal chinks. Berry 4 - 5-celled.	356
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* * * * Corolla none : calyx petal-like.

DIRCA. Calyx obscurely toothed, bearing the long stamens.	395
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ORDER **Di-Trigynia**. Styles or sessile stigmas 2 - 3.

ACER. Pod a double samara. Leaves opposite.	80
ULMUS. Pod a single 1-celled samara. Leaves alternate.	399
CHRYSOSPLENIUM. Pod inversely heart-shaped, many-seeded.	151
POLYGONACEÆ. Pod a 1-seeded achenium. Leaves alternate.	385

ORDER **Tetra-Pentagynia**. Styles or sessile stigmas 4 - 5.

SEDUM. Pods separate, as many as the petals.	146
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CLASS IX. ENNEANDRIA.

- LAURACEÆ. Anthers opening by valves. Style 1. 393
 ECHINODORUS. Anthers opening lengthwise. Styles and ovaries many. 460

CLASS X. DECANDRIA.

ORDER **Monogynia**. Style or sessile stigma 1.

* Corolla polypetalous, papilionaceous or irregular.

- LEGUMINOSÆ. Tribes 5 and 6. Pod 1-celled, a legume. 93

* * Corolla polypetalous or nearly so, regular.

- DECODON. Petals and stamens on the tube of the calyx. Pod 3-celled. 133

- ERICACEÆ. Nos. 8, 14-19, 21, 22. Stamens hypogynous. Pod 2-5-celled. 257

* * * Corolla monopetalous.

- ERICACEÆ. Pod, or rarely berry, 3-10-celled. 257

ORDER **Digynia**. Styles or sessile stigmas 2.

- SILENEÆ. Petals distinct from the tubular calyx, on long claws. 56

- SAXIFRAGACEÆ. Petals on the short calyx-tube. Pod 2-horned. 147

- CHRYSOSPLENIUM. Petals none. Calyx-tube adherent to the pod. 151

- SCLERANTHUS. Petals none. Calyx-tube constricted, inclosing the free utricle. 65

ORDER **Tri-Decagynia**. Styles or sessile stigmas 3-10.

* Ovaries united into one, but the styles separate.

+ Pod or berry 5-10-celled.

- PHYTOLACCA. Berry depressed, 10-celled, 10-seeded. Petals none. 385

- PENTHORUM. Pod 5-celled, 5-horned, many-seeded. Petals none. 147

- OXALIS. Pod 5-celled, the cells few-seeded. Petals conspicuous. 75

++ Pod 1-celled, several-many-seeded from the base or axis.

- CARYOPHYLLACEÆ. Sepals 4-5, free from the valved pod. 55

- PORTULACA. Sepals 2, adherent to the base of the pod, which opens by a lid. 66

* * Ovaries (carpels) separate and distinct.

- SEDUM. Pods, petals, and sepals equal in number, free and distinct. 146

- SPIREÆ. Calyx 5-cleft or 5-toothed, bearing the petals and stamens. 116

- ZANTHORHIZA. Sepals and petals free and distinct: pods several. 14

- ISOPYRUM. Petals none. Sepals 5, petal-like, free and distinct. 11

CLASS 11. DODECANDRIA.

ORDER **Monogynia**. Style or sessile stigma 1.

* Petals 4, irregular, on claws.

- POLANISIA. Sepals 4. Pod veiny, 1-celled, 2-valved, many-seeded. 42

* * Petals 5-9.

- PODOPHYLLUM. Sepals 6-9; the petals as many, deciduous. Berry 1-celled. 21

- HUDSONIA. Calyx 5-cleft. Pod 1-celled, 3-valved, few-seeded. Petals fugacious. 48

- PORTULACA. Calyx 2-parted. Pod 1-celled, opening by a lid. Petals fugacious. 66

- LYTHRUM. Calyx 6-7-toothed. Petals nearly equal. Pod 2-celled, many-seeded. 132

- CUPHEA. Calyx tubular. Petals very unequal. Pod soon 1-celled, few-seeded. 133

* * * Corolla 7-12-parted, wheel-shaped.

SABBATIA. Calyx 7-11-parted. Style 2-parted. Pod 1-celled. 356

* * * * Corolla none.

ASARUM. Calyx 3-lobed, the tube coherent with the 6-celled ovary. 374

ORDER **Di-Hexagynia**. Styles or sessile stigmas 2-6.

* Ovaries wholly united into one pod.

HYPERICUM. Petals 5. Styles 3. Pod 1-celled, many-seeded. 54

LECHEA. Petals 3. Stigmas 3. Pod partly 3-celled, 6-seeded. 48

* * Ovaries partly united into a 3-6-horned pod.

RESEDA. Petals 4-7, unequal. Stamens turned to one side. 43

* * * Ovaries distinct, in the calyx.

AGRIMONIA. Pistils 2, forming achenia in fruit. Petals imbricated. 117

GILLENIA. Pistils 5, forming pods. Petals convolute in the bud. 117

CLASS XII. ICOSANDRIA.

ROSACEÆ. Calyx 4-5-cleft, or double. Petals 4-5. 112

CACTACEÆ. Sepals and petals imbricated in several rows. 141

CLASS XIII. POLYANDRIA.

ORDER **Monogynia**. Style or sessile stigma 1.

* Ovary 1-celled, with a single placenta.

PODOPHYLLUM. Berry large. Stigma compressed. Flower solitary. 21

ACTÆA. Berry many-seeded. Stigma depressed. Flowers racemed. 15

CIMICIFUGA ♂ MACROTYS. Pod dry, many-seeded. 16

* * Ovary 3-several-celled, or with 2-several parietal placenta.

NYMPHÆACEÆ. Petals in many rows. Berry many-celled. 23

SARRACENIA. Petals & sepals 5. Style umbrella-shaped. Pod 5-celled. 24

PAPAVERACEÆ. Petals 4, or 6-12. Sepals deciduous, numerous. Pod 1-celled. 25

CISTACEÆ. Petals 5, fugacious. Sepals persistent. Pod 1-celled. 47

HYPERICUM. Petals 5. Sepals persistent. Pod 3-5-celled. 52

ORDER **Di-Polygynia**. Styles or sessile stigmas 2-many.

* Ovaries and pods or achenia all separate and free.

BRASENIA. Petals and sepals (3-4) persistent. Pods indehiscent. 22

RANUNCULACEÆ. Petals deciduous, or often none, & calyx petal-like. 2

ASIMINA. Sepals 6, of 2 kinds, and the 3 sepals deciduous. Pods pulpy. 19

* * Ovaries imbricated and combined in a mass on a long axis.

MAGNOLIACEÆ. Sepals and petals in 3 or more rows of three. 17

* * * Ovaries several, separately immersed in a top-shaped receptacle.

NELUMBIUM. Sepals and petals many in several rows. 23

* * * * Ovaries few, combined below into a 1-celled pod.

RESEDA. Petals and stamens irregular, the latter on a 1-sided disk. 43

CLASS XIV. DIDYNAMIA.

ORDER **Gymnospermia**. Achenia (seeds, *L.*) 4, naked within the calyx.

LABIATÆ. Corolla irregular (2-lipped). Leaves opposite. 313

ORDER **Angiospermia**. Fruit a proper (1-4-celled) pod.

* Ovary 1-celled.

PHRYMA. Achenium single, 1-celled, 1-seeded. Leaves opposite. 312

- OROBANCHACEÆ.** Pod with 2-4 many-seeded parietal placentæ.
Leaves none, or scale-like. 288
- * * Ovary and pod 2-celled, or rarely more, several-seeded.
- BIGNONIACEÆ.** Seeds many, no albumen. Corolla imbricated in bud. 290
- ACANTHACEÆ.** Seeds few, no albumen. Corolla convolute in the bud. 292
- SCROPHULARIACEÆ.** Seeds with albumen. Corolla imbricated. 294
- * * * Ovary and fruit 2-4-celled, splitting into 2-4 one-seeded nutlets.
- VERBENACEÆ.** Corolla and calyx irregular or 2-lipped, free. 311
- * * * * Ovary 3-celled, two of the cells empty.
- LINNÆA.** Calyx adherent, crowning the dry 1-seeded fruit. 170
- CLASS XV. TETRADYNAMIA.** (Petals always 4.)
- ORDER Siliculosa.** Pod (silicle) scarcely longer than broad.
- CRUCIFERÆ.** Nos. 11-17. 31
- ORDER Siliquosa.** Pod (siliqua) much longer than broad.
- CRUCIFERÆ.** Nos. 1-10, 18. 30
- CLASS XVI. MONADELPHIA.**
- ORDER Di-Triandria.** Stamens 2-3.
- SISYRINCHIUM.** Perianth 6-parted, spreading, superior. 483
- PODOSTEMUM.** Perianth 2-3 little scales below. Stam. on one side. 403
- ORDER Pentandria.** Stamens 5.
- PASSIFLORA.** Sepals and petals 5. Styles 3 or 4. Berry 1-celled. 143
- LINUM.** Sepals, petals, and styles 5. Pod 5-10-celled. 72
- LOBELIA.** Corolla monopetalous, split on one side. Pod 2-celled. 253
- ORDER Decandria.** Stamens 10.
- * Flower regular, 5-petalous.
- GERANIACEÆ.** Fruit 5 one-seeded carpels united to a long beak. 73
- OXALIS.** Pod 5-celled, several-seeded. Styles 5, separate. 75
- * * Flower irregular, papilionaceous.
- LEGUMINOSÆ.** Tribes 3 and 4. Fruit a legume. 91
- ORDER Polyandria.** Stamens many.
- MALVACEÆ.** Corolla regular: petals convolute in the bud. 67
- CLASS XVII. DIADELPHIA.** (Flowers always irregular.)
- ORDER Hex-Octandria.** Stamens 6-8.
- FUMARIACEÆ.** Pod 1-celled, with 2 parietal placentæ, or 1-seeded. 27
- POLYGALA.** Pod 2-celled, 2-seeded. 87
- ORDER Decandria.** Stamens 10.
- LEGUMINOSÆ.** Pod a legume. Corolla papilionaceous. 90
- CLASS XVIII. POLYADELPHIA.**
- ORDER Enne-Dodecandria.** Stamens 9-12.
- ELODEA.** Styles 3, distinct. Stamens in 3 clusters. 54
- ORDER Polyandria.** Stamens numerous.
- TILIA.** Style 1. Stamens in 5 clusters. 71
- HYPERICACEÆ.** Styles 2-5 or 2-5-partible. Stamens in 3-5 clusters, or 3-5-adelphous. 51

CLASS XIX. SYNGENESIA.

ORDER **Polygamia Æqualis**. Flowers in a head (Flower compound, *L.*), all perfect.

COMPOSITÆ. Nos. 1, 3-8, 19, 37, 50, 51, 55-69. 184

ORDER **Polygamia Superflua**. Flowers in a head (compound), all fertile, the marginal pistillate only.

COMPOSITÆ. Nos. 9-11, 13-18, 20-24, 30, 31, 38, 39, 41-49, 51, 52. 184

ORDER **Polygamia Frustranea**. Flowers in a head (compound), the marginal neutral, the rest perfect.

COMPOSITÆ. Nos. 12, 32-37, 40, 53, 54. 184

ORDER **Polygamia Necessaria**. Flowers in a head (compound), the central staminate, the marginal pistillate and fertile (or mono diœcious).

COMPOSITÆ, Subtr. MELAMPODINÆ. Nos. 25-29. 218

ORDER **Polygamia Segregata**. "Flowers each with their own involucre," or, more properly, Heads 1-few-flowered, aggregated into a compound head.

COMPOSITÆ. No. 2. (ELEPHANTOPUS.) 190

ORDER **Monogamia**. Flowers separate (not compound).

VIOLACEÆ. Flowers polypetalous, irregular. Style club-shaped. 43

IMPATIENS. Flowers polypetalous, very irregular. Stigma sessile. 76

LOBELIA. Corolla monopetalous, irregular. Style 1. Pod 2-celled. 253

APOCYNUM. Corolla monopetalous, regular. Pods 2: stigma 1. 364

CLASS XX. GYNANDRIA.

ORDER **Diandria**. Stamens (apparently) 2, really but one of 2 anther-cells, except in Cypripedium.

ORCHIDACEÆ. Flower irregular, epigynous. 463

ORDER **Pentandria**. Stamens 5.

ASCLEPIADACEÆ. Calyx and corolla regular, hypogynous. Pods 2. 365

ORDER **Hex-Dodecandria**. Stamens 6-12.

ARISTOLOCHIACEÆ. Calyx epigynous: corolla none. Fruit 6-celled. 374

CLASS XXI. MONŒCIA.

ORDER **Monandria**. Stamen 1.

LEMNA. Flowers bursting from the side of a floating frond. 449

ZOSTERA. Flowers on a leaf-sheathed spadix. 453

ZANNICHELLIA. Flowers axillary, sessile: the fertile of 2-5-pistils. 453

EUPHORBIA. Flowers in a cup-shaped involucre. Ovary 3-celled. 403

ORDER **Di-Triandria**. Stamens 2-3.

* Stamens aggregated in a common spike or head, naked.

TYPHA. Flowers all in a spike, intermixed with down. 450

SPARGANIUM. Flowers in heads, naked, the fertile bracted. 451

** Stamens in the axils of bracts.

CAREX. Achenium lenticular or triangular, inclosed in a sac. 535

SCLERIA. Achenium globular, crustaceous or bony, naked. 534

TRIPSACUM. Grain inclosed in cartilaginous glumes, sunk in the joints of the spike. 615

ORDER **Tri-Polyandria**. Stamens 3-many, distinct.

* Staminate flowers naked, crowded together without regular bracts.

—Herbs: both kinds of flowers in one spike (spadix).

ARACEÆ. Spadix surrounded by a spathe. Berry 1-celled. 445

- ++ Trees : flowers in separate heads.
- LIQUIDAMBAR. Styles 2. Pods 2-beaked, 2-celled, several-seeded. 432
- PLATANUS. Style 1. Nutlets club-shaped, 1-celled, 1-seeded. 433
- * * Staminate flowers in catkins : calyx none or scale-like.
- + Fertile flowers in catkins or spikes. Leaves simple.
- BETULACEÆ. Fruits scale-like or nut-like, 2-3 under each bract. 421
- COMPTONIA. Nutlets 1 under each bract of the burr-like catkin. 420
- CARPINUS. Nutlets single in the axil of a leaf-like bract. 419
- OSTRYA. Nutlets each in a bladderly bag, making a Hop-like catkin. 419
- ++ Fertile flowers 2 together, naked, forming fleshy or dry drupes.
- JUGLANDACEÆ. Seed large, crumpled and lobed. Leaves pinnate. 410
- * * * Staminate and fertile flowers both in glumes, naked.
- ZIZANIA. Flowers paniced. Stamens 6. 573
- * * * * Staminate fl. with a regular calyx (or involucre) and no corolla.
- + Nuts 1-celled, large, 1-3 together in an involucre or cup.
- CUPULIFERÆ. Staminate flowers mostly in aments. Trees. 412
- ++ Fruit an achenium or utricle : styles only 1 or 2.
- ++ Stamens 5 or fewer.
- URTICACEÆ. Calyx fleshy or herbaceous. Embryo in albumen. 433
- CHENOPODIACEÆ. Calyx herbaceous or fleshy. Embryo coiled. 376
- AMARANTHACEÆ. Calyx dry and scarious. Embryo coiled around albumen. 382
- ++ ++ Stamens 12-24.
- CERATOPHYLLUM. Calyx herbaceous. Achenium horned. 401
- +++ Fruit 3-celled or an achenium : styles or stigmas 3 or more.
- EUPHORBACEÆ. Pod 3-lobed, 3-celled, 3-coccos. 404
- * * * * Flowers furnished with both calyx and corolla.
- + Head imbricated with scarious bracts. Stamens 4.
- ERIOCAULON. Sepals and petals free. Pod 2-celled, 2-seeded. Stig. 2. 514
- ++ Flowers spiked. Stamens 4 or 8.
- MYRIOPHYLLUM. Sepals and petals adherent to the 4-celled nutlet. 139
- +++ Flowers scattered on a scape. Stamens numerous.
- SAGITTARIA. Sepals and petals 3, free. Achenia wing-margined, collected in a head. 460
- ORDER **Monadelphia**. Stamens united by their filaments.
- * Pod 3-lobed, 3-celled, 3-seeded. Flowers with a regular calyx.
- PHYLLANTHUS. Stamens 3, much united. Stigmas 6. 407
- ACALYPHA. Stamens 8-16, united at the base. Styles cut-fringed. 407
- * * Flowers naked, in the axils of scales, forming catkins.
- CONIFERÆ. Fruit a cone or strobile. 108
- ORDER **Syngenesia**. Stamens connected by their anthers.
- * Fruit an achenium.
- XANTHIUM. Staminate and fertile flowers in separate involucre, the latter a 2-celled burr. 221
- AMBROSIA. Staminate and fertile flowers in separate involucre, the latter nut-like, 1-celled. 221
- IVA. Stam. and fertile flowers in the same open cup-like involucre. 230
- * * Fruit a fleshy pod.
- CUCURBITACEÆ. Anthers elongated and tortuous. Calyx and corolla epigynous. 144

CLASS XXII. DICÆCIA.

ORDER **Monandria**. Stamen 1.

NAIAS. Flowers axillary, sessile. Calyx and corolla none. 452

ORDER **Diandria**. Stamens 2.

SALIX. Sterile and fertile flowers both in catkins, naked (stam. 1-6). 424

ORDER **Triandria**. Stamens 3.

VALLISNERIA. Pod cylindrical, 1-celled, many-seeded (aquatic). 463

CAREX. Achenium in a sac. 535

EMPETRACEÆ. Drupe 3-9-celled, 3-9-seeded. Leaves Heath-like. 409

ORDER **Tri-Pentandria**. Stamens 3-5.

* Stamens 3 or 4.

VISCUM. Anthers sessile on the calyx-lobes. Berry 1-celled, 1-seeded. 398

* * Stamens 4 or 5.

NEGUNDO. Fruit a double samara. Leaves compound. 81

MYRICA. Fruit a dry drupe. Flowers in short aments. 420

URTICA. Fruit an achenium. Flowers spiked and paniced. 435

* * * Stamens constantly 5.

+Calyx adherent: fruit large, drupe-like.

PYRULARIA. Style 1. Fruit pear-like, 1-celled, 1-seeded. 398

++Calyx free from the 1-celled and 1-seeded dry fruit: corolla none.

CANNABINEÆ. Calyx of one sepal; folding round the achenium. 435

AMARANTHUS. Calyx 3-5-sepalled. Utricle smooth, opening by a lid. 384

ACNIDA. Calyx 3-5-sepalled. Achenium crustaceous, 3-5-ridged. 381

+++Calyx free from the drupe-like achenium: petals 5.

RHUS & LOBADIUM. Fruit hairy. Styles or stigmas 3. 79

++++Calyx free from the 3-5 distinct pistils.

ZANTHOXYLUM. Pods 2-valved, short-stalked, few-seeded. 77

ORDER **Hexandria**. Stamens 6.

RUMEX. Achenium 3-angular, covered by the inner conniving sepals. 391

SMILAX. Berry 1-3-seeded, free from the perianth. 485

CHAMÆLIRIUM. Pod 3-celled, ovoid, many-seeded. 502

DIOSCOREA. Pod 3-celled, 3-winged, 3-seeded: calyx adherent. 484

ORDER **Oct-Polyandria**. Stamens 8-many.

* Flowers with calyx and corolla.

GYMNOCLADUS. Petals 5, on the calyx. Pod 1. 111

MENISPERMUM. Sepals and petals 4-8, distinct. Drupes 1-4. 19

* * Calyx regular: petals none.

LAURACEÆ. Calyx petal-like, 6-parted. Stamens 9. Drupe free. 394

SHEPHERDIA. Calyx 4-cleft: the tube becoming berry-like and enclosing the achenium. Stamens 8. 396

* * * Calyx and corolla none.

POPULUS. Flowers in catkins. Stamens 8-40. Pod 1-celled. 430

ORDER **Monadelphia**. Stamens united by their filaments.

* Flowers in a kind of short catkin: ovules naked, on the scales.

TAXUS. Scales empty at the base of the naked cup-shaped berry. 444

JUNIPERUS. Scales of the fertile catkin 3-6, forming a sort of drupe. 444

* * Flowers with calyx and corolla.

NAPÆA. Calyx 5-toothed. Styles 8. Pod 8-celled, 8-seeded. 69

LIMNOBIUM. Calyx 3-parted. Petals 3. Berry 6-9-celled, many-seeded. 462

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CLASS XXIII. POLYGAMIA.

	* Stamens 1-3.	
	+ Flowers glumaceous. Fruit a caryopsis (grain).	
GRAMINEÆ.	Nos. 45-47, 53-59.	571
	++ Flowers with a calyx, or naked.	
FRAXINUS.	Fruit a 1-2-seeded samara. Leaves pinnate.	373
EMPETRACEÆ.	Fruit a 3-9-celled drupe. Leaves Heath-like.	409
CALLITRICHE.	Fruit nut-like, 4-lobed, 4-celled, 4-seeded.	402
	* * Stamens 3-8.	
	+ Fruit 1-celled, 1-seeded.	
	++ Petals none.	
CHENOPODIACEÆ.	Calyx herbaceous, inclosing the achenium.	376
IREGINE.	Calyx scarious, inclosing the utricle.	384
ULMUS.	Samara rounded, broadly winged. Calyx 4-9-cleft.	399
CELTIS.	Drupe free from the 5-6-parted calyx. Styles 2.	400
NYSSA.	Drupe coherent with the calyx-tube. Style 1.	396
	++ ++ Petals 5.	
RHUS.	Fruit drupe-like, rather dry, free. Styles 3.	78
	++ Pod 1-celled, many-seeded (a legume).	
GLEDITSCHIA.	Sepals, petals, and stamens 3-5.	112
	+++ Berry or drupe 2-8-celled, free or nearly so.	
VITIS.	Berry 2-celled, 4-seeded. Stamens 4-5, opposite the petals.	86
RHAMNUS.	Drupe 3-4-celled, 3-4-seeded. Stam. opposite the petals.	84
AQUIFOLIACEÆ.	Drupe 4-6-celled. Stam. alternate with the petals.	275
DIOSPYROS.	Berry 4-8-celled, 4-8-seeded. Stamens 8 and 16.	277
	++++ Drupe 2-3-celled, crowned with the obsolete limb of the calyx.	
PANAX.	Stamens 5, epigynous. Flowers umbelled.	166
	+++++ Pod a 2-celled or double samara, free.	
PTELEA.	Samara winged all round, orbicular, 2-celled.	78
ACER.	Samaras 2, partly united, winged on the back, separating.	80
	+++++ Pod 3-lobed, 3-horned, septical.	
MELANTHACEÆ.	Stamens and spreading divisions of the perianth 6.	496
	* * * Stamens 9 in the sterile, 3-6 in the fertile flowers.	
UDORA.	Ovary 1-celled, with 3 parietal placentæ. Flowers axillary.	462

CLASS XXIV. CRYPTOGAMIA.

Order EQUISETACEÆ.	(<i>Horsetails.</i>)	613
Order FILICES.	(<i>Ferns.</i>)	620
Order LYCOPODIACEÆ.	(<i>Club-Mosses.</i>)	636
Order HYDROPTERIDES.		639
Order MUSCI.	(<i>Mosses.</i>)	641
Order HEPATICÆÆ.	(<i>Liverworts.</i>)	678
Order LICHENES.	(<i>Lichens.</i>)	
Order ALGÆ.	(<i>Sea-Weeds.</i>)	
Order FUNGI.	(<i>Mushrooms, &c.</i>)	

IV. ANALYTICAL KEY TO THE NATURAL ORDERS
OF THE PLANTS OF THE NORTHERN UNITED
STATES.

SERIES I. PHÆNOGAMOUS PLANTS.

CLASS I. DICOTYLEDONOUS or EXOGENOUS PLANTS.

	Page
SUBCLASS I. ANGIOSPERMÆ. Seeds in a pericarp.	2
Div. I. POLYPETALOUS. Calyx and corolla both present; the petals distinct (separate).	2
1. <i>Ovary or ovaries one-celled.</i>	
* <i>Calyx free, or nearly so (not adherent).</i>	
+ Pistils coherent in an imbricated mass on the prolonged receptacle.	<i>Magnoliaceæ</i> , 17
++ Pistils immersed in the upper surface of the top-shaped receptacle.	<i>Nelumbiaceæ</i> , 22
+++ Pistils 2 or more, distinct, unconnected.	
Stamens hypogynous, numerous or indefinite.	
Flowers diœcious or polygamous.	<i>Menispermaceæ</i> , 19
Flowers perfect.	
Petals 6, in 2 rows, valvate.	<i>Anonaceæ</i> , 18
Petals 3-4, persistent, imbricated.	<i>Cabombaceæ</i> , 22
Petals 4-many, often irregular or stamen-like.	} <i>Ranunculaceæ</i> , 2
Stamens hypogynous, 5 or 10.	
Styles recurved, becoming lateral (<i>Zanthorhiza</i>).	} <i>Zanthoxylaceæ</i> , 77
Styles conniving, 3-5.	
Stamens perigynous (on the base or throat of the calyx).	
Leaves with stipules, seeds destitute of albumen.	<i>Rosaceæ</i> , 112
Leaves destitute of proper stipules.	
Pistils fewer than the sepals or petals (2).	<i>Saxifragaceæ</i> , 147
Pistils, petals, and sepals equal in number (3-5).	<i>Crassulaceæ</i> , 145
++++ Pistil only one, simple (of a single carpel).	
Stamens hypogynous, early deciduous.	
As many as the petals and opposite them: anthers opening by uplifted valves.	} <i>Berberidaceæ</i> , 20
More numerous than the petals. (<i>Podophyllum</i> .)	
Also <i>Actæa</i> , <i>Cimicifuga</i> , &c., in <i>Ranunculaceæ</i> ,	2
Stamens perigynous.	
Flower regular. Fruit a drupe. Stamens many.	<i>Pomeæ</i> , 112
Flower regular. Fruit an achenium. Stamens few.	<i>Sanguisorbeæ</i> , 113
Flower papilionaceous (or somewhat so). Fruit a pod.	<i>Leguminosæ</i> , 90
+++++ Pistil one, compound.	
Ovary with a free placenta in the centre, or 1-few-ovuled from the base.	
Sepals 2: petals 5.	<i>Portulacaceæ</i> , 66
Sepals or calyx-lobes as many as the petals (4-5).	

- Stamens as many as the petals and opposite them.
 Calyx dry and scarious, funnel-form, plaited. *Plumbaginaceæ*, 279
 Calyx small, 5-7-parted. (Naumburgia.) *Primulaceæ*, 283
 Stamens alternate with the petals, or twice their number.
 Leaves opposite. (Herbs.) *Caryophyllaceæ*, 55
 Leaves alternate. (Shrubs or trees.) *Anacardiaceæ*, 78
 Ovary with 2 or more parietal placentæ.
 Stamens (5) monadelphous on the stalk of the ovary. *Passifloraceæ*, 143
 Stamens (5) cohering by their anthers (flower irregular). *Violuceæ*, 43
 Stamens distinct or 2-5-adelphous, hypogynous.
 Corolla irregular: stam. 10 or more, on a 1-sided disk. *Resedaceæ*, 42
 Corolla irregular: stamens 6, in 2 sets. *Fumariaceæ*, 27
 Corolla regular.
 Petals withering-persistent, 5. *Droseraceæ*, 49
 Petals fugacious or deciduous.
 Calyx deciduous: sepals as many as the petals. *Capparidaceæ*, 42
 Calyx caducous: sepals fewer than the petals. *Papaveraceæ*, 25
 Calyx persistent.
 Petals not oblique: style single or none. *Cistaceæ*, 47
 Petals oblique: styles separate or separable. *Hypericaceæ*, 51
 Stamens distinct, perigynous. *Saxifragaceæ*, 147
 * * *Calyx adherent to the ovary.*
 Flowers perfect: stamens distinct.
 Stamens 8-10. Capsule 2-lobed or 2-beaked. *Saxifragaceæ*, 147
 Stamens 5. Calyx 5-cleft. Petals 5. *Grossulaceæ*, 141
 Stamens indefinite, as also the sepals and petals. *Cactuceæ*, 141
 Flowers monœcious. Stamens united. *Cucurbitaceæ*, 144
 2. *Ovary (compound) 2-several-celled.*
 * *Stamens attached to the base of the petals or corolla.*
 Corolla epigynous or perigynous. Stamens united. *Cucurbitaceæ*, 144
 Corolla hypogynous.
 Stamens monadelphous, many. Anthers kidney-shaped. *Malvaceæ*, 67
 Stamens distinct, mostly 2. *Oleaceæ*, 372
 * * *Stamens epigynous, as many as the petals, distinct.*
 Styles 2-5. Petals 5.
 Fruit splitting into 2 seed-like dry carpels. *Umbellifera*, 153
 Fruit drupe-like or berry-like. *Araliaceæ*, 166
 Style and stigma one. Petals 4. Drupe 2-celled. *Cornaceæ*, 167
 * * * *Stamens manifestly perigynous, distinct.*
 Stamens indefinite. Fruit a pome, or drupe-like. *Pomeæ*, 128
 Stamens definite.
 Seeds indefinite or numerous. (Fruit a pod.)
 Anthers opening by a pore at the tip. *Melastomaceæ*, 131
 Anthers opening lengthwise.
 Calyx adherent to the entire surface of the ovary. *Onagraceæ*, 134
 Calyx partly or entirely free.
 Inclosing the pod. Style and stigma one. *Lythraceæ*, 132
 Pod exerted, 2-beaked, or style 2-partible. *Saxifragaceæ*, 147
 Seeds definite, few or solitary in each cell.
 Stamens alternate with the petals or twice their number.
 Calyx wholly adherent to the surface of the ovary. *Onagraceæ*, 134
 Calyx free, or nearly so, in fruit. *Celastraceæ*, 82
 Stamens as many as the petals and opposite them.
 Calyx valvate in the bud. Drupe 3-5-celled. *Rhamnaceæ*, 84
 Calyx a mere ring. Petals valvate. Berry 2-celled. *Vitaceæ*, 85
 * * * * *Stamens hypogynous.*
 Calyx valvate in the bud.
 Stamens monadelphous, numerous: anthers 1-celled. *Malvaceæ*, 67

- Stamens 5-adelphous or in 5 clusters: anthers 2-celled. *Tiliaceæ*, 71
 Stamens distinct, as many as the petals and sepals. *Limnanthaceæ*, 76
 Calyx imbricated in the bud.
 Stamens mono-diadelphous. Flower papilionaceous. *Polygalaceæ*, 87
 Stamens cohering over the stigma. Flower irregular. *Balsaminaceæ*, 76
 Stamens monadelphous next the base. Flower regular.
 Styles 5, cohering with a long-beaked axis. *Geraniaceæ*, 73
 Styles 5, separate. Pod 5-10-celled, 10-many-seeded.
 Stamens 5. Leaves simple, entire. *Linaceæ*, 72
 Stamens 10. Leaves 3-foliolate, obcordate. *Oxalidaceæ*, 75
 Stamens 3-5-adelphous. Leaves opposite, entire. }
 Stamens distinct, polyandrous. } *Hypericaceæ*, 51
 Leaves sessile, opposite, entire, dotted. }
 Leaves long-petioled. Petals indefinite. *Nymphæaceæ*, 23
 Leaves forming hollow pitchers. Petals 5. *Sarraceniaceæ*, 24
 Stamens distinct, tetradynamous. Pod 2-celled (silique). *Crucifera*, 30
 Stamens distinct, definite (10 or under).
 Seeds 1-2 in each cell.
 Leaves pellucid-dotted. Samara winged. *Zanthoxylaceæ*, 77
 Leaves dotless, opposite, compound or lobed.
 Samara double, winged at the apex. *Aceraceæ*, 79
 Pod leathery, round, 2-3-valved. *Hippocastanaceæ*, 81
 Leaves dotless, alternate. Drupe 4-6-celled. *Aquifoliaceæ*, 275
 Seeds many or several in each cell of the capsule.
 Styles or sessile stigmas 2-3. Flowers minute. *Elatinaceæ*, 55
 Style 1. (Anthers mostly opening by pores.) *Ericaceæ*, 256

Div. II. MONOPETALOUS. Petals united in a corolla of one piece. 169

1. *Calyx adherent to the ovary.*

- Stamens syngenesious.
 Flowers in an involucrate head (compound flower). *Compositæ*, 184
 Flowers separate, perfect, irregular. Pod many-seeded. *Lobeliaceæ*, 253
 Flowers separate, monœcious or diœcious. *Cucurbitaceæ*, 144
 Stamens distinct, definite, inserted on the corolla.
 Fruit with only one (fertile) cell, 1-seeded.
 Stamens 3. Flowers cymose. *Valerianaceæ*, 181
 Stamens 4. Flowers in an involucrate head. *Dipsaceæ*, 183
 Fruit 2-5-celled, 2-many-seeded. Leaves opposite.
 Leaves with intervening stipules, or whorled. *Rubiaceæ*, 175
 Leaves destitute of stipules. *Caprifoliaceæ*, 169
 Stamens distinct, definite, inserted with the corolla.
 As many as its lobes. *Campanulaceæ*, 255
 Twice as many as its lobes. *Vacciniæ*, 256

2. *Calyx free from the ovary.** *Stamens twice as many as the lobes of the regular corolla.*

- Flowers perfect. Style one. Ovary 3-5-celled. *Ericaceæ*, 256
 Flowers polygamous. Styles 4. Ovary 8-celled. *Ebenaceæ*, 277

* * *Stamens as many as the lobes of the regular corolla.*

+ And opposite them. Ovary 1-celled.

- Utricle 1-seeded, in a scarious and plaited calyx. *Plumbaginaceæ*, 279
 Pod several-many-seeded: placenta central. *Primulaceæ*, 280

++ Alternate with them.

- Stamens hypogynous, or slightly cohering to the base of the corolla.
 Pod 3-5-valved, 3-5-celled, many-seeded. *Ericaceæ*, 256
 Drupe 4-6-seeded, berry-like. *Aquifoliaceæ*, 275
 Stamens inserted on the tube of the corolla.
 Ovary strictly compound, 2-5 celled, several-ovuled: styles united.

- Embryo large, crumpled or coiled : little albumen. *Convolvulaceæ*, 347
 Embryo small, in copious albumen.
 Leaves opposite, with intervening (stipules). *Rubiaceæ*, 176
 Leaves destitute of stipules.
 Stamens 4. Pod circumscissile. *Plantaginaceæ*, 278
 Stamens 5.
 Corolla lobes convolute in the bud.
 Anthers opening lengthwise. *Polemoniaceæ*, 343
 Anthers opening transversely. *Diapensiaceæ*, 346
 Corolla plaited or infolded-valvate in the bud. *Solanaceæ*, 352
 Ovary compound, with parietal placenta.
 Leaves simple and entire, opposite. *Gentianaceæ*, 355
 Leaves simple or 3-foliolate, alternate : cor. valvate. *Menyanthideæ*, 356
 Leaves cut-lobed or pinnate, alternate. *Hydrophyllaceæ*, 340
 Ovaries forming 4 achenia around the style. *Boraginaceæ*, 334
 Ovaries 2 (forming pods) connected at the apex by a single stigma.
 Anthers cohering over the stigma : pollen powdery. *Apocynaceæ*, 364
 Anthers fixed on the stigma : pollen waxy. *Asclepiadaceæ*, 365
 * * * *Stamens (2) fewer than the lobes of the regular corolla.* *Oleaceæ*, 371
 * * * * *Stamens fewer than the lobes of the irregular or unsymmetrical corolla, diandrous or didynamous (the fifth rudimentary or none).*
 Ovaries forming 4 little achenia around the base of the style. *Labiata*, 313
 Ovary 1 - 4-ovuled, splitting into as many 1-seeded nutlets. *Verbenaceæ*, 311
 Ovary several - many-ovuled, forming a pod in fruit.
 One-celled, with a free central placenta. Stamens 2. *Lentibulaceæ*, 287
 One-celled, with 2 - 4 parietal placenta. Stamens 4. *Orobanchaceæ*, 288
 Two-celled, with winged exalbuminous seeds. *Bignoniaceæ*, 290
 Four - five-celled (falsely) with wingless exalbum. seeds. *Sesameæ*, 291
 Two-celled, with few wingless exalbuminous seeds. *Acanthaceæ*, 292
 Two-celled, with (usually many) albuminous seeds. *Scrophulariaceæ*, 294
 Div. III. APETALOUS. Corolla (sometimes calyx also) wanting. 374
 1. *Apetalous forms of Polypetalous or Monopetalous Orders.*
 Stamens indefinite. *Ranunculaceæ*, 2
 Stamens definite (10 or less).
 Calyx adherent ; the
 Stamens (4 - 5) as many as and alternate with its lobes. *Rhamnaceæ*, 84
 Stamens as many as its lobes and opposite them, or 1. *Haloragaceæ*, 139
 Stam. double the calyx-lobes. *Chrysosplenium* in *Saxifragaceæ*, 147
 Calyx free (in *Fraxinus* often none).
 Leaves alternate.
 Pod 4-horned, 4-celled. Penthorum in *Crassulaceæ*, 145
 Pods 3 - 5, from separate simple pistils. *Zanthoxylaceæ*, 77
 Achenia 1 - 5, in the base of the calyx. *Sanguisorbeæ*, 113
 Leaves opposite, compound or lobed.
 Fruit a double samara. Stamens 5 - 8. *Aceraceæ*, 79
 Fruit a simple samara. Stamens 2 - 4. *Fraxinus* in *Oleaceæ*, 373
 Leaves opposite, simple and entire.
 Pod 3-celled : styles 3. *Mollugineæ*, 57
 Pod 1-celled.
 Styles 2 - 5, or 2 - 5 cleft. *Caryophyllaceæ*, 56
 Style and stigma one. *Glaux* in *Primulaceæ*, 284
 2. *Proper Apetalous Orders.*
 * *Fruit many-seeded, 2 - several-celled. (Flowers perfect, not in catkins.)*
 Calyx adherent below to the 6-celled fleshy fruit. *Aristolochiaceæ*, 374
 Calyx none. Capsule 2-celled, 2-valved. *Podostemaceæ*, 403
 * * *Fruit with only one seed in each cell.*

- + Flowers with a regular adherent calyx ; not in catkins or heads.
 Ovules several on a stalk from the base of the cell. *Santalaceæ*, 397
 Ovule solitary, suspended from the top of the cell.
 Polygamious : filaments and style slender. *Nyssaceæ*, 396
 Mono-diœcious : anthers and stigma sessile. Limb of the calyx obsolete in the fertile flowers. Tree-parasites. *Loranthaceæ*, 398
- ++ Flowers with a regular free calyx, or none ; not in catkins or heads.
 Shrubs or trees.
 Calyx incl. the achenium, berry-like in fruit. Diœcious. *Eleagnaceæ*, 395
 Calyx free and separate.
 Fruit a membranaceous winged samara. *Ulmaceæ*, 399
 Fruit a drupe.
 One-celled : sessile stigmas 2, long. *Celtideæ*, 399
 One-celled : style and stigma one.
 Anthers opening by uplifted valves. Diœcious. *Lauraceæ*, 394
 Anthers opening lengthwise. Flower perfect. *Thymeleaceæ*, 395
 Three - nine-celled : stigma or style 3 - 9-lobed. *Empetraceæ*, 409
- Herbs.
 Ovary 2 - several-celled or lobed.
 Stigmas more than the cells. Pod dehiscent. *Euphorbiaceæ*, 463
 Stigmas and styles fewer than the cells. Indehiscent. *Callitrichaceæ*, 402
 Stigmas equalling the cells or ovaries in number. (Fl. perfect.)
 Calyx none : ovaries 3 - 5. Flowers spiked. *Saururaceæ*, 401
 Calyx colored : styles 10. Flowers racemed. *Phytolaccaceæ*, 385
 Ovary 1-celled, 1-ovuled. (Calyx persistent, often inclosing the fruit.)
 Stipules forming sheaths. Leaves entire. *Polygonaceæ*, 385
 Stipules not sheathing. Leaves lobed or compound. *Cannabineæ*, 434
 Stipules wanting.
 Bracts and calyx scarious, imbricated. *Amaranthaceæ*, 382
 Bracts not scarious : calyx fleshy or herbaceous.
 Styles 2 - 5. Embryo coiled. *Chenopodiaceæ*, 375
 Style 1. Embryo straight. *Urticeæ*, 434
- +++ Flowers (monœcious or diœcious), one or both sorts amentaceous.
 Fertile flowers only in a kind of catkin or strobile. *Cannabineæ*, 434
 Sterile flowers only in catkins or heads. (Trees or shrubs.)
 Fruit a nut, with a cupule or involucre. Leaves simple. *Cupuliferæ*, 413
 Fruit a dry drupe, naked. Leaves pinnate. *Juglandaceæ*, 410
 Both kinds amentaceous or capitate.
 Bracts and calyx fleshy, berry-like in fruit. *Moreæ*, 433
 Bracts scale-like.
 Fruit drupe-like, 3-celled, 3-seeded. *Empetraceæ*, 409
 Fruit nut-like, drupe-like, or samara-like, 1-celled, 1-seeded.
 Ovaries solitary under the scales. Fruit wingless. *Myricaceæ*, 420
 Ovaries 2 - 3 under each scale. Nut often winged. *Betulaceæ*, 421
 Ovaries irregularly crowded in a head. *Platanaceæ*, 433
 Fruit several - many-seeded pods.
 Pods woody, 2-celled, 2-beaked : seeds naked. *Balsamifluæ*, 432
 Pods herbaceous, 1-celled : seeds downy-tufted. *Salicaceæ*, 424

SUBCLASS II. GYMNOSPERMÆ. Ovules and seeds naked.

Flowers mono-diœcious in a kind of catkin. *Coniferæ*, 438

CLASS II. MONOCOTYLEDONOUS or ENDOGENOUS PLANTS.

1. *Flowers destitute of calyx and corolla, or on a spadix (sometimes with an imperfect perianth) ; not glumaceous or Grass-like.*

- Terrestrial, mostly with a spathe. Fruit berry-like. *Araceæ*, 445
 Terrestrial. Fruit nut-like, 1-seeded, naked or downy. *Typhaceæ*, 450
 Aquatic (floating or immersed).

- Flowers bursting from the edge of the free-floating frond. *Lemnaceae*, 449
 Flowers in the axils or on a spadix. Immersed. *Naiadaceae*, 451
2. *Flowers with a double or 6-merous perianth.*
 * *Adherent to the ovary (in the fertile flowers).*
 +Dioecious or polygamous, regular.
- Aquatics. Fruit many-seeded, indehiscent. *Hydrocharidaceae*, 461
 Terrestrial, twining. Pod few-seeded, 3-valved, winged. *Dioscoreaceae*, 454
- ++Flowers perfect. (Pod several-many-seeded.)
- Stamens (1-2) gynandrous. Pod 1-celled. *Orchidaceae*, 463
 Stamens distinct or monadelphous. Pod 3-celled.
 Hexandrous: anthers introrse, distinct. *Amaryllidaceae*, 479
 Triandrous: anthers introrse, distinct. *Hamodoraceae*, 480
 Triandrous: anthers extrorse, sometimes monadelphous. *Iridaceae*, 482
- * * *Perianth free from the ovary (6-merous, rarely 4-merous).*
 +Colored alike, not glumaceous.
- Anthers extrorse (except *Tofieldia*). Styles or sessile stigmas mostly 3.
 Seeds albuminous, several or many in each cell. *Melanthaceae*, 495
 Seeds exalbuminous, 1-2 in each cell. *Juncagineae*, 458
- Anthers introrse.
 Styles or sessile stigmas 3, separate. Leaves veiny. *Smilaceae*, 484
 Style 3-partible. Leaves equitant or grass-like. *Hæmodoraceae*, 481
 Style one, not splitting.
 Perianth cleft or parted. Pod loculicidal. *Liliaceae*, 488
 Perianth tubular. Pod not dehiscent. Aquatics. *Pontederiaceae*, 509
- ++Perianth consimilar (6-merous), regular, glume-like. *Juncaceae*, 503
 +++Perianth dissimilar, of 3 herbaceous sepals and 3 colored petals.
- Ovaries numerous, distinct. Stamens 6-many. *Alismaceae*, 458
 Ovary 3-celled. Styles or sessile stigmas 3, separate. *Trilliaceae*, 485
 Ovary 2-3-celled. Style and stigma one. *Commelynaceae*, 511
- ++++Perianth dissimilar, two outer sepals glume-like: petals colored.
 Rush-like: flowers imbricated with scales or glumaceous bracts.
- Flowers perfect, 3-androus: pod 1-celled, many-seeded. *Xyridaceae*, 513
 Flowers diclinous, 2-androus: pod 2-celled, 2-seeded. *Eriocaulonaceae*, 514
- * * * *Proper perianth none or rudimentary: bracts glumaceous.*
- Sheaths closed. Glume (scale-like bract) single. *Cyperaceae*, 515
 Sheaths open opposite the leaf. Glumes 2 to each spikelet, and usually 2 to each flower. *Gramineae*, 567

SERIES II. CRYPTOGRAMOUS PLANTS.

CLASS III. ACROGENS.

- Fructification borne on the leaves. Terrestrial. *Filices*, 620
 Fructification in a terminal spike or axillary. Terrestrial.
 Leafless: spore-cases under the shield-shaped stalked scales of the spike or cone, opening lengthwise. *Equisetaceae*, 618
 Leafy: leaves small, sessile: spore-cases sessile in the axils of leaves or bracts, opening across, or 3-4-valved. *Lycopodiaceae*, 636
 Fructification at the base of the leaves or on naked or immersed branches. Aquatics. *Hydropterides*, 639

CLASS IV. ANOPHYTES.

- Leafy: leaves distinct. Calyptra separating from the base, forming a cap. Spore-cases opening by a lid. *Musci*, 641
 Frondose or leafy. Spore-cases not opening by a lid. *Hepaticae*, 678

BOTANY

OF THE

NORTHERN UNITED STATES.

SERIES I. PHÆNÓGAMOUS or FLOWERING PLANTS.

VEGETABLES bearing proper flowers, with stamens and pistils, and producing seeds which contain an embryo. (Vide *Introduction*, supra, and *Botanical Text-Book*, pp. 318, 328.)

CLASS I. DICOTYLÉDONOUS or EXÓGENOUS PLANTS.

Stems formed of bark, wood, and pith; the wood forming a layer between the other two, increasing, when the stem continues from year to year, by the annual addition of a new layer to the outside, next the bark. Leaves netted-veined. Embryo with two or more opposite cotyledons.

Subclass I. ANGIOSPÉRME.

Pistil consisting of a closed ovary, which contains the ovules and forms the fruit. Pollen applied to a stigma. Cotyledons only two.

Division I. POLYPÉTALOUS EXÓGENOUS PLANTS.

Floral envelopes consisting of both calyx and corolla; the petals separate (occasionally absent).

ORDER 1. RANUNCULÀCEÆ. (CROWFOOT FAMILY.)

Herbs (or woody vines) with a colorless acrid juice, polypetalous, or apetalous with the calyx colored like a corolla, hypogynous; the sepals, petals, numerous stamens, and many or few (rarely single) pistils all distinct and unconnected. — Flowers regular or irregular. Sepals 5-3-15. Petals 3-15, or wanting. Stamens indefinite, rarely few: anthers short. Fruits either dry pods, or seed-like (achenia), or berries, 1-several-seeded. Seeds anatropous, with fleshy albumen and a minute embryo. — Stipules none. Leaves mostly dissected, their stalks dilated at the base.

Synopsis of the Genera.

Tribe 1. CLEMATIDÆ. Sepals valvate in the bud, or with the edges bent inwards. Petals none, or small and stamen-like. Achenia numerous, tailed with the feathery or hairy styles. Seed solitary, suspended. — Vines: leaves all opposite.

1. ATRAGENE. Petals several, like sterile stamens.

2. CLEMATIS. Petals none.

Tribe 2. ANEMONEÆ. Sepals imbricated in the bud. Petals none, or very small and stamen-like. Achenia numerous or several. Seed solitary, suspended. — Stem-leaves often opposite or whorled, forming an involucre.

3. PULSATILLA. Achenia bearing long plumose tails.

4. ANEMONE. Achenia merely pointed, numerous, not ribbed nor inflated. Involucre remote from the flower, and like the other leaves.

5. HEPATICA. Achenia several, not ribbed. Involucre like a calyx.

6. *THALICTRUM*. Achenia 4-10, ribbed or grooved, or inflated.

Tribe 3. *RANUNCULÆ*. Sepals imbricated in the bud. Petals conspicuous, flat. Achenia numerous. Seed solitary.

7. *RANUNCULUS*. Petals with a little scale or pore at the base on the inside. Seed erect.

Tribe 4. *HELLEBORINÆ*. Sepals imbricated in the bud, deciduous, rarely persistent, petal-like. Petals (*nectaries* of the earlier botanists) tubular, irregular, or 2-lipped, often none. Pods (follicles) few, rarely single, few-several-seeded.—Leaves all alternate.

* Flower symmetrical. Pods several-seeded.

8. *ISOPYRUM*. Petals none (in the American species). Pods few. Leaves compound.

9. *CALTHA*. Petals none. Pods several. Leaves kidney-shaped.

10. *TROLLIUS*. Petals minute, entire. Pods 8-15, sessile.

11. *COPTIS*. Petals small, hollowed at the apex, entire. Pods 3-7, stalked. Sepals deciduous.

12. *HELLEBORUS*. Petals 8-10, small, tubular, 2-lipped. Pods several, sessile. Sepals 5, persistent, turning green with age.

13. *AQUILEGIA*. Petals 5, longer than the 5 deciduous sepals, spur-shaped, tubular, symmetrical. Pods 5, tipped with long styles.

** Flower unsymmetrical. Pods several-seeded.

14. *DELPHINIUM*. Upper sepal spurred. Petals 4, of 2 forms.

15. *ACONITUM*. Upper sepal hooded, receiving the 2 long-clawed petals.

*** Flower symmetrical. Pods ripening only one seed.

16. *ZANTHORHIZA*. Petals 5, small, 2-lobed, with claws. Stamens few. Flowers in drooping compound racemes, polygamous. Stems shrubby!

Tribe 5. *CIMICIFUGÆ*. Sepals imbricated, falling off as the flower opens. Petals small and flat, or none. Pistils 1-several. Fruit a 2-several-seeded pod or berry. Leaves all alternate.

17. *HYDRASTIS*. Flower solitary. Pistils several in a head, becoming berries in fruit, 2-seeded. Leaves simple, lobed. Petals none.

18. *ACTÆA*. Flowers in a single short raceme. Pistil single, forming a many-seeded berry. Leaves 2-3-ternately compound. Petals manifest.

19. *CIMICIFUGA*. Flowers in long spiked racemes. Pistils 1-8, in fruit forming dry several-seeded pods. Leaves 2-3-ternately compound.

Tribe I. CLEMATÍDEÆ. THE VIRGIN'S-BOWER TRIBE.

1. ATRÁGENE, L. ATRAGENE.

Sepals 4, colored; their valvate margins slightly turned inwards in the bud. Petals several, slender, like sterile stamens. Anthers linear. Achenia numerous in a head, bearing the persistent styles in the form of long plumose tails. — Perennial vines, climbing by the leafstalks; stems a little woody. Leaves opposite, compound. Peduncles 1-flowered. (Derivation obscure: the name was given to a climbing plant by Theophrastus.)

1. **A. Americàna**, Sims. (AMERICAN ATRAGENE.) Leaflets stalked, ovate, pointed, entire or a little toothed, sometimes slightly heart-shaped. — Shady rocky hills, Maine and western N. England to Michigan. April, May. — From each of the opposite buds in spring there arise two ternate leaves with long-stalked leaflets, and a peduncle which bears a bluish-purple flower, 2–3 inches across.

2. CLÉMATIS, L. VIRGIN'S-BOWER.

Sepals 4, colored, the valvate margins more or less bent inwards in the bud. Petals none. Anthers linear. Achenia numerous in a head, bearing the persistent styles mostly as hairy or plumose tails. — Perennial herbs or vines, a little woody, and climbing by the twisting of the leafstalks. Leaves opposite. (*Κληματίς*, a name applied by Dioscorides to a climbing plant with long and lithe branches.)

* *Peduncles bearing single large flowers: calyx thickish or leathery.*

1. **C. ochroleuca**, Ait. (PALE VIRGIN'S-BOWER.) Stem simple, erect; leaves simple, ovate, entire, clothed with soft, silky hairs. — Copses near Brooklyn, New York. May. — A foot high, leaves 3 inches long, reticulated and soon smooth above. Calyx silky outside, yellowish within. Tails of the fruit finely plumose.

2. **C. Viórna**, L. (LEATHER-FLOWER.) Smooth; stem climbing; leaves bearing 3–7 ovate or oblong, entire or 2–3 lobed leaflets, or on the flower branches simple; calyx bell-shaped, the (purplish) sepals very thick and leathery, with the points narrow and recurved; tails of the fruit very plumose. — Rich soil, Penn. and Ohio. May–Aug.

* * *Flowers in paniced clusters.*

3. **C. Virginiàna**, L. (COMMON VIRGIN'S-BOWER.) Smooth; leaves bearing 3 ovate acute leaflets, which are cut or lobed, and somewhat heart-shaped at the base; tails of the fruit plumose. — Riv-

er-banks, &c., common; climbing over shrubs; flowering in July and August. The axillary peduncles bear clusters of numerous white flowers (sepals obovate, spreading), which are polygamous or diœcious; the fertile are succeeded in autumn by the conspicuous feathery tails of the fruit.

Tribe II. ANEMONEÆ. THE ANEMONE TRIBE.

3. PULSATILLA, Tourn. PASQUE-FLOWER.

Sepals 4-6, colored. Petals none, or like abortive gland-like stamens. Achenia with long feathery tails. Otherwise as Anemone. (Derivation obscure. The popular name was given because the plant is in blossom at Easter.)

1. **P. pàtens**, Mill. Silky with long soft hairs, dwarf; radical leaves 3-parted; the divisions wedge-shaped, 3-cleft and cut, their lobes linear-lanceolate; involucre cut to the base into many narrow equal divisions; flower erect, dull purple. — Prairies, Wisconsin, *Lapham*. March, April; flowering before the leaves appear. Sepals 1' or more long. Tails of the fruit 2' long.

4. ANEMONE, L. ANÉMONE. WIND-FLOWER.

Sepals 5-15, petal-like. Petals none. Achenia without tails. — Perennial herbs with radical leaves; those of the stem 2-3 together, and forming an involucre at the base of the flower-stalks. (Deriv. from *ἀνεμος*, the *wind*, because the flower was thought to open only when the wind blows. *Plin. Nat. Hist.*, 21, § 94.)

* *Stem-leaves (involucre) stalked.*

1. **A. nemorosa**, L. (WIND-FLOWER. WOOD ANEMONE.) Low, smooth; stem perfectly simple; *flower single* on a naked peduncle; leaves of the involucre 3, long-petioled, 3-divided, toothed and cut; the lateral ones often (var. *QUINQUEFOLIA*) 2-parted; sepals 4-6, oval, white, sometimes tinged with purple outside; *carpels few*. — Margin of woods, April, May. — A delicate and pretty vernal species, the spreading flower 1' broad. Carpels only 15 or 20, oblong, with a hooked beak.

2. **A. cylindrica**, Gray. (LONG-FRUITED ANEMONE.) Slender, clothed with silky hairs; flowers 2-6 on very long and upright naked peduncles; leaves of the involucre thrice or twice as many as the flower-stalks, 3-divided; their divisions wedge-shaped, the lateral 2-parted, the middle one 3-cleft; lobes cut and toothed at the apex; *sepals 5, obtuse*, silky outside, greenish-white; *head of fruit cylindrical*. — Sandy or dry woods, Massachusetts to Michigan. May. — Plant 1°-2° high. Peduncles 7'-12' long, all appearing together

from the same involucre, and naked throughout, or sometimes part of them with involucels, as in No. 3. Head of fruit dense, 1' long: achenia very woolly, as also in the two succeeding species.

3. **A. Virginiàna**, L. (TALL ANEMONE.) Hairy; principal involucre 3-leaved; the leaves long, petioled, 3-parted; the *divisions ovate-lanceolate*, pointed, cut-serrate, the lateral 2-parted, the middle 3-cleft; peduncles elongated, the earliest naked, the others with a 2-leaved involucel at the middle; *sepals* 5, *acute*, greenish (in one variety white and obtuse), silky beneath; *head of fruit oval or oblong*. — Woods and meadows, common. June – August. — Plant 2°–3° high; the upright peduncles 6'–12' long. In this and the two following species the first flower-stalk is leafless; but from the same involucre soon proceed one or two lateral ones, which are 2-leaved at the middle; these partial involucre in turn giving rise to similar peduncles, thus producing a succession of flowers through the whole summer.

4. **A. multífida**, DC. (MANY-CLEFT ANEMONE.) Low, silky-hairy; principal involucre 2–3-leaved, bearing one naked and one or two 2-leaved peduncles; leaves of the involucre on short petioles, similar to the root-leaves, twice or thrice 3-parted and cleft, their *divisions linear*; *sepals* 5–8, *obtuse*, red, sometimes greenish-yellow; *head of fruit spherical or oval*. — Rocks, Vermont and N. New York, L. Superior, &c., rare. June. — Plant 6'–12' high; *sepals* ½' long.

* * *Leaves of the stem and branches (involucre and involucels) sessile.*

5. **A. Pennsylvànica**, L. (PENNSYLVANIAN ANEMONE.) Principal involucre 3-leaved, bearing a naked peduncle, and soon a pair of branches or peduncles with a 2-leaved involucre at the middle, which branch similarly in turn; *leaves broadly wedge-shaped*, 3-cleft, cut and toothed; root-leaves 5–7-parted or cleft; *sepals obovate*, white; head of fruit spherical; the carpels flat, hairy. — W. New Engl. to Ohio and Wisconsin. June – Aug. — Plant rather hairy, 6' high when it begins to blossom, but continuing to produce branches, each terminated by a naked peduncle, through the summer; flowers 1½' broad, handsome.

5. HEPÁTICA, Dill. LIVER-LEAF. HEPATICA.

Involucre simple and 3-leaved, very close to the flower, so as to resemble a calyx; otherwise as in Anemone. — Leaves all radical, heart-shaped and 3-lobed, thickish and persistent through the year, the new ones appearing later than the flowers. Flowers single, on hairy scapes. (Name from a fancied resemblance of the leaves in shape to the liver.)

1. **H. triloba**, Chaix. (ROUND-LOBED HEPATICA.) Leaves with 3 ovate obtuse or rounded lobes; those of the involucre also obtuse. — Woods, common, especially in New Engl.; flowering almost as soon as the snow leaves the ground in spring. Sepals 7–9, blue, purplish, or nearly white. Achenia several, in a small loose head, ovate, pointed, hairy. Lobes of the leaves usually very obtuse, or rounded.

2. **H. acutiloba**, DC. (SHARP-LOBED HEPATICA) Leaves with 3 ovate and pointed lobes, or sometimes 5-lobed; leaves of the involucre acute or acutish. — Woods, Vermont and New York to Michigan. Flowers pale purple.

6. THALICTRUM, L. MEADOW RUE.

Sepals 4 or more, petal-like or greenish. Petals none. Achenia 4–15, tipped by the stigma or short style, grooved or ribbed, or else inflated. Seed suspended. — Perennials, with 2–3-ternately compound leaves, the divisions and the leaflets stalked. Flowers in corymbs or panicles, often polygamous. (Derivation of the name obscure.)

* *Stem-leaves forming an involucre at the summit, like Anemone: root a cluster of small tubers: flowers perfect: fruits sessile, grooved.*

1. **T. anemonoides**, Michx. (RUE-ANEMONE.) Low; root-leaves twice or thrice 3-divided; the leaflets and the long-stalked leaflets of the involucre obtusely 3-lobed at the apex; flowers few in a simple umbel, white. (*Anemone thalictroides, L., Bigel.*) — Woods. April, May. — A pretty plant, more like *Anemone* than *Thalictrum* in aspect. The stem bears 2 or 3 leaves at the very summit like those from the root, but without the common petiole, so that they appear like a whorl of long-stalked simple leaves. Sepals 7–10, half an inch long, not falling off before the stamens. Pistils several in a little head, tipped with a flat stigma.

* * *Stem-leaves scattered, 3–4 times compound: root fibrous: flowers diœcious or polygamous: sepals 4–5, falling early: fruits sessile, tipped with long stigmas, grooved.*

2. **T. dioicum**, L. (EARLY MEADOW RUE.) *Leaves all with general petioles; leaflets rounded and 5–7-lobed; flowers in compound panicles, greenish.* — Rocky woods and hill-sides. April, May. — A foot or so high, with very pale and delicate foliage, and slender yellowish anthers on capillary filaments.

3. **T. Cornuti**, L. (MEADOW RUE.) *Stem-leaves without general petioles; leaflets 3-lobed at the apex, the lobes acutish; flowers in very compound large panicles, white.* — Meadows and along streams. June, July. — Stem 3°–4° high, furrowed. Leaves whit-

ish or downy beneath. Filaments slightly club-shaped; anthers oblong.

Tribe III. RANUNCULÆÆ. THE CROWFOOT TRIBE.

7. **RANÚNCULUS**, L. CROWFOOT. BUTTERCUP.

Sepals 5. Petals 5, larger than the calyx, with a little pit or scale at the base inside. Achenia numerous in a head, flattened, pointed; the seed erect. — Annuals or perennials: stem-leaves alternate. Flowers solitary or somewhat corymbed, yellow, rarely white. (Sepals and petals rarely only 3, the latter often more than 5. Stamens occasionally few in number.) — (Name from *Rana*, a frog, the aquatic species growing where those animals abound.)

§ 1. *Petals white, the claw yellow, with a little cavity or pore: fruits transversely wrinkled. Aquatics, the immersed leaves many times divided into capillary lobes.*

1. **R. aquátilis**, L. (WHITE WATER-CROWFOOT.) Stem floating; the leaves all immersed and filiformly dissected, or sometimes with the uppermost emersed and 3-parted, the divisions cut and toothed; petals oblong-obovate. — Ponds and flowing waters. June, Aug. — The most common form is the Var. *FLUVIATILIS*, with all the leaves immersed and capillary; the state with emersed leaves is rarely met with in the United States.

§ 2. *Petals yellow, with a little scale at the base: fruits not wrinkled or roughened. (All but No. 2 terrestrial.)*

* *Aquatic, perennial: immersed leaves filiformly dissected.*

2. **R. Púrshii**, Richards. (YELLOW WATER-CROWFOOT.) Stem floating, with the leaves all dissected into several times forked filiform divisions; or sometimes rooting in the mud, with the emersed leaves kidney-shaped or round and variously lobed or cleft; petals 5–8, much larger than the calyx; carpels in a spherical head, pointed with a straight beak. (*R. multifidus*, *Pursh*, *Bigel.* *R. lacustris*, *Beck.*) — Stagnant water, Massachusetts to Michigan. May–July. — Stems 2°–4° long, round and tubular. Petals bright yellow, mostly as large as in the common Buttercup, No. 16.

** *Leaves all undivided: perennial, glabrous.*

4. **R. Flámmula**, L. (SPEARWORT.) Stem reclining, rooting at the lower joints; leaves lanceolate, obscurely toothed or entire, acute, the lower ones petioled; carpels in a spherical head, pointed with a slender beak. — Ditches, &c., common, probably indigenous. June–Aug. — Stems 1°–2° long. Flower ½' broad.

5. **R. réptans**, L. (CREEPING SPEARWORT.) Stem slender, *prostrate*, rooting at the joints; *leaves linear or lanceolate*, rather obtuse, entire, tapering into petioles, often clustered at the joints; *carpels* few in a small spherical head, tipped *with a minute blunt point*. (The most common slender form is *R. FILIFORMIS*, Michx.) Gravelly or muddy banks of ponds and rivers, common. June - Aug. — A very delicate creeping species: stems 4' - 6' long, sometimes ascending. Petals 5 or more, deep yellow, much longer than the calyx.

6. **R. pusillus**, Poir. (LITTLE SPEARWORT.) Stem slender, *ascending or erect*; *root-leaves ovate or roundish*, obtuse, entire, often rather heart-shaped, on long petioles; the lower stem-leaves similar; the uppermost linear-lanceolate, obscurely toothed, scarcely petioled; *carpels* in a spherical head, *scarcely pointed*; *stamens few*. — Wet places, S. New York and New Jersey. July. — Stems 6' - 12' high, branched. Petals 1 to 5, often 3, scarcely longer than the calyx, pale yellow. Stamens 5 - 10.

7. **R. Cymbalária**, Pursh. (SEA-SIDE CROWFOOT.) Stem sending off *long runners* from the base which are rooting and leafy at the joints; *leaves all roundish, heart-shaped at the base, coarsely crenate-toothed*, on long petioles; *flower-stalks (scapes) leafless, 1 - 5-flowered*; *carpels in oblong heads, very numerous, beaked*. — Seashore, Maine to New Jersey. Salt springs, Salina, New York. June - Aug. — 2? Runners often 1° long. Leaves rather fleshy. Scapes 3' - 6' high. Petals 5 - 8, bright yellow, a little longer than the calyx.

* * * *Lower leaves undivided or merely cleft: perennial.*

8. **R. rhomboideus**, Goldie. Dwarf, *hairy*; *root-leaves rhombic-ovate*, toothed or crenate; lowest stem-leaves often similar; the upper 3 - 5-parted, almost sessile, the lobes linear; *carpels* orbicular with a minute beak, in a spherical head; *petals large, exceeding the calyx*. (Also *R. brevicaulis*, Hook.?) — Prairies, Michigan and Wisconsin. Apr. - May. — Stems 3' - 6' high, sometimes not longer than the root-leaves. Flower deep yellow, as large as in No. 13.

9. **R. abortivus**, L. (SMALL-FLOWERED CROWFOOT.) *Glabrous and very smooth*; primary *root-leaves round heart-shaped or kidney-form*, barely crenate, the succeeding ones often 3-lobed or 3-parted; those of the stem and branches 3-5-parted or divided, subsessile; their divisions oblong or narrowly wedge-form, mostly toothed; *carpels* in a globular head, *tipped with a very short recurved beak*; *petals shorter than the reflexed calyx*. — Shady hill-sides, common. Apr. - June. — Stem erect, 1° - 2° high, at length branched above, the pale yellow flowers very small in proportion.

10. **R. recurvatus**, Poir. (HOOKED CROWFOOT.) *Hirsute*; *leaves of the root and stem nearly alike, long-petioled, deeply 3-cleft*; the lobes broadly wedge-shaped, 2 - 3-cleft, cut and toothed towards the apex; *carpels* in a globular head, *conspicuously beaked by the re-*

curved hooked styles; petals shorter than the reflexed calyx. — Woods, common. June. — Stem 1°–2° high. Leaves ample. Petals oblong, pale yellow, quite inconspicuous.

* * * * *Lower leaves merely cleft: annual.*

11. **R. sceleratus**, L. (CURSED CROWFOOT.) Smooth and glabrous; stem thick; root-leaves 3-lobed, rounded, the lower stem-leaves 3-parted, the lobes obtusely cut and toothed, the uppermost almost sessile with the lobes oblong-linear and nearly entire; *carpels pointless*, very small and numerous, *in cylindrical heads*; petals scarcely exceeding the reflexed calyx. — Wet ditches, introduced from Europe? June, July. — A foot high. Stem hollow. Leaves thickish; the juice very acrid and blistering. Petals light yellow.

* * * * * *Leaves all ternately divided: perennial.*

— *Head of carpels oblong or cylindrical.*

f 12. **R. Pennsylvanicus**, L. (BRISTLY CROWFOOT.) Hirsute with rough spreading bristly hairs; stem stout, erect; divisions of the leaves stalked, somewhat ovate, unequally 3-cleft, sharply cut and toothed, acute; carpels pointed with a short straight beak; *petals rather shorter than the reflexed calyx*. — Wet places, common. June–Aug. — A coarse plant, 2°–3° high, with inconspicuous pale flowers.

++ *Head of carpels globular: petals much larger than the calyx.*

X 13. **R. fascicularis**, Muhl. (EARLY CROWFOOT.) Low, pubescent with close-pressed silky hairs; *root a cluster of thickened fleshy fibres*; radical leaves appearing pinnate, the long-stalked terminal division remote from the sessile lateral ones, itself 3–5-divided or parted and 3–5-cleft, the lobes oblong or linear; stems ascending; petals spatulate-oblong, twice the length of the spreading calyx; *carpels scarcely margined*, tipped with a slender rather curved beak. — Rocky hills, April, May. — Plant 5'–9' high; the bright yellow flower 1' broad; petals rather distant, the base scarcely broader than the scale.

14. **R. repens**, L. (CREEPING CROWFOOT.) Low, hairy or nearly glabrous; *stems ascending, and some of them forming long runners*; leaves 3-divided; the divisions all stalked (or at least the terminal one), broadly wedge-shaped or ovate, unequally 3-cleft or parted and variously cut; peduncles furrowed; petals obovate, much larger than the spreading calyx; *carpels strongly margined*, pointed by a stout straightish beak. — Moist or shady places, meadows, &c., May–Aug. — Very variable in size and foliage, commencing to flower by upright stems in spring before the long runners are formed. Flowers as large as, or often larger than, in No. 13. Fibres of the root sometimes thickened.

15. **R. bulbosus**, L. (BULBOUS CROWFOOT, BUTTERCUPS.) Hairy; *stem erect from a solid bulb*; radical leaves 3-divided; *the lat-*

eral divisions sessile, the terminal stalked and 3-parted, all wedge-shaped, cleft and toothed; peduncles furrowed; petals round, wedge-shaped at the base, much longer than the reflexed calyx; carpels tipped with a very short beak.—Meadows and pastures, introduced from Europe, very abundant in E. New England. May—July.—A foot high. Leaves appearing as if pinnate. Petals often 6 or 7, deep glossy yellow, the corolla more than an inch broad.

16. **R. àcris**, L. (TALL CROWFOOT, BUTTERCUPS.) Hairy; stem erect; leaves 3-divided; *the divisions all sessile and 3-cleft or parted, their segments cut into lanceolate or linear crowded lobes; peduncles not furrowed; petals obovate, much longer than the spreading calyx.*—Meadows and fields, everywhere; introduced from Europe. June—Aug.—Plant twice the height of No. 15, the flower nearly as large but not so bright and deep yellow.—The *Buttercups* are avoided by cattle, on account of their very acrid juice, which, however, being volatile, is dissipated in drying, when these plants are cut with hay.

Tribe IV. HELLEBORÍNEÆ. THE HELLEBORE TRIBE.

8. **ISOPYRUM**, L. (ENEMION, Raf.)

Sepals 5, petal-like, deciduous. Petals 5, minute, wanting in the American species. Stamens 10—40. Pistils 3—6 or more, pointed with short styles. Pods ovate or oblong, 2—several-seeded.—Slender smooth herbs, with 2—3-ternately compound leaves; the leaflets 2—3-lobed. Flowers axillary and terminal, white. (Name from *ἴσος*, *equal*, and *πυρός*, *wheat*, which has no obvious meaning as applied to these plants.)

1. **I. biternàtum**, Torr. & Gray. Petals none; pistils 3—6 (commonly 4), divaricate in fruit, 2—3-seeded; seeds even.—Moist shady places, Ohio and Indiana. May.—Fibres of the root thickened here and there into little tubers. Foliage and size of the plant much like *Thalictrum anemonoides*.

9. **CÁLTHA**, L. MARSH MARIGOLD.

Sepals 6—9, petal-like. Petals none. Pistils 5—10, with no styles. Pods (follicles) compressed, spreading, many-seeded. Glabrous perennials, with round and heart-shaped or kidney-form large undivided leaves. (Name from *κάλαθος*, *a goblet*, in allusion to the golden flower-cup or calyx.)

1. **C. palústris**, L. (MARSH MARIGOLD.) Stem hollow, fur-

rowed; leaves round or kidney-shaped, either crenate or nearly entire; sepals about 6, broadly oval (bright yellow).—Swamps and wet meadows, April–May.—This well-known plant is used as a pot-herb in spring, when coming into flower, under the name of Cowslips; but the Cowslip is a totally different plant, namely, a species of Primrose. The *Caltha* should bear with us, as in England, the popular name of Marsh Marigold.

10. *TRÓLLIUS*, L. GLOBE-FLOWER.

Sepals 5–15, petal-like. Petals numerous, small, 1-lipped, the concavity near the base. Stamens and pistils numerous. Pods 9 or more, sessile, many-seeded.—Smooth perennials with palmately parted and cut leaves, like *Ranunculus*, and large solitary terminal flowers. (Name thought to be derived from the old German word *troll*, a globe, or something round.)

1. *T. laxus*, Salisb. (SPREADING GLOBE-FLOWER.) Sepals 5–6, spreading; petals 15–25, inconspicuous, much shorter than the stamens.—Deep swamps, New Hampshire to Penn. and Michigan. May.—Flowers twice the size of the common Buttercup; the sepals spreading, so that the name is not appropriate, as it is to the *European Globe-flower* of the gardens, nor is it showy, the color being a pale greenish yellow.

11. *CÓPTIS*, Salisb. GOLD-THREAD.

Sepals 5–7, petal-like, deciduous. Petals 5–7, small, club-shaped, tubular at the apex. Stamens 15–25. Pistils 3–7, on slender stalks. Pods divergent, membranaceous, pointed with the style, 4–8-seeded.—Low smooth perennials, with ternately divided root-leaves, and small white flowers on scapes. (Name from *κόπτω*, to cut, alluding to the divided leaves.)

1. *C. trifolia*, Salisb. (THREE-LEAVED GOLDTHREAD.) Leaflets 3, obovate–wedge-form, sharply toothed, obscurely 3-lobed; scape 1-flowered.—Bogs, abundant northward. May.—Root of long, bright yellow, bitter fibres. Leaves evergreen, shining. Scape naked, slender, 3'–5' high.

12. *HELLÉBORUS*, L. HELLEBORE.

Sepals 5, petal-like or greenish, persistent. Petals 8–10, very small, tubular, 2-lipped. Pistils 3–10, sessile, forming coriaceous many-seeded pods.—Perennial herbs of the Old World, with ample palmate or pedate leaves, and large solitary nodding flowers.

(Name from *ελεῖν*, to injure, and *βροά*, food, from their well-known poisonous properties.) — One species has been introduced, viz.

1. **H. viridis**, L. (GREEN HELLEBORE.) Root-leaves glabrous, pedate; those of the stem nearly sessile at the ramifications; calyx spreading, greenish. — Near Brooklyn and Jamaica, Long Island, in old fields, naturalized. April.

13. AQUILÈGIA, L. COLUMBINE.

Sepals 5, regular, colored like the petals. Petals 5, with a short spreading lip, produced backwards into long tubular spurs, much longer than the calyx. Pistils 5, with slender styles. Pods erect, many-seeded. — Perennials, with 2-3-ternately compound leaves, the leaflets lobed. Flowers large and showy, terminating the branches. (Name from *aquila*, an eagle, from some fancied resemblance of the spurs to talons.)

1. **A. Canadensis**, L. (WILD COLUMBINE.) Spurs nearly straight; stamens and styles longer than the ovate sepals. — Rocks, common, April - June. — A foot high, from a perpendicular thickened root, glabrous; the leaves glaucous beneath. Flowers 2' long, scarlet, yellow inside, nodding, so that the spurs turn upward, but the stalk becomes upright in fruit. — More delicate and graceful than the *A. vulgaris* of Europe, which is so common in gardens.

14. DELPHINIUM, L. LARKSPUR.

Sepals 5, irregular, the upper one produced into a spur at the base. Petals 4, irregular, the upper pair produced backwards into long spurs which are inclosed in the spur of the calyx; the lower pair with short claws. Pistils 1-5, mostly 3, forming many-seeded pods in fruit. — Leaves palmately divided or cut. Flowers in terminal racemes. Our wild species are perennial. (Name from *Delphin*, in allusion to the shape of the flower, which is sometimes not unlike the classical figures of the dolphin.)

1. **D. exaltatum**, Ait. (TALL LARKSPUR.) Leaves deeply 3-5-cleft; the divisions narrow wedge-form, diverging, 3-cleft at the apex, acute; racemes wand-like, paniced, many-flowered; spur straight; pods erect. — Rich soil, W. Penn. to Michigan. July. — Stem 2°-5° high. Lower leaves 4'-5' broad. Flowers purplish-blue, downy. — Cultivated in gardens.

2. **D. tricorne**, Michx. (DWARF LARKSPUR.) Leaves deeply 5-parted, their divisions unequally 3-5-cleft; the lobes linear, acutish; raceme few-flowered, loose; spur straightish, ascending; pods

strongly diverging. — W. Penn., Ohio. April, May. — Root a tuberos cluster. Stem simple, 6' - 12' high. Flowers bright blue.

3. **D. azûreum**, Michx. (AZURE LARKSPUR.) Leaves deeply 3-5-parted, the divisions 2-3 times cleft; the lobes all narrowly linear; *raceme straight*; spur ascending, usually curved upwards; *Pods erect*. — Ohio? Wisconsin. May, June. — Stem 1°-2° high, slender, often softly pubescent. Flowers pale sky-blue, whitish.

D. CONSÓLIDA, L., the common annual GARDEN LARKSPUR, belonging to a section of the genus which has the 4 petals all united into one, and a single pistil, has escaped from the gardens into the road-sides in some places. — Two or three other species are familiar in cultivation.

15. **ACONITUM**, L. MONK'S-HOOD OR WOLF'S-BANE.

Sepals 5, very irregular; the upper one hooded or helmet-shaped, larger than the others. Petals 2 (the 3 lower wanting entirely, or very minute rudiments among the stamens), consisting of small spur-shaped bodies raised on long claws and concealed under the helmet. Pistils 3-5. Pods several-seeded. Seed-coat usually wrinkled or scaly. — Perennials, with palmately cleft or dissected leaves, and showy flowers in racemes or panicles. (Name, it is said, from *Acone*, in Bithynia.)

1. **A. uncinatum**, L. (WILD MONK'S-HOOD.) Stem slender, weak, and disposed to climb, with diverging branches; leaves deeply 3-5-lobed, petioled; the lobes ovate-lanceolate, coarsely toothed; helmet obtusely conical, compressed, slightly pointed or beaked in front. — Rich shady soil along streams, Penn. to Wisconsin, rare. Aug. Stems supporting themselves upon adjacent bushes, &c, often 5°-6° high. Flowers deep blue.

A. RECLINATUM, Gray, a white-flowered species like *A. Lycoc-tonum* of Europe, will doubtless be detected in the mountains of Pennsylvania. — **A. NAPÉLLUS**, the officinal WOLF'S-BANE, and several other species, represent the genus in gardens.

16. **ZANTHORHIZA**, Marshall. YELLOW-ROOT.

Sepals 5, regular, spreading, deciduous. Petals 5, much smaller than the sepals, concave and 2-lobed, raised on a claw. Stamens 5 or 10. Pistils 5-15, bearing 2 or 3 pendulous ovules. Pods 1-seeded, oblong, the short style becoming lateral in its growth. — A low plant, with shrubby shoots, the bark and the long roots deep yellow and bitter. Flowers polygamous, dull purple, in compound drooping racemes, appearing, along with the

1-2-pinnate leaves, from large terminal buds in early spring. (Name from *ξανθός*, *yellow*, and *ρίζα*, *root*.)

1. **Z. apiifolia**, L'Her. — Shady banks of streams, in the mountains of Penn. and southward. Sherburne, New York, *Dr. Douglass*. Stems clustered, 1°-2° high. Leaflets cleft and toothed. — The roots of this, and also of the next plant, were used as a yellow dye by the aborigines.

Tribe 5. CIMICIFUGÆ. THE BUGBANE TRIBE.

17. HYDRÁSTIS, L. ORANGE-ROOT. YELLOW-PUCCOON.

Sepals 3, petal-like, falling away when the flower opens. Petals none. Pistils 12 or more in a head, 2-ovuled: stigma flat, 2-lipped. Ovaries becoming a head of crimson 1-2-seeded berries in fruit. — A low perennial herb, sending up in early spring, from a thick and knotted yellow rootstock, a single radical leaf, and a simple hairy stem which is 2-leaved near the summit, and terminated by a single greenish-white flower. (Name probably from *ὑδωρ*, *water*, and *δράω*, *to act*, alluding to the active properties of the juice.)

1. **H. Canadensis**, L. — Rich woods, New York to Wisconsin. — Leaves rounded, heart-shaped at the base, 5-7-lobed, doubly-serrate, veiny, when full grown in summer 4'-9' wide.

18. ACTÆA, L. BANE BERRY. COHOSH.

Sepals 4 or 5, falling off when the flower expands. Petals 4-10, small, flat, spatulate. Stamens numerous, with slender white filaments. Pistil single: stigma sessile, depressed, 2-lobed. Fruit a many-seeded berry. Seeds smooth, flattened and packed horizontally in 2 rows. Perennials, with 2-3-ternately compound leaves, the ovate leaflets sharply cleft and toothed, and a short and thick terminal raceme of white flowers. (Name from *ἀκτῆ*, *the elder*, from a resemblance in the leaves.)

1. **A. rubra**, Willd. (RED BANE BERRY.) Raceme ovoid or hemispherical; petals acutish; pedicels of the fruit slender; berries cherry-red. — Woods. Apr. — May. — About 2 feet high; the leaves very large when full grown. Berries oval, ripe in summer, forming a raceme 3'-4' long; the slender pedicels an inch long.

2. **A. alba**, Bigelow. (WHITE BANE BERRY.) Raceme oblong; petals truncate at the apex; pedicels of the fruit thickened, even as large as the common peduncle; berries milk-white. — Woods,

May, later than No. 1, and generally a larger plant. Berries sometimes tipped with purple. — From Mr. Oakes we have a variety with quite *slender fructiferous pedicels*. On the other hand, we learn that Dr. Knieskern has found in W. New York a red-fruited plant with thick pedicels; so that the most obvious characteristics of the two species are not entirely constant.

19. CIMICÍFUGA, L. BUGBANE.

Sepals 4 or 5, falling off soon after the flower expands. Petals, or rather transformed stamens, 1 – 8, small, on claws, 2-horned at the apex. Stamens as in *Actæa*. Pistils 1 – 8, forming dry pods in fruit. — Perennials, with 2 – 3-ternately divided leaves, the leaflets cut-serrate, and white fetid flowers in elongated wand-like racemes. (Name from *cimex*, a bug, and *fugo*, to drive away; the Siberian species being used as a bugbane.)

§ 1. *MACRÒTYS*, Raf. — Pistil 1, or sometimes 2: seeds smooth, flattened and packed horizontally in the pod in two rows, as in *Actæa*: stigma flat.

1. *C. racemòsa*, Ell. (BLACK SNAKE-ROOT.) Racemes very long; pods ovoid, sessile. — Rich woods, Maine and Vermont to Michigan. July. — Plant 3° – 8° high, from a thick knotted root-stock: the racemes in fruit becoming 1° – 2° long. Stamens very numerous, white.

§ 2. *CIMICIFUGA*, L. — Pistils 3 – 8: seeds flattened laterally, covered with chaffy scales, and occupying one row in the membranaceous pods: stigma pointed.

2. *C. Americana*, Michx. (AMERICAN BUGBANE.) Racemes slender, paniced; pods mostly 5, stalked, flattened, veiny, 6 – 8-seeded. — High mountains of Pennsylvania and southward. Aug. — Plant 2° – 3° high, more slender than No. 1; the flowers also smaller.

ADÒNIS AUTUMNÀLIS, L., the PHEASANTS' EYE of Europe, has been found growing spontaneously in Western New York.

NIGÉLLA DAMASCÈNA, L., the FENNEL-FLOWER, which offers a remarkable exception, in having the pistils partly united into a compound ovary, so as to form a several-celled pod, grows nearly spontaneously around gardens.

PÆDÒNIA, the PÆONY, of which some species are familiar in gardens, forms a sixth tribe of this order, distinguished by a leafy persistent calyx, and an hypogynous fleshy disk surrounding the base of the follicular pistils.

ORDER 2. MAGNOLIACEÆ. (MAGNOLIA FAMILY.)

Trees or shrubs, with the leaf-buds sheathed by membranous stipules, polypetalous, hypogynous, polyandrous, polygynous; the calyx and corolla colored alike, in three or more rows of three, imbricated in the bud. — Sepals and petals deciduous. Stamens in several rows at the base of the receptacle: anthers adnate. Pistils many, mostly packed together and covering the prolonged receptacle, cohering with each other, and in fruit forming a sort of fleshy or dry cone. Seeds 1 or 2 in each carpel, anatropous: albumen fleshy: embryo minute. — Leaves alternate, not toothed, marked with minute transparent dots, feather-veined. Bark aromatic and bitter. Flowers single, large.

1. MAGNŌLIA, L. MAGNOLIA.

Sepals 3. Petals 6–9. Stamens with very short filaments and long anthers opening inwards. Pistils aggregated and coherent in a mass, together forming a fleshy and rather woody cone-like fruit; each carpel opening on the back at maturity, from which the 1 or 2 berry-like seeds hang by an extensile stalk composed of a fine web of unrolled spiral vessels. Inner seed-coat bony. — Buds conical, formed of the successive pairs of stipules rolled up, each pair enveloping the leaf next above, which is folded lengthwise, and applied straight against the side of the next stipular sheath, and so on. (Named after *Magnol*, Professor of Botany at Montpellier, in the 17th century.)

1. *M. glàuca*, L. (SMALL OF LAUREL MAGNOLIA. SWEET BAY.) *Leaves* oblong or oval, *obtuse, white beneath*; petals rounded-ovate; cone of fruit small, oblong. — Swamps, from near Cape Ann, and New York southward, near the coast. June–Aug. — Shrub 4°–10°, with thickish leaves, which further south are evergreen. Flower white, very fragrant, 2'–3' broad.

2. *M. acuminàta*, L. (CUCUMBER-TREE.) *Leaves* oval, *pointed, green* and a little pubescent beneath, scattered; petals oblong; cone of fruit small, cylindrical. — Rich woods, W. New York, Penn., Ohio. May, June. — Tree 60–90 feet high. Leaves thin, 5'–10' long. Flower pale greenish-yellow, 3'–4' broad. Fruit 2'–3' long, when young slightly resembling a small cucumber.

3. **M. Umbrélla**, Lam. (UMBRELLA-TREE.) *Leaves obovate-lanceolate*, pointed at both ends, soon smooth, *crowded in a circle at the apex of the flowering branches*; petals obovate-oblong; cone of fruit large, conical-oblong. — Mountains of Penn. (and W. New York?). May. — A small tree. Leaves 1°-2° long. Flowers white, 7'-8' broad. Fruit rose-color, 4'-5' long. — Possibly *M. FRASERI* (the LONG-LEAVED CUCUMBER-TREE) grows in the mountains of Pennsylvania. It is hardy in cultivation as far north as Boston. *M. MACROPHYLLA* (the LARGE-LEAVED MAGNOLIA) scarcely is so.

2. LIRIODÉNDRON, L. TULIP-TREE.

Sepals 3, reflexed. Petals 6, in 2 rows, making a bell-shaped corolla. Anthers linear, opening outwards. Pistils flat and scale-form, long and narrow, imbricated and cohering together in an oblong cone, dry, separating from each other and from the prolonged slender axis in the fruit, and falling away whole, like a samara or key, indehiscent, 1-2-seeded in the small cavity at the base. Buds flattish, sheathed by the successive pairs of flat stipules joined at their edges, the folded leaves bent down on the petiole so that their apex points to the base of the bud. (Name from *λίριον*, *lily* or *tulip*, and *δένδρον*, *tree*.)

1. **L. Tulipífera**, L. — Rich soil. May, June. — A most beautiful tree, sometimes 140° high and 8°-9° in diameter in the Western States, where it is called *POPLAR*. Leaves very smooth, with 2 lateral lobes near the base, and 2 at the apex, which appears as if cut off abruptly by a broad shallow notch. Corolla 2' broad, greenish-yellow marked with orange.

ORDER 3. ANONÀCEÆ. (CUSTARD-APPLE FAMILY.)

Trees or shrubs, with naked buds and no stipules, a calyx of 3 sepals, a corolla of 6 petals in 2 rows, valvate (or nearly so) in the bud, hypogynous, polyandrous. Albumen ruminated. — Petals thickish. Anthers adnate, opening outwards; filaments very short. Pistils several or many, separate or cohering in a mass, fleshy or pulpy in fruit. Seeds anatropous, large, with a crustaceous seed-coat, and a minute embryo at the base of the ruminated albumen. — Leaves alternate, entire, feather-veined. Flowers axillary, solitary. Bark, &c., acrid-aromatic or fetid.

1. ASÍMINA, Adans. NORTH AMERICAN PAPAWE.

Sepals 3. Petals 6, in two sets, their margins in each set slightly overlapping in the bud; the outer set larger. Stamens numerous in a globular mass. Pistils few, forming large and oblong pulpy several-seeded fruits. — Shrubs or small trees, with unpleasant odor when bruised; the dull-colored flowers axillary and solitary. (Name from *Asiminier*, of the French colonists.)

1. **A. triloba**, Dunal. (COMMON PAPAWE.) Leaves thin, obovate-lanceolate, pointed; petals dull-purple, veiny, round-ovate, the outer ones 3-4 times as long as the calyx. (*Uvaria*, *Alph. DC.*, *Torr. & Gray*.) — Banks of streams in rich soil, W. New York and Penn. to Ohio and southward. April, May. — Tree 10°-20° high; the young shoots and expanding leaves clothed with a rusty down, soon glabrous. Flowers appearing with the leaves, 1½' wide, each ripening 1-3 pulpy pods which are 2'-3' long, yellowish, sweet and edible in autumn.

ORDER 4. MENISPERMÀCÆÆ. (MOONSEED FAMILY.)

Woody climbers, with palmate or peltate alternate leaves, without stipules; the sepals and petals similar in 3 or more rows, imbricated in the bud; hypogynous, polygamo-diacious, 3-6-gynous: fruit a 1-seeded drupe, with a large curved embryo. — Stamens several. Ovaries nearly straight, with the stigma at the apex, but incurved in fruiting, so that the seed is bent into a crescent, or ring. Embryo curved like the seed. Albumen sparing.

1. MENISPÉRMUM, L. MOONSEED.

Sepals 4-8. Petals 4-7. Stamens 12-20 in the sterile flowers: anthers 4-celled. Pistils 2-4 in the fertile flowers, raised on a short stalk, one or two ripening into round drupes, the stone coiled into a ring. (Name from *μήνη*, *moon*, and *σπέρμα*, *seed*.)

1. **M. Canadense**, L. (CANADIAN MOONSEED.) Leaves peltate near the edge, 3-7-angled or lobed; panicles axillary. — Banks of streams. May. — Flowers greenish-white: petals shorter than the sepals: imperfect stamens sometimes in the fertile flowers. Drupes black with a bloom, looking like frost-grapes: the bony endocarp wrinkled: the slender embryo bent into the form of a horse-shoe.

ORDER 5. BERBERIDACEÆ. (BARBERRY FAMILY.)

Shrubs or herbs, with the sepals and petals both imbricated in the bud in 2 or more rows of 2-4 each; the hypogynous stamens as many as the petals and opposite them; anthers opening by 2 valves or lids. (Podophyllum is an exception.) Pistil single.—Petals situated opposite the sepals taken as a whole. Filaments short. Fruit a berry or a pod. Seeds few or several, anatropous, with albumen. Leaves alternate.

Synopsis.

Tribe I. BERBERIDEÆ. Shrubs. Embryo large: cotyledons flat.

1. BERBERIS. Petals 6, each 2-glandular at the base.

Tribe II. NANDINEÆ. Herbs. Embryo short or minute.

2. LEONTICE. Petals 6, small and gland-like, hooded-kidney-form.

3. JEFFERSONIA. Petals 8, oblong, not glandular. Pod opening by a lid. Stamens 8: anthers opening by lids.

4. PODOPHYLLUM. Petals 6-9. Stamens 12-18: anthers not distinctly opening by lids. Fruit pulpy.

1. BERBERIS, L. BARBERRY.

Sepals 6, roundish, with 2 or 3 bractlets outside. Petals 6, obovate, with 2 glandular spots inside above the short claw. Stamens 6. Stigma circular, depressed. Fruit a 1-few-seeded berry. Seeds erect, with a crustaceous integument.—Shrubs, with yellow wood and inner bark, yellow flowers in drooping racemes, and sour berries and leaves. Stamens irritable. (Derived from *Berbéry*s, the Arabic name of the fruit.)

1. *B. vulgaris*, L. (COMMON BARBERRY.) Leaves scattered on the fresh shoots of the season, mostly small and with sharp-lobed margins, or reduced to sharp triple or branched spines; from which the next season proceed rosettes or fascicles of obovate-oblong bristly-toothed leaves, and drooping many-flowered racemes; petals entire; berries oblong, scarlet.—Introduced from Europe; thoroughly naturalized in E. New England. May, June.

B. CANADÉNSIS, Pursh, the AMERICAN BARBERRY, which grows abundantly in the mountains of Virginia, is to be sought in those of Pennsylvania. It is a low bush, with scarcely bristle-toothed leaves, notched petals, and oval berries.—The MAHONIAS, of which 2 or 3 species of Western America are cultivated, are Barberries with pinnate leaves.

2. LEÓNTICE, L. (CAULOPHYLLUM, Michx.) COHOSH.

Sepals 6, with 2-3 or more fugacious bractlets at the base, ovate-oblong. Petals 6 gland-like somewhat kidney-shaped or hooded bodies with short claws, much smaller than the sepals, one at the base of each of them. Stamens 6, opposite the petals: anthers oblong; the face of each cell opening (as in the family) like a lid or valve, hinged at the top. Pistil gibbous: style short: stigma minute: ovary bursting at an early stage by the pressure of the 2 erect enlarging seeds, soon withering away; the spherical seeds naked on their thick seed-stalks, looking like drupes; the fleshy integument blue; the solid albumen horny. (Name abbreviated by Linnæus from *Leontopetalum* of Tournefort. The name Caulophyllum was given because the leafstalks appear like a continuation of the stem.)

1. **L. thalictroides, L.** (BLUE COHOSH, or PAPPOOSE-ROOT.) Glaucous; stems simple from knotted and matted rootstocks; leaves ample, 3-ternate; the stem-leaf with a short common petiole or none; a smaller 2-ternate one at the base of the raceme-like panicle; leaflets obovate-wedge-form, 3-lobed. — Rich woods, Maine and Rhode Island to Wisconsin. May. Flowers small, yellowish-green. Seeds the size of large peas.

3. JEFFERSONIA, Barton. TWIN-LEAF.

Sepals 4, fugacious. Petals 8, oblong, flat. Stamens 8: anthers oblong-linear, on slender filaments. Ovary ovoid, soon gibbous, pointed: stigma 2-lobed. Pod rather pear-shaped, opening half way round horizontally making a lid. Seeds many on the lateral placenta, with a fleshy lacerate aril on one side. — Perennial glabrous herb, with matted fibrous roots, long-petioled root-leaves, bearing 2 half-ovate leaflets, and simple naked 1-flowered scapes. (Named in honor of *Thomas Jefferson*.)

1. **J. diphýlla, Pers.** — Woods in limestone soil, New York, Penn., and westward. Apr., May. — Low. Flower white, 1' broad: the parts sometimes in threes or fives. — Called *Rheumatism-root*.

4. PODOPHYLLUM, L. MAY-APPLE. MANDRAKE.

Sepals 6; the 3 outer fugacious, the inner early deciduous. Petals 6-9, obovate. Stamens (6-) 12-18: anthers not opening by perfect uplifted valves. Ovary ovoid: stigma large. Fruit

pulpy. Seeds covering the thick lateral placenta, inclosed in pulpy arils, all forming a mass which fills the cavity of the fruit. — Perennial, with creeping rootstocks and thick fibrous roots. Stems 2-leaved, 1-flowered. (Name from *ποῦς*, a foot, and *φύλλον*, a leaf, from a fancied resemblance of the 5-7-parted leaf to the foot of some web-footed animal.)

1. **P. peltatum**, L. Stamens 12-18; leaves 5-9-parted; the lobes oblong, rather wedge-shaped, somewhat lobed and toothed at the apex. — Rich woods, common. May. — Flowerless stems terminated by a large, round, 7-9-lobed leaf, peltate in the middle, like an umbrella. Flowering stems bearing 2 one-sided leaves, with the stalk fixed near the inner edge; the nodding white flower from the fork, nearly 2' broad. Fruit ovoid, 1'-2' long, ripe in July, slightly acid, mawkish, eaten by pigs and boys.

ORDER 6. CABOMBACEÆ. (WATER-SHIELD FAMILY.)

Aquatics, like Water-Lilies; but the sepals, petals, stamens, and pistils much fewer (definite) in number, all distinct and separate. (The principal technical characters as in the genus below.)

1. **BRASÈNIA**, Schreber. WATER-SHIELD.

Sepals 3 or 4, persistent, purple inside. Petals 3-4, linear, persistent. Stamens 12-36: filaments filiform: anthers innate. Pistils 4-18, forming little club-shaped indehiscent pods. Seeds 1-2 in each, attached to the dorsal suture! Embryo pendulous, small, inclosed in a peculiar bag, at the end of the albumen next the hilum. — Perennial herb, in ponds. Leaves alternate, long-petioled, centrally peltate, oval, floating on the water. Flowers axillary, small, dull-purple. (Name of uncertain origin.)

1. **B. peltata**, Pursh. (*Hydropeltis*, Michx.) — July. — Stalks coated with clear jelly. Leaves entire, 2'-3' across.

ORDER 7. NELUMBIACEÆ. (NELUMBO FAMILY.)

Huge aquatics, like Water-Lilies, but the pistils distinct, forming acorn-shaped nuts, and separately imbedded in cavities of the enlarged top-shaped receptacle. Seeds solitary, filled with the large highly developed embryo: albu-

men none. — Sepals and petals colored alike, in several rows, hypogynous, as well as the numerous stamens, deciduous. Leaves orbicular, centrally peltate and cup-shaped.

1. NELUMBIUM, Juss. NELUMBO. SACRED BEAN.

Character same as of the order. (Name Latinized from *Nelumbo*, the Ceylonese name of the E. Indian species.)

1. **N. luteum**, Willd. (YELLOW NELUMBO, or WATER CHINQUEPIN.) Corolla pale yellow: anthers tipped with an appendage. — Waters of the Western States; rare in the Middle States: introduced into the Delaware below Philadelphia. Also Big Sodus Bay, L. Ontario, and in the Connecticut near Lyme, probably introduced by the aborigines. June, July. — Leaves 1^o–2^o broad. Flower 5'–6' in diameter. Tubers farinaceous. Seeds also eatable. Embryo like that of *Nymphæa* on a large scale. Cotyledons thick and fleshy, inclosing a plumule of 1 or 2 well-formed young leaves.

ORDER 8. **NYMPHÆACEÆ.** (WATER-LILY FAMILY.)

Aquatic herbs, with round or peltate floating leaves, and solitary showy flowers from a prostrate rootstock; the partly colored sepals and numerous petals and stamens imbricated in several rows; the numerous pistils combined into a many-celled compound ovary. — Sepals and petals persistent and decaying on or around the fruit. Stamens with slender adnate anthers opening inwards. Fruit a pod-like berry ripening under water, crowned with the radiate stigmas, 14–30-celled; the many anatropous seeds attached to the sides and back of the cells. Embryo small, inclosed in a little bag at the end of the albumen, next the hilum, with a distinct plumule, inclosed by the 2 cotyledons.

1. NYMPHÆA, Tourn. WATER-NYMPH. WATER-LILY.

Sepals 4, green outside. Petals numerous in many rows, the inner narrower and gradually passing into stamens, inserted all over the receptacle which incloses the base of the ovary. Stamens inserted on the top of the receptacle, the outer with petal-like filaments. Stigmas linear, separate. Fruit depressed-globular, covered with the bases of the decayed petals. Seeds inclos-

ed in a sac-like aril. — Flowers white (rose-color or blue), very showy. (Dedicated by the Greeks to the Water-Nymphs.)

1. **N. odoràta**, Ait. (SWEET-SCENTED WATER-LILY.) Leaves orbicular, sometimes almost kidney-shaped, cordate-cleft at the base to the petiole, the margin entire; stigmas 16 - 30, incurved: flower white, fragrant. — Varies with the flowers rose-color. — Ponds, common in deep water; the trunks imbedded in the mud at the bottom, often as large as a man's arm. July - Sept.

2. **NÛPHAR**, Smith. YELLOW POND-LILY.

Sepals 5 or 6, partly colored, roundish. Petals numerous, small and stamen-like, compactly inserted with the stamens into an enlargement of the receptacle at the base of the ovary, shorter than the circular flat-topped and radiate sessile compound stigma. Fruit ovoid, naked. Aril none. — Flowers yellow. (Name from *Neufar*, the Arabic name for the Pond-Lily.)

1. **N. àdvena**, Ait. Leaves erect or floating on half-cylindrical petioles, heart-shaped at base, oblong or rounded; *sepals* 6; *fruit furrowed*. — Ponds and ditches, mostly in shallow water; flowering all summer. Also called *Spatter-dock*.

2. **N. lùtea**, Smith. Leaves floating, on triangular or rounded petioles; *sepals* 5; *fruit not furrowed*; stigma 16 - 20-rayed. — Var. **KALMIANA** is smaller in all its parts; stigma 8 - 14-rayed. — Ponds, common northward.

ORDER 9. SARRACENIÀCEÆ. (PITCHER-PLANTS.)

Bog-plants with hollow pitcher-form or trumpet-shaped radical leaves, and an umbrella-shaped petal-like style; characters those of the typical genus.

1. **SARRACÈNIA**, Tourn. SIDESADDLE-FLOWER.

Sepals 5, with 3 bractlets at the base, colored, persistent. Petals 5, oblong or obovate, incurved, deciduous. Stamens numerous, hypogynous. Ovary compound, 5-celled, globose, crowned with a short style, which is expanded at the summit into a very broad and petal-like 5-angled 5-rayed umbrella-shaped body; the 5 delicate rays terminating under the angles in as many little hooked stigmas. Capsule with a granular surface, protected by the persistent style, 5-celled, with many-seeded placentæ in the

axis, 5-valved. Seeds anatropous, with a small embryo at the base of fleshy albumen. — Perennials, yellowish-green and purplish; the hollow leaves having a wing on one side, and a rounded arching hood at the apex. (Named by Tournefort in honor of *Dr. Sarrazin* of Quebec, who first sent our Northern species, and a botanical account of it, to Europe.)

1. *S. purpûrea*, L. (SIDESADDLE-FLOWER. HUNTSMAN'S CUP.) Leaves pitcher-shaped, ascending, curved, broadly winged, the hood erect, open, round - heart-shaped; flower deep purple; the petals arched over the (greenish-yellow) style, fiddle-shaped. — Var. *HETEROPHYLLA*: flower all greenish-yellow — Peat-bogs, common northward: the pale variety at Northampton, Massachusetts, and W. New York, rare. June. — The curious leaves are usually half filled with water and drowned insects: the inner face of the hood clothed with stiff bristles pointing downward. Flower globose, nodding on a scape a foot high: it is difficult to fancy any resemblance between its shape and a sidesaddle, but it is not very unlike a pillion.

ORDER 10. PAPAVERACEÆ. (POPPY FAMILY.)

Herbs with milky or colored juice, regular flowers, fugacious sepals, polyandrous, hypogynous, having a 1-celled pod with 2 or more parietal placenta — Sepals 2, sometimes 3, falling when the flower expands. Petals 4 - 12, spreading, imbricated in the bud, deciduous. Stamens 16 - many, distinct. Fruit a dry pod. Seeds numerous, anatropous, often crested, with a minute embryo at the base of fleshy and oily albumen. — Juice narcotic or acrid. Leaves alternate, without stipules. Peduncles mostly 1-flowered.

Synopsis.

- * Petals more or less crumpled in the bud.
- Pod partly many-celled by the projecting placenta, not valved.
- 1. PAPAVER. Stigma united in a radiate crown: style none.
- Pod strictly 1-celled, 2 - 6-valved; the valves separating by their edges from the thread-like placenta, which remain as a framework.
- 2. ARGEMONE. Stigmas (sessile) and placenta 4 - 6. Pod and leaves prickly.
- 3. STYLOPHORUM. Stigmas and placenta 3 - 4. Style distinct, columnar. Pod bristly.

4. **CHELIDONIUM**. Stigmas and placenta 2. Pod linear, smooth. Petals 4. Stamens rather few.

* * Petals not crumpled in the bud.

5. **SANGUINARIA**. Petals 8-12. Pod oblong, turgid, 2-valved.

1. PÀPÀVER, L. POPPY.

Sepals mostly 2. Petals 4. Stigmas united in a flat 4-20-radiate crown resting on the summit of the ovary and capsule; the latter short and turgid, with 4-20 many-seeded placenta projecting like imperfect partitions, opening by as many pores or chinks under the edge of the stigma. — Herbs with a white juice; the flower-buds nodding. (Derivation obscure.) — Two species of the Old World are scarcely naturalized in this country, viz.

1. **P. somníferum**, L. (COMMON POPPY.) ① Smooth, glaucous; leaves clasping, wavy, incised and toothed; pod globose. — Escaped from gardens. Corolla mostly white or purple.

2. **P. dùbium**, L. (SMOOTH-FRUITED CORN-POPPY.) ① Pinnatifid leaves and the long stalks bristly; pods club-shaped, smooth; corolla light scarlet. — Introduced around Westchester, Penn.

2. ARGEMÒNE, L. PRICKLY POPPY.

Sepals 2 or 3. Petals 4-6. Style almost none: stigmas 3-6, radiate. Pod oblong, prickly, opening by 3-6 valves at the top. — Herbs with prickly bristles and yellow juice. Seeds crested. Leaves sessile, sinuate-lobed, and with prickly teeth, blotched with white. Flower-buds erect, short-peduncled. (Name from ἀργέμα, a disease of the eye, for which the juice was a supposed remedy.)

1. **A. Mexicana**, L. (MEXICAN PRICKLY POPPY.) ① ② Flowers solitary (pale yellow or white); calyx prickly. — Waste places, escaped from gardens. July - Oct.

3. STYLÓPHORUM, Nutt. CELANDINE POPPY.

Sepals 2, hairy. Petals 4. Style distinct, columnar: stigma 3-4 lobed. Pod ovoid, bristly, 3-4-valved to the base. Seeds conspicuously crested. — Perennial herb, with pinnatifid or pinnately divided leaves like Celandine, the uppermost in pairs, subtending one - several slender 1-flowered peduncles, the buds and pods nodding. Juice yellow. Corolla yellow. (Name from στύλος, a style, and φέρω, to bear; one of its characters.)

1. **S. diphýllum**, Nutt. (*Meconopsis diphylla*, DC., Torr. & Gr.) — Woods, W. Penn. to Wisconsin. May — Aug. — Divisions of the leaves 5-7, sinuate-lobed. Flower 2' broad. — *S. petiolatum*, Nutt., is the same plant.

4. CHELIDÓNIUM, L. CELANDINE.

Sepals 2. Petals 4. Stamens 16-24. Style nearly none: stigma 2-lobed. Pod linear, slender, smooth, 2-valved, the valves opening from the bottom. Seeds crested. — Perennial, with brittle stems, saffron-colored acrid juice, pinnately divided or 2-pinnatifid leaves, and small yellow flowers in umbel-like clusters. (Name from *χελιδών*, the *Swallow*, because, according to Dioscorides, it begins to flower at the time the swallows appear.)

1. **C. màjus**, L. (CELANDINE.) Common peduncles many-flowered; leaflets 5-7, bluntly lobed and toothed, the uppermost confluent. — Waste places. May — Aug.

5. SANGUINÀRIA, Dill. BLOOD-ROOT.

Sepals 2. Petals 8-12, spatulate-oblong, the inner narrower. Stamens about 24. Style short: stigma 2-grooved. Pod oblong, turgid, 2-valved. Seeds with a large crest. — A low perennial, with thick prostrate rootstocks surcharged with red-orange acrid juice, sending up in earliest spring a rounded palmate-lobed leaf, and a 1-flowered naked scape. Flower white. (Name taken from the color of the juice.)

1. **S. Canadénsis**, L. — Open woods, common. April, May.

GLAUCIUM FLÀVUM, the YELLOW HORN-POPPY, has escaped from gardens in some places.

ESCHSCHÓLTZIA CALIFÓRNICA, and E. DOUGLÁSII, now common cultivated annuals, are curious Papaveraceous plants from California and Oregon. Their juice is colorless, but fetid, or with the odor of muriatic acid.

ORDER 11. FUMARIÀCEÆ. (FUMITORY FAMILY.)

Delicate smooth herbs, with watery juice, compound dissected leaves, irregular flowers, with 4 somewhat united petals, 6 diadelphous stamens, and pods and seeds like those of the Poppy Family. — Sepals 2, small and scale-like.

Corolla flattened, closed; the 4 petals in two pairs; the outer with spreading tips, and one or both spurred or gibbous at the base; the inner pair narrower and with their callous crested tips united over the stigma. Stamens in 2 sets of 3 each, placed opposite the larger petals, hypogynous; their filaments more or less united; the middle anther of each set 2-celled, the lateral ones 1-celled. Stigma flattened at right angles with the ovary. Pod 1-celled, either 1-seeded and indehiscent, or several-seeded with 2 placentæ. — Leaves alternate.

Synopsis.

- * Pod slender: the 2 valves separating from the filiform placentæ.
- 1. *ADLUMIA*. Corolla heart-shaped, persistent. Seeds crestless.
- 2. *DICENTRA*. Corolla heart-shaped or 2-spurred. Seeds crested.
- 3. *CORYDALIS*. Corolla 1-spurred at the base. Seeds crested.
- * * Pod fleshy, indehiscent, globular, 1-seeded.
- 4. *FUMARIA*. Corolla 1-spurred. Seed crestless.

1. *ADLUMIA*, Raf. CLIMBING *CORYDALIS*.

Petals all permanently united in an ovate corolla, 2-gibbous at the base, becoming dry and persistent, inclosing the small few-seeded pod. Seeds not crested. Stigma 2-crested. — A climbing biennial vine, with 3-pinnate leaves, cut-lobed delicate leaflets, and ample panicles of drooping flowers. (Dedicated by Rafinesque to *Major Adlum*.)

1. *A. cirrhosa*, Raf. (*Corydalis fungosa*, Vent) — Wet woods, Maine to W. States. July - Oct. — A handsome vine with delicate foliage and pale flesh-colored blossoms, climbing by the tendril-like young leafstalks over high bushes, cultivated for festoons and bowers in shaded places. Petals all firmly united with each other and with the sheath of filaments; the cross-section displaying 3 large and 4 small cavities.

2. *DICENTRA*, Bork. (wrongly *Dicytra* or *Dielytra*).

Petals conniving, but scarcely united, deciduous or withering; the 2 outer gibbous or spurred at the base. Stigma 2-crested and sometimes 2-horned. Filaments slightly united. Pod 10-20-seeded. Seeds with a lateral crest. — Low, stemless perennials;

with ternately compound and dissected leaves and simple scapes, bearing racemose nodding flowers. Pedicels 2-bracted. (Name from *dis*, twice, and *κέντρον*, a spur.)

1. **D. Cucullària**, DC. (DUTCHMAN'S BREECHES.) *Granulate-bulbous*; lobes of the leaves linear; *raceme simple*, few-flowered; *corolla with 2 divergent spurs* longer than the pedicel; *crest of the inner petals minute*. — Rich woods, especially westward. April, May. — A very delicate plant, sending up in early spring, from the cluster of little grain-like tubers inclosed in a scaly sheath like a bulb, the finely cut long-stalked leaves and slender scape, the latter bearing 4-10 pretty, but odd-shaped, white flowers tipped with cream-color.

2. **D. Canadènsis**, DC. (SQUIRREL-CORN.) Subterranean shoots *tuberiferous*; leaves and raceme as in No. 1.; *corolla* merely *heart-shaped*, the spurs very short, rounded; *crest of the inner petals conspicuous, projecting*. — Rich woods, Maine to Wisconsin, especially northward. May. — Tubers scattered, round, flattened, as large as peas or grains of Indian corn, yellow. Calyx minute. Flowers greenish-white tinged with red, with the fragrance of Hyacinths.

3. **D. eximia**, DC. Divisions and lobes of the leaves broadly oblong; *raceme compound, clustered*; *corolla oblong, 2-gibbous* at the base; *crest of the inner petals projecting*. — Rocks, W. New York, rare, *Thomas, Sartwell*; and southward along the Alleghanies. — A larger plant than the others, blossoming all summer, often cultivated. Flowers reddish-purple. — *D. FORMOSA*, from Oregon, also cultivated, is a similar but still larger species.

3. CORÝDALIS, L. CORYDALIS.

Corolla 1-spurred at the base (on the upper side), deciduous. Style persistent. Pod many-seeded. Seeds crested. Flowers in racemes. (The ancient Greek name for the Fumitory.) Our species are biennial.

1. **C. aùrea**, Willd. (GOLDEN CORYDALIS.) *Stems low, spreading*; racemes simple; spur incurved; *Pods pendent*; seeds with a scalloped crest. — Rocks by streams, Vermont to Penn. and Michigan. April-July. — Glauous: flowers golden-yellow and showy, or paler and less handsome. Pods hardly 1' long, uneven.

2. **C. glaùca**, Pursh. (PALE CORYDALIS.) *Stem upright*; racemes paniced; spur short and rounded; *Pods erect*, slender, elongated; seeds with a small entire crest. — Rocky places, common. May-July. Corolla whitish shaded with yellow and flesh color.

4. FUMÀRIA, L. FUMITORY.

Corolla 1-spurred at the base. Style deciduous. Fruit indehiscent, small, globular, 1-seeded. Seeds crestless. — Branched annuals, with finely dissected compound leaves and dense racemes or spikes. (Name from *fumus*, smoke.)

1. **F. officinàlis**, L. (COMMON FUMITORY.) Sepals ovate-lanceolate, acute, sharply toothed, narrower and shorter than the corolla; fruit slightly notched. — Waste places, about dwellings; introduced. — Flowers small, flesh-color tipped with crimson.

ORDER 12. CRUCÍFERÆ. (MUSTARD FAMILY.)

Herbs with a pungent watery juice and cruciform tetradynamous flowers: fruit a silique or silicle. — Sepals 4, deciduous. Petals 4, hypogynous, regular, placed opposite each other in pairs, their spreading limbs forming a cross. Stamens 6, 2 of them inserted lower down and shorter. Pod 2-celled by a thin partition stretched between the 2 marginal placentæ, from which when ripe the valves separate, either much longer than broad (*silique*), or short (*silicle* or *pouch*), sometimes indehiscent and nut-like (*nucumetaceous*) or separating across into 1-seeded joints (*lomenteaceous*). Seeds campylotropous, without albumen, filled by the large embryo, which is curved or folded in various ways. — Leaves alternate, no stipules. Flowers in terminal racemes or corymbs: pedicels not bracted. — A very natural, homogeneous family.

Synopsis.

I. SILIQUOSÆ. Pod a *silique*, opening by valves.

Tribe 1. ARABIDEÆ. Pod elongated (except *Nasturtium*). Cotyledons accumbent; that is, with their edges applied to the radicle. Seeds flattened.

1. **NASTURTIIUM**. Pod oblong, turgid, or barely linear and curved upwards. Seeds irregularly in two rows in each cell.
2. **IODANTHUS**. Pod linear, elongated, terete. Seeds in a single row. Petals violet-purple.
3. **CARDAMINE**. Pod linear, flattened; the valves nerveless. Seeds in a single row in each cell. Stems leafy. Flowers white or purple.

4. DENTARIA. Pod lanceolate, flat, the valves nerveless. Seeds in a single row in each cell. Stem few-leaved in the middle, from a toothed or jointed rootstock. Flowers white-purple.
5. ARABIS. Pod linear, flat or flattish; valves 1-nerved in the middle. Seeds in a single row in each cell. Flowers white or rose-color.
6. TURRITIS. Pod, &c., as in Arabis, but the seeds in 2 rows in each cell.
7. BARBAREA. Pod linear, 4-sided. Flowers yellow.

Tribe 2. SISYMBRIÆ. Pod elongated. Cotyledons plane, incumbent, that is, the back of one of them applied to the radicle. Seeds thickish or oblong.

8. ERYSIMUM. Pod 4-sided, linear. Flowers yellow.
9. SISYMBRIUM. Pods terete or flattish, linear or awl-shaped.

Tribe 3. BRASSICÆ. Pod elongated. Cotyledons incumbent, conduplicate and folded round the radicle. Seeds globose.

10. SINAPIS. Pod terete: valves 3-5-nerved. Calyx spreading.

II. SILICULOSÆ. — Pod short, a *silicle*, opening by valves.

Tribe 4. ALYSSINÆ. Pod oval or oblong: partition broad. Cotyledons accumbent. (The short-podded species of *Nasturtium* would be looked for here.)

11. DRABA. Pod flattened, many-seeded. Flowers white or yellow.
12. COCHLEARIA. Pod ovoid, turgid, several-seeded. Flowers white.

Tribe 5. CAMELINÆ. Pod ovoid or oblong: partition broad. Cotyledons incumbent.

13. CAMELINA. Pod obovoid, turgid. Style slender.
14. SUBULARIA. Pod oval, turgid. Style none.

Tribe 6. LEPIDINÆ. Pod short, the boat-shaped valves compressed at right angles to the narrow partition. Cotyledons incumbent (or sometimes accumbent.)

15. LEPIDIUM. Pod roundish, 2-seeded.
16. CAPSELLA. Pod inversely heart-shaped-triangular, many-seeded.

III. LOMENTACÆ. — Pod separating across into joints.

Tribe 7. CAKILINÆ. Cotyledons plane, accumbent.

17. CAKILE. Pod short, 2-jointed, with one seed in each joint.

Tribe 8. RAPHANÆ. Cotyledons conduplicate, incumbent, as in Tribe 3.

18. RAPHANUS. Pod elongated, transversely many-celled.

Tribe I. ARABÍDEÆ. THE CRESS TRIBE.

1. NASTÚRTIUM, R. Br. CRESS.

Pod nearly terete, linear-oblong and curved upwards, or short like a silicle. Seeds small, irregularly 2-rowed in each cell, marginless. — Aquatic or marsh plants, with yellow or white flowers, and pinnate or pinnatifid leaves. (Name from *Nasus tortus*, a convulsed nose, alluding to the effect of its pungent qualities.)

* *Introduced: pod linear: flower white.*

1. **N. officinale**, R. Br. (WATER CRESS.) Stems rooting, smooth; leaves pinnate, with 3–5 rounded leaflets; petals conspicuous, longer than the calyx. ♀. — Brooks and ditches, escaped from cultivation. Finely naturalized at Niagara Falls on the Canada side.

* * *Indigenous: pods oblong or ovoid: flowers yellow or yellowish.*

2. **N. palustre**, DC. (MARSH CRESS.) Stem upright, smooth or hairy; leaves pinnatifid and toothed, the lower lyre-shaped; petals (yellowish) as long as the calyx; *pods ovoid-oblong varying to ovoid, obtuse, turgid, tipped with a very short style, equalling or rather shorter than the spreading pedicels.* ♀. — Wet banks of streams, common. June–Sept. — Plant coarse, 1°–2° high, with very small flowers. — The plant of the Northern States is often hairy, and has shorter pods than the European, nor does it agree with *N. amphibium*, for which it has been taken.

3. **N. hispidum**, DC. (HAIRY CRESS.) Upright, rough-hairy; leaves runcinate-pinnatifid and toothed; petals (yellowish) hardly as long as the calyx; *pods (minute) ovoid, scarcely half as long as the somewhat spreading pedicels, tipped with a very short style.* ♀. — Wet places, Middletown, Connecticut, and Hudson River near the Highlands. *Barratt.* — Apparently connected by intermediate varieties with the foregoing.

4. **N. natans**, DC. (FLOATING CRESS.) Aquatic, smooth; *immersed leaves pinnate*, with numerous and crowded *capillary* divisions; *emersed leaves oblong, entire or serrate, sometimes pinnatifid*; petals (white) longer than the calyx; *pods globose-obovate, tipped with a slender style.* ♀. — In ponds and rivers, Oneida Lake and St. Lawrence River, New York. Ohio and Michigan. July.

N. sylvestre of Europe, with linear pods and yellow blossoms, is said to be naturalized on the Delaware near Philadelphia.

2. IODÁNTHUS, Torr. & Gray. FALSE ROCKET.

Pod linear, elongated, terete. Seeds in a single row in each cell, margined. Style thick: stigma capitate. Claws of the vio-

let-purple petals longer than the calyx. — A smooth perennial, with ovate-oblong pointed toothed leaves, the lowest sometimes lyrate-pinnatifid, and showy flowers in paniced racemes. (Name from *ιώδης*, violet-colored, and *ἄνθος*, flower.)

1. **I. hesperidoides**, Torr. & Gray. (*Hesperis pinnatifida*, Michx.) — Banks of rivers, W. Penn., Ohio, &c. May, June. — Stem 1° - 3° high. Petals 5'' long, spatulate. Pods 1' to nearly 2' long, somewhat curved upwards, much longer than the stout spreading pedicels, knotty, rather fleshy: the valves obscurely 1-nerved.

3. CARDÁMINE, L. BITTER CRESS.

Pod linear, flattened, usually opening elastically; the valves nerveless. Seeds in single rows in each cell; their stalks slender. — Flowers white or purple. (From *Κάρδαμον*, an ancient Greek name for Cress.)

* *Biennial: leaves pinnate: flowers small.*

1. **C. hirsuta**, L. (COMMON BITTER CRESS.) Mostly smooth in the United States, sometimes hairy; leaves pinnate with 5-13 leaflets, or lyrate-pinnatifid; leaflets of the lower leaves rounded, angled or toothed; of the upper oblong or linear, often entire; petals twice as long as the calyx (white); the narrow pods and the pedicels upright: style shorter than the width of the pod. — Moist places, everywhere: a small delicate variety, with narrow leaflets, growing on dry rocks, is *C. VIRGINICA*, Michx. (not of *Hb. Linn.*) May-July.

* * *Perennial: leaves pinnate: flowers showy.*

2. **C. pratensis**, L. (MEADOW CRESS. CUCKOO-FLOWER.) Stem ascending; leaflets 7-13, those of the lower leaves rounded and stalked; of the upper oblong or linear, entire, or slightly angled-toothed; petals (white or purplish) thrice the length of the calyx; style short but distinct. — Wet places and bogs, Vermont to Michigan northward, rare. May.

* * * *Perennial: leaves simple or 3-foliolate.*

3. **C. bellidifolia**, L. (DAISY-LEAVED BITTER CRESS.) Dwarf (2'-3' high) tufted; leaves ovate, entire, or sometimes 3-lobed, those from the short stems and root alike, long-petioled: pods upright: style nearly none. — Summit of the White Mountains, N. Hampshire. July. — Flowers few, corymbed, white. Pods 1'; leaves 4'' long.

4. **C. rotundifolia**, Michx. (AMERICAN WATER CRESS.) Stems branching, weak or decumbent, with creeping runners; root fibrous; leaves all much alike, roundish, somewhat angled, often heart-shaped at the base, petioled, the lowest frequently 3-lobed or of 3 leaflets; pods linear-awl-shaped, pointed with the style; stigma minute; seeds oval-oblong. (*Sill. Journal*, 42, p. 30.) — Cool, shaded

springs, Penn., and southward along the mountains. May, June. — Leaves with just the taste of the English Water Cress. Runners in summer 1° - 3° long. Flowers white, smaller than in No. 5.

† 5. **C. rhomboidea**, DC. (SPRING CRESS.) *Upright, tuberiferous; stems simple; root-leaves round and rather heart-shaped; lower stem-leaves ovate or rhombic-oblong, somewhat petioled, the upper almost lanceolate, all somewhat angled or sparingly toothed; pods linear-lanceolate, pointed with a slender style tipped with a conspicuous stigma; seeds round-oval.* — Wet meadows and springs, common. Flowers large, white. — Var. **PURPUREA**, W. New York and northward, is lower, a little pubescent, with the blossoms rose-color or purple. At the base of the stem is a cluster of little tubers. April, May. — Approaches *Dentaria*.

C. TÈRES, Michaux, is said to grow in New England in his *Flora*, and his specimens at Paris are ticketed "Lake Champlain, Vermont." But the plant appears clearly to be *Nasturtium tanacetifolium*, or *N. lyratum*, of the Southern States (cotyledons accumbent!), which leads me to suspect a mistake in the record of the locality.

4. **DENTÀRIA**, L. TOOTHWORT. PEPPER-ROOT.

Pod lanceolate, flat, as in *Cardamine*, but broader. Seed-stalks flat. — Perennials with long horizontal and fleshy toothed root-stocks of a pleasant pungent taste, sometimes interrupted; the low simple stems bearing 2 - 3 petioled compound leaves about the middle, often in a whorl, and a single raceme of large white or purple flowers. (Name from *dens*, a tooth.)

1. **D. diphýlla**, L. (COMMON TOOTHWORT OR PEPPER-ROOT.) *Rootstock long and continuous, toothed; stem-leaves 2, like the radical ones, close together, of 3 rhombic-ovate coarsely toothed leaflets.* — Rich woods, Maine and W. Massachusetts westward. May. — Root-stocks 5' - 10' long, crisp, tasting like Water Cress. Flowers white.

2. **D. máxima**, Nutt. (GREAT TOOTHWORT.) *Rootstock a string of strongly toothed tubers; stem-leaves (2-7) mostly 3 and alternate; leaflets 3 ovate, obtuse, coarsely toothed and incised, often 2-3 cleft.* (*D. laciniata*, var. *δ.*, Torr. & Gr., *Fl.*) — W. New York, and Penn., Nuttall! Watertown, New York, Dr. *Crawe!* May. — Stem 10' - 2° (Nutt.) high: raceme elongated. Flowers larger than No. 1, purple. Joints of the rootstock 1' - 2' long, ½' thick, starchy. Dr. *Crawe's* specimens of this rare species are not so large as Nuttall describes. The leaves are intermediate between No. 1 and No. 3.

3. **D. laciniàta**, Muhl. (CUT-LEAVED TOOTHWORT.) *Root-stock necklace-form, consisting of a chain of 3 or 4 nearly toothless oblong tubers; stem-leaves 3 in a whorl, 3-parted; the leaflets linear or*

lanceolate, obtuse, irregularly cut or cleft into narrow teeth, the lateral ones deeply 2-lobed. — Rich soil along streams, W. New Engl. to Penn. and Ohio. May. — A span high: raceme scarcely longer than the leaves. Flowers pale purple. Root-leaves much dissected.

4. **D. heterophylla**, Nutt. (DWARF TOOTHWORT.) *Root-stock necklace-form*, obscurely toothed; *stem-leaves 2 or 3*, small, *alternate*, 3-parted, the leaflets lanceolate and nearly entire; root-leaves of 3 round-ovate obtuse somewhat toothed and lobed leaflets. — W. Pennsylvania and southward. May. — A span high: stem-leaves 1' long. Flowers few, purple.

5. **ARABIS**, L. ROCK CRESS.

Pod long and linear, flattened, the valves 1-nerved in the middle. Seeds in a single row in each cell, usually margined or winged. — Flowers white or rose-color. (Name from the country Arabia. Linn., *Phil. Bot.*, § 235.)

* *Seeds narrowly margined or marginless.*

+ *Root perennial.*

1. **A. petræa**, Lam. (ALPINE ROCK CRESS.) Stem nearly upright, sometimes branched, glabrous, root-leaves petioled, pinnatifid; those of the stem oblong-linear, entire; pods spreading, straight; seeds with a narrow margin. — Shore of L. Superior and northward. Low, with the aspect of No. 2.

+ + *Root biennial or sometimes annual.*

2. **A. lyrata**, L. (AMERICAN ROCK CRESS.) Diffusely branched, low, glabrous except the lyrate-pinnatifid radical leaves; *stem-leaves spatulate or lanceolate, tapering to the base*, the upper entire; petals (white) twice the length of the calyx; *Pods erect-spreading, pointed with a short style*; seeds marginless. — Rocks. April - June. Stems 4' - 10' high. Radicle often oblique.

3. **A. dentata**, Torr. & Gray. (TOOTHED ROCK CRESS.) Rough-pubescent, diffusely branched; *leaves oblong*, very obtuse, unequally and sharply toothed; those of the stem *half-clasping and eared* at the base, of the root broader and tapering into a short petiole; petals (whitish) scarcely exceeding the calyx; *Pods spreading, straight, short-stalked*; *style scarcely any*. — River-banks, Utica, New York, rare, and Ohio. May. — About 1° high, slender. Pods 1' long; valves very obscurely nerved.

4. **A. patens**, Sulliv. (OPEN HAIRY ROCK CRESS.) Downy with spreading hairs, erect; stem-leaves oblong-ovate, acutish, coarsely toothed or the uppermost entire, half-clasping by the heart-shaped base; petals (bright white) twice the length of the calyx; *pedicels slender, spreading*; *Pods spreading and curving upwards, tipped with*

a distinct style. — Rocky banks of the Scioto, Ohio, Sullivant. May. — Plant 1^o - 2^o high. Flowers thrice as large as in No. 5, showy.

5. **A. hirsuta**, Scop. (STRAIT HAIRY ROCK CRESS.) Rough-hairy, sometimes smoothish, strait; stem-leaves oblong or lanceolate, entire or toothed, partly clasping by a somewhat arrow-shaped or heart-shaped base; petals (greenish white) small but longer than the calyx; *pedicels and pods strictly upright; style scarcely any.* — Rocks, Vermont to Penn. and Ohio. May, June. — Stem 1^o - 2^o high, simple or branched from the base. Root-leaves spatulate-oblong, sessile or nearly so. Pods numerous and appressed, narrow. Flowers small.

* * Seeds winged. (Petals narrow, whitish: seed-stalks adherent to the partition.)

6. **A. lævigata**, DC. (SMOOTH ROCK CRESS) Smooth and glaucous, upright; *stem-leaves partly clasping by the arrow-shaped base, lanceolate or linear, sparingly cut-toothed or entire; petals scarcely longer than the calyx; pods long and narrow, recurved-spreading.* — Rocky places, from Vermont westward. May. — Stem 1^o - 3^o high. Pods 3' long, on short merely spreading pedicels.

7. **A. Canadensis**, L. (SICKLE-POD.) Stem upright, smooth above; *stem-leaves pubescent, pointed at both ends, oblong-lanceolate, sessile, the lower toothed; petals twice the length of the calyx, oblong-linear; pods drooping, flat, scythe-shaped.* — Woods. June - Aug. — Stem 2^o - 3^o high. Pods 3' long and 2'' broad, veiny, hanging on rough-hairy pedicels, curved like a scymitar. (*A. falcata*, Michx.)

‡ *Obscure species.*

8. **A. heterophylla**, Nutt. Nearly smooth; root-leaves spatulate, toothed; upper ones linear, sessile, entire; pods long and spreading (3' long); petals linear-oblong, exceeding the calyx. — Paris, Maine, or near the White Mountains. ② Nuttall.

6. TURBITIS, Dill. TOWER MUSTARD.

Pod and flowers, &c., as in *Arabis*; but the seeds occupying 2 rows in each cell. — Biennials or rarely annuals. Flowers white or rose-color. (Name from *turris*, a tower, in allusion to the tall and narrow form of the plants.)

1. **T. glabra**, L. (SMOOTH TOWER MUSTARD.) *Stem-leaves oblong or ovate-lanceolate, smooth and glaucous, entire, half-clasping by the arrow-shaped base; petals little longer than the calyx; flowers and the long and narrow pods strictly erect.* — W. New York and Ohio. June. — Plant 2^o high. Root-leaves rough-hairy, toothed, petioled. Flowers yellowish-white. Pods 3' long, very narrow, straight.

2. **T. stricta**, Graham. (STRAIGHT TOWER MUSTARD.) Smooth;

stem-leaves lanceolate or linear, half-clasping by the arrow-shaped base, entire or nearly so; *petals twice the length of the calyx*; *pedicels erect* in flower and fruit; the linear elongated pods upright or spreading. — Jefferson and Chenango counties, New York, and L. Superior. May. — A foot high. Root-leaves small. Petals white, tinged with purple. Ripe pods 3' long, broader and flatter than in No. 1, and not always strictly upright.

3. **T. brachycárpa**, Torr. & Gray. (SHORT-PODDED TOWER MUSTARD.) Smooth and glaucous; *stem-leaves linear-lanceolate*, acute, arrow-shaped; *pedicels* of the flowers *nodding*, of the short and broadish pods spreading or ascending. — Fort Gratiot, &c., Michigan. — Root-leaves hairy. Pod 1' long. Flowers pale purple.

7. **BARBARÈA**, R. Br. WINTER CRESS.

Pod linear, somewhat 4-sided, the valves being strongly keeled by a mid-nerve. Seeds in a single row in each cell, marginless. — Perennials or biennials: flowers yellow. (Anciently called The Herb of St. Barbara.)

1. **B. vulgàris**, R. Br. (COMMON WINTER CRESS. YELLOW ROCKET.) Smooth; lower leaves lyrate, the terminal division round; upper leaves obovate, cut-toothed, or pinnatifid at the base; pods convex-4-angled, pointed with a distinct style. — Moist places and road-sides, common: probably introduced. May - Aug.

B. PRECOX grows in Canada and is perhaps sparingly introduced into the Northern States. It has longer flattened pods and a very short style.

Tribe II. SISYMBRIÈÆ. THE HEDGE MUSTARD TRIBE.

8. **ERÝSIMUM**, L. TREACLE MUSTARD.

Pod linear, 4-sided, the valves keeled. Seeds in a single row in each cell, oblong, marginless: cotyledons often obliquely incumbent. Calyx erect. — Chiefly biennials, with yellow flowers: the leaves not clasping. (Name from *ἐρύω*, to draw blisters.)

1. **E. cheiranthoïdes**, L. (WORM-SEED MUSTARD.) Minutely roughish, branching, slender; leaves lanceolate, scarcely toothed; pods ascending on slender divergent pedicels; stigma small, entire. — W. New York, thoroughly naturalized. July. Flowers small. Pods 1' long, obscurely 4-angled.

2. **E. Arkansànum**, Nutt. (WESTERN WALL-FLOWER.) Minutely roughish-hoary; stem simple; leaves lanceolate, somewhat toothed; pods nearly erect on very short pedicels, elongated, exactly

4-sided, pointed with a short taper style; stigma 2-lobed. — Central Ohio, on limestone cliffs, *Sullivant*. (Illinois, *Geyer*, *Dr. Meade*.) June, July. — Plant stout, 1^o-2^o high, with a crowded raceme of showy bright orange-yellow flowers as large as the Wall-flower. Pods 3' - 4' long, straight.

9. SISÝMBRIUM, L. HEDGE MUSTARD.

Pod terete or rather 4 - 6-sided; the valves 1 - 3-nerved. Seeds in a single row in each cell, oblong, marginless. Calyx open. — Flowers small, white or yellow. (An ancient Greek name for some plant of this family.)

1. **S. officinale**, Scop. (HEDGE MUSTARD.) *Leaves runcinate*; flowers very small, pale yellow; *Pods close pressed* to the stem, *awl-shaped*, scarcely stalked. ① — Waste places, introduced. May - Sept. — An unsightly branched weed, 2^o high.

2. **S. Thaliànum**, Gaud. (MOUSE-EAR CRESS.) *Leaves obovate or oblong, entire or barely toothed*; flowers white; pods linear, somewhat 4-sided, longer than the slender spreading pedicels. ② — Old fields and rocks, New York and Penn. Probably introduced. May. — A span high, slender, branched, hairy at the base.

3. **S. canescens**, Nutt. (HOARY HEDGE MUSTARD.) *Leaves 2-pinnatifid*, the divisions small and toothed; flowers whitish; pods in long racemes, oblong or rather club-shaped, not longer than the spreading pedicels. ① — Ohio and westward. — Slender, 1^o high, often hoary pubescent. Flowers very small.

Tribe III. BRASSICÆÆ. THE CABBAGE TRIBE.

10. SINÀPIS, Tourn. MUSTARD.

Pod nearly terete, with a short beak; the valves 3 - 5-(rarely 1-) nerved. Seeds globose, one-rowed. Cotyledons folded around the radicle. Calyx open. — Annuals or biennials, with yellow flowers. Lower leaves lyrate, incised, or pinnatifid. (Greek name *Σίναπι*, which is said to come from the Celtic *nap*, a turnip.)

1. **S. álba**, L. (WHITE MUSTARD.) *Pods bristly, turgid, on spreading pedicels, shorter than the sword-shaped beak*; leaves all pinnatifid. — Cultivated; sometimes spontaneous in old fields.

2. **S. arvénis**, L. (FIELD MUSTARD. CHARLOCK.) *Pods smooth, knotty, about thrice the length of the conical 2-edged beak*; upper leaves merely toothed. — A noxious weed in fields, W. New York, thoroughly naturalized.

3. **S. nìgra**, L. (BLACK MUSTARD.) *Pods smooth, 4-cornered (the valves 1-nerved only) appressed to the stem, tipped with a slender*

style; leaves lyrate or lobed. — Fields and waste places, partly naturalized. The seeds furnish the *mustard* of our tables.

Tribe IV. ALYSSINEÆ. THE ALYSSUM TRIBE.

11. DRÀBA, L. WHITLOW GRASS.

Pouch oval or oblong, flattened; the valves flat or slightly convex. Seeds numerous, in 2 rows in each cell, marginless. Calyx equal. Filaments not toothed. Low herbs, with entire or toothed leaves. Flowers white or yellow. (Name from *δράβη*, *acid*, in allusion to the pungency or acidity of the leaves.)

§ 1. DRÀBA, DC. — *Petals undivided.*

1. **D. arábisans**, Michx. (ROCK-CRESS WHITLOW GRASS.) Branched at the base, tufted, leafy; root-leaves oblanceolate, clustered; stem-leaves oblong, all sharply toothed towards the apex; flowers white in a short crowded raceme; *pods lanceolate-oblong*, tipped with a very short style, *longer than the pedicels*, smooth, often twisted when old. ♀ — Rocky banks of lakes, Vermont, N. New York, Michigan. May. — Plant 8' high, with conspicuous flowers.

2. **D. nemoralis**, Ehrh. (GROVE WHITLOW GRASS.) Low (3' - 5'), leafy next the base; leaves oval or lanceolate, toothed; *pods elliptical or oblong, much shorter than the pedicels, in a long raceme*; flowers yellow or whitish, minute. ① — Fort Gratiot, Michigan.

3. **D. Caroliniàna**, Walt. (LOW WHITLOW GRASS.) Dwarf, leafy and hispid at the base, branching; leaves roundish-ovate, entire; *pods linear, in a very short raceme*, much longer than the pedicels; flowers white, rather conspicuous. ② — Sandy fields, from Rhode Island southward. April - June. — Plant 1' - 3' high.

§ 2. ERÓPHILA. *Petals 2-cleft.*

4. **D. vérna**, L. (COMMON WHITLOW GRASS.) Dwarf; leaves clustered at the base, oblong or lanceolate, slightly toothed, hairy; stems several, leafless; *pods oval*, on long pedicels; flowers white, very small. ② — Fields, Maine to Penn. April, May. Scapes 1' - 3' high.

12. COCHLEÀRIA, Tourn. SCURVY-GRASS.

Pouch globose or ovoid, several-seeded; the valves very convex: otherwise as *Draba*. — Flowers white. (Deriv. *cochlear*, a spoon, from the concave leaves of some species.)

1. **C. Armoràcia**, L. (HORSE-RADISH.) Root-leaves very large, oblong, crenate-toothed, sometimes pinnatifid; those of the stem lanceolate. — Moist grounds, escaped from gardens, scarcely nat-

uralized. — Roots large and deep, well known for their pungent properties. (*C. OFFICINALIS*, the English SCURVY-GRASS, is sometimes found around gardens.)

Tribe V. CAMELINEÆ. THE FALSE FLAX TRIBE.

13. CAMELINA, Crantz. FALSE FLAX.

Pouch obovoid or pear-shaped, pointed, turgid; partition broad. Seeds numerous, oblong. Style slender. Flowers small, yellow. (Deriv. χαμαί, *dwarf*, and λίνον, *flax*.)

1. *C. sativa*, Crantz. Leaves lanceolate, arrow-shaped; pods margined, large. ① — Flax-fields, &c., imported. It has been fancied to be a sort of degenerate flax. (*Thlaspi arvense*, of Nuttall's Genera, is the same plant.)

14. SUBULÀRIA, L. AWLWORT.

Pouch oval, turgid, with a broad partition. Seeds several. Cotyledons long and slender, the cleft extending to the radicular side of the curvature. Style none. — A dwarf stemless perennial, aquatic; the tufted leaves awl-shaped (whence the name). Scape naked, few-flowered. Flowers minute, white.

1. *S. aquatica*, L. — Margin of lakes in Maine, *Nuttall, Tuckerman, &c.* June. Scape 1' - 3' high.

Tribe VI. LEPIDINEÆ. THE PEPPERWORT TRIBE.

15. LEPÍDIUM, L. PEPPERWORT. PEPPERGRASS.

Pouch roundish, flattened contrary to the narrow partition, usually notched at the apex; the valves boat-shaped and keeled. Seeds 1 in each cell: cotyledons incumbent or accumbent! Flowers small, white. Stamens often only two! (Name from λεπίδιον, *a little scale*, alluding to the small flat pods.)

1. *L. Virgínicum*, L. (WILD PEPPERGRASS.) Pods orbicular, wingless, notched; cotyledons accumbent; leaves lanceolate, toothed or incised; the radical ones pinnatifid; petals 4; stamens 2, sometimes 3. ① — Fields and road-sides. June - Sept.

2. *L. ruderàle*, L. (NARROW-LEAVED PEPPERWORT.) Pods roundish-oval, wingless, notched; cotyledons incumbent; stem-leaves linear, entire; petals wanting; stamens 2. ① — Michigan and northward.

3. *L. campéstre*, R. Br. (FIELD PEPPERWORT.) Pods ovate,

winged, notched, rough with minute scales; leaves arrow-shaped, toothed, downy. — S. New York, sparingly introduced.

16. CAPSÉLLA, Vent. SHEPHERD'S PURSE.

Pouch inversely heart-shaped-triangular, flattened contrary to the narrow partition; the valves boat-shaped, wingless. Seeds numerous: cotyledons incumbent. Annuals: flowers small, white. (Name a diminutive of *capsula*, a pod.)

1. **C. Bursa-pástoris**, Mœnch. (COMMON SHEPHERD'S PURSE.) Root-leaves clustered, pinnatifid or toothed; stem-leaves arrow-shaped, sessile. — Waste places, the commonest of weeds: introduced from Europe. April–Sept. (*Thlaspi Bursa-pastoris*, L.)

Tribe VII. CAKILÍNEÆ. THE SEA-ROCKET TRIBE.

17. CAKÍLE, Tourn. SEA-ROCKET.

Pod short, 2-jointed, angular, fleshy, the upper joint flattened at the apex, separating at maturity; each indehiscent, 1-celled, 1-seeded; the lower sometimes seedless. Seed erect in the upper, suspended in the lower joint. Cotyledons rather obliquely incumbent. — Sea-side, branching, fleshy annuals. Flowers purplish. (An old Arabic name.)

1. **C. Americàna**, Nutt. (AMERICAN SEA-ROCKET.) Leaves obovate, sinuate and toothed; lower joint of the fruit obovoid, emarginate; the upper ovate, flattish at the apex. (*Bunias edentula*, *Bige-locæ*.) — Coast of the Northern States and of the Great Lakes. July–Sept. — Joints nearly even and fleshy when fresh; the upper one 4-angled and appearing more beaked when dry. — Our plant is certainly distinct from the European species, which, however, or one more like it, occurs in the Southern States.

Tribe VIII. RAPHÀNEÆ. THE RADISH TRIBE.

18. RÁPHANUS, L. RADISH.

Pods linear or oblong, tapering upwards, 2-jointed; the lower joint often seedless and stalk-like; the upper necklace-form by constriction between the seeds, with no proper partition. Seeds as in the Mustard Tribe. — Annuals or biennials. (Name from *ῥά*, *quickly*, and *φαίω*, *to appear*, alluding to their rapid germination.)

1. **R. Raphanístrum**, L. (WILD RADISH. CHARLOCK.) Pods necklace-form, long-beaked; leaves lyre-shaped, rough; petals

yellow turning whitish or purplish, veiny. — Waste places and cultivated fields, too thoroughly naturalized in New England, where it is a most troublesome weed.

The most familiar representatives of this order in cultivation, not already mentioned, are of the *Cress Tribe*, the WALL-FLOWER (*Cheiranthus Cheiri*), various sorts of STOCK (*Matthiola annua*, &c.); of the *Hedge Mustard Tribe*, the ROCKET (*Hesperis matronalis*); of the *Cabbage Tribe*, the CABBAGE, CAULIFLOWER, RUTABAGA, and TURNIP (species of *Brassica*); of the *Alyssum Tribe*, the SWEET ALYSSUM (*A. maritimum*), MOONWORT or HONESTY (*Lunaria rediviva*); of the *Penny-Cress Tribe*, the CANDY-TUFT (*Iberis umbellata*, &c.); of the *Radish Tribe*, the GARDEN RADISH itself (*Raphanus sativa*): also the WOAD (*Isatis tinctoria*) the type of a tribe with indehiscent winged or nut-like fruit.

ORDER 13. CAPPARIDACEÆ. (CAPER FAMILY.)

Herbs (when in northern regions), *with cruciform flowers, but 6 or more not tetradynamous stamens, a 1-celled pod with 2 parietal placentæ, and kidney-shaped seeds.* — Pod as in Cruciferæ, but with no partition, often stalked: seeds similar, but the embryo coiled. — Properties acrid, and also bitter and nauseous. Leaves alternate, mostly compound.

1. POLANÍSIA, Raf.

Sepals 4. Petals 4, rather unequal, with claws. Stamens 8-32, unequal. Receptacle not elongated. Pod stalkless or nearly so above the stamens, linear or oblong, veiny, turgid, many-seeded. — Fetid annuals with glandular or clammy hairs. Leaves digitate. Flowers in leafy racemes. (Name from *πολύς*, *many*, and *ἄνισος*, *unequal*, points in which the genus differs in its stamens from *Cleome*.)

1. **P. gravèolens**, Raf. Leaves with 3 oblong leaflets; stamens about 11, scarcely exceeding the petals; style short. — Gravelly banks of lakes from L. Champlain westward. June - Aug. — Flowers small: calyx and filaments purplish: petals yellowish-white.

ORDER 14. RESEDACEÆ. (MIGNONETTE FAMILY.)

Herbs, with unsymmetrical 4-7-merous small flowers, with a fleshy one-sided hypogynous disk between the petals and the (3-40) stamens, bearing the latter. Calyx not closed

in the bud. Pod 3-6-lobed, 3-6-horned, 1-celled with 3-6 parietal placentæ, opening at the top long before the seeds (which are as in Order 13) are full grown. — Leaves alternate. Flowers crowded in terminal spikes or racemes. — An European family represented by the MIGNONETTE (*Reseda odorata*) and the DYER'S WEED.

1. RESEDA, L. MIGNONETTE. DYER'S ROCKET.

Petals 4-7, often cleft, unequal. Stamens 10-40, turned to one side. (Deriv. from *resedo*, to calm or assuage, in allusion to supposed sedative properties.)

1. R. Lutèola, L. (DYER'S WEED OR WELD.) Leaves lanceolate, undivided; calyx 4-parted; petals 4; the upper one 3-5-cleft, the two lateral 3-cleft, the lower one linear and entire; pods depressed. ① — Escaped from gardens to the road-sides in W. New York. — Plant 2^d high. Flowers greenish-yellow, spiked. — Used for dyeing yellow.

ORDER 15. VIOLÀCÆÆ. (VIOLET FAMILY.)

Herbs, with a somewhat irregular 1-spurred corolla of 5 petals, 5 hypogynous stamens joined by their (adnate introrse) anthers, and a 1-celled 3-valved pod with 3 parietal placentæ. — Sepals 5, persistent. Petals twisted-imbricate in the bud. Stamens with short and broad filaments, produced beyond the anther-cells and more or less coherent over the stigma: two of the stamens with spurs or appendages which are received into the spur of the corolla. Style club-shaped: stigma 1-sided. Valves of the capsule bearing the several-seeded placentæ on their middle. Seeds anatropous, rather large, with a hard seed-coat, and an embryo nearly as long as the albumen: cotyledons flat. — Leaves alternate, with stipules. Flowers axillary, nodding.

1. SOLÈA, Ging., DC. GREEN VIOLET.

Sepals not eared nor prolonged at the base. Petals very unequal, the larger one merely gibbous at the base, 2-lobed at the apex; the others linear-oblong, slightly notched at the apex,

nearly alike. Two of the anthers slightly appendaged behind. Style hooked at the summit. Pod large.—A homely perennial herb, with rather tall stems, leafy to the top, and 1–3 small greenish-white flowers in the axils, on short recurved pedicels. (Named in honor of *W. Sole*, author of an essay on *Mentha*.)

1. **S. cóncolor**, Ging. (*Viola concolor*, *Pursh*, &c.)—Woods, New York to Ohio. June.—Plant 1°–2° high. Leaves oblong, pointed at both ends, entire. Pod 1' long: after opening, each valve in dry weather folds together forcibly and firmly, projecting the large round seeds to a considerable distance. The same thing occurs, less strikingly, in many violets.

2. VIOLA, L. VIOLET. HEART'S-EASE.

Sepals extended or eared at the base. Petals somewhat unequal, the larger one spurred at the base. Two of the stamens spurred. (The ancient Latin name of the genus.)

* *Stemless: leaves and scapes all from subterranean rootstocks: perennial.* (Often producing concealed apetalous fruitful flowers during the whole summer.)

— *Flowers light yellow.*

1. **V. rotundifolia**, Michx. (ROUND-LEAVED VIOLET.) Leaves round-ovate, heart-shaped, slightly crenate, appressed to the ground; lateral petals bearded and marked with brown lines; spur very short.—Cold woods, Maine to Michigan. April, May.—Smoothish: leaves 1' broad at flowering, increasing to 3' or 4' in summer, close pressed to the ground, shining above.

— — *Flowers white; the lower petals veined with lilac.*

2. **V. lanceolata**, L. (LANCE-LEAVED VIOLET.) Smooth; leaves lanceolate, erect, blunt, tapering into a long petiole, almost entire; petals beardless.—Damp soil, Maine to Penn. towards the coast. May.

3. **V. primulaefolia**, L. (PRIMROSE-LEAVED VIOLET.) Smooth or a little pubescent; leaves oblong or ovate, abrupt or somewhat heart-shaped at the base; lateral petals often sparingly bearded. (*V. acuta*, *Bigelow*.)—Damp soil, Maine to Penn. May.—Intermediate between No. 2 and No. 4.

4. **V. blanda**, Willd. (SWEET WHITE VIOLET.) Leaves round-heart-shaped or kidney-form, minutely pubescent; petals beardless.—Damp woods and hill-sides. April, May.—Flowers small, fragrant.

— — — *Flowers violet or blue.*

5. **V. palustris**, L. (MARSH VIOLET.) Smooth; leaves round-heart-shaped and kidney-form, slightly crenate; flowers (small)

pale lilac with purple streaks, nearly beardless; *spur very short* and *obtuse*. — Summit of the White Mountains, N. Hampshire.

6 **V. Selkirkii**, Goldie. (GREAT-SPURRED VIOLET.) Leaves round-heart-shaped with a deep narrowed sinus, hairy above; *spur nearly as long as the beardless petals, thickened at the end*; anther-spurs very long. — Shaded hill-sides, W. Massachusetts and New York northward. May. — A delicate species, 2' high, with the flowers large in proportion.

7. **V. sagittata**, Ait. (ARROW-LEAVED VIOLET.) Smoothish or hairy; *leaves oblong or lanceolate-ovate*, toothed towards the base, abruptly contracted into the petiole, *often halbert-form or arrow-shaped*; petals bearded; *spur short, very thick and sac-like*. — Var. *OVATA* (*V. ovata*, Nutt.) is the more hairy state, in drier soil. — Open moist places and hill-sides, New England to Penn. May. — Foliage variable: the flowers large and numerous, deep-colored.

8. **V. cucullata**, Ait. (HOOD-LEAVED VIOLET.) Smooth or slightly pubescent; *leaves strongly heart-shaped* or triangular-kidney-form, *rolled in at the base*, toothed; lower petals bearded; *spur short, obtuse*. — Low grounds. April – June. This, the common blue violet, is very variable in size, &c. Scapes 6' – 12' high. Flowers deep-colored or pale, sometimes white or striped with white.

9. **V. palmata**, L. (PALMATE VIOLET.) Hairy or smoothish; *leaves* (mostly heart-shaped in outline) variously 5 – 7-cleft and *toothed*, the middle lobe largest; *lower petals bearded*; spur short. — Low grounds, common. May. — Leaves very variable; the earliest often simply heart-shaped and undivided, like those of No. 8: others approaching No. 7. Flowers as in No. 8.

10. **V. pedata**, L. (BIRD-FOOT VIOLET.) Nearly smooth; *leaves pedately about 7-parted*; the lobes linear or narrowly oblong tapering downwards, toothed at the apex; *petals beardless*; spur very short. — Sandy or dry soil, N. England to Penn. towards the coast. May, June. — Flowers very showy, 1' broad, pale or deep lilac-purple, fragrant. Near Baltimore is a variety with the two upper petals intensely velvety-purple, and as showy as the finest Pansy.

* * Leafy-stemmed, perennial.

— *Flowers pale purple or violet, or whitish.* (Plants smooth.)

11. **V. Canadensis**, L. (CANADA VIOLET.) Upright; leaves heart-shaped, pointed, serrate; *stipules ovate-lanceolate, entire*; petals white or whitish inside, the upper tinged with violet beneath, the lateral bearded; *spur very short*; stigma beakless. — Rich woods, Maine to Michigan, chiefly northward. May – Aug. — Plant 1° – 2° high.

12. **V. rostrata**, Pursh. (LONG-SPURRED VIOLET.) Stems ascending; leaves roundish-heart-shaped, serrate, the upper acute;

stipules lanceolate, fringe-toothed, large; *spur slender, longer than the pale violet beardless petals*; stigma slender, beakless. — Shaded hillsides, Maine and W. Massachusetts to Ohio, rare. June. — Plant 4'–6' high: the flowers large in proportion: spur $\frac{1}{2}$ ' long. Anther-spurs very long.

13. **V. Muhlenbergii**, Torr. (SPREADING VIOLET.) Stems ascending, at length with creeping branches; leaves round-heart-shaped, or the lowest kidney-form, crenate, the uppermost slightly pointed; stipules lanceolate, fringe-toothed; *spur tapering, about half the length of the pale violet petals*, the lateral slightly bearded; stigma beaked. (*V. debilis*, Pursh, Bigelow.) — Shaded wet places, common. May, June. — Stems 4'–7' long. Flowers middle-sized.

14. **V. striata**, Ait. (PALE VIOLET.) Stems angular, spreading and branching; leaves heart-shaped, finely serrate, often acute; stipules oblong-lanceolate, large, strongly fringe-toothed; *spur thickish, much shorter than the cream-colored petals*, the lateral bearded, the lower striped with purplish lines; stigma recurved. — Rhode Island, Mr. Hunt, W. New York to Ohio, May, June. — Leaves, &c., much as in No. 13; the flowers larger, perhaps sulphur-color, but not yellow.

+ + Flowers yellow. (Stem leafy only at the top.)

15. **V. pubescens**, Ait. (DOWNY YELLOW VIOLET.) Softly pubescent; *leaves very broadly heart-shaped*, toothed, somewhat pointed; stipules ovate or ovate-lanceolate, large; spur extremely short; lower petals veined with purple. — Var. 1. *ERIOCARPA* is large, villous-pubescent, the large pods woolly. Var. 2. *SCABRIUSCULA* is smaller, slightly pubescent, and brighter green, the pods smooth or woolly. — Rich woods, common. June, July. — Plant 6'–10' high.

16. **V. hastata**, Michx. (HALBERT-LEAVED VIOLET.) Nearly glabrous, simple; *leaves halbert-shaped*, slightly serrate, acute; stipules ovate, small; spur very short. — Mountains of Penn. and southward. June. — Slender, 6'–10' high. Leaves variable. Flowers smaller than in No. 15.

* * * Leafy-stemmed, annual or biennial.

17. **V. tricolor**, L. Var. *ARVENSIS*. (FIELD PANSY.) Leaves roundish or the upper oval, entire or obscurely crenate; stipules very large, lyrate-pinnatifid; petals variegated (yellowish blue and purple) frequently very small or wanting; spur not longer than the appendages of the calyx. — Dry hills and fields, Long Island and New Jersey, &c.: doubtless introduced, and a depauperate variety of the garden *Pansy* or *Heart's-ease*.

V. odorata, the SWEET VIOLET of Europe, which far excels all the American species in fragrance, sometimes grows spontaneously around houses.

ORDER 16. CISTACEÆ. (ROCK-ROSE FAMILY.)

Herbs or low shrubs, with regular flowers, distinct hypogynous stamens, a 1-celled 3-5-valved pod with as many parietal placentæ borne on the middle of the valves, and orthotropous albuminous seeds. — Sepals 5, persistent; the 2 external small like bracts, sometimes wanting; the 3 others a little twisted in the bud. Petals 3 or 5, usually fugacious, convolute in the opposite direction from the calyx in the bud. Stamens few or many. Style single or none. Ovules few or many, on slender stalks, with the orifice at the apex. Embryo slender, straightish or curved, in mealy albumen. — Leaves simple and mostly entire, the lower usually opposite, and the upper alternate. Root perennial.

Synopsis.

1. HELIANTHEMUM. Petals 5, crumpled in the bud, fugacious. Stamens and ovules numerous in the conspicuous petal-bearing flowers.
2. HUDSONIA. Petals 5, fugacious. Stamens 9-20. Style slender. Pod strictly 1-celled, about 3-seeded.
3. LECHEA. Petals 3, rather persistent. Stamens 3-12. Style none. Pod partly 3-celled, the imperfect partitions bearing broad 2-seeded placentæ.

1. HELIANTHEMUM, Tourn. ROCK-ROSE.

Petals 5, crumpled in the bud, fugacious. Style short or none: stigma 3-lobed. Capsule strictly 1-celled. Embryo curved like the letter S. — Flowers in most N. American species of two sorts, viz., 1. the *primary*, or earliest ones, with large petals, numerous stamens, and many-seeded pods: 2. *secondary*, or later ones, which are much smaller and in clusters, with small petals (or none), few stamens, and much smaller 3-few-seeded pods. The yellow flowers open in sunshine, and cast their petals by the next day. (Name from *ἥλιος*, *the sun*, and *ἄνθεμον*, *flower*.)

1. *H. Canadense*, Michx. (FROST-WEED.) *Petal-bearing flowers solitary; the small secondary flowers clustered in the axils of the leaves, nearly sessile; calyx of the large flowers hairy-pubescent; of the small hoary, like the stem and lower side of the lanceolate-oblong leaves.* — A variety is more hoary, and with a stronger tendency

to multiply the minute clustered flowers. — Sandy or gravelly dry soil (rarer westward). June — Aug. — Stem at first simple. Corolla of the large flowers 1' wide, producing pods 3'' long: pods of the smaller flowers not larger than a pin's head. — Late in autumn crystals of ice shoot from the cracked bark at the root, whence the popular name.

2. **H. corymbosum**, Michx. *Flowers all clustered at the summit* of the stem or branches, the petal-bearing ones at length on slender stalks; calyx woolly. — Pine barrens, New Jersey (?) and southward. — Primary flowers smaller than in No. 1.

2. HUDSONIA, L. HUDSONIA.

Petals 5, fugacious (lasting but a day), much larger than the calyx. Stamens 9 — 30. Style long and slender: stigma minute. Pod oblong, inclosed in the calyx, strictly 1-celled, with 2-6 seeds attached near the base of the valves by slender upright seed-stalks. Embryo spirally coiled. — Bushy heath-like little shrubs (seldom a foot high), covered all over with the small awl-shaped or scale-like persistent downy leaves, producing numerous (small but showy) bright yellow flowers crowded along the upper part of the branches. (Named in honor of *Hudson*, an English botanist contemporary with Linnæus.)

1. **H. ericoides**, L. (HEATH-LIKE HUDSONIA.) Downy but greenish; leaves awl-shaped, loose; flowers on slender naked stalks. — Dry sandy soil near the coast, New Jersey to Plymouth and Maine (near Columbia, *Miss Hamlin*). May.

2. **H. tomentosa**, Nutt. (DOWNY HUDSONIA.) Hoary with down; leaves oval or oblong, close-pressed and imbricated; flowers sessile. — Sandy coast, New Jersey to Maine, and on the Great Lakes from Champlain to Superior. Also in the interior at Conway, Maine! June. — Flowers 5'' broad.

3. LECHÆA, L. PINWEED.

Petals 3, narrow, not longer than the calyx, withering-persistent. Stamens 3 — 12. Style scarcely any: stigmas 3, fringed. Pod globular, appearing partly 3-celled from the 3 large placentæ borne on imperfect partitions, each bearing 2 seeds on the face towards the valve: in our species the placentæ curve backwards and partly inclose the seeds. Embryo nearly straight. — Homely perennial herbs, with very small greenish or purplish flowers. (Named in honor of *Leche*, a Swedish botanist, Professor at Abo.)

1. **L. mājor**, Michx. (LARGER PINWEED.) *Hairy*; stem upright, simple, producing slender prostrate branches from the base; *leaves elliptical*, mucronate-pointed, alternate and opposite or sometimes whorled; *flowers densely crowded* in paniced clusters; pedicels shorter than the globose-depressed (very small) pods. — Woodlands. July - Sept. — Plant 1° - 2° high, stout.

2. **L. thymifolia**, Pursh. (THYME-LEAVED PINWEED.) *Hoary with appressed hairs*, especially the decumbent stout leafy shoots from the base; flowering stems ascending, loosely branched, with the *leaves linear or oblanceolate*; *those of the shoots elliptical*, whorled, crowded; *flowers scattered* in small and loose clusters; pedicels as long as the globose pods. — Sandy coast, New Jersey to Maine. July - Sept. — Scarcely a foot high, tufted, rigid; the pods larger than in No. 1.

3. **L. minor**, Lam. (SMALLER PINWEED.) *Minutely hairy*; stems slender, upright or diffuse; leafy shoots densely tufted at the base; *leaves linear*; *flowers loosely racemed* on the slender branchlets; pedicels mostly longer than the globose pods. — Dry open soil. June - Sept. — Plant 5' - 15' high, slender, running into numberless variations according to the soil and season. Pods smaller than in No. 2.

ORDER 17. DROSERACEÆ. (SUNDEW FAMILY.)

Bog-herbs, mostly glandular-haired, with regular hypogynous flowers, pentamerous and withering-persistent calyx, corolla, and stamens, and a 1-celled pod with twice as many styles or stigmas as there are parietal placentæ. — Calyx imbricated. Petals convolute. Stamens 5 - 15: anthers turned outwards. Seeds numerous, anatropous, with a short embryo at the base of the albumen. — Leaves circinate in the bud, i. e. rolled up from the apex to the base like a fern.

1. DRÓSERÀ, L. SUNDEW.

Stamens 5. Styles 3, or sometimes 5, deeply 2-parted so that they are taken for 6 or 10, slender. Pod globular or oblong, 3- (rarely 5-) valved, the valves bearing the numerous seeds on their middle for the whole length. — Low perennials, with the leaves clothed with reddish gland-bearing bristles, in our species all in a tuft at the base; the naked scape bearing the flowers in a 1-sided raceme which nods at the apex, so that the fresh-blown flower

(which opens only in sunshine) is always highest. (The glands of the leaves exude a clear fluid, appearing like dew-drops, whence the name, from *δροσερός*, *dewy*.)

1. **D. rotundifolia**, L. (ROUND-LEAVED SUNDEW.) *Leaves orbicular* abruptly narrowed into the spreading *hairy petioles*; seeds spindle-shaped, the coat loose and chaff-like; flowers white. — Peat-bogs, common. July, Aug.

2. **D. longifolia**, L. (LONGER-LEAVED SUNDEW.) *Leaves spatulate-oblong*, tapering into the long rather erect naked petioles; seeds oblong, with a rough close coat; flowers white. — Bogs, common eastward. June - Aug. — Plant raised on its prolonged caudex when growing in water.

3. **D. linearis**, Goldie. (SLENDER SUNDEW.) *Leaves linear*, obtuse, the blade (2' - 3' long, scarcely 2" wide) *on naked erect petioles* about the same length; seeds oblong, with a smooth and perfectly close coat; flowers white. — Upper Michigan. — Scapes sometimes 1 - 3-flowered, as figured by Hooker, often elongated and 8 - 10-flowered, occasionally forked with a primary flower in the division.

4. **D. filiformis**, Raf. (THREAD-LEAVED SUNDEW.) *Leaves very long and filiform*, erect, with no distinction between the blade and the stalk; seeds spindle-shaped; flowers numerous, purple rose-color ($\frac{1}{2}$ ' broad). — Wet sand, near the coast, Plymouth, Massachusetts, to New Jersey and southward. Aug. — Scapes 6' - 12' high, and the singular leaves little shorter.

Suborder PARNASSIÆ.

Smooth herbs, with slightly perigynous stamens, an outer series of them sterile and in clusters, imbricated petals, and 4 sessile stigmas opposite the parietal placentæ. Leaves alternate, not coiled in the bud. — Consists of the following genus, of dubious affinity.

1. PARNASSIA, Tourn. GRASS OF PARNASSUS.

Sepals 5, persistent. Petals 5, veiny, spreading, rather persistent: a cluster of somewhat united sterile filaments at the base of each. Proper stamens 5, alternate with the petals: anthers opening inwards. Ovary 1-celled, with 4 projecting parietal placentæ. Seeds very numerous, anatropous, with a winged seed-coat and no albumen. — Perennial herbs, with the entire leaves chiefly radical, and the solitary flowers terminating the long naked stems. Petals white, with greenish or yellowish veins. (Named from Mount

Parnassus, on which a plant called *Grass of Parnassus* was said by Dioscorides to grow. *Tourn.*)

1. **P. Caroliniàna**, Michx. Petals sessile, *more* than twice the length of the calyx, many-veined; *abortive filaments* 3 in each set, stout, distinct almost to the base (with yellow glandular tips).—Wet banks, New Engl. to Michigan. July.—Leaves thickish, ovate or rounded, sometimes heart-shaped, usually but one on the stalk, low down and clasping. Stalk 8'–18' high. Flower 1' broad.

2. **P. palústris**, L. Petals sessile, rather longer than the calyx, few-veined; *abortive filaments* 9–13 in each set, slender.—Upper Michigan; and to be sought elsewhere along our northern borders.—Stalks 3'–8' high. Leaves all heart-shaped.

ORDER 18. HYPERICÀCÆÆ. (ST. JOHN'S-WORT FAM.)

Herbs or shrubs, with opposite entire dotted leaves and no stipules, regular hypogynous flowers, the petals convolute in the bud, and many or few stamens collected in 3 or more clusters or bundles. Pod 1-celled with 2–5 parietal placentæ, and as many styles, or 3–5-celled by the meeting of the placentæ in the centre: dehiscence septicidal.—Sepals 4 or 5, imbricated in the bud, persistent. Petals 4 or 5, mostly deciduous. Pod 2–5. (rarely 6–7-) lobed, with as many persistent styles, which are at first sometimes united. Seeds very numerous and small, anatropous, with little or no albumen.—Plants with a resinous and acrid juice, dotted with pellucid or dark glands, usually smooth. Leaves mostly sessile. Flowers solitary or cymose.

Synopsis.

1. ASCYRUM. Sepals 4, very unequal. Petals 4, oblique, yellow.
2. HYPERICUM. Sepals 5. Petals 5, oblique, yellow.
3. ELODEA. Sepals 5. Petals 5, equal-sided, purplish. Glands 3.

1. ÁSCYRUM, L. ST. PETER'S-WORT.

Sepals 4; the 2 outer very broad and leaf-like; the inner much smaller. Petals 4, oblique, very deciduous. Stamens numerous; the filaments in clusters, but scarcely if at all united at the base. Pod strictly 1-celled, 2–3. (rarely 4-) valved.—Low, rather shrubby plants, with pale black-dotted leaves and nearly solitary

pale yellow flowers. (Name from *a*, *without*, and *σκήπος*, *roughness*, being smooth plants.)

1. **A. stans**, Michx. (UPRIGHT ST. PETER'S-WORT.) Stem simple or branched above, 2-edged; *leaves oval or oblong, somewhat clasping*, thickish; petals large, obovate; styles 3-4. — Pine barrens, Long Island and New Jersey. Aug. — Plant 1°-2° high, stout. Flowers showy, almost sessile: outer sepals round-heart-shaped.

2. **A. Crux-Andrææ**, L. (ST. ANDREW'S CROSS.) Stems much branched and decumbent; *leaves narrowly obovate-oblong, contracted at the base*, thin; petals linear-oblong; styles 2, very short; pod flat. — Pine barrens, New Jersey and southward. July-Sept. — Low, slender; the pedicels of the smallish flowers shorter than the leaves. Petals scarcely exceeding the outer sepals, approaching each other in pairs over them, in the form of a St. Andrew's cross.

2. HYPÉRICUM, L. ST. JOHN'S-WORT.

Sepals 5, somewhat equal, herbaceous. Petals 5, oblique. Stamens numerous or few, united or clustered in 3-5 parcels, without interposed glands. Pod 1- or 3-5-celled. — Herbs or shrubs, branched above, with yellow flowers. (An ancient name, of obscure origin, thought by Linnæus to be composed of *ὑπέρ* and *εἰκών*.)

§ 1. *Stamens very numerous, 5-adelphous: pod 5- (occasionally 6-7-) celled, with the placentæ projecting far into the cells: herbaceous, perennial: flowers very large.*

1. **H. pyramidatum**, Ait. (GREAT ST. JOHN'S-WORT.) Branches 2-4-angled; leaves ovate-oblong, partly clasping; petals narrowly obovate, not deciduous until after they wither; stigmas capitate. — Banks of rivers, rare. July. — Plant 3°-5° high. Leaves 2'-3' long. Flowers almost 2' wide. Pod large, conical.

§ 2. *Stamens very numerous: pod 3-5-celled by the meeting or junction of the placentæ, which are seed-bearing on the outer face.*

* *Shrubs: styles (at first united) and cells of the pod 3 or 5: calyx leafy, reflexed: stamens scarcely at all clustered.*

2. **H. Kalmianum**, L. (KALM'S SHRUBBY JOHN'S-WORT.) Bushy; branches 4-angled: branchlets 2-edged; leaves crowded, *glaucous*, narrowly oblanceolate; flowers few in a cluster; pods ovate 5-celled. — Wet rocks, Niagara Falls and northern lakes. Aug. — Shrub 1°-3° high, leafy to the summit. Leaves 1'-2' long. Flowers about 1' wide.

3. **H. prolificum**, L. (SHRUBBY ST. JOHN'S-WORT.) Branchlets 2-edged; leaves lanceolate-oblong, mostly obtuse, narrowed at

the base; flowers numerous in simple or compound clusters; *Pods ovoid-oblong, 3-celled.* — Penn. to Ohio and Michigan. July – Sept. — Shrub 1° – 3° high, with long rather simple shoots, leaves 2' long and $\frac{1}{2}$ ' or more wide, and large flowers. In New Jersey and southward is a variety? which is more bushy, with smaller and more clustered leaves and flowers.

* * *Perennial herbs: styles (spreading) and cells of the pod 3: petals and anthers with black dots: calyx appressed: stamens in 3 or 5 clusters.*

4. **H. perforatum**, L. (COMMON ST. JOHN'S-WORT.) Stem much branched and corymbed, somewhat 2-edged (producing runners from the base); leaves elliptical-oblong or linear-oblong, with pellucid dots; petals (deep yellow) twice the length of the lanceolate acute sepals; styles diverging; flowers numerous in open cymes. — Pastures and meadows, &c. June – Sept. — Introduced from Europe, but thoroughly naturalized, and too well known everywhere as a pernicious weed, which it is almost impossible to extirpate. Its juices are very acrid.

5. **H. corymbosum**, Muhl. (SPOTTED ST. JOHN'S-WORT) Conspicuously marked with both black and pellucid dots; stem terete, sparingly branched; leaves oblong, somewhat clasping; flowers crowded (small); petals pale yellow, much longer than the oblong sepals. — Damp places, common. July – Sept. — Leaves larger and flowers much smaller than in No. 4; petals marked with black lines as well as dots. § 3. *Stamens very numerous, obscurely clustered: pod 1-celled, the 3 placentæ projecting but not joined in the centre, bearing the seeds on the inner face.*

* *Somewhat shrubby at the base. (Styles united.)*

6. **H. nudiflorum**, Michx. (NAKED-FLOWERED ST. JOHN'S-WORT.) Stem 4-angled, winged above; *leaves oblong or lanceolate-oval, obtuse, pale; cyme compound, leafless; sepals oblong; pods ovoid-conical.* — Pennsylvania (rare) and southward. Flowers rather small.

7. **H. sphaerocarpon**, Michx. (ROUND-FRUITED ST. JOHN'S-WORT.) Stem nearly terete; *leaves oblong-linear, obtuse, thickish, pale beneath, spreading; cyme compound, depressed, leafless; sepals ovate; pods depressed-globose.* — Rocky banks, Ohio and southwestward. July. — A handsome species, 2° high. Pod strictly 1-celled.

8. **H. adpressum**, Barton. (UPRIGHT-LEAVED ST. JOHN'S-WORT.) Stem simple, somewhat 4-angled below and 2-edged above, scarcely woody at the base; *leaves ascending, lanceolate or linear-oblong, thin, the upper acute; cyme few-flowered, nearly leafless; sepals very unequal; pods ovoid-oblong.* — Moist places, Philadelphia and New Jersey. Rhode Island, *Olney*. July, Aug. — Plant 1° – 2° high. Flowers half as large as in No. 4.

* * *Herbaceous, perennial.*

9. **H. ellipticum**, Hook. (ELLIPTICAL-LEAVED ST. JOHN'S-WORT.) Stem simple, somewhat 4-angled; *leaves thin, elliptical, obtuse*; *cyme* nearly naked, *few-flowered, depressed*; sepals very unequal, spreading; *styles united* nearly to the top; pods ovoid-globose. — Borders of ponds, Rhode Island to Michigan. July. — A foot high. Leaves 1' long. Flowers small, light yellow; pods purplish.

10. **H. angulosum**, Michx. (ANGLED ST. JOHN'S-WORT.) Stem slender, strict, simple, sharply 4-angled; *leaves opaque, ovate or oblong-lanceolate, acute*, closely sessile by a broad base; *cyme compound*, naked, *the branches prolonged, with the scattered flowers raceme-like*; sepals appressed to the ovoid pod; *styles distinct*. — Wet pine barrens of New Jersey and southward. July – Sept. — Stems 1° – 2° high. Leaves $\frac{1}{2}$ ' – 1' long, erect. Flowers copper-yellow. Pod shorter than the calyx.

§ 4. *Stamens 5–12, distinct: pod (brown-purple) 1-celled, with 3 strictly parietal placenta: styles short, distinct: petals oblong or linear, small: low and slender annuals.*

11. **H. mutilum**, L. (SMALL ST. JOHN'S-WORT.) Stem widely branching; *leaves ovate-oblong, obtuse, heart-shaped, partly clasping, 5-nerved*; cymes leafy; pods ovate-conical, rather longer than the calyx. (*H. parviflorum, Muhl*) — Low grounds, everywhere. — Plant 6' – 10' high, leafy to the top. Flowers 2" broad.

12. **H. Canadense**, L. (CANADIAN ST. JOHN'S-WORT.) Branches erect, corymbose; *leaves linear or narrowly lanceolate, narrowed at the base, black-dotted beneath*; cymes naked; pods conical-oblong, acute, usually much longer than the calyx. — Wet sandy soil. — A span high. Flowers larger than in No. 11, copper-yellow.

13. **H. Saròthra**, Michx. (ORANGE-GRASS. PINE-WEED.) Stem and bushy branches thread-like, wiry, 4-angled; *leaves minute aicl-shaped scales, appressed*; flowers mostly sessile and scattered along the erect branches; pods slender, very acute, much longer than the calyx. (*Sarothra gentianoides, L.*) — Sandy fields; flowering all summer, like the two foregoing. — Plant 4' – 9' high, appearing as if leafless. Flowers very small orange-yellow.

3. ELODÉA, Adans. MARSH ST. JOHN'S-WORT.

Sepals 5, equal. Petals 5, equal-sided, oblong. Stamens 9 (rarely 12 or 15), triadelphous; the sets separated by as many orange-colored glands. Pod 3-celled, oblong: styles distinct. — Perennial herbs, growing in marshes or shallow water, with small close clusters of purplish flowers in the axils of the leaves and at the summit. (Name from *ελώδης*, growing in marshes.)

1. **E. Virgínica**, Nutt. *Leaves closely sessile or clasping by a broad base, oblong or ovate, very obtuse; filaments united below the middle.* (*Hypericum Virginicum, L.*)—Common in swamps. July, Aug.

2. **E. petiolàta**, Pursh. *Leaves tapering into a short petiole, oblong: filaments united beyond the middle.*—New Jersey and westward, rare.

ORDER 19. ELATINÀCEÆ. (WATER-WORT FAMILY.)

Little marsh annuals, with opposite dotless leaves and membranaceous stipules, minute axillary flowers like Chickweeds, but the pod 2-5-celled, and the seeds as in St. John's-worts.—The principal genus is

1. ELÁTINE, L. WATER-WORT.

Sepals 2-4, persistent. Petals 2-4, hypogynous. Stamens 2-8. Styles, or sessile capitate stigmas, 2-4. Pod 2-4-celled, several-many-seeded, 2-4-valved; the partitions left attached to the axis, or evanescent. Seeds cylindrical, straightish or curved. (An obscure Greek name for some such herb.)

1. **E. Americàna**, Arnott. Dwarf (1' high), creeping, rooting in the mud, tufted; leaves obovate; flowers sessile; sepals, petals, stamens, and stigmas 2, rarely 3; seeds 5 or 6 in each cell, rising from the base. (*Peplis Americana, Pursh.* *Crypta minima, Nutt.*)—Margin of ponds, &c. Pod very thin and delicate; the seeds large in proportion, straightish.

ORDER 20. CARYOPHYLLÀCEÆ. (PINK FAMILY.)

Herbs, with opposite entire leaves, symmetrical 4-5-merous flowers with, or sometimes without, petals; the distinct stamens no more than twice the number of the sepals; styles 2-5; seeds attached to the base or central column of the 1-celled (rarely 3-5-celled) pod, with a slender embryo coiled or curved around the outside of mealy albumen.—Bland herbs; the stems usually swollen at the joints; uppermost leaves rarely alternate. Leaves often united at the base. Calyx imbricated in the bud, persistent. Styles stigmatic along the inside. Seeds campylotropous.—There

are three principal suborders, and some small appended groups, as subjoined in the

Synopsis.

Suborder I. SILÈNEÆ. THE PROPER PINK FAMILY.

Sepals united into a tubular calyx. Petals and stamens borne on the stalk of the many-seeded pod, the former with long claws. — Stipules none. Flowers mostly showy.

1. DIANTHUS. Calyx with scaly bractlets at the base. Styles 2.
2. SAPONARIA. Calyx naked. Styles 2. Pod opening by 4 teeth.
3. SILÈNE. Calyx naked. Styles 3. Pod opening by 6 teeth.
4. LYCHNIS. Calyx naked. Styles 5. Pod opening by 5 or 10 teeth.

Suborder II. ALSÍNEÆ. THE CHICKWEED FAMILY.

Sepals distinct or nearly so. Petals without claws (sometimes none) and with the stamens inserted at the base of the sessile ovary, or into a little disk which often coheres with the base of the calyx. Pod 1-celled, few-many-seeded. Stamens opposite the sepals when not more numerous than they. — Low herbs. Stipules none.

* Styles opposite the sepals, or, when fewer, opposite those which are exterior in the bud: stamens twice the number of the (4-5) sepals, or rarely fewer.

5. ARENARIA. Petals 5, rarely 4, entire. Styles 3 (rarely 2 or 4). Flowers perfect.
 6. HONKENYA. Petals 5, entire. Styles 3-5. Disk large and gland-bearing. Flowers of two sorts, or somewhat diceious.
 7. STELLARIA. Petals 5, 2-cleft, or wanting. Styles 3-4. Pod 3-8-valved.
 8. CERASTIUM. Petals 5, 2-lobed. Styles 5. Pod opening at the apex by 10 teeth.
- * * Styles alternate with the sepals: stamens as many as and opposite the sepals, sometimes twice as many.
9. SAGINA. Petals 4-5, undivided, or none. Styles 4-5. Pod 4-5-valved.

Suborder III. ILLECÈBREÆ. THE KNOTWORT FAMILY.

Characters same as of the Chickweed Family, but with dry scale-like stipules, the uppermost leaves rarely alternate, and the 1-celled pods sometimes 1-seeded.

- * Pod (capsule) many-seeded. Styles 3-5. Petals usually manifest.
10. SPERGULA. Styles 5. Leaves whorled.
 11. SPERGULARIA. Styles 3. Leaves opposite.

* * Pod (utricle) 1-seeded. Styles 2, often united. Petals bristle-form or none. Stamens plainly inserted on the base of the calyx.

12. ANYCHIA. Petals none. Sepals flattish, unarmed.

13. PARONYCHIA. Petals minute or bristle-form. Sepals concave, awned.

Suborder IV. SCLERANTHÆ. THE KNAWEL FAMILY.

Characters of the preceding, but no stipules, and the sepals more united below into an indurated tube surrounding the utricle; the stamens inserted at the throat.

14. SCLERANTHUS. Petals none. Stamens 5 or 10.

Suborder V. MOLLUGINEÆ. INDIAN CHICKWEEDS.

Characters as in suborders II. and III., but the stamens opposite the sepals, and the pod completely 3-celled. Stipules obsolete.

15. MOLLUGO. Petals none. Stamens 3-5. Styles 3.

Suborder I. SILÈNEÆ. THE PROPER PINK FAMILY.

1. DIÁNTHUS, L. PINK.

Calyx tubular, 5-toothed, supported at the base by 2 or more imbricated bractlets. Stamens 10. Styles 2. Pod long-stalked, 1-celled, 4-valved at the apex. Seeds horizontal: embryo barely curved. — Ornamental plants, of well-known aspect and value in cultivation, none natives of this country. (Name from *Διός*, of *Jupiter*, and *ἄνθος*, *flower*, i. e. Jove's own flower.)

1. *D. Armèria*, L. (DEPTFORD PINK.) Flowers in close clusters; bractlets of the calyx and bracts lance-awl-form, downy, as long as the tube; leaves linear, hairy. ① — Fields, &c., naturalized in E. Massachusetts. July. — Flowers small, scentless, rose-color with white dots, crenate.

2. SAPONÀRIA, L. SOAPWORT.

Calyx tubular, 5-toothed, naked at the base. Stamens 10. Styles 2. Pod short-stalked, 1-celled, or partly 2-celled at the base, 4-toothed at the apex. Embryo coiled into a ring. — Flowers cymose-clustered. (Name from *sapo*, soap, the mucilaginous juice in the subjoined species forming a lather with water.)

1. *S. officinàlis*, L. (COMMON SOAPWORT. BOUNCING BET.) Clusters corymbed; calyx cylindrical, slightly downy; petals crowned; leaves oval-lanceolate. ② — Naturalized in waste places. July

—Sept. — A stout plant, with large flesh-color or pale pink flowers; commonly met with in a *double* state.

2. **S. Vaccària**, L. (COW-HERB.) Cymes corymbed; calyx pyramidal, 5-angled, smooth; petals not crowned; leaves ovate-lanceolate, partly clasping. ① — Escaped from gardens into waste places near dwellings. — Petals pale red.

3. **SILÈNE**, L. CATCHFLY. CHAMPION.

Calyx tubular, 5-toothed, naked at the base. Stamens 10. Styles 3. Pod 1-celled, or partly 3-celled at the base, opening by 6 teeth at the apex. Embryo coiled. — Flowers solitary or in clustered cymes. Petals mostly crowned with a scale at the base of the blade. (Name from *σίαλον*, *saliva*, in allusion to the viscid secretion on the stems and calyx of many species. The English name *Catchfly* alludes to the same peculiarity.)

* Calyx bladderly-inflated: perennial: flowers panicled, white.

1. **S. stellàta**, Ait. (STARRY CHAMPION.) Leaves in whorls of 4, ovate-lanceolate, taper-pointed; calyx bell-shaped; petals cut into a fringe, crownless. — Wooded banks, Connecticut to Ohio and Michigan. July. — Stem 3° high, minutely pubescent, with a large and open pyramidal panicle. Corolla $\frac{3}{4}$ ' broad. (*Cucubalus stellatus*, L., *Bigelow*.)

2. **S. nivea**, DC. (SNOW-WHITE CHAMPION.) Leaves opposite, lanceolate or oblong, taper-pointed; calyx oblong; petals wedge-form, 2-cleft, minutely crowned. — Columbia, Pennsylvania, *Muhl.* Columbus, Ohio, *Sullivant*. July. — Stem 1°-2° high, almost smooth. Flowers few, larger than in No. 1.

3. **S. inflàta**, Smith. (BLADDER CHAMPION.) Glauous; leaves opposite, ovate-lanceolate, acute; calyx globular, much inflated, elegantly veined; petals 2-cleft, crownless. — Fields and road-sides, naturalized around Boston. July. — A foot high. Flowers loosely cymose.

* * Calyx elongated or club-shaped, not inflated except by the enlarging pod: flowers cymose or clustered: perennial, pubescent with viscid hairs, especially the calyx: petals crowned, red or rose-color.

4. **S. Pennsylvànica**, Michx. (WILD PINK.) Stems numerous from the same long root, low; root-leaves narrowly spatulate, nearly glabrous, tapering into hairy petioles; stem leaves (2-3 pairs) lanceolate; flowers clustered, short-stalked; calyx club-shaped; petals wedge-form, slightly notched and eroded at the end. — Rocky or gravelly places. April-June. — Flowers handsome, purple-rose-color.

5. **S. Virgínica**, L. (FIRE PINK. CATCHFLY.) Stems single; leaves thin, spatulate, or the upper oblong-lanceolate; flowers few and loosely cymose, peduncled; calyx oblong-cylindrical, soon obconical;

petals oblong, 2-cleft. — Open woods, from W. New York (*Sartwell*) westward and southward. June — Aug. — Stem upright, 2° high. Petals crimson, the limb 1' long.

6. **S. règia**, Sims. (ROYAL CATCHFLY.) Stem roughish, erect; *leaves thickish, ovate-lanceolate, acute; flowers numerous, short-stalked*, in clusters, forming a strict panicle; calyx ovoid-club-shaped in fruit; *petals spatulate-lanceolate mostly undivided.* — Prairies, Ohio. July. — Stems 4° high. Petals large as in No. 5, deep scarlet.

7. **S. rotundifolia**, Nutt. (ROUND-LEAVED CATCHFLY.) Viscid-hairy; stems weak, branched, decumbent; *leaves thin, round, abruptly pointed*, the lower obovate; flowers few and loosely cymose, stalked; calyx elongated; *petals 2-cleft and cut-toothed.* — Shaded banks of the Ohio. June — Aug. — Stems 2° long. Leaves and flowers large: petals deep scarlet.

* * * *Calyx not inflated except by the pod: annual: flowers* (except in No. 8) *white or whitish and opening only at night or in cloudy weather.*

8. **S. Armèria**, L. (SWEET-WILLIAM CATCHFLY.) Smooth, glaucous; stem glutinous below each joint; leaves ovate-lanceolate; *flowers cymose-clustered; calyx elongated, club-shaped; petals inversely heart-shaped, crowned with awl-shaped scales.* — Escaped from gardens to waste places. — Calyx and petals purplish.

9. **S. antirrhina**, L. (SLEEPY CATCHFLY.) Nearly smooth; stem slender, some of the upper joints viscid; leaves lanceolate or linear; *flowers small, loosely paniculate-cymose; calyx ovoid; petals obovate, inconspicuous, slightly crowned.* — Dry soil. July. — Stem 8' — 30' high.

10. **S. nocturna**, L. (SPIKED NIGHT-CATCHFLY.) Pubescent; leaves short, the lower spatulate, the upper linear; *flowers small, alternate in a strict 1-sided spike; petals (greenish-white) 2-parted.* — Introduced and sparingly naturalized in Penn., according to *Schweinitz*.

11. **S. noctiflora**, L. (NIGHT-FLOWERING CATCHFLY.) *Viscid-hairy; stem tall; lower leaves large and spatulate; the upper lanceolate, taper-pointed; flowers solitary in the forks, peduncled; calyx cylindrical with long awl-shaped teeth; petals rather large, 2-parted.* (*S. nocturna, Bigelow.*) — Cultivated grounds, naturalized. — Stem 1° — 3° high. Petals white or purplish.

* * * * *Dwarf, tufted, smooth: perennial, 1-flowered.*

12. **S. acutis**, L. (MOSS CHAMPION.) Tufted like a moss; leaves linear, crowded to the summit of the short stems (1' — 3'); flowers almost sessile; calyx slightly inflated; petals purple or rarely white, inversely heart-shaped, crowned. — Alpine summits of the White Mountains, N. Hampshire.

4. LÝCHNIS, Tourn. COCKLE. RAGGED ROBIN.

Calyx tubular, naked at the base. Stamens 10. Styles 5. Pod 1-celled, or half 5-celled, scarcely stalked, opening at the top by 5 or 10 teeth. Embryo coiled in a ring. (Name from *λύχνος*, a lamp, the cottony covering of such species as the *L. coronaria* of our gardens having been used for wicks.)

1. **L. Githàgo**, Lam. (CORN COCKLE.) Annual, hairy, branched; leaves linear; calyx with long teeth, leaf-like in fruit, ribbed; petals crownless, entire (purple). — Grain-fields, introduced, too well known to farmers as a troublesome weed. (*Agrostemma Githago*, L.)

Suborder II. ALSÍNEÆ. THE CHICKWEED FAMILY.

5. ARENÀRIA, L. SANDWORT.

Sepals 5, rarely 4. Petals as many, entire. Stamens twice as many. Styles 3 (rarely 2 or 4), opposite the outer sepals. Pod splitting from above into as many valves as styles, the valves sometimes 2-cleft. — Flowers terminal, solitary or cymose, perfect, white. (Name from *arena*, sand.)

§ 1. ALSÍNE. *Valves of the capsule 3, entire: seeds naked. Leaves commonly awl-shaped or thread-form.*

1. **A. squarròsa**, Michx. (PINE-BARREN SANDWORT.) Densely tufted from a deep perpendicular root; *leaves closely imbricated*, but spreading, *awl-shaped, short, channelled*; branches naked and minutely glandular above, several-flowered; *sepals obtuse, ovate, shorter than the pod.* ♀ — In pure sand, Long Island and New Jersey. May - July.

2. **A. stricta**, Michx. (ROCK SANDWORT.) Erect, or spreading from a small root, smooth; *leaves slender, between awl-shaped and bristle-form*, with many others clustered in the axils; cyme diffuse, naked, many-flowered; *sepals pointed, 3-ribbed, ovate, as long as the pod.* ♀ — Rocks and dry banks, Vermont to Michigan. July. — Branches and leaves generally spreading, so that the name is not appropriate.

3. **A. Grœnlândica**, Spreng. (MOUNTAIN SANDWORT.) Densely tufted from slender roots, smooth; *leaves linear-thread-shaped*, rather distant, not clustered, obtuse; cyme few-flowered; *sepals oblong, obtuse, nearly equalling the pod.* ♀ — Crevices of rocks, summit of the Shawangunk and Whiteface Mountains, New York, Green Mountains, and White Mountains. July - Sept. —

Dwarf, not rigid like the foregoing, but the leaves rather fleshy. Corolla $\frac{1}{2}$ ' wide; the obovate petals slightly notched.

§ 2. *ARENARIA* proper. — *Valves of the capsule 2-cleft at the apex.*

4. **A. serpyllifolia**, L. (THYME-LEAVED SANDWORT.) Diffusely branched, roughish; leaves ovate, acute (small); sepals lanceolate, pointed, 3-5-nerved, longer than the petals, equalling the ovate 6-toothed pod. ① — Sandy fields, introduced. June - Aug. — An inconspicuous weed.

§ 3. *MÆHRINGIA*. — *Valves of the capsule 2-cleft, thus appearing twice as many as the styles: seeds minutely appendaged (strophiolate) at the hilum. Peduncles often appearing lateral by the prolongation of the stem.*

5. **A. lateriflora**, L. (SIDE-FLOWERING SANDWORT) Sparingly branched, erect, minutely pubescent; leaves oval or oblong obtuse; peduncles 2- (rarely 3-4-) flowered, appearing lateral; sepals oblong, obtuse, shorter than the petals. — Shady gravelly banks along streams, New England to Michigan, northward. May - June. — Leaves $\frac{1}{2}$ ' to 1' long: corolla $\frac{1}{3}$ ' broad.

6. HONKENYA, Ehrhart. SEA-SANDWORT.

Sepals 5, fleshy. Disk at the base of the ovary conspicuous and glandular, 10-notched. Petals 5, inserted under the edge of the disk, obovate-wedge-shaped, tapering into a claw. Stamens 10, inserted on the notches or glands of the disk. Styles 3-5, short, opposite as many of the sepals. Pod fleshy, opening by as many valves as styles, few-seeded. — Very fleshy perennials of sandy shores, forked, with solitary axillary flowers, more or less polygamo-diœcious. Petals white. (Named in honor of *Honckeney*, a German botanist.)

1. **H. peploides**, Ehrhart. Leaves very thick and fleshy, ovate, slightly pointed; sepals obtuse. — Sea-beach, Maine to New Jersey. May, June. — Grows in large tufts in the sands, 6'-10' high. Leaves $\frac{3}{4}$ ' long, partly clasping, or often minute on thickened sterile branches.

7. STELLÀRIA, L. CHICKWEED. STARWORT.

Sepals 5. Petals 5, or fewer, deeply 2-cleft, sometimes none. Stamens 10, or 3-8. Styles 3-4, opposite as many sepals. Pod opening by as many or twice as many valves as styles, several-many-seeded. — Flowers (white) terminal, or appearing lat-

eral by the prolongation of the stem from the upper axils. (Name from *stella*, a star, in allusion to the star-shaped flowers.)

* *Stamens usually fewer than 10. Leaves broad.*

1. **S. mēdia**, Smith. (COMMON CHICKWEED.) Annual or biennial; stems spreading, marked with an alternate pubescent line; leaves ovate, the lower on hairy petioles; petals 2-parted, shorter than the calyx. — Fields and around dwellings; a most common weed, doubtless brought from Europe.

2. **S. pūbera**, Michx. (GREAT CHICKWEED.) Perennial; stems spreading, marked with 2 opposite hairy lines; leaves all sessile, oblong or ovate; petals deeply 2-cleft, longer than the calyx. — Shaded rocks, Penn. and southward. May. — Leaves 2' long.

* * *Stamens mostly 10; styles often 4. Perennial.*

3. **S. lōngipes**, Goldie. (LONG-STALKED STITCHWORT.) Shining or somewhat glaucous, very smooth; *leaves ascending*, lanceolate or linear-lanceolate, acute, *broadest at the base*, rather rigid; cyme few-flowered, the long *pedicels strictly erect*; petals longer than the calyx; seeds smooth. — W. New York and Michigan, northward, rare. Near No. 4.

4. **S. longifōlia**, Muhl. (STITCHWORT.) Stem branching above, weak; *leaves linear, acutish at both ends, spreading*; *cymes naked and at length lateral, peduncled*, many-flowered, the slender *pedicels spreading*; petals 2-parted, soon longer than the calyx; seeds smooth. — Grassy places, common. June. — Stem often with rough angles, 8' - 18' high.

5. **S. boreālis**, Bigelow. (NORTHERN STITCHWORT.) Stems flaccid, many times forked, with a flower in each division, *leafy to the top*; *leaves broadly lanceolate*, acute, 1-nerved; petals shorter than the calyx, or often wanting; styles commonly 4; *Pods longer than the calyx*; *seeds smooth*. — Shaded swamps, Rhode Island (*Olney*) to Michigan, northward. June - Aug. — Stems 5' - 10' high. Earlier flowers apetalous: latest leaves often reduced to bracts.

6. **S. aquātica**, Pollich. (WATER STITCHWORT.) Stems weak, decumbent, prolonged, leaving the naked few-flowered *sessile cymes lateral*; *leaves oblong*, acute, veined; petals and ripe *Pods about the length of the calyx*; styles 3; *seeds roughened*. — In swamps and rills, Westchester, Penn., *Darlington*, &c., and doubtless elsewhere northward.

S. CRASSIFŌLIA, to which belongs *Sagina fontinalis*, *Short & Peter*, according to Fenzl, is to be sought in Ohio and Michigan.

S. CERÁSTIUM, L. MOUSE-EAR CHICKWEED.
Sepals 5, rarely 4. Petals as many, 2-lobed. Stamens twice as many, or fewer. Styles equal in number to the sepals and op-

posite them. Pod usually elongated, opening at the apex by twice as many teeth as styles, many-seeded. — Flowers white, in terminal cymes. (Name from *κέρας*, a horn, alluding to the shape of the pods.)

* *Petals about the length of the calyx : pods long and curved.*

1. **C. vulgatum**, L. (MOUSE-EAR CHICKWEED.) Very hairy, seldom clammy, pale, in tufts; *leaves obovate; sepals lanceolate, acute, in fruit as long as the peduncles.* — Waste places; introduced, not so common as the next in the North. May–Sept. — Biennial or perennial? Flowers small, at first in close clusters.

2. **C. viscosum**, L. (LARGER MOUSE-EAR CHICKWEED.) Pubescent with somewhat clammy hairs; stems spreading; *leaves lanceolate-oblong or oblong-ovate; sepals oblong-ovate, obtuse, in fruit shorter than the peduncles.* — Dry fields and woods, possibly native, as well as introduced. May–Aug. — Biennial? Taller, more diffuse, and greener than No. 1, with longer leaves and looser as well as larger flowers. Stamens sometimes but 5, when it is probably the *C. semidecandrum* of American authors.

* * *Petals longer than the calyx.*

3. **C. nutans**, Raf. (CLAMMY WILD CHICKWEED.) Pubescent with glutinous hairs; stems erect, slender, grooved, diffusely branched, *divaricately many-flowered; leaves oblong-lanceolate, acute, the lowest spatulate; peduncles elongated; petals longer than the calyx; pods nodding on the stalks, curved upwards, thrice the length of the calyx.* — Moist places, from Vermont westward. May–July. — Biennial? or annual, 6'–20' high.

4. **C. oblongifolium**, Torr. (OBLONG-LEAVED CHICKWEED.) Stems ascending, villous, *many-flowered; leaves oblong-lanceolate and ovate; peduncles clammy-hairy; petals and ripe pods about twice the length of the calyx.* † — Rocky places, New York and Penn. May. — Stouter and larger-flowered than the following species.

5. **C. arvense**, L. (FIELD CHICKWEED.) Stems ascending or erect, tufted, downy, slender, naked and *few-flowered* at the summit; *leaves linear; petals more than twice the length of the calyx; pods scarcely longer than the calyx.* † (Also *C. tenuifolium*, Pursh.) — Dry or rocky places, Northeastern States, perhaps indigenous. May, June. — A span high, large-flowered.

9. SAGINA, L. PEARLWORT.

Sepals 4 or 5. Petals 4 or 5, undivided, often obsolete or none. Stamens as many as the sepals, rarely twice their number. Styles as many as the sepals and alternate with them. Pod

many-seeded, 4-5-valved, the valves opposite the sepals. — Small matted herbs, with thread-like or awl-shaped leaves, and minute flowers. (Name from *sagina*, fattening; but it would apparently take a long time to fatten any thing upon these minute weeds.)

1. **S. procumbens**, L. Perennial, depressed; *leaves thread-form or narrowly linear*; peduncles ascending in fruit; stamens 4-5; *petals shorter than the calyx*, sometimes none. — Springy places, Maine to Penn. May - Aug.

2. **S. apétala**, L. Annual, erect, thread-like; *leaves almost bristle-form*; stamens 4; *petals obsolete or none*. — Sandy fields, New York to Penn. Plant 2' - 4' high.

S. ERÉCTA, L., now considered to be CERASTIUM, is naturalized at Baltimore.

Suborder III. ILLECÈBREÆ. THE KNOTWORT FAMILY.

10. SPÉRGULA, L. SPURREY.

Sepals 5. Petals 5, large, entire. Stamens 10. Styles 5. Pod many-seeded, 5-valved, the valves opposite the sepals. — Annuals with narrow leaves in whorls, and cymose (white) flowers. (Name from *spargo*, to scatter, alluding to its rapid dispersion by its numerous seeds.)

1. **S. arvénsis**, L. (CORN SPURREY.) Leaves awl-shaped-linear, numerous in the whorls, with minute interposed stipules, often clustered in the axils; flowers in a compound cyme, slender-stalked. — Grain fields and waste places, introduced. — A foot high: the black seeds thick, with a sharp edge.

11. SPERGULÀRIA, Pers. SPURREY-SANDWORT.

Sepals 5. Petals 5, entire. Stamens 2-10. Styles and valves of the many-seeded pod 3, or if 5 the valves alternate with the sepals! — Low herbs, of brackish sandy soil, with fleshy opposite leaves, and smaller ones often clustered in the axils: stipules scaly-membranous.

1. **S. rùbra**, Pers. Depressed and much branched, smooth or smoothish; leaves narrow linear, rather fleshy; petals purple-rose-color; seeds with or without membranaceous margins. (*Arenaria rubra*, L.) — Sandy fields, near brackish water, and, Var. MARINA, more fleshy and larger in all its parts, on the sea-coast, common. June - Sept. — Annual? Stamens 2-10, commonly 3 or 5.

12. ANÝCHIA, Michx. FORKED CHICKWEED.

Sepals 5, scarcely concave, indistinctly mucronate on the back, greenish. Petals none. Stamens 2-3, rarely 5. Styles 2, very short. Utricle 1-seeded. — Small, many times forked annuals, with small stipules and minute flowers in the forks. (Same derivation as the next genus.)

1. **A. dichótoma**, Michx. Erect or spreading, with capillary branches; leaves varying from lanceolate to elliptical, somewhat petioled. (*Queria Canadensis*, L.) — Dry woods (10' high, delicate, rather large-leaved) or in parched open ground, when it is more stunted, crowded, and narrow-leaved. July - Aug.

13. PARONÝCHIA, Tourn. WHITLOW-WORT.

Sepals 5, linear or oblong, concave, awned at the apex. Petals bristle-form or minute teeth. Stamens 5. Styles united. Utricle 1-seeded. — Tufted herbs, with dry silvery stipules and clustered flowers. (A Greek name for a *whitlow*, and for a plant thought to cure it.)

1. **P. argyrócoma**, Nutt. (SILVER CHICKWEED.) Densely matted, much branched, spreading; leaves linear; flowers capitate, surrounded by conspicuous silvery bracts; calyx hairy, short-awned; petals mere teeth between the stamens. † — Slides in the Notch of the White Mountains, New Hampshire, and bare summits above: a recent discovery. (Also on the Alleghanies from Virginia southward.) July.

P. DICHÓTOMA, Nutt., grows at Harper's Ferry, Virginia, and is to be sought in the mountains of Pennsylvania.

Suborder IV. SCLERÁNTHEÆ. THE KNAWEL FAMILY.

14. SCLERÁNTHUS, L. KNAWEL.

Sepals 5, united below in an indurated cup, inclosing the 1-seeded utricule. Petals none. Stamens 10 or 5. Styles 2, distinct. — Homely and inconspicuous little weeds, with obscure greenish clustered flowers. (Name from *σκληρός*, *hard*, and *ἄνθος*, *flower*, from the hardened calyx-tube.)

1. **S. ánnuus**, L. Depressed, tufted (3' - 5') and spreading, annual; leaves awl-shaped, somewhat united at the base; flowers nearly sessile. — Waste places and sandy fields: introduced.

Suborder V. MOLLUGÍNEÆ. INDIAN CHICKWEEDS.

15. MOLLÙGO, L. INDIAN CHICKWEED.

Sepals 5. Petals none. Stamens 3 - 5, hypogynous, opposite the sepals. Styles 3, short. Pod 3-celled, 3-valved, loculicidal, the partitions breaking away from the many-seeded axis. — Low homely annuals, much branched; the stipules obsolete. (An old Latin name for some soft plant.)

1. **M. verticellàta, L.** (CARPET-WEED.) Prostrate, forming patches; leaves spatulate, clustered in whorls at the joints, where the 1-flowered pedicels form a sort of sessile umbels; stamens usually 3. — Sandy river-banks, and cultivated grounds. June - Sept.

ORDER 21. PORTULACÀCEÆ. (PURSLANE FAMILY.)

Herbs, with succulent leaves, and regular but unsymmetrical flowers; viz., sepals fewer than the petals; the stamens opposite the petals or more numerous: otherwise nearly as Chickweeds. — Sepals 2. Petals 5. Stamens mostly 5 - 20. Styles 3 - 6, united below, stigmatic along the inside. Pod 1-celled, with few or many campylotropous seeds rising on slender stalks from the base, or on a central placenta. Embryo curved around mealy albumen. — Insipid herbs, with opposite or alternate entire leaves. Corolla opening only in sunshine, ephemeral, then shrivelling.

Synopsis.

* Base of the calyx cohering with the base of the ovary: perigynous.

1. **PORTULACA.** Stamens 10 - 20. Pod opening by a lid.

* * Calyx free: petals hypogynous. Pod 3-valved.

2 **TALINUM.** Stamens about 20. Sepals deciduous. Pod many-seeded.

3. **CLAYTONIA.** Stamens 5. Sepals persistent. Pod few-seeded.

1. PORTULÀCA, Tourn. PURSLANE.

Sepals united and cohering with the ovary below. Stamens 8 - 20. Style mostly 5-cleft. Pod globular, many-seeded, opening transversely, the upper part (with the upper part of the calyx) separating like a lid. — Fleshy annuals, with scattered leaves,

some species with brilliant flowers. (An old Latin name of unknown meaning.)

1. **P. oleràcea**, L. (COMMON PURSLANE.) Smooth, prostrate; leaves wedge-form; flowers sessile (pale yellow); stamens 10-12. — Cultivated grounds, introduced into the United States.

2. **TALÌNUM**, Adans. TALINUM.

Sepals free, deciduous. Stamens 10 - 30. Style 3-lobed at the apex. Pod 3-celled at the base when young, 3-valved, with many seeds on a globular stalked placenta. — Fleshy perennials. (Derivation of the name obscure.)

1. **T. teretifolium**, Pursh. Leafy stems low, from a short rootstock; leaves linear, cylindrical; peduncle long and naked, bearing an open cyme of purple flowers. — Serpentine rocks, Westchester, Penn., and southward. June - Aug. — Corolla $\frac{2}{3}$ broad.

3. **CLAYTÒNIA**, L. SPRING-BEAUTY.

Sepals ovate, free, green and persistent. Stamens 5, adhering to the short claws of the petals. Style 3-lobed at the apex. Pod 3-valved, 2 - 5-seeded. — Our species are perennials, sending up simple stems in early spring from a small deep tuber, bearing a pair of opposite leaves, and a loose raceme of pretty flowers. Corolla pale rose-color with deeper veins, opening for more than one day! (Named in honor of *Clayton*, one of the earliest botanists of this country, who contributed to Gronovius the materials for the *Flora Virginica*.)

1. **C. Virgínica**, L. Leaves linear-lanceolate, elongated. — Moist open woods, from Connecticut westward.

X 2. **C. Caroliniàna**, Michx. Leaves spatulate-oblong or oval-lanceolate. — Vermont, Northern New York, and southward along the Alleghanies.

ORDER 22. **MALVÀCEÆ**. (MALLOW FAMILY.)

Herbs or shrubs, with alternate stipulate leaves and regular flowers, the calyx valvate and the corolla convolute in the bud, numerous stamens monadelphous in a column, 1-celled anthers, and kidney-shaped seeds. — Sepals 5, united at the base, persistent, often involucellate with a whorl of bractlets outside, forming a sort of exterior calyx. Petals 5,

cohering by their short claws with the tube of filaments. Anthers kidney-shaped, opening across the top. Pistils several, with the ovaries united in a ring or forming a several-celled pod. Seeds with little albumen: embryo curved, the leafy cotyledons variously doubled up. — Mucilaginous plants, with tough bark, and palmately-veined leaves. Flower-stalks with a joint.

Synopsis.

* Calyx naked (no involucl): carpels separable in the fruit.

1. **ABUTILON**. Pods each 3-6-seeded, not falling away when ripe.
2. **SIDA**. Pods 1-seeded, separating. Flowers perfect.
3. **ΝΑΡΕΑ**. Pods 1-seeded, separating. Flowers diœcious.

* * Calyx involuclate at the base.

+ Carpels numerous, separating whole when ripe, 1-seeded.

4. **MALVA**. Involucl of 3 bractlets.
5. **ALTHÆA**. Involucl of 6 to 9 bractlets.
- ++ Carpels permanently united into 3-5-celled loculicidal pod.
6. **HIBISCUS**. Involucl of many bractlets. Pod few-many-seeded.

1. **ABÛTILON**, Tourn. INDIAN MALLOW.

Calyx naked at the base. Styles 5-15. Pods 5-15, remaining coherent so as to form a sort of compound capsule, spreading at the summit, where each splits open along the inner edge. Seeds about 3 in each carpel. — Flowers in the axils of the heart-shaped leaves. (Name of unknown origin.)

1. **A. Avicénnæ**, Gærtn. (**VELVET-LEAF**.) Leaves roundish-heart-shaped, taper-pointed, velvety; peduncles shorter than the leaf-stalks; corolla yellow; pods 12-15, hairy, beaked, the beaks splitting in two. ① — Escaped from gardens, naturalized. Aug. — Plant about 4° high.

2. **SIDA**, L. SIDA.

Calyx naked at the base. Styles 5 or more: the ripe fruit separating into as many 1-seeded pods, each splitting open at the top. Radicle pointing upwards. Stigmas terminal, minutely capitate. — Flowers perfect. (A name used by Theophrastus.)

1. **S. spinòsa**, L. Annual, low, branched from the base; leaves ovate-oblong, abrupt at the base, serrate; stipules bristle-form; flower-stalks axillary, shorter than the petioles; fruit separating into

five 2-beaked pods, opening between the beaks. — Waste places, from S. New York southwestward. — A homely weed, with small yellow flowers. A little tubercle at the base of the leaves on the stronger plants gives the specific name, but it cannot be called spiny.

S. **NAPÆA**, the *Napæa lævis*, L., well known in gardens, which was first raised by Hermann at Leyden from seeds said to have come from Virginia, is not known to grow wild in the Northern States, and I doubt if it really belongs to this country at all.

3. **NAPÆA**, Clayt. GLADE MALLOW.

Calyx naked at the base, 5-toothed. *Flowers dioecious*; the staminate flowers entirely destitute of pistils; the fertile with a short column of filaments but no anthers. Styles mostly 8, distinct almost to the base, stigmatic along the inside. Fruit depressed-globular, separating when ripe into as many 1-seeded pods as styles. Radicle pointing downwards. — A tall and roughish perennial herb, with very large 9-11-parted lower leaves, the pointed lobes pinnatifid-cut and toothed, and small white flowers in paniced clustered corymbs. (Named by Clayton from *νᾰπη*, a wooded valley, or mountain glade, or, poetically, the nymph of the groves, alluding to the place where he discovered the plant.)

1. **N. dioica**, L. (*Sida dioica*, Cav.) — Limestone valleys, Penn., southward to Augusta Co., in the Valley of Virginia, where Clayton discovered it, west to Ohio and Illinois; rare. July. — Root-leaves 1°-2° broad.

4. **MÁLVA**, L. MALLOW.

Calyx with a 3-leaved involucl at the base, like an outer calyx. Styles numerous. Fruit depressed, separating at maturity into as many 1-seeded and usually indehiscent kidney-shaped little pods as there are styles. Radicle pointing downwards. — Flowers perfect. (An old Latin name, from *Μαλᾶχη*, alluding to the emollient leaves.)

1. **M. rotundifolia**, L. (DWARF MALLOW.) *Stems prostrate* or spreading from a deep root; *leaves rounded-heart-shaped, obtusely 5-lobed*, crenate, long-petioled; flowers solitary, axillary; petals notched at the end, twice the length of the calyx. † — Around dwellings everywhere, introduced, troublesome. — Corolla small, whitish, with purple veins.

2. **M. sylvéstris**, L. (HIGH MALLOW.) *Stems erect*; *leaves rather sharply 5-7-lobed*; flowers axillary, 3-4 together; petals in-

versely heart-shaped, thrice the length of the calyx (rose-purple). † — Waste places, escaped from gardens, partially naturalized.

3. **M. triangulàta**, Leavenworth. Roughish-hairy; stems nearly erect; *leaves deltoid-triangular, crenate, pointed*, the lowest mostly heart-shaped at the base, the upper variously 3-5-lobed or cut; flowers numerous in a loose terminal panicle, on short pedicels; petals wedge-obovate (purple); involucl as long as the downy (not bristly) short calyx. † (Nuttallia cordifolia, *Nutt. N. cordata*, *Lindl. Malva Houghtonii, Torr. & Gr.*) — Dry prairies, &c., from Wisconsin southward. July. — Stems 2° high: flowers 1½' broad.

M. CRÍSPA, the CURLED MALLOW, and **M. MOSCHÀTA**, the MUSK MALLOW, are occasionally spontaneous around gardens.

5. ALTHÆA, L. MARSH MALLOW.

Calyx surrounded by a 6-7-cleft involucl. Otherwise as in *Malva*. (Name from ἀλθω, to cure.)

1. **A. officinàlis**, L. (COMMON MARSH MALLOW.) Stem erect; leaves ovate, or slightly heart-shaped, toothed, sometimes 3-lobed, clothed with velvety down; peduncles axillary, many-flowered, much shorter than the leaves. † — Salt marshes, naturalized in New England and New York. Aug., Sept. — Flowers pale rose-color. Root thick, abounding in mucilage, the basis of the *Pâtes de Guimaure*.

A. RÒSEA, and **A. FICIFÒLIA**, are the garden HOLLYHOCKS.

6. HIBÍSCUS, L. HIBISCUS.

Calyx involuclate at the base by a row of numerous bractlets. Styles united: stigmas 5, capitate. Anther-bearing column prolonged. Fruit a 5-celled many-few-seeded pod, opening into 5 valves which bear the partition on their middle (loculicidal). Herbs or shrubs, usually with large and showy flowers. (An old Greek and Latin name of unknown meaning.)

§ 1. **KOSTELÉTZKYA**, Presl. — *Cells of the depressed pod 1-seeded.*

1. **H. Virgínicus**, L. Roughish-hairy; leaves ovate and taper-pointed, heart-shaped, unequally toothed, the lower 3-lobed; pod bristly. † — Marshes on the coast, New York southward. Aug. — Stem 2°-4° high. Corolla 2' wide, purple-rose-color.

§ 2. **HIBISCUS** proper. — *Cells of the pod many-seeded: calyx and many-leaved involucl persistent.*

2. **H. Moscheùtos**, L. (SWAMP ROSE-MALLOW.) *Leaves ovate, pointed, toothed, the lower 3-lobed, whitened with a fine soft*

down underneath; the 1-flowered peduncles often united at the base with the petioles; *calyx not inflated; seeds smooth.* ♀ — Borders of marshes along and near the coast. Salt springs, Salina, New York. Aug., Sept. — Plant stout, 5° high. Corolla 5' in diameter, pale rose-purple, or white with a crimson eye, showy in cultivation.

3. **H. militaris**, Cav. (HALBERT-LEAVED MALLOW.) *Smooth throughout; lower leaves ovate-heart-shaped, toothed, 3-lobed; upper leaves halbert-form, the short lateral lobes spreading at the base, the middle one prolonged and taper-pointed; peduncles slender; fruiting calyx inflated; seeds hairy.* ♀ — River-banks, Penn. to Ohio. Aug. — As tall as, but more slender and smaller-flowered, than the last: corolla pale rose-color.

4. **H. Triònum**, L. (BLADDER KETMIA.) *Somewhat hairy; upper leaves deeply 3-parted, with lanceolate divisions, the middle one much the longest; fruiting calyx inflated, membranaceous, with bristly ribs, 5-winged at the summit; seeds rough.* ① — Escaped from gardens, but scarcely naturalized. Corolla pale greenish-yellow with a purple eye, ephemeral; hence the name *Flower-of-an-hour*.

H. SYRIACUS, the *Shrubby Althæa* of the old gardeners, is cultivated about houses.

H. ESCULÉNTUS (the OKRA), belonging to the section ABELMÓSCHUS, Medic. (in which the leaves of the involucl are deciduous, and the membranaceous inflated calyx splits open on one side), is common in gardens, especially southward.

ORDER 23. TILIACEÆ. (LINDEN FAMILY.)

Trees, with the mucilaginous properties, fibrous bark, and valvate calyx, &c., of the Mallow Family; but the petals imbricated in the bud, the stamens usually polyadelphous, and the anthers 2-celled; — represented in northern regions only by the genus

1. TÍLIA, L. LINDEN. BASSWOOD.

Sepals 5. Petals 5, spatulate-oblong. Stamens numerous: filaments cohering in 5 clusters with each other (in European species), or with the base of a spatulate petal-like body placed opposite the real petals. Pistil with a 5-celled ovary and 2 half-anatropous ovules in each, a single style, and a 5-toothed stigma. Fruit a sort of woody globular nut, becoming 1-celled and 1-2-seeded. Embryo with a taper radicle and a pair of leaf-like

somewhat heart-shaped and lobed cotyledons, which are a little folded. — Fine trees, with soft and white wood, obliquely heart-shaped and serrate leaves, deciduous stipules, and small cymes of flowers, hanging on an axillary peduncle which is united to a leaf-like bract. Flowers cream-color, honey-bearing, fragrant. (The classical name of the genus.)

1. **T. Americàna**, L. (BASSWOOD.) Leaves green and glabrous or nearly so. — Rich woods. June. — This familiar tree is rarely called *Lime-tree*, oftener *White-wood*, commonly *Basswood*; the name (now obsolete in England) alluding to the use of the inner bark for mats and cordage.

2. **T. heterophýlla**, Vent. (WHITE BASSWOOD.) Leaves smooth and bright green above, whitened with a woolly down underneath. (*T. alba*, Michx.) — Mountains of Penn. and southward. — Leaves larger than in No. 1, often 8' broad.

T. EUROPÆA, the EUROPEAN LINDEN, which is planted in and near our cities as an ornamental tree, is at once distinguished from any native species by the absence of the petal-like scales among the stamens. This tree (the *Lin*) gave the family name to *Linnaeus*.

ORDER 24. LINÀCEÆ. (FLAX FAMILY.)

Herbs, with regular hypogynous flowers 4-5-merous throughout, strongly imbricated calyx and convolute petals, the 5 stamens monadelphous at the base, and an 8-10-seeded pod, with twice as many cells (complete or incomplete) as there are styles; — consisting chiefly of the genus

1. LINUM, L. FLAX.

Sepals, petals, stamens, and styles 5. Pod of 5 united carpels (into which it splits in dehiscence) and only 5-celled, with 2 seeds hanging from the summit of each; but each cell is incompletely or completely divided into two by a false partition which projects from the back of the carpels, thus becoming 10-celled. Seeds anatropous, mucilaginous, flattened, containing a large embryo with plano-convex cotyledons. — Herbs, with a fibrous bark, simple and sessile entire leaves (alternate or often opposite) without stipules, and terminal, corymbose or paniced flowers. Corolla usually ephemeral. (The classical name of the Flax.)

1. **L. Virginiànum**, L. (WILD FLAX.) *Leaves oblong-*

lanceolate, the upper acute; flowers small, scattered on the corymbose or paniced branches, on very short peduncles turned to one side; sepals ovate, pointed, smooth; *petals yellow*. — Dry woods. June — Aug. — ② or ④? Stem 1° — 2° high. Corolla 3'' broad. Pods depressed-globose, 10-celled, splitting at length through all the partitions into 10 pieces.

2. **L. rigidum**, Pursh. (LARGER YELLOW FLAX.) *Leaves linear*, rigid, pointed, with rough margins; flowers corymbose-paniced; sepals ovate-lanceolate, rigid-pointed, 3-nerved, with roughened glandular margins; *petals sulphur-yellow*. — Rhode Island, Connecticut, scarce. Michigan westward. ①

3. **L. usitatissimum**, L. (COMMON FLAX.) *Leaves linear-lanceolate*, acute; sepals ovate, acute, 1 — 3-nerved, with membranaceous margins; *petals blue* (large). — Fields, sparingly escaped from cultivation. ① — Pod globose, pointed, 10-celled.

ORDER 25. GERANIACEÆ. (GERANIUM FAMILY.)

Plants with mostly regular hypogynous 5-merous flowers, imbricated sepals and convolute petals, 10 stamens slightly monadelphous at the base, the alternate ones shorter, and 5 pistils cohering to a central prolonged axis, from which they separate at maturity by the curling back of the styles elastically, carrying with them the small 1-seeded pods. — Calyx persistent. Ovules 2 in each carpel, pendulous, anatropous, usually but one ripening. Pods small and membranaceous, cohering to 5 shallow excavations in the base of the prolonged axis, usually torn open on the inner face, when they are carried away by the recurving styles. Seed without albumen: cotyledons folded together. — Strong-scented herbs (or the Pelargoniums, which have somewhat irregular flowers, mostly shrubby plants), with opposite or alternate stipulate leaves, and bitter astringent roots.

1. GERANIUM, L. CRANESBILL.

Stamens 10, all with perfect anthers, the 5 longer with glands at their base. Styles recurved but not twisted in the ripe fruit, smooth inside. — Stems forking. Peduncles 1 — 3-flowered. (An.

old Greek name, from γέρας, a Crane; the long fruit-bearing beak thought to resemble the bill of that bird.)

* *Root perennial.*

1. **G. maculatum**, L. (WILD CRANESBILL.) Stem erect, hairy; leaves about 5-parted, the wedge-shaped divisions lobed and cut at the end; sepals awned; petals entire, light purple. — Open woods. April–July. — A well-known plant, with large and handsome flowers. Leaves somewhat blotched with whitish as they grow old.

* * *Root biennial or annual.*

2. **G. Carolinianum**, L. (CAROLINA CRANESBILL.) Stems diffusely branched from the base, hairy; leaves about 5-parted, the divisions cleft and cut into numerous oblong-linear lobes; sepals awned, as long as the emarginate (pale red-purplish) petals; *seeds very minutely reticulated* (under a lens). — Barren soil and waste places. May–July. — Biennial in the north, low, spreading when old. Flowers small: the peduncles and pedicels short.

3. **G. dissectum**, L. (CUT-LEAVED CRANESBILL.) Stems spreading, hairy; leaves 5–7-parted; the divisions linear, 3-cleft or cut; sepals awned, nearly as long as the 2-lobed (bluish-purple) petals; *seeds conspicuously reticulated*. — Waste places, introduced, if really in the country. Some states of No. 2 are often taken for it; but we have seen none with so long lobes to the leaves or seeds so much reticulated.

4. **G. pusillum**, L. (SMALL-FLOWERED CRANESBILL.) Stems procumbent, slender, minutely pubescent; leaves rounded kidney-form, 5–7-parted, the divisions mostly 3-cleft; *sepals awnless*, about as long as the 2-cleft (bluish-purple) petals; *seeds smooth*. — Waste places, New York: introduced.

5. **G. Robertianum**, L. (HERB ROBERT.) Sparsely hairy, diffuse; *leaves 3-divided, the divisions 2-pinnatifid*; sepals awned, shorter than the (purple) petals; *pods wrinkled*; *seeds smooth*. — Moist woods and shaded ravines. June–Oct. — Plant strongly odorous.

2. ERÓDIUM, L'Her. STORKSBILL.

Stamens 5, perfect, the 5 shorter sterile. Styles in fruit at length twisting spirally, bearded inside. Otherwise as Geranium. (Name from ἐρωδιός, a Heron, in allusion to the shape of the beak.)

1. **E. cicutarium**, L'Her. Annual, hairy; stems low, spreading; leaves pinnate; the leaflets sessile, 1–2-pinnatifid; peduncles several-flowered; petals (purplish) longer than the calyx. — Shore of Oneida Lake, New York, *Knieskern*. Introduced.

ORDER 26. OXALIDACEÆ. (WOOD-SORREL FAMILY.)

Plants with sour juice, compound leaves, and regular flowers, with the sepals, petals, and stamens nearly as in Geranium; but with 5 separate styles and a 5-celled several-seeded pod. — The principal genus is

1. **OXALIS**, L. WOOD-SORREL.

Sepals 5, persistent. Petals 5, withering after expansion. Stamens 10, monadelphous at the base, alternately shorter. Pod membranaceous, deeply 5-lobed, 5-celled, each cell opening on the back. Seeds few in each cell, pendulous from the axis, anatropous, their outer coat loose and separating. Embryo straight in fleshy albumen. — Herbs, with alternate or radical stipulate leaves, mostly of 3 inversely heart-shaped leaflets, which close and droop at nightfall. (Name from *ὄξύς*, *sour*.)

* *Stemless: leaves and scapes from a root-stock or bulb.*

1. **O. Acetosélla**, L. (COMMON WOOD-SORREL.) *Root-stock creeping and scaly-toothed; scape 1-flowered; petals white with reddish veins, often notched.* — Deep cold woods, Maine to Michigan, northward. June. — Plant 3' - 5' high, sparsely hairy: the flower $\frac{3}{4}$ ' broad. Leaflets broadly obovate.

2. **O. violàcea**, L. (VIOLET WOOD-SORREL.) *Bulb scaly; scapes several-flowered in an umbel, longer than the leaves; petals violet.* — Rocky places, most common southward. May, June. — Nearly smooth, 5' - 9' high. Leaves very broadly obovate. Sepals tipped with a gland. Corolla 1' broad.

* * *Stems leafy: peduncles axillary.*

3. **O. stricta**, L. (YELLOW WOOD-SORREL.) *Perennial? by running subterranean shoots; stems at first erect, branching; peduncles 2-6-flowered, longer than the leaves; petals yellow; pods elongated, erect in fruit, the cells several-seeded.* — Borders of woods, fields, and cultivated grounds. May - Sept. — Probably we have but one species of Yellow Wood-Sorrel, which varies greatly in appearance and in the size of its flowers according to season and situation.

ORDER 27. BALSAMINACEÆ. (BALSAM FAMILY.)

Annuals, with succulent stems gorged with a bland watery juice, and very irregular hypogynous flowers, the 5 stamens somewhat united, and the pod bursting elastically. — Characters as in the principal genus.

1. IMPATIENS, L. BALSAM. JEWEL-WEED.

Calyx and corolla colored alike and confounded, imbricated in the bud. Sepals apparently only 4; the upper one, which is notched at the apex, probably consisting of two combined; the lower one largest and forming a spurred sac. Petals 2, unequal-sided and 2-lobed (each consisting of a pair united). Stamens 5, short: anthers opening on the inner face, connivent over the stigma. Ovary 5-celled: stigma sessile. Pod with evanescent partitions, and a thick axis bearing the several anatropous seeds, 5-valved, the valves coiling elastically and projecting the seeds in bursting. Embryo straight: albumen none. — Leaves simple, alternate, without stipules. Flowers axillary or paniced; often of two sorts, viz. the larger ones, as described above, which seldom ripen seeds, and very small ones, which are fertilized early in the bud, when the floral envelopes never expand, but are forced off by the growing pod and carried upwards on its apex. (Name from the sudden bursting of the pods when touched, whence also the popular appellations TOUCH-ME-NOT, or SNAP-WEED.)

1. I. pallida, Nutt. (PALE TOUCH-ME-NOT.) *Flowers pale yellow, sparingly dotted with brownish-red; sac dilated and obtusely conical, broader than long, tipped with a very short recurved spur.* — Moist shady places and along rills, in rich soil; most common north-westward. July – Sept. — Larger and greener than the next, with larger flowers. Leaves ovate, petioled, toothed.

2. I. fulva, Nutt. (SPOTTED TOUCH-ME-NOT.) *Flowers orange-color, thickly spotted with reddish-brown; sac longer than broad, acutely conical, tapering into a recurved spur.* — Rills and shady moist places, common, especially southward. June – Sept. — Plant 2° – 4° high: the flowers loosely paniced at the ends of the branches, hanging gracefully on their slender nodding stalks, the open mouth of the cornucopiæ-shaped sepal upward. Flowers smaller than in the last.

I. BALSAMINA, the GARDEN BALSAM or *Ladies' Slippers*, is becoming spontaneous about gardens.

TROPÆOLUM MAJUS, the NASTURTIUM of gardens, is the type of a family between this and the ensuing.

ORDER 28. LIMNANTHACEÆ.

Annual low herbs, with pinnated alternate leaves without stipules, and regular 3 – 5-merous flowers: calyx valvate

and petals convolute in the bud: stamens twice their number: the one-seeded little fleshy fruits entire, but their styles united. — Consists of one 5-merous Californian plant (*Limnánthes*), with handsome flowers, sometimes cultivated in gardens, and the

1. FLÖERKEA, Willd. FALSE MERMAID.

Flower 3-merous (rarely 4-merous): the 3 petals shorter than the calyx, lanceolate. Stamens 6, nearly hypogynous. Ovaries 3, opposite the sepals, united only at the base; the style rising in the centre: stigmas 3. Fruit of 3 (or 1-2) fleshy achenia. Seed large, anatropous, erect, filled by the large embryo with its hemispherical fleshy cotyledons. — A small and inconspicuous annual, with minute solitary flowers on axillary peduncles. (Named after *Floerke*, a German botanist.)

1. F. proserpinacoïdes, Willd. — Marshes and riverbanks, W. N. Engl. to Ohio. April-June. — The rather succulent stems and foliage slightly pungent. Leaflets 3-5, lanceolate.

ORDER 29. ZANTHOXYLÀCÆ.

Trees or shrubs, pungent and bitter-aromatic, with pellucid-dotted leaves, and diœcious or polygamous regular small flowers: ovaries separate or 2-celled. — Sepals 3-5. Petals as many, or wanting. Stamens equalling or double the sepals in number. Pistils 2-5, distinct or united, 1-2-seeded (ovules 2, collateral). Seed-coat crustaceous. Embryo in fleshy albumen. — Leaves alternate or opposite. Stipules none.

1. ZANTHÓXYLUM, L. (PRICKLY ASH.)

Flowers diœcious. Sepals 5, petal-like when there are no petals. Stamens 5. Pistils 3-5, raised on a short base or stalk, distinct, the styles connivent. Pods thickish, 2-valved when ripe. Seeds black and shining. — Stems and often the leaf-stalks prickly. Leaves mostly pinnate. (Name from *ξανθός*, yellow, and *ξύλον*, wood.)

1. Z. Americànum, Mill. (NORTHERN PRICKLY ASH.)
Leaves and flowers in axillary clusters; leaflets 4-5 pairs and an odd

one, ovate-oblong, downy when young; petals wanting; pistils 5, with slender styles; pods short-stalked. — Rocky woods and river-banks, common northward. April, May. — A low or tall prickly shrub, with yellowish-green flowers appearing with the leaves. Bark and pods very pungent to the taste.

2. PTELEA, L. SHRUBBY TREFOIL.

Flowers polygamous. Sepals 3-5. Petals 3-5. Stamens as many. Ovary 2-celled: style short: stigmas 2. Fruit a 2-celled samara, winged all round, nearly orbicular. — Shrubs, with 3-foliolate leaves, and greenish-white small flowers in compound terminal cymes. (The Greek name of the Elm, applied to a genus which has a somewhat similar fruit.)

1. **P. trifoliata**, L. Leaflets ovate, pointed, downy when young, the middle one wedge-form at the base. — Rocky places, from Michigan and Penn. southward. June. — A tall shrub. Fruit bitter. Odor of the flowers disagreeable; but not so much so as those of the

AILANTHUS GLANDULOSUS, or **TREE-OF-HEAVEN**, — a cultivated tree of this family, — whose flowers, redolent of any thing but “airs from heaven,” offer a serious objection to the planting of this ornamental tree near dwellings.

ORDER 30. ANACARDIACEÆ. (CASHEW FAMILY.)

Trees or shrubs, with a resinous or milky acrid juice, dotless alternate leaves, and small, often polygamous, regular pentandrous flowers, with a 1-celled and 1-ovuled ovary, but with 3 styles or stigmas. — Petals imbricated in the bud. Seed borne on a curved stalk that rises from the base of the cell, without albumen. Stipules none.

1. RHÚS, L. SUMACH.

Sepals 5. Petals 5. Stamens 5, inserted into the edge or between the lobes of a flattened disk in the bottom of the calyx. Fruit small and indehiscent, a sort of dry drupe. — Leaves (simple in *R. Cótinus*, the *Smoke-Plant* of gardens) usually compound. Flowers greenish-white or yellowish. (The old Greek and Latin name of the genus.)

§ 1. **SUMAC**, DC. — *Flowers mostly polygamous, paniced.*

* *Not poisonous: fruit clothed with (acid) crimson hairs: panicle compound, dense, terminal: leaves odd-pinnate.*

1. **R. typhina**, L. (STAGHORN SUMACH.) *Branches and stalks densely velvety-hairy; leaflets 11-31, pale beneath, oblong-lanceolate, pointed, serrate. — Hill-sides. June. — A large shrub, or a spreading tree 20°-30° high, with orange-colored aromatic wood, and copious milky-resinous juice.*

2. **R. glabra**, L. (SMOOTH SUMACH.) *Smooth, somewhat glaucous; leaflets 11-31, whitened beneath, lanceolate-oblong, pointed, serrate. — Rocky or barren soil. July. — Smaller than No. 1.*

3. **R. copallina**, L. (DWARF SUMACH.) *Branches and stalks downy; petioles winged-margined between the 9-21 oblong or ovate-lanceolate leaflets, which are oblique or unequal at the base, smooth and shining above. — Rocky hills. July. — Shrub 2°-7° high, with running roots. Leaflets variable, entire or sparingly toothed.*

* * *Poisonous to the touch: fruit smooth: panicles axillary.*

4. **R. venenata**, DC. (POISON SUMACH.) *Smooth, or nearly so; leaves odd-pinnate; leaflets 7-13, obovate-oblong, somewhat pointed at both ends, entire. (R. Vénix, L., partly.) Swamps. June. — Shrub 10°-18° high, with thin light-green foliage and dun-colored fruit. The most poisonous species, even the effluvium affecting many persons. It is also called, inappropriately, Poison Elder and Poison Dogwood.*

5. **R. Toxicodéndron**, L. (POISON IVY. POISON OAK.) *Climbing by rootlets over rocks, &c., or ascending trees; leaves with 3 leaflets, which are rhombic-ovate, mostly pointed, and rather downy beneath, variously notched or cut-lobed, or entire. — When climbing trees it is R. radicans, L. — Thickets, fence-rows, &c. June. Less poisonous than No. 4.*

§ 2. **LOBADIUM**, Raf. — *Flowers diœcious, in clustered scaly-bracted spikes like catkins, preceding the leaves: disk 5-parted. (Not poisonous.)*

6. **R. aromática**, Ait. (FRAGRANT SUMACH.) *Leaves pubescent when young, thickish when old; leaflets 3, rhombic-ovate, unequally cut-toothed, the middle one wedge-shaped at the base; flowers yellow; fruit downy with acid hairs. — Dry rocky soil, Vermont to Michigan. April. — A flow straggling bush, the crushed leaves sweet-scented.*

ORDER 31. ACERACEÆ. (MAPLE FAMILY.)

Trees, with opposite dotless leaves, without stipules, yielding a sweet sap, regular but often apetalous or unsymmetrical polygamo-diœcious small flowers, and a 2-winged fruit.

— Styles 2: ovary surrounded at the base by a glandular-lobed disk into which the 5–12 stamens are inserted, 2-celled, with 2 pendulous anatropous ovules in each: from the back of each carpel grows the wing, converting the fruit into a pair of separable 1-seeded samaras. Seed nearly without albumen, variously coiled, and the leaf-like cotyledons crumpled.

1. **À CER**, L. MAPLE.

Calyx 5-lobed or of 5 sepals. Petals 5, or none. Stamens 6–8, rarely 5. — Flowers mostly polygamous. Leaves simple, palmately lobed, mostly heart-shaped at the base. (The classical name of the Maple, from the Celtic *ac*, hard.)

* *Flowers in terminal racemes, later than the leaves: stamens 6–8.*

1. **A. Pennsylvanicum**, L. (STRIPED MAPLE.) Leaves 3-lobed at the apex, finely and sharply doubly serrate; the short lobes taper-pointed, and also serrate; *racemes drooping, loose; petals obovate*; fruit with large diverging wings. (*A. striatum*, Lam.) — Rich woods, Maine to Michigan. June. — A small slender tree, with light-green bark striped with dark lines, and greenish flowers and fruit. Also called *Striped Dogwood*, and *Moose-Wood*.

2. **A. spicatum**, Lam. (MOUNTAIN MAPLE.) Leaves downy underneath, 3- (or slightly 5-) lobed, coarsely serrate, the lobes taper-pointed; *racemes upright, dense, somewhat compound; petals linear-spatulate*; fruit with small very divergent wings. (*A. montanum*, Ait.) — Moist hill-sides in woods, Maine to Michigan northward. June. — A tall shrub, forming clumps.

* * *Flowers umbellate-corymbed, appearing with the leaves.*

3. **A. saccharinum**, Wang. (SUGAR MAPLE. ROCK MAPLE.) Leaves 3–5-lobed, with rounded sinuses and pointed sparingly sinuate-toothed lobes, either heart-shaped or nearly truncate at the base, whitish and smooth or a little downy along the veins beneath; flowers from terminal leaf-bearing and lateral leafless buds, drooping on very slender hairy pedicels; calyx hairy at the apex; petals none; wings of the fruit broad, slightly diverging. — Var. *nigrum*. (BLACK SUGAR-MAPLE.) Leaves green both sides, minutely downy even when old, the lobes rather wider, and the sinus at the base often closed. (*A. nigrum*, Michx.) — Rich woods, most abundant northward or in mountain valleys. April.

* * * *Flowers in umbel-like clusters arising from lateral leafless buds, preceding the leaves: stamens 3–6.*

4. **A. dasycarpum**, Ehrhart. (WHITE OR SILVER MAPLE.)

Leaves deeply 5-lobed with the sinuses rather acute, silvery-white (and when young downy) underneath, the divisions narrow, cut-lobed and toothed; flowers (greenish yellow) on short pedicels; *petals none*; *fruit woolly when young*, with large divergent wings. — River-banks, most common southward. April. — A fine ornamental tree.

5. **A. rùbrum**, L. (RED or SWAMP MAPLE.) Leaves 3-5-lobed with the sinuses acute, whitish underneath; the lobes irregularly serrate and notched, acute, the middle one usually longest; *petals linear-oblong*; flowers on very short pedicels; but the *fruit* on prolonged drooping pedicels, *smooth*. — Swamps and wet woods, everywhere. March, April. — A small tree, with reddish twigs; the leaves varying greatly in shape, turning bright crimson in early autumn; the blossoms scarlet, or sometimes greenish-yellow.

2. **NEGÚNDO**, Mœnch. ASH-LEAVED MAPLE.

Calyx 5-cleft. Petals none. Stamens mostly 5. — Flowers diœcious, from lateral buds; the sterile in clusters on capillary pedicels; the fertile in drooping racemes. Leaves pinnate, with 3 or 5 leaflets.

1. **N. aceroides**, Mœnch. (*Acer Negundo*, L.) Leaflets smoothish when old, very veiny, ovate, pointed, toothed; fruit smooth, with large rather incurved wings. — River-banks. Penn. to Michigan. April. — A small but handsome tree, with light-green twigs, and very delicate drooping clusters of small greenish flowers, rather preceding the leaves. Also called BOX-ELDER.

ORDER 32. HIPPOCASTANÆÆ.

Trees or shrubs, with opposite digitate leaves, no stipules, and showy hypogynous flowers which are both unsymmetrical and irregular. Fruit a leathery round pod, 2-3-valved, ripening 1 to 3 very large bitter seeds like chestnuts. — Consists essentially of the genus

1. **ÆSCULUS**, L. HORSE-CHESTNUT.

Calyx regular, 5-lobed. Petals 4, sometimes 5, more or less unequal, with claws. Stamens 7 (rarely 6 or 8); filaments long and slender, often unequal. Style 1: ovary 3-celled, with 2 ovules in each, only one of which, or one in each cell, ripens into a seed. Seed with a thick and shining coat and a large and round pale scar, without albumen. Cotyledons very thick and fleshy, somewhat crumpled and united, remaining under ground in germina-

tion : plumule 2-leaved : radicle conical, curved. — Leaflets of the 5–7-foliolate leaves serrate, straight-veined, like a Chestnut-leaf. Flowers in a terminal thyrsus or dense panicle, often polygamous, the greater portion with imperfect pistils and sterile. Pedicels jointed. (The ancient name of some Oak or other mast-bearing tree.)

§ 1. *Æsculus* proper. — *Fruit covered with prickles.*

1. *Æ. Hippocástanum*, L. (COMMON HORSE-CHESTNUT.) Corolla spreading, white spotted with purple and yellow, of 5 petals; stamens declined; leaflets 7. — This well-known introduced tree may be said to be almost naturalized.

2. *Æ. glàbra*, Willd. (OHIO BUCKEYE.) Stamens curved, much longer than the pale yellow corolla of 4 upright petals; fruit prickly when young; leaflets 5. — River-banks, W. Penn. to Michigan. June. — A small tree, the bark exhaling an unpleasant odor, as in the rest of the genus. Flowers small, not showy.

§ 2. *Pàvia*, Boerh. — *Fruit smooth.* (BUCKEYE.)

3. *Æ. flàva*, Ait. (YELLOW BUCKEYE.) Stamens shorter than the light yellow corolla of 4 very unequal petals; filaments nearly straight, woolly; leaflets 5–7, pubescent beneath. — Woods, Ohio, &c. May. — Often a large tree: seeds very large.

Æ. PÀVIA, L., the Buckeye with purple or reddish flowers, probably grows in S. W. Pennsylvania.

ORDER 33. CELASTRÀCEÆ. (SPINDLE-TREE FAM.)

Shrubs or small trees, with small regular and symmetrical flowers, the sepals and the petals both imbricated in the bud, the stamens as many as the petals and alternate with them (opposite the sepals), inserted on a disk which often fills the bottom of the calyx. Fruit a 3- (rarely 4–5-) celled pod, free from the calyx. — Seeds solitary or few, anatropous, with a large embryo in fleshy albumen: cotyledons broad and leaf-like. — Stipules deciduous or inconspicuous. Pedicels jointed.

Synopsis.

Tribe 1. STAPHYLEÆ. Seeds bony, with no aril. Ovary many-ovuled, free from the cup-shaped disk. — Leaves compound.

1. STAPHYLEA. Flowers in raceme-like clusters. Pods bladdery.

Tribe 2. EUONYMEÆ. Seeds with pulpy arils. Ovules 2 in

each cell. Style 1: stigma 3-lobed. Disk adhering to the bottom of the calyx. — Leaves simple.

2. *CELASTRUS*. Stamens on the edge of the disk. Leaves alternate.

3. *EUONYMUS*. Stamens on the upper surface of the disk, in which the ovary is immersed. Leaves opposite.

1. STAPHYLÈA, L. BLADDER-NUT.

Sepals 5, erect. Petals 5, with short claws. Pistil of 3 carpels united in the axis; their long styles cohering, but separating as the ovary enlarges into the membranaceous inflated 3-lobed and 3-celled pod. Seeds 2 or 3 in each cell, naked, bony. — Upright shrubs with opposite pinnate leaves of 3 or 5 serrate leaflets, and white flowers in drooping raceme-like clusters, terminating the branchlets. (Name from *σταφυλή*, a cluster.)

1. *S. trifolia*, L. (AMERICAN BLADDER-NUT.) Leaflets 3, ovate, pointed. — Moist thickets. May. — Shrub 10° high, with greenish striped branches. Flowers $\frac{1}{2}$ ', pods 2', long.

2. CELÁSTRUS, L. SHRUBBY BITTER-SWEET.

Sepals 5, united at the base. Petals 5, sessile. Stamens on the margin of a cup-shaped disk. Pistil on the disk. Pod globose (orange-color and berry-like), 3-valved, loculicidal. Seeds 1–2 in each cell, erect, inclosed by a pulpy scarlet aril. — Leaves alternate. Flowers small, greenish, in raceme-like clusters terminating the branches, polygamo-dicecious. (An ancient Greek name for some evergreen, which our plant is not.)

1. *C. scándens*, L. (WAX-WORK. CLIMBING BITTER-SWEET.) Woody, climbing or twining; leaves thin, ovate-oblong, finely serrate, pointed. — Along streams and thickets. June. — The opening orange-colored pods, displaying the scarlet covering of the seeds, are very ornamental in autumn.

3. EUÓNYMUS, TOURN. SPINDLE-TREE.

Sepals 4 or 5, united at the base, forming a short and flat calyx. Petals 4–5, rounded, spreading. Stamens very short, inserted on the upper face of a broad and flat 4–5-angled disk, which coheres with the calyx and is stretched over the ovary. Style short or none. Pod 3–5-lobed, 3–5-valved, loculicidal. Seeds 1–2 in each cell, inclosed in a red aril. — Shrubs, with 4-sided branchlets, opposite serrate leaves, and loose cymes of small green or

dark-purple flowers on axillary peduncles. (Deriv. from εὔ, *good*, and ὄνομα, *name*, because it has the bad reputation of poisoning cattle. *Tourn.*)

1. **E. atropurpureus**, Jacq. (BURNING BUSH.) Shrub tall and upright; *leaves petioled*, oval-oblong, pointed; parts of the (dark purple) flower commonly in fours; *Pods smooth, deeply lobed*. — New York and westward: also cultivated. June. — Ornamental at the close of autumn, by its copious clusters of crimson fruit, drooping on long peduncles.

2. **E. Americânus**, L. (STRAWBERRY-BUSH.) Shrub low, often spreading or trailing; leaves sessile, oblong-lanceolate, varying to obovate; parts of the (purplish or green) flowers mostly in fives; *Pods rough-warty, depressed*. — Wet places, W. New York westward. May - July. — Fruit not copious, crimson when ripe, the aril scarlet.

ORDER 34. RHAMNACEÆ. (BUCKTHORN FAMILY.)

Shrubs or small trees, with simple leaves, small and regular flowers (sometimes apetalous), with the stamens as many as the valvate sepals and alternate with them, and accordingly opposite the petals! Drupe or pod with only one seed in each cell, not arilled. — Petals folded inwards in the bud, hooded or concave, inserted along with the stamens into the edge of the fleshy disk which lines the short tube of the calyx and often unites it to the lower part of the 2-5-celled ovary. Ovules solitary, anatropous, erect. Stigmas 2-5, distinct; the styles united. Embryo large, with broad cotyledons, in fleshy albumen. — Leaves mostly alternate: stipules minute. Branches often thorny.

1. **RHÁMNUS**, L. BUCKTHORN.

Calyx 4-5-cleft. Petals 4-5, shorter than the sepals, flat-tish, or none. Filaments short. Ovary nearly free from the calyx. Fruit a berry-like drupe, containing 3 or 4 cartilaginous nuts. — Flowers minute, in short axillary clusters, often polygamous or diœcious. (*Ῥάμνος*, the ancient name, from the numerous branchlets.)

1. **R. cathárticus**, L. (COMMON BUCKTHORN.) Leaves ovate, minutely serrate; *stamens, petals, and seeds mostly 4*. — Naturalized in some places, and especially near West Point, New York. Culti-

vated for hedges. May. — A tall shrub, with gray branches and thorny branchlets. Fruit black.

2. **R. alnifolius**, L'Her. (ALDER-LEAVED BUCKTHORN.) Leaves oval, pointed, serrate; *petals usually wanting*; *stamens* 5; *seeds* 3. — Swamps, Maine to Michigan northward. June. — A spreading shrub, 2° - 3° high.

2. CEANOTHUS, L. NEW JERSEY TEA.

Calyx 5-lobed, the lower part cohering with the ovary, the upper separating across in fruit. Petals hood-form, on slender claws. Filaments elongated. Fruit 3-lobed, dry and splitting into its 3 carpels when ripe. — Shrubby plants; the flowers in little umbel-like clusters, which are crowded in dense panicles or corymbs at the summit of naked flower-branches: calyx and pedicels colored like the petals. (A name of Theophrastus, of unknown meaning, applied to some very different plant.)

1. **C. Americānus**, L. (NEW JERSEY TEA.) Leaves ovate or oblong-ovate, 3-ribbed, serrate, downy beneath, often heart-shaped at the base; common peduncles elongated. — Dry woodlands. July. — An undershrub, 1° - 3° high from a dark red root, varying greatly; branches downy. Flowers in pretty white clusters. — The leaves were used as a substitute for tea during the American Revolution.

2. **C. ovālis**, Bigelow. Leaves narrowly oval or elliptical-lanceolate, finely glandular-serrate, glabrous or nearly so, as well as the short common peduncles. — Dry rocks, W. Vermont to Michigan northward. May. — A handsome low shrub, with the white flowers larger than in No 1, more corymbed, and narrower smooth leaves, mostly acute at both ends.

ORDER 35. VITACEÆ. (VINE FAMILY.)

Shrubs climbing by tendrils, with small regular flowers, a minute truncated calyx, and the stamens as many as the valvate petals and opposite them! Berry 2-celled, 4-seeded. — Petals 4 - 5, very deciduous, inserted with the stamens on the outside of the fleshy disk which fills the cup of the almost obsolete calyx. Pistil with a short style or none, and a slightly 2-lobed stigma: ovary 2-celled, with 2 erect anatropous ovules from the base of each. Seeds bony, with a minute embryo at the base of the hard albumen. — Leaves palmately veined or compound: tendrils and flower-clusters

opposite the leaves. Flowers small, greenish, polygamous in all the American species.

1. VITIS, L. GRAPE-VINE.

Calyx with a nearly entire border. Petals separating at the base sooner than at the apex, and so usually falling off together without expanding. Base of the ovary girt with a 4-5-lobed ring, or 4-5 glands alternate with the stamens. Flowers fragrant in a compound thyrus: pedicels mostly umbellate-clustered. (The Latin name of the Vine.)

* *Leaves clothed with rusty or whitish wool beneath, at least when young.*

1. **V. Labrusca**, L. (NORTHERN FOX GRAPE.) *Branchlets and young leaves very woolly; leaves continuing woolly beneath, round heart-shaped, variously angled and lobed, obtusely toothed; fertile panicles compact; berries large ($\frac{1}{2}$ ' - $\frac{3}{4}$ ' in diameter). — Moist thickets, common. June. — Berries ripe in Sept., dark purple or amber-color, with a tough musky pulp. Improved by cultivation, it has given rise to the *Isabella Grape*, &c.*

2. **V. æstivàlis**, Michx. (SUMMER GRAPE.) *Young leaves downy with loose cobwebby hairs beneath, smoothish when old, green above, variously 3-5-lobed, with the sinuses rounded, coarsely toothed; fertile panicles compound; berries small ($\frac{1}{3}$ ') black with a bloom. — Thickets, common, climbing high. June. — Berries pleasant, ripe in Oct.*

* * *Leaves green on both sides, thin.*

3. **V. cordifòlia**, Michx. (WINTER OR FROST GRAPE.) *Leaves rounded heart-shaped, sharply and coarsely toothed, scarcely lobed, smooth, as well as the stalks, or sparsely beset with hairs on the veins beneath; berries small ($\frac{1}{4}$ ') black-blue with a copious bloom. — Thickets, common. June. — Berries very acerb till frost, then edible and spicy, but sour.*

4. **V. ripària**, Michx. (RIVER-SIDE FROST GRAPE.) *Leaves heart-shaped, commonly 3-lobed, unequally and very sharply cut-toothed, the larger teeth and lobes long-pointed, the veins beneath and the young stalks more or less pubescent; berries small, greenish-amber color or purple. — W. New England to Penn. and Michigan. June. — Not well distinguished, and probably not distinct from No. 3.*

V. VULPINA, L., the FOX GRAPE or MUSCADINE of the Southern States (*V. rotundifolia*, Michx.), is a well-marked species, with a fruit quite as large as in No. 1, with a musky flavor: it may be expected to occur in W. Pennsylvania.

2. AMPELÓPSIS, Michx. VIRGINIAN CREEPER.

Calyx slightly 5-toothed. Petals concave, spreading, deciduous after expansion. No 5-lobed ring around the ovary. — Leaves digitate, with 5 leaflets (turning crimson in autumn). Flower-clusters cymose. (Name from *ἄμπελος*, a vine, and *ὄψις*, appearance.)

1. A. quinquefòlia, Michx. — A common and familiar shrubby vine, climbing extensively, blossoming in July, ripening its small blackish berries in Oct. Also called *American Ivy*.

ORDER 36. **POLYGALÀCEÆ**. (MILKWORT FAMILY.)

Plants with a kind of irregular papilionaceous flowers, 4 – 8 diadelphous stamens, their anthers opening at the top by a pore or chink; the fruit a 2-celled and 2-seeded pod, entirely free from the calyx. — Represented by the typical genus

1. POLÝGALA, Tourn. MILKWORT.

Flower very irregular. Calyx persistent, of 5 sepals, of which 3 (the upper and the 2 lower) are small and often greenish, while the two lateral or inner (called *wings*) are much larger and colored like the petals. Petals 3, hypogynous, connected with each other and with the stamen-tube, the middle (lower) one keel-shaped and often crested on the back. Stamens 6 or 8: their filaments united below into a split sheath or into 2 sets, cohering more or less with the petals, free above: anthers 1-celled, often cup-shaped, opening by a hole or broad chink at the apex. Ovary 2-celled, with a single anatropous ovule pendulous in each cell: style prolonged and curved: stigma various. Fruit a small loculicidal 2-seeded pod, usually rounded and notched at the apex, much flattened contrary to the very narrow partition. Seeds with a caruncle, or variously shaped appendage at the hilum. Embryo large, with flat and broad cotyledons, surrounded by albumen. — Bitter plants (low herbs in temperate regions) with simple entire leaves, often dotted, and no stipules: sometimes bearing concealed fertile flowers also next the ground. (An old name from *πολύς*, much, and *γάλα*, milk, from a fancied property of its increasing this secretion.)

* *Biennial*: flowers yellow: crest of the keel small.

1. **P. lutea**, L. Flowers in solitary ovate or oblong heads, terminating the stem or simple branches (bright orange-yellow); leaves obovate or spatulate; lobes of the caruncle nearly as long as the seed. — Sandy swamps, Long Island, New Jersey and southward. June – Sept. — Stems 6' – 12' high, at first simple, bearing the showy head of flowers $\frac{3}{4}$ ' in diameter. Leaves 1–2' long.

2. **P. cymosa**, Walt. Flowers in small heads disposed in a compound level-topped cyme (citron-yellow turning blackish-green in drying); leaves linear or oblong-spatulate; caruncle short. (*P. corymbosa*, Michx., &c.) — Damp pine barrens, New Jersey? Delaware, and southward. — Stems 8' – 12' high, simple or branched from the base.

* * *Annual*: flowers purple or white, in spikes; no subterranean ones.
+ Leaves all alternate or scattered: flowers purple or flesh-color.

3. **P. incarnata**, L. Glaucous; stem slender, simple or sparingly branched; leaves small, linear-awl-shaped; spike oblong or cylindrical; wings much shorter than the conspicuously crested corolla; claws of the petals united in a very long and slender cleft tube; caruncle longer than the stalk of the seed. — Dry soil, Ohio to Wisconsin and southward. July. — Plant 1° high.

4. **P. sanguinea**, L. Stem branched at the top; leaves oblong-linear; spikes roundish or oblong, very obtuse; wings broadly ovate, very obtuse; caruncle almost as long as the seed. (*P. purpurea*, Nutt.) — Sandy and moist ground, common. July – Sept. — Stem 6' – 12' high. Spikes $\frac{1}{2}$ ' thick, reddish-purple: the rachis, as in No. 5 and 6, beset with the persistent awl-shaped scaly bracts after the flowers have fallen.

5. **P. fastigiata**, Nutt. Stem slender, at length much branched above; leaves linear; spikes short; wings ovate-oblong, tapering at the base into distinct claws; caruncle as long as, and nearly enveloping, the stalk-like base of the minutely hairy seed. (*P. sanguinea*, Torr. & Gr., *Fl.*, excl. syn.; not of Nutt., nor L.) — Pine barrens of New Jersey (Nuttall) and southward. — Spikes looser, and the rose-purple flowers much smaller, than in No. 4, brighter-colored than in the next, which it most resembles. Crest of the corolla minute, as in the related species.

6. **P. Nuttallii**, Torr. & Gr. (*Fl.* 1, p. 670, excl. syn., & descr.). Low; stem branched above; leaves linear; spikes oblong, dense; wings elliptical, on very short claws; caruncle small and applied to one side of the stalk-like base of the very hairy seed. (*P. sanguinea*, Nutt., not of L. *P. Mariana*, &c., Pluk., t. 437. *P. ambigua*, Torr. & Gr., *Fl.*, not of Nutt.) — Dry sandy soil, Massachusetts to New Jersey and southward near the coast. Aug. — Plant 4' – 8' high. Spikes

$\frac{1}{4}$ ' in diameter; the flowers light purple and greenish, duller-colored than in the last, with thicker wings on shorter claws; and the narrow caruncle not longer than the stalk-like base of the pear-shaped seed.

+ + *Leaves, at least the lower, in whorls: flowers purple or whitish.*

7. **P. cruciàta**, L. Low, with spreading opposite branches; leaves nearly all in whorls of four (rarely of five), linear and somewhat spatulate or oblanceolate; *spikes sessile or nearly so*, dense, oblong becoming cylindrical; *bracts persistent; wings broadly deltoid-ovate, slightly heart-shaped, tapering to a bristly point*; caruncle nearly as long as the seed. — Margin of swamps, Maine to Michigan, but rare northward, common southward near the coast. Aug. - Sept. — Stems 4' - 10' high, with almost winged angles. Spikes fully $\frac{1}{2}$ ' in diameter: flowers greenish-white, mostly tinged with purple.

8. **P. brevifolia**, Nutt. Rather slender, branched above; leaves in whorls of four, or scattered on the branches, narrowly spatulate-oblong; *spikes peduncled*, oblong, rather loose; *wings lanceolate-ovate, pointless or barely mucronate*. — Margin of sandy bogs, New Jersey. Rhode Island, *Olney*. Sept. — Closely allied to the last, of which it is possibly only a marked variety. Wings purple-rose-color throughout.

9. **P. verticillàta**, L. Slender, much branched; *stem-leaves in whorls of four or five, those of the branches scattered, linear, acute; spikes peduncled*, dense, acute, *elongated; bracts falling with the flowers; wings round, clawed*; the 2-lobed caruncle half the length of the seed. — Dry soil, common. June - Oct. — Stems 6' - 10' high, with long erect branches. Spike slender; the small flowers greenish-white, or sometimes tinged with purple: crest rather large in proportion.

10. **P. ambigua**, Nutt. Very slender, loosely branched; *lowest stem-leaves in whorls of four, the rest scattered*, narrowly linear; *spikes long-peduncled, very slender*, the flowers often scattered; *wings oval*; caruncle shorter; otherwise nearly as in No. 9. — Dry woods, New Jersey southward and westward. More slender in all its parts than the last, with a looser spike.

* * * *Perennial: flowers white, spiked; no subterranean ones.*

11. **P. Sénega**, L. (SENECA SNAKE-ROOT.) Stems several from a thick and hard knotty root, simple; leaves lanceolate, with rough margins, alternate; spike cylindrical, the flowers on extremely short pedicels; wings round-obovate, concave; crest short; caruncle nearly as long as the seed. — Rocky woods, W. New England westward. May, June. — Stems nearly 1° high: spike 1' - 2' long. — There is a variety in the Western States with nearly ovate taper-pointed leaves.

* * * * *Biennial or perennial: flowers purple; also with whitish fertile ones on subterranean branches.*

12. **P. polygama**, Walt. Stems numerous from the biennial root, mostly simple, ascending, very leafy; leaves oblanceolate or oblong, alternate; terminal raceme many-flowered, the broadly obovate wings longer than the crested corolla; radical flowers racemed on short runners on or beneath the ground, with imperfect corollas; lobes of the caruncle 2, scale-like, shorter than the seed. (*P. rubella*, Muhl.) — Dry sandy soil, common. July. — Stems 6' - 12' high; the rose-purple flowers ($\frac{1}{4}$ ' long) very handsome, 8-androus, often ripening seeds as well as the subterranean ones.

13. **P. paucifolia**, Willd. Perennial; flowering stems short (3' - 4'), and leafy chiefly at the summit, rising from long and slender prostrate or subterranean shoots, which also bear concealed fertile flowers; lower leaves small and scale-like, scattered; the upper crowded, ovate, petioled; flowers 1 - 3, large, peduncled; wings obovate, rather shorter than the conspicuously fringe-crested keel; stamens 6; caruncle of 2 - 3 awl-shaped lobes longer than the seed. — Woods in light soil. May. — A delicate plant, with large and very handsome flowers, $\frac{3}{4}$ ' long, rose-purple, or rarely pure white. Sometimes called *Flowering Wintergreen*, but more appropriately FRINGED POLYGALA.

ORDER 37. LEGUMINOSÆ. (PULSE FAMILY.)

Plants with papilionaceous flowers, 10 monadelphous, diadelphous, or rarely distinct stamens, and a single simple pistil producing a legume in fruit. Leaves alternate, with stipules, usually compound. — Calyx of 5 sepals, more or less united. Corolla of 5 petals, papilionaceous,* or rarely almost symmetrical, inserted into the base of the calyx. Stamens inserted with the corolla. Ovary free, 1-celled (sometimes 2-celled by an infolding of the walls, or divided across into joints), with a single lateral placenta: style simple: ovules amphitropous, or rarely anatropous. Seeds without albumen, filled by the embryo. — Leaflets almost always entire. Flowers usually perfect. — These are the

* The upper, or odd, usually spreading petal is named the *standard*; the 2 side ones, *wings*; the two lower, which commonly cohere by their lower edges, form what is called, from their obvious shape, the *keel*, which usually incloses the stamens.

characters of the *proper Pulse Family*, viz. the suborder PAPILIONACEÆ.*

Synopsis.

I. Corolla truly papilionaceous. Radicle mostly incurved.

Tribe 1. VICIÆ. — Stamens diadelphous, 9 united by their filaments into a sheath split on the upper side (next the standard) where the 10th is free. Pod continuous and 1-celled. Cotyledons very thick and fleshy (as in a pea), not rising to the surface, but remaining underground in germination. — Herbs, with abruptly pinnate leaves, the common leaf-stalk produced into a tendril or bristle. Peduncles axillary.

1. VICIA. Style bearded round the apex, or down the anterior side.
2. LATHYRUS. Style bearded on the posterior side, flattened.

Tribe 2. PHASEOLEÆ. — Stamens more or less diadelphous (9 and 1). Pod continuous, not jointed, nor more than 1-celled, except by cellular matter sometimes deposited between the seeds. Cotyledons thick and fleshy, usually rising to the surface, but remaining nearly unchanged (seldom foliaceous) in germination. — Twining or trailing plants, with odd-pinnate leaves of 3—several leaflets, mostly stipellate, destitute of tendrils. Flowers often clustered in the racemes.

* Keel twisted. Cotyledons thick, nearly unchanged in germination.

3. PHASEOLUS. Keel spiral. Leaves 3-foliolate, stipellate.
4. APIOS. Keel incurved, at length twisted. Leaves 5—7-foliolate.
* * Keel not twisted. Leaves 3-foliolate.
- ✓ 5. GALACTIA. Calyx 4-cleft. Bracts deciduous, not striate.
6. AMPHICARPEA. Calyx 4—5-toothed. Peduncles many-flowered.
Bracts persistent, striate.
- ✓ 7. CLITORIA. Calyx tubular, 5-cleft, 2-bracteolate. Peduncles 1—3-flowered. Standard spurless.
- ✓ 8. CENTROSEMA. Calyx short, 5-cleft, 2-bracteolate. Peduncles few-flowered. Standard spurred on the back.

Tribe 3. HEDYSAREÆ. — Stamens monadelphous or diadelphous. Pod (a *loment*) separating transversely into 2—several 1-seeded indehiscent joints, or rarely reduced to one such joint. Cotyledons becoming green leaves in germination. Leaves odd-pinnate: leaflets 3—many, mostly stipellate.

- ✓ 9. ÆSCHYNOMENE. Stamens equally diadelphous (5 and 5). Pod several-jointed. Flowers all perfect. Leaflets numerous.

* Since no species of the other great division, or suborder MIMOSEÆ, grow spontaneously within our limits (although there are several farther west and south), their peculiarities have here, for greater simplicity, been left entirely out of view.

10. **DESMODIUM**. Stamens diadelphous (9 and 1) sometimes monadelphous. Pod several-jointed. Flowers perfect. Leaflets 3.
 11. **LESPEDEZA**. Stamens diadelphous: anthers uniform. Pod 1- (rarely 2-) jointed. Flowers often polygamous. Leaflets 3.
 12. **STYLOSANTHES**. Stamens monadelphous: anthers of 2 forms. Pod 1-2-jointed. Flowers polygamo-monœcious. Leaflets 3.

Tribe 4. **LOTEÆ**. — Stamens monadelphous or diadelphous (9 and 1). Pod continuous, 1-celled, or else 2-celled lengthwise. Cotyledons becoming green leaves in germination. — Not twining, climbing, nor tendril-bearing.

Subtribe 1. **ASTRAGALEÆ**. — Stamens diadelphous. Pod with one or both the sutures tumid, or projecting inwards, so as often to become partly or completely 2-celled lengthwise. Leaves pinnate.

13. **ASTRAGALUS**. Pod partly or quite 2-celled by the projection of the lower (dorsal) suture.
 14. **PHACA**. Pod 1-celled, with the upper (seed-bearing) suture tumid or projecting, turgid. Keel obtuse.

Subtribe 2. **GALEGEÆ**. — Stamens often monadelphous. Sutures of the pod not turned inwards. Leaves commonly pinnate or pinnately 3-foliolate, the earliest ones opposite.

* Pods linear, flat, several-seeded.

15. **ROBINIA**. Stam. diadelphous. Shrubs or trees: leaflets stipellate.
 16. **TEPHROSIA**. Stam. scarcely diadelphous. Stipelles none.

* * Pods 1-2-seeded, short, scarcely dehiscent.

- ✓ 17. **AMORPHA**. Stam. monadelphous merely at the base. Petal one!
 ✓ 18. **PSORALEA**. Stam. diadelphous. Corolla truly papilionaceous.
 ✓ 19. **PETALOSTEMON**. Stam. monadelphous, only 5! Corolla scarcely papilionaceous.

Subtribe 3. **TRIFOLIEÆ**. — Stamens diadelphous. Leaves palmately (sometimes pinnately) 3-5-foliolate, the earliest ones alternate.

20. **TRIFOLIUM**. Flowers capitate. Pods membranous, small.
 21. **MELILOTUS**. Flowers racemed. Pods coriaceous, wrinkled.
 22. **MEDICAGO**. Flowers racemed or spiked. Pods curved or coiled.

Subtribe 4. **GENISTEÆ**. — Stamens monadelphous: anthers of 2 forms. Leaves simple or palmately 3-15-foliolate.

23. **GENISTA**. Keel straight. Pod flattened. Leaves simple.
 24. **CROTALARIA**. Keel scythe-shaped. Pod inflated. Leaves simple.
 25. **LUPINUS**. Keel scythe-shaped, pointed. Pod flattish, knotty. Leaves 1-15-foliolate.

Tribe 5. SOPHOREÆ. — Stamens distinct. Corolla truly papilionaceous.

26. BAPTISIA. Pod turgid. Herbs: leaves mostly palmate.

27. CERCIS. Pod flat, wing-margined on one side. Trees: leaves simple.

II. Corolla not really papilionaceous. Radicle straight.

Tribe 6. CASSIÆ. — Stamens distinct, some of them often imperfect. Corolla open, irregular, or almost regular.

28. CASSIA. Flowers perfect: anthers opening by pores.

29. GYMNOCLADUS. Flowers diœcious. Petals equal. Thornless.

30. GLEDITSCHIA. Flowers polygamous. Petals unequal. Trees thorny.

Tribe I. VICIÆ. THE VETCH OR PEA TRIBE.

1. VÍCIA, Tourn. VETCH. TARE.

Calyx 5-cleft or 5-toothed, the 2 upper teeth often shorter. Style thread-shaped, hairy all round the apex or down the outer side (next the keel). Pod 2—several-seeded. Stipules usually half arrow-shaped. (The old Latin name.)

* Annual: flowers 1-2 in the axils, nearly sessile.

1. **V. sativa**, L. (COMMON VETCH OR TARE.) Somewhat pubescent; stem simple; leaflets in 5-7 pairs, varying from obovate-oblong to linear, notched and mucronate at the apex; calyx-teeth equal; pod linear, several-seeded. — Cultivated fields and waste places; introduced; both the common form and the Var. *ANGUSTIFOLIA*, with longer and narrow leaflets. Corolla rather large, violet-purple.

** Annual: peduncles elongated. (Species of *Ervum*, L.)

2. **V. tetraspérma**, L. (SMOOTH TARE.) Peduncles 1-2-flowered; leaflets 4-6 pairs, linear-oblong, obtuse; calyx-teeth unequal; pods narrowly oblong, 4-seeded, smooth. — Naturalized around New York. — An insignificant plant, 6' - 12' high, with small whitish flowers.

3. **V. hirsùta**, Koch. (HAIRY TARE.) Peduncles 3-6-flowered; leaflets 6-8 pairs, truncate; calyx-teeth equal; pods oblong, 2-seeded, hairy. (*Ervum hirsutum*, L.) — Massachusetts to Penn.; naturalized. — A slender straggling plant, with small purplish-blue flowers.

*** Perennial: peduncles elongated; calyx-teeth very unequal. (Indigenous.)

4. **V. Crácca**, L. (TUFTED VETCH.) Downy-pubescent; leaflets 20-24, oblong-lanceolate, strongly mucronate; peduncles densely many-flowered; calyx-teeth shorter than the tube. — Border of

fields and thickets. July. — Flowers blue with purple, $\frac{1}{2}$ ' long, one-sided in the spike, reflexed.

5. **V. Caroliniàna**, Walt. (STRAGGLING VETCH.) Nearly smooth; *leaflets* 8–12, *oblong, obtuse, scarcely mucronate*; *peduncles loosely flowered*; calyx-teeth very short. — River-banks, &c. May. — Stem weak, 2°–4° high, climbing; the flowers more scattered than in No. 4, whitish, the keel tipped with blue.

6. **V. Americàna**, Muhl. (AMERICAN VETCH.) Glabrous; *leaflets* 10–14, *elliptical or ovate-oblong*, very obtuse, many-veined; *peduncles* 4–8-flowered. — Moist thickets, New York to Michigan. June. — Plant 1°–2° high: flowers purplish-blue, $\frac{3}{4}$ ' long.

2. LÁTHYRUS, L. VETCHLING. EVERLASTING PEA.

Calyx 5-cleft, the upper teeth shorter. Style flattish, not grooved above, hairy along the inner side (next the free stamen). Pods oblong, several-seeded. (*Λάθυρος*, a leguminous plant of Theophrastus.) — Our wild species are perennial and mostly smooth plants.

1. **L. marítimus**, Bigelow. (BEACH PEA.) Stem stout; *leaflets* 4–8 pairs, crowded, oval or obovate; *stipules broadly halbert-shaped, nearly as large as the leaflets*; *peduncles* 6–10-flowered; lower calyx-teeth longer than the tube. — Sea-coast, and shore of the Great Lakes. June–Aug. — Stems 1° high: flowers large, blue-purple. *Leaflets very veiny, as also are those of the other species.*

2. **L. venòsus**, Muhl. (VEINY VETCHLING.) Stem climbing; *leaflets* 5–7 pairs, scattered, oblong-ovate, often downy beneath; *stipules very small and usually slender, half arrow-shaped*; *peduncles many-flowered*. — Shady banks, Michigan and southward. June. — A large species: flowers purple.

3. **L. ochroleùcus**, Hook. (PALE VETCHLING.) Stem slender; *leaflets* 3–4 pairs, ovate or oval, smooth, glaucous, thin; *stipules half heart-shaped, about half as large as the leaflets*; *peduncles* 7–10-flowered; *corolla yellowish-white*. — Hill-sides from W. Vermont westward and northward. July. — Flowers smaller than in the foregoing, as large as in the following.

4. **L. myrtifòlius**, Muhl. (MYRTLE-LEAVED VETCHLING.) Stem slender; *leaflets* 2–3 (rarely 4) pairs, *ovate-elliptical, or oblong, obtuse*; *stipules half ovate-arrow-shaped, rather large*; *peduncles* 3–6-flowered; *corolla pale dull purple*. — W. New England to Michigan. July–Aug. — Leaves sometimes narrow and verging to the next species.

5. **L. palústris**, L. (MARSH VETCHLING.) Stem slender, often wing-margined; *leaflets* 3–4 pairs, *lanceolate, linear, or narrow-*

ly oblong, mucronate-pointed; stipules small, lanceolate, half arrow-shaped, sharp-pointed at both ends; peduncles 3-5-flowered; corolla blue-purple. Moist places, common, especially northward.

L. LATIFOLIUS (EVERLASTING PEA) and *L. ODORATUS* (SWEET PEA) are commonly cultivated species.

PISUM SATIVUM, the PEA, *FABA VULGARIS*, the HORSE-BEAN, *ERVUM LENS*, the LENTIL, and *CICER ARIETINUM*, the CHICK-PEA, are other cultivated representatives of this tribe.

Tribe II. PHASEOLEÆ. THE BEAN TRIBE.

3. PHASEOLUS, L. KIDNEY BEAN.

Calyx 5-toothed or 5-cleft, the 2 upper teeth often higher united. Keel of the corolla, with the included stamens and style spirally coiled or incurved. Pod linear or scythe-shaped, several-many-seeded, tipped with the hardened base of the style. — Leaflets 3, stipellate. Flowers in somewhat knotty or compound racemes. (The ancient name of the Kidney Bean.)

* *Pods scymetar-shaped: racemes loose, paniced.*

1. **P. perennis**, Walt. (PERENNIAL WILD BEAN.) Stem climbing, downy; leaflets roundish-ovate, short-pointed; racemes prolonged; pods drooping, strongly curved, 4-5-seeded. — Copses, Connecticut to Penn. and southward. Aug. — Stem 4°-10° long: flowers numerous, purple, handsome.

* * *Pods straight, linear, rather terete: flowers few in a short clustered raceme like a head.* (Strophostyles, Ell.)

2. **P. diversifolius**, Pers. (LOBED BEAN-VINE.) Annual; stem prostrate, spreading, rough-hairy; leaflets ovate-3-lobed, or angled towards the base, or some of them oblong-ovate and entire; peduncles at length twice the length of the leaves. — Sandy fields and banks, from Boston along the coast to Penn. and southward. Aug. — Corolla greenish-white tinged with red or purple. Pod thickish.

3. **P. helvolus**, L. (LONG-STALKED BEAN-VINE.) Perennial, hairy; stems diffuse or prostrate, slender; leaflets ovate or oblong, entire; peduncles 3-6 times the length of the leaves. — Sandy fields, Long Island and New Jersey southward. Aug. — More slender than the last: pods narrower: flowers as large and similar.

P. VULGARIS is the common KIDNEY BEAN or HARICOT.

P. LUNATUS is the LIMA BEAN of our gardens.

4. APIOS, Boerh. GROUND-NUT. WILD BEAN.

Calyx somewhat 2-lipped, the 2 lateral teeth being nearly obsolete, the lower one longest. Standard very broad, reflexed: the

incurved scythe-shaped keel at length twisted. Pod straight or slightly curved, linear, elongated, thickish, many-seeded. — A perennial herb, bearing pleasant-tasted tubers on underground shoots, twining and climbing over bushes. Leaflets 5–7, ovate-lanceolate, not stipellate. Flowers in dense and short, often branching, racemes, clustered on the knotty peduncle. (Name from *ἄπιον*, a *pear*, from the shape of the tubers.)

1. **A. tuberōsa**, Mœnch. (*Glycine Apios*, L.) — Moist thickets, common. Aug. — Flowers brown-purple, fragrant.

5. GALÁCTIA, P. Browne. MILK PEA.

Calyx 4-cleft, equal, the upper lobe broadest. Keel scarcely incurved. Pod linear, flat, several-seeded. — Low, mostly prostrate or twining perennials. Leaflets usually 3, stipellate. Flowers in somewhat interrupted or knotty racemes, purplish. (Name from *γάλα -ακτος*, *milk*; some species being said to yield a milky juice.)

1. **G. glabélla**, Michx. (SMOOTHISH MILK PEA.) Stem nearly smooth; leaflets elliptical or ovate-oblong, obtuse or notched, sometimes slightly hairy beneath; racemes short, 4–8-flowered; pods somewhat hairy. — Sandy woods, S. New York and New Jersey southward. July. — Flowers large for the genus, rose-purple.

G. mólilis, Michx., may be expected to grow in S. Pennsylvania.

6. AMPHICARPÆA, Ell. HOG PEA-NUT.

Flowers of 2 kinds, those of the racemes from the upper branches perfect, but seldom ripening fruit; those near the base and on creeping branches imperfect, with the corolla none or rudimentary, and few free stamens, but fruitful. Calyx about equally 4- (rarely 5-) toothed, with no bractlets. Keel and wing-petals similar, nearly straight; the standard partly folded round them. Pods of the upper flowers, when formed, somewhat scymetar-shaped, 3–4-seeded; of the lower obovate or pear-shaped, fleshy, ripening usually but one large seed, commonly subterranean, or concealed by decaying leaves. — Low and slender perennials; the twining stems clothed with brownish hairs. Leaflets 3, rhombic-ovate, stipellate. Flowers small, in clustered or compound racemes. Bracts persistent, round, partly clasping, striate, as well as the stipules. (Name from *ἀμφί*, at both ends, and *καρπός*, fruit, in allusion to the two kinds of flowers.)

1. **A. monoïca**, Nutt. Racemes nodding; bracts shorter than the pedicels; calyx-teeth short and broad. — Rich woodlands. Aug., Sept. — A delicate wood-vine, with pale purplish or whitish blossoms, two or more from each bract, which evidently consists of a pair of opposite bracts united. Underground pods hairy, often very numerous.

7. CLITÒRIA, L. BUTTERFLY PEA.

Calyx tubular, 5-toothed. Standard much larger than the rest of the flower, rounded, notched at the top, not spurred on the back: keel small, shorter than the wings. Stamens monadelphous below. Pod linear-oblong, flattish, knotty, several-seeded, pointed with the base of the style, the valves nerveless. — Erect or twining perennials, with mostly 3 stipellate leaflets, and very large flowers. Peduncles 1 - 3-flowered: bractlets opposite, striate.

1. **C. Mariàna**, L. Smooth; leaves oblong-ovate; stipules and bracts awl-shaped; peduncles short; pods short-stalked, 4 - 8-seeded. — Dry banks, Long Island and New Jersey southward. July. — Low, ascending or twining; the showy pale blue-purple flowers 2' long.

8. CENTROSÈMA, DC. SPURRED BUTTERFLY PEA.

Calyx short, 5-cleft. Corolla, &c., much as in Clitoria, but the standard with a spur-shaped projection on the back. Pod long and linear, flat, pointed with the awl-shaped style, many-seeded, thickened at the edges, the valves marked with a line on each side next the margin. — Twining perennials: leaflets 3, stipellate, and large showy flowers. Stipules, bracts, and bractlets striate, the latter longer than the calyx. (Name from *κέντρον*, a spur, and *σῆμα*, the standard.)

1. **C. Virginiàna**, Benth. Rather rough with minute hairs; leaflets varying from oblong-ovate to linear, very veiny, shining; peduncles 1 - 4-flowered; calyx-teeth linear-awl-shaped. — Sandy dry woods, New Jersey? southward. July. — Corolla scarcely 1' long, violet, pubescent externally. Pods straight and narrow, 4' - 5' long.

WISTÀRIA FRUTÉSCENS, a shrubby climber of the South, which is hardy in cultivation as far north as Boston, is to be sought in W. Pennsylvania.

Tribe 3. HEDYSARÆÆ. THE SAINTFOIN TRIBE.

9. **ÆSCHYNÓMENE**, L. SENSITIVE JOINT VETCH.

Calyx 2-lipped; the upper lip 2-, the lower 3-cleft. Stamens diadelphous in 2 sets of 5 each. Pod flattened, composed of several square easily separable joints. — Leaves odd-pinnate, with several pairs of leaflets, sometimes sensitive, as if shrinking from the touch (whence the name, from *αἰσχυνομένη*, *being ashamed*).

1. **Æ. hispida**, Willd. Annual, erect, rough-bristly; leaflets 20–25 pairs, linear, obtuse; racemes 3–5-flowered; pod stalked, 6–10-jointed. — Along rivers, S. Penn. southward. Aug. — Flowers yellow tinged with red externally.

10. **DESMÓDIUM**, DC. TICK-TREFOIL.

Calyx mostly 2-lipped. Stamens diadelphous (9 and 1), or monadelphous below the middle. Pod flat, deeply lobed on the lower margin, separating into few or many flat reticulated joints (mostly hoary, with minute hooked hairs by which they adhere to the fleece of animals or to clothing). — Perennial herbs, with pinnately 3-foliolate leaves, stipellate. Flowers in axillary or terminal racemes, often paniced, purple or purplish, often turning green in withering. (Name from *δεσμός*, *a chain*, from the appearance of the jointed pods.)

* *Stem erect or ascending: pods of 1–4 large joints (which are semi-obovate and concave on the back), raised on a stalk (stipe) many times longer than the slightly toothed calyx and nearly as long as the pedicel: stamens wholly or partly monadelphous: raceme terminal, paniced, or the pedicels often clustered: stipules bristle-form, deciduous.*

1. **D. nudiflorum**, DC. (NAKED-FLOWERED T.) *Leaves all crowded at the summit of the sterile stems; leaflets broadly ovate, bluish, whitish beneath; raceme elongated, on a prolonged ascending leafless stalk or scape from the root. — Dry woods, Aug. — Nearly smooth; the naked flower-stems 2° long. Pod-stalks $\frac{3}{4}$ ' long.*

2. **D. acuminatum**, DC. (POINTED-LEAVED T.) *Leaves all crowded at the summit of the stem, from which arises the elongated naked raceme or panicle; leaflets round-ovate, taper-pointed, green both sides. — Rich woods. July. — Slightly hairy. Leaflets, especially the end one, which is more rounded, 4'–5' long. Pedicels and pod-stalks shorter than in No. 1: the joints of the pod $\frac{1}{2}$ ' long.*

3. **D. pauciflorum**, DC. (FEW-FLOWERED T.) *Leaves scattered along the low ascending stems; leaflets rhombic-ovate,*

bluntish, pale beneath; *raceme few-flowered*, terminal. — Woods, W. New York and Penn. to Ohio. Aug. — Slender, smoothish, 8'–15' high: leaflets much as in No. 1.

* * *Stems prostrate: stipules ovate, pointed, persistent: pods short-stalked, of 3–5 joints.*

4. **D. humifusum**, Beck. (RUNNING T.) *Smoothish*; leaflets ovate or oval; *stipules ovate-lanceolate*; racemes axillary and terminal; pods slightly sinuate along the upper margin, the joints obtusely triangular. — Woods, near Boston (Waltham, Greene), and Penn., rare. Aug. — Resembles the next.

5. **D. rotundifolium**, DC. (ROUND-LEAVED RUNNING T.) *Hairy all over*; leaflets orbicular, or the odd one slightly rhomboid; *stipules large, broadly ovate*; racemes axillary and terminal (few-flowered); pods almost equally sinuate on both edges; the joints rhomboid-oval. — Dry rocky woods. Aug. — Stems extensively trailing, usually very hairy.

* * * *Stems (tall) erect: stipules and (deciduous) bracts large and conspicuous, scale-like, finely striate: pods of 4–7 inequilateral joints which are longer than broad.* (Flowers large.)

6. **D. Canadense**, DC. (CANADIAN T.) Stem straight and wand-like, *bristly-hairy*; leaflets *oblong-lanceolate, bluntish, many times longer than the petioles*; stipules lanceolate or awl-shaped, about the length of the petiole; racemes dense, erect, in a terminal panicle; joints of the pod half oval and triangular. — Woods, most common northward. Aug. — Stem 3°–6° high, usually simple. Petioles remarkably short ($\frac{1}{4}$ '– $\frac{1}{2}$ '). The stipules are much narrower than in the two following, and not very persistent; but the ovate pointed bracts, as in those, are large and very conspicuous in the bud.

7. **D. canescens**, DC. (ROUGH-HOARY T.) Stem loosely branched, *hairy*; leaflets *ovate, bluntish, about the length of the petioles, whitish and reticulated beneath*, both sides roughish with a close-pressed fine pubescence; stipules broadly ovate, persistent; joints of the pod very unequally rhomboidal. — Moist grounds, Vermont to Penn. and Michigan. Aug. — Branches clothed with minute and hooked, and long spreading rather glutinous hairs, and the fine, partly hooked pubescence of the leaves causes them to adhere to cloth, &c.

8. **D. cuspidatum**, Torr. & Gr. (SHARP-POINTED T.) *Very smooth*; stem straight; leaflets, as well as the large bracts and persistent stipules, *lanceolate-ovate and taper-pointed*; racemes loosely paniced; joints of the pod rhomboid-oblong. — Thickets. July. — Stem rather simple. Leaflets green both sides, 3'–5' long. Bracts and stipules $\frac{3}{4}$ ' long.

* * * * *Stems erect: stipules and bracts small and inconspicuous, deciduous: racemes paniced.*

+ *Joints of the pod large, half-rhombic, or unequal-sided rhomboidal.*

9. **D. lævigatum**, DC. (SMOOTHISH LARGE T.) *Smooth or nearly so throughout; stem straight; leaflets ovate, bluntish, pale beneath; panicles minutely rough-pubescent.* — Pine woods, S. New Jersey and southward. — Stem tall, sometimes glaucous. Leaflets 2' - 3' long.

10. **D. viridiflorum**, Beck. (VELVET-LEAVED T.) *Stem very downy, rough at the summit; leaflets broadly ovate, very obtuse, rough above, whitened with a soft velvety down underneath.* — S. New York and southward. Aug. — Leaflets 2' - 3' long, sometimes less downy. Flowers turning blue-green in withering, like the others after No. 5.

11. **D. Dillèni**, Darlingt. (DILLENII'S T.) *Stem pubescent; leaflets oblong or oblong-ovate, commonly bluntish, pale beneath, softly and finely pubescent.* — Open woodlands, common. Aug. — A variable species, 2° - 4° high. Leaflets mostly thin, 2' - 3' long.

12. **D. paniculatum**, DC. (PANICLED OR LONG-LEAVED T.) *Nearly smooth throughout; stem slender; leaflets narrowly oblong-lanceolate, tapering to a blunt point, thin; racemes much panicled.* — Copses, common. July. — Stems 2° - 4° high: leaflets 3' - 5' long, $\frac{1}{2}$ ' - $\frac{3}{4}$ ' wide.

13. **D. strictum**, DC. (NARROW-LEAVED T.) *Smooth; stem very straight and slender, simple; leaflets linear, blunt, strongly reticulated, thickish; panicle wand-like.* — Pine woods of New Jersey. Aug. — Stems 3° - 4° long, weak: leaflets 1' - 2' long, $\frac{1}{4}$ ' wide.

+ + *Joints of the pod small, semi-orbicular or obliquely rounded.*

14. **D. sessilifolium**, Torr. & Gr. (SESSILE-LEAVED T.) *Stem straight and wand-like, rather woolly; leaves sessile; leaflets linear or linear-oblong, blunt, thickish, reticulated, rough above, downy beneath; branches of the panicle long.* — Copses. Ohio and Michigan. Aug. — Pods small.

15. **D. rigidum**, DC. (RIGID T.) *Stem branching, somewhat hoary, like the lower surface of the leaves, with a close roughish pubescence; leaflets ovate-oblong, blunt, thickish, reticulated-veiny, rather rough above, the lateral ones longer than the petiole.* — Dry hill-sides, Mass. to Penn. and Michigan. Aug. — Intermediate, as it were, between No. 16 and No. 11.

16. **D. ciliare**, DC. (HAIRY SMALL-LEAVED T.) *Stem slender, hairy or rough-pubescent; leaves crowded, on very short hairy petioles; leaflets round-ovate or oval, thickish, more or less hairy on the margins and underneath.* — Dry hills and sandy fields; common, especially southward. Aug. — Leaflets $\frac{1}{2}$ ' - 1' long, sometimes smoothish and very like No. 17, except the short petioles, which are not longer below than above the lateral leaflets.

17. **D. Marilándicum**, Boott. (SMOOTH SMALL-LEAVED T.) Nearly smooth throughout, slender; leaflets ovate or roundish, very obtuse, thin, the lateral ones about the length of the slender petiole. (*D. obtusum*, DC.) — Copses, common. Aug., Sept. — Stems 1° - 2° high, ascending. Leaflets 1' or smaller. Joints of the small pods 2 or 3.

11. LESPEDÉZA, Michx. BUSH CLOVER.

Calyx 5-cleft, the lobes nearly equal, slender. Stamens diadelphous (9 and 1) : anthers all alike. Pods of a single 1-seeded joint (sometimes 2-jointed, with the lower joint empty and stalk-like) oval or roundish, flat, reticulated. — Perennials with pinnately 3-foliolate leaves, not stipellate. Stipules and bracts minute. Flowers often polygamous. (Dedicated to *Lespedez*, the Spanish governor of Florida when Michaux visited it.)

* *Flowers of 2 sorts, the larger (violet-purple) perfect, but seldom fruitful; paniced or clustered; with smaller pistillate and fertile but mostly apetalous ones intermixed or in sessile little clusters.*

1. **L. procumbens**, Michx. (TRAILING DOWNY BUSH CLOVER.) *Soft-downy*, except the upper surface of the leaves, trailing, slender; leaflets oval or elliptical; peduncles slender, mostly simple, few-flowered. — Sandy soil, commonest southward. Aug. — The apetalous fertile flowers, as in the rest, have short hooked styles.

2. **L. repens**, Torr. & Gr. (TRAILING SLENDER BUSH CLOVER.) *Smooth, except minute close-pressed scattered hairs, prostrate, spreading, very slender*; leaflets oval or obovate-elliptical; peduncles slender and few-flowered; pods roundish. — Dry sandy soil, S. New York and New Jersey southward. — Much like the last. Leaflets $\frac{1}{2}$ ' long.

3. **L. violàcea**, Pers. (COMMON BUSH CLOVER.) *Stems upright or spreading, branched*; leaflets varying from oval-oblong to linear, whitish-downy beneath with close-pressed pubescence; *peduncles or clusters few-flowered*; pods ovate. — The principal varieties are, 1. *DIVÉRGENS*, with oval or oblong leaflets and loosely paniced flowers; this runs into, 2. *SESSILIFLÒRA*, with the flowers principally on peduncles much shorter than the leaves, and clustered; and a more distinct form is, 3. *ANGUSTIFÒLIA*, with closely clustered flowers on straight branches, crowded leaves, and narrowly oblong or linear leaflets, which are often silky. — Dry copses, common; the var. 3 chiefly southward. Aug. - Sept. — Pods ripening from both sorts of flowers.

4. **L. Stùvei**, Nutt. (CLUSTERED BUSH CLOVER.) *Stems upright-spreading, bushy, downy*; leaflets oval or roundish, longer than

the petiole, silky or white-woolly beneath (and sometimes above); clusters many-flowered, crowded; pods ovate, downy.— Dry hills, and sand, Plymouth, Mass., to New Jersey and southward. Also Michigan.— Appearing intermediate between No. 3 and No. 5.

* * *Flowers all alike and perfect, in close spikes or heads: corolla whitish or cream-color, with a purple spot on the banner, about the length of the downy calyx: stems upright, wand-like.*

5. **L. hirta**, Ell. (HAIRY BUSH CLOVER.) *Peduncles longer than the leaves; petioles slender; leaflets roundish or oval, hairy; spikes cylindrical, rather loose; pods nearly as long as the calyx.* (*L. polystachia*, Michx.)—Dry hill-sides. Aug., Sept.—Stem 2°-4° high.

6. **L. capitata**, Michx. (HEADED BUSH CLOVER.) *Peduncles and petioles short; leaflets elliptical or oblong, thickish, reticulated and mostly smooth above, silky beneath; spikes short and headed; pods much shorter than the calyx.*—Varies greatly, most of all in Var. *ANGUSTIFOLIA*: slender; leaflets linear; peduncles sometimes elongated.—Dry and sandy soil; the narrow variety only found near the coast and southward. Sept.—Stems woolly, 2°-4° high, rigid.

12. **STYLOSÁNTHES**, Swartz. PENCIL FLOWER.

Flowers of two kinds intermixed in the clusters; one sort complete but unfruitful, the other fertile and consisting only of a pistil between 2 bractlets.—Calyx with a slender tube like a stalk, 2-lipped at the summit; upper lip 2-, the lower 3-cleft. Stamens monadelphous: 5 of the anthers linear, the 5 alternate ones ovate. Fertile flowers with a hooked style. Pod reticulated, 1-2-jointed; the lower joint, when present, empty and stalk-like, the upper ovate, 1-(2-) seeded.—Low perennials, branched from the base, with pinnately 3-foliolate leaves; the stipules united with the petiole. (Name composed of *στύλος*, a column, and *ἄνθος*, a flower, from the stalk-like calyx-tube on which the flower is raised.)

1. **S. elatior**, Swartz. Tufted; leaflets lanceolate, strongly straight-veined; upper stipules sheathing; heads or clusters small and few-flowered.—Pine barrens, Long Island and New Jersey southward. July-Oct.—Stems 6'-12' long, wiry, often bristly. Flowers small, yellow.

✓ **ÁRACHIS HYPOGÆA**, the PEA-NUT, (cultivated southward) belongs to this tribe.

Tribe IV. LÔTEÆ. THE MELILOT TRIBE.

13. ASTRÁGALUS, L. MILK VETCH.

Calyx 5-toothed. Stamens diadelphous. Pod usually turgid, many-seeded, partly or completely 2-celled lengthwise by the projection of the outer suture (the one next the keel) into or across the cavity. — Chiefly herbs, with odd-pinnate leaves, and spiked or racemed flowers. (The ancient Greek name of a leguminous plant, as also of the ankle-bone; but the connection between the two is past all guess.)

1. **A. Canadénsis, L.** Tall and erect; stem downy; leaflets 21–27, oblong; flowers greenish cream-color, very numerous, in close spikes; pods ovoid-oblong, 2-celled. ♀ — River-banks, N. New York to Wisconsin, common. July, Aug.

14. PHÀCA, L. BLADDER VETCH.

Calyx 5-toothed or cleft. Stamens diadelphous. Keel obtuse. Pod turgid or inflated, 1-celled; the inner or seed-bearing suture a little tumid or inflexed (sometimes the lower also), many-seeded. — Perennial herbs, with odd-pinnate leaves, and spiked or close-racemed flowers. (The ancient Greek name for a sort of Lentil.)

1. **P. neglécta, Torr. & Gr.** Nearly smooth, erect; leaflets 13–21 pairs, elliptical or oblong, somewhat notched at the end, minutely hoary underneath; *peduncles about the length of the leaves; pods not stalked in the calyx, globose-ovoid, inflated, grooved at the two sutures*, which are both turned inwards, but especially the inner. — Gravelly banks of rivers, &c., W. New York to Wisconsin. June, July. — Plant 1°–2° high, greener and less coarse than *Astragalus Canadensis*, with pure white flowers in less prolonged spikes. Pod rather papery than coriaceous when ripe, $\frac{3}{4}$ ' broad.

2. **P. Robbinsii, Oakes.** Nearly smooth, slender; leaflets 7–11, elliptical, often notched; *peduncles much longer than the leaves; raceme loose and prolonged and nearly 1-sided in fruit; the pods hanging, stalked in the calyx, oblong, boat-shaped*, the seed-bearing suture convex, the other straight. — Rocky ledges of the Onion River, near Burlington, Vermont, *Dr. Robbins* (1829). — Stems nearly 1° high, slender. Flowers 5'' long, white. Pods scarcely 1' long, turgid, papery and veiny, nearly smooth (at first minutely black-haired), the inner suture not tumid when ripe, but the outer slightly projecting inwards.

15. ROBÍNIA, L. LOCUST-TREE.

Calyx short, 5-toothed, slightly 2-lipped. Standard large and rounded, turned back, scarcely longer than the wings and keel. Stamens diadelphous. Pod linear, flat, several-seeded, margined on the seed-bearing edge. — Trees or shrubs, often with prickly spines for stipules. Leaves odd-pinnate, the ovate or oblong leaflets stipellate. Flowers showy in hanging axillary racemes. Base of the leaf-stalks covering the buds of the next year. (Named in honor of *John Robin*, herbalist to Henry IV. of France, and his son *Vespasian Robin*, who first cultivated the Locust-tree in Europe.)

1. **R. Pseudacacia, L.** (COMMON LOCUST, or FALSE ACACIA.) Racemes slender, loose; flowers white, fragrant. — S. Penn. southward along the mountains: commonly cultivated as an ornamental tree, and for its invaluable timber. June. — Branches with spines, smooth.

2. **R. viscòsa, Vent.** (CLAMMY LOCUST.) Branchlets, &c., clammy; flowers crowded in the racemes, tinged with rose-color, nearly inodorous. — Cultivated like the last, a smaller tree, native of the Southern Alleghanies. June.

R. hispida, the BRISTLY ROSE-ACACIA, with very large and handsome deep rose-color blossoms, is a common ornamental shrub in gardens.

16. TEPHRÒSIA, Pers. HOARY PEA.

Calyx about equally 5-cleft. Standard roundish, usually silky outside, turned back, scarcely longer than the coherent wings and keel. Stamens monadelphous or nearly diadelphous. Pod linear, flat, several-seeded. — Silky-hoary perennial herbs (except in the tropics), with odd-pinnate leaves, and white or purplish racemed flowers. (Name from *τεφρός*, ash-colored or hoary.)

1. **T. Virginiàna, Pers.** Stem erect; flowers in a terminal paniced raceme; leaflets 17-29, crowded, linear-oblong, mucronate. — Dry sandy woods. June. — A foot high, white-haired and silky all over, but smoother with age, with large and handsome blossoms yellowish-white marked with red-purple.

17. AMÓRPHA, L. FALSE INDIGO.

Calyx inversely conical, 5-toothed, persistent. Standard concave, erect: the other petals entirely wanting! Stamens 10,

longer than the petal, monadelphous at the very base, otherwise distinct. Pod oblong, longer than the calyx, 1-2-seeded, roughened, tardily dehiscent. — Shrubs, with odd-pinnate leaves; the leaflets marked with minute pellucid at length brownish dots, usually stipellate. Flowers violet, crowded in clustered terminal spikes. (Name from a privative and *μορφή*, *form*, referring to the deformed flower from the absence of 4 of the petals.)

1. **A. fruticòsa**, L. (COMMON FALSE INDIGO.) Rather pubescent; leaflets 8-12 pairs, oval, scattered; pods 2-seeded. — Riverbanks, S. Penn. southward. June. — A tall shrub. Leaflets about 1' long.

2. **A. canéscens**, Nutt. (LEAD PLANT.) Low, barely shrubby at the base, whitened with hoary wool; leaflets 15-25 pairs, elliptical, crowded, small, the upper surface smoothish with age; pods 1-seeded. — Prairies and rocks, Michigan to Wisconsin. July. — Supposed to indicate the presence of lead-ore.

18. PSORÀLEA, L. SCURFY PEA.

Calyx 5-cleft, persistent, the lower lobe longest. Stamens mostly diadelphous. Corolla truly papilionaceous. Pod seldom longer than the calyx, often wrinkled, indehiscent, 1-seeded. — Perennial herbs, usually sprinkled all over or roughened (especially the calyx and pods, &c.) with glandular dots or points. Leaves pinnately or palmately 3-5-foliolate. Stipules cohering with the petiole. Flowers spiked or racemed, white or blue-purplish. (Name from *ψωραλέος*, *scurfy*, from the scurfy glands or dots.)

1. **P. Onobrÿchis**, Nutt. Nearly smooth and free from glands, erect; leaves pinnately 3-foliolate; leaflets lanceolate-ovate, taper-pointed (3' long); *stipules and bracts awl-shaped*; racemes axillary, elongated; pods ovate, roughened and wrinkled. — Riverbanks, Ohio and southwestward. July. — Stem 3°-5° high: flowers small.

2. **P. stipulàta**, Torr. & Gr. Nearly smooth and glandless; stems diffuse; leaves pinnately 3-foliolate; leaflets ovate-elliptical, reticulated; *stipules ovate*; flowers in heads on axillary peduncles; *bracts broadly ovate, sharp-pointed*. — Rocks, Falls of the Ohio. June. Perhaps not within the limits of this work. (Char. amended.)

19. PETALOSTÈMON, Michx. PRAIRIE CLOVER.

Calyx nearly equally 5-toothed. Corolla indistinctly papilionaceous: petals all on thread-shaped claws, 4 of them nearly similar

and spreading, with their claws united to the top of the sheath of filaments, alternate with the anthers; the fifth (standard) inserted on the bottom of the calyx, heart-shaped or oblong, folded. Stamens 5, monadelphous, the tube cleft. Pod membranaceous, inclosed in the calyx, indehiscent, 1-seeded. — Chiefly perennial herbs, upright, dotted with glands, with odd-pinnate leaves, minute stipules, and small flowers in very dense terminal and peduncled heads or spikes. (Name combined of the two Greek words for petal and stamen, alluding to their peculiar union in this genus.)

1. **P. violàceum**, Michx. Smoothish; leaflets 5, linear; heads globose-ovate, or oblong-cylindrical when old; bracts pointed, not longer than the silky-hoary calyx; *corolla violet-purple or red-purple*. — Dry prairies, Michigan and Wisconsin. July. — Leaves crowded or clustered, small.

2. **P. cándidum**, Michx. Smooth; leaflets 7-9, lanceolate or linear-oblong; heads oblong, when old cylindrical; bracts awned, longer than the nearly glabrous calyx; *corolla white*. — Wisconsin, with No. 1. — Leaflets 1' long.

20. TRIFOLIUM, L. CLOVER. TREFOIL.

Calyx persistent, 5-cleft, the teeth bristle-form. Corolla withering or persistent, the petals all somewhat coherent below: standard longer than the wings, these mostly longer than the keel. Pods small and membranous, often included in the calyx, 1-6-seeded, indehiscent, or opening by one of the sutures. — Tufted or diffuse herbs. Leaves mostly palmately 3-foliolate: leaflets often toothed. Stipules united with the petioles. Flowers chiefly in heads or spikes. (Name from *tres*, three, and *folium*, a leaf.)

* *Corolla purple or purplish, deciduous or withering: flowers sessile in compact heads.*

1. **T. arvéense**, L. (RABBIT-FOOT CLOVER.) Silky, branching; leaflets obovate-linear or narrowly wedge-form, minutely 3-toothed at the apex; *calyx-teeth longer than the corolla, plumose-woolly; heads oblong and cylindrical*. ① — Old fields, naturalized. — Plant 5'-10' high; the corolla whitish with a purple spot; the heads becoming grayish and very softly woolly. Also called *Stone Clover*.

2. **T. pratéense**, L. (RED CLOVER.) Stems ascending, somewhat hairy; leaflets oval or obovate, often notched at the end and marked with a pale spot; *stipules broad, bristle-pointed; heads ovate*,

sessile; lowest calyx-tooth much the longest, all shorter than the (rose-red) corolla. ② ♁ — Meadows, largely cultivated, and naturalized. Flowers fragrant.

3. **T. mèdeium**, L. (ZIGZAG CLOVER.) Stems ascending, zigzag, smoothish; leaflets oblong or elliptical; *stipules narrowly lanceolate, taper-pointed*; heads roundish, often stalked. ♁ — Dry hills, naturalized in Essex County, Massachusetts. — Near No. 2: flowers larger and more purple. Leaves spotless.

* * *Corolla white or rose-purple, withering-persistent and turning brownish in fading: flowers in umbel-like round heads on a naked peduncle, their short stalks reflexed when old.*

4. **T. refléxum**, L. (BUFFALO CLOVER.) Stems ascending, downy; leaflets obovate-oblong, finely toothed; stipules leaf-like; calyx-teeth hairy; pods 3-5-seeded. ① ② — W. New York (rare) and Western States. — Heads and flowers larger than in No. 2: standard rose-red; wings and keel whitish.

5. **T. stoloníferum**, Muhl. (RUNNING BUFFALO CLOVER.) Smooth; stems with long runners from the base; leaflets broadly obovate or obcordate, minutely toothed; stipules membranaceous, ovate-lanceolate; heads loose; pods 2-seeded. ♁ — Open woodlands, &c., Ohio, westward. — Flowering stems 6'-8' high: blossoms white, tinged with purple, as large as in No. 4.

6. **T. rèpens**, L. (WHITE CLOVER.) Smooth; the slender stems spreading and creeping; leaflets inversely heart-shaped or merely notched, obscurely toothed; stipules scale-like, narrow; petioles and especially the peduncles very long; heads small and loose; pods about 4-seeded. ♁ — Pastures, waste places, and even in woodlands. Indigenous? — Blossoms white, rarely purplish, turning tawny with age.
* * * *Corolla yellow, persistent and turning chestnut-brown with age, at length reflexed: low annuals.*

7. **T. agràrium**, L. (HOP CLOVER.) Smoothish, somewhat upright; leaflets wedge-shaped, all three from the same point (palmate) and nearly sessile; stipules narrow, cohering with the petiole for more than half its length. — Sandy fields, &c., introduced. — Slender, 6' - 12' high.

8. **T. procúbens**, L. (LOW HOP CLOVER.) Stems spreading or ascending, pubescent; leaflets wedge-obovate, notched at the end; the lower pair at a small distance from the other (pinnately 3-foliolate); stipules ovate, short — Dry fields, naturalized, 3' - 6' high; flowers small.

21. MELILÒTUS, Tourn. MELILOT. SWEET CLOVER.

Flowers much as in Clover, but in spiked racemes, small: corolla deciduous. Pod ovoid, coriaceous, wrinkled, longer than

the calyx, scarcely dehiscent, 1-2-seeded. — Herbs, fragrant in drying, with pinnately 3-foliolate leaves; leaflets toothed. (Name from μέλι, *honey*, and Λωτός, some leguminous plant.)

1. **M. officinàlis**, Willd. (YELLOW MELILOT.) Upright; leaflets obovate-oblong, obtuse; corolla yellow; the petals nearly of equal length. ① — Waste or cultivated grounds, introduced. — Plant 2°-4° high; with nearly the odor of the Sweet-scented Vernal Grass.

2. **M. leucántha**, Koch. (WHITE MELILOT.) Upright; leaflets truncate; corolla white, the standard longer than the other petals. ② — With No. 1.

22. MEDICÀGO, L. MEDICK.

Flowers nearly as in Melilotus. Pod 1-several-seeded, scythe-shaped, curved, or variously coiled. — Leaves pinnately 3-foliolate. Stipules often cut. (Deriv. from μηδική, the name applied to Lucerne because it came from Media.)

1. **M. sativa**, L. (LUCERNE.) Upright, smooth; leaflets obovate-oblong, toothed; flowers (purple) racemed; pods spirally twisted. ① — Cultivated for green fodder, beginning to be naturalized. June - August.

2. **M. lupulina**, L. (BLACK MEDICK. NONESUCH.) Pro-cumbent, pubescent; leaflets wedge-obovate, toothed at the apex; flowers in short spikes (yellow); pods kidney-form, 1-seeded. ② — Waste places, naturalized.

23. GENÍSTA, L. WOAD-WAXEN. WHIN.

Calyx 2-lipped. Standard oblong-oval, spreading; keel oblong, straight, scarcely including the stamens and style. Stamens monadelphous, the sheath entire; 5 alternate anthers shorter. Pod flattened, several-seeded. — Shrubby plants, with simple leaves, and yellow flowers. (Name from the Celtic *gen*, a bush.)

1. **G. tinctoria**, L. (DYER'S GREEN-WEED.) Low, not thorny, with striate-angled erect branches; leaves lanceolate; flowers in spiked racemes; pods smooth. — Slightly naturalized in New York and E. Massachusetts; — thoroughly established on sterile hills in Essex County, Massachusetts. June.

24. CROTALÀRIA, L. RATTLE-BOX.

Calyx 5-cleft, somewhat 2-lipped. Standard large, heart-shaped: keel scythe-shaped. Sheath of the monadelphous stamens

cleft on the upper side : 5 of the anthers smaller and roundish. Pod inflated, oblong, many-seeded. — Herbs in the U. S., with simple leaves. Flowers racemed, yellow. (Name from *κρόταλον*, a rattle; the loose seeds rattling in the coriaceous inflated pods.)

1. **C. sagittàlis**, L. Annual, hairy, low; leaves oval or oblong-lanceolate, scarcely petioled; stipules united and decurrent on the stem, so as to be inversely arrow-shaped; peduncles few-flowered; corolla not longer than the calyx. — Sandy soil, Massachusetts to Penn. July. — Plant 4'–6' high.

25. LUPINUS, Tourn. LUPINE.

Calyx deeply 2-lipped. Sides of the standard reflexed: keel scythe-shaped, pointed. Sheath of the monadelphous stamens entire: anthers alternately oblong and roundish. Pod coriaceous, oblong, flattened, often knotty by constrictions between the seeds. Cotyledons thick and fleshy. Herbs, with palmately 3–7- (1–15-) foliolate leaves, and showy flowers in terminal racemes or spikes. (Name from *Lupus*, a wolf, because these plants were thought to devour the fertility of the soil.)

1. **L. perénnis**, L. (WILD LUPINE.) Somewhat hairy; stem erect (1°–2°); leaflets 7–11, narrowly obovate-oblong; flowers in a long and loose terminal raceme; pods linear-oblong, very hairy. — Sandy soil, common. — Flowers showy, purplish-blue, rarely pale or white. — Several S. European Lupines are common in gardens, and others from Oregon have recently been introduced, especially *L. polyphýllus*.

Tribe V. SOPHOREÆ. THE SOPHORA TRIBE.

26. BAPTÍZIA, Vent. FALSE INDIGO.

Calyx 4–5-toothed. Standard not longer than the wings: keel-petals somewhat united. Stamens distinct. Pod stalked in the persistent calyx, roundish or oblong, inflated, pointed, many-seeded. — Perennial herbs, with palmately 3-foliolate (rarely simple) leaves, which generally blacken in drying, and racemed flowers. (Named from *βαπτίζω*, to dye, from the economical use of some species, which yield a sort of indigo.)

1. **B. tinctoria**, R. Brown. (YELLOW-FLOWERED WILD INDIGO.) Smooth, rather glaucous; leaves almost sessile; leaflets rounded wedge-obovate; stipules and bracts minute and deciduous; racemes few-flowered terminating the numerous branches; pods oval-

globose, on a stalk longer than the calyx. — Sandy dry soil, common. June – Aug. — Plant 2° - 3° high, bushy, slender. Leaflets $\frac{3}{4}$ ' long. Corolla yellow, $\frac{1}{2}$ ' long.

2. **B. austràlis**, R. Brown. (BLUE FALSE INDIGO.) Smooth, tall and stout (4° - 5°); leaflets oblong-wedge-form, obtuse; *stipules lanceolate, as long as the petioles, rather persistent; raceme elongated, many-flowered, erect*; bracts deciduous; *stalk of the oval-oblong pods about the length of the calyx.* — Alluvial soil, Penn. and westward: often cultivated. June. — Raceme 1° long. Flowers 1' long, indigo-blue. Pods 2' - 3' long.

3. **B. leucántha**, Torr. & Gr. (TALL WHITE FALSE INDIGO.) Smooth; leaves and racemes as in No. 2; *stipules early deciduous; pods oval-oblong, raised on a stalk fully twice the length of the calyx.* — Alluvial soil, Ohio and Michigan. July. — Flowers white; the standard short. Pods 2' long.

4. **B. leucophæa**, Nutt. (PALE FALSE INDIGO.) Hairy, low, with divergent branches; leaves almost sessile; leaflets narrowly oblong-obovate or spatulate; *stipules and bracts large and leafy, persistent; racemes long and reclined; the flowers on elongated pedicels*; pods ovoid, hoary. — Michigan and southward. April. — Stout, 1° high: the reclining raceme often 1° long; pedicels 1' - 2', the cream-colored corolla 1', in length.

27. CÉRCIS, L. RED-BUD. JUDAS-TREE.

Calyx 5-toothed. Standard smaller than the wings: the keel-petals larger and not united. Stamens distinct, rather unequal. Pod oblong, flat, many-seeded, the upper suture with a winged margin. — Trees, with rounded heart-shaped simple leaves, deciduous stipules, and red-purple flowers in little umbel-like clusters along the branches, appearing before the leaves, acid to the taste. (The ancient name of the Oriental *Judas-tree*.)

1. **C. Canadénsis**, L. (RED-BUD.) Leaves rounded heart-shaped, pointed, downy at the origin of the veins underneath. — New Jersey and Penn. to Ohio. March - May. — A small ornamental tree, often cultivated: the blossoms smaller than in the European species.

Tribe VI. CASSIÆ. THE SENNA TRIBE.

28. CÁSSIA, L. SENNA.

Sepals 5, scarcely united. Petals 5, unequal. Stamens 5 - 10, unequal, and some of them often imperfect, spreading: anthers

mostly opening by 2 pores or chinks at the apex. Pod many-seeded, often with cross partitions. — Herbs (in the United States), with simply abrupt-pinnate leaves and mostly yellow flowers. (An ancient name, of obscure derivation.)

* *Perennial: lower anthers fertile, 7; the 3 upper ones deformed and imperfect.*

1. **C. Marilandica**, L. (WILD SENNA.) Leaflets 6–9 pairs, lanceolate-oblong; petiole with a club-shaped gland near the base; stipules deciduous; flowers crowded in short axillary racemes, paniced at the summit of the branches; pods linear, slightly curved, flat, at first hairy. — Alluvial soil, common. July. — Stem 3°–4° high: leaves used as a substitute for the officinal *Senna*.

* * *Annual, low: anthers all fertile: stipules striate, persistent: gland beneath the lowest pair of leaflets cup-shaped: leaves sensitive to the touch: flowers in small clusters above the axils: pods flat.*

2. **C. Chamæcrista**, L. (PARTRIDGE PEA.) Leaflets 10–15 pairs, linear-oblong, oblique at the base; flowers (large) on slender pedicels; anthers 10, elongated, unequal (4 of them yellow, the others purple); style slender. — Sandy fields, common. Aug. — Stems spreading, 1° long: 2 or 3 of the showy bright yellow petals often with a purple spot at the base.

3. **C. nictitans**, L. (WILD SENSITIVE PLANT.) Leaflets 10–20 pairs, oblong-linear; flowers (small) on very short pedicels; anthers 5, nearly equal; style very short. — Sandy fields, especially southward. Aug. — Corolla yellow, inconspicuous.

29. GYMNÓCLADUS, Lam. COFFEE-TREE.

Flowers diœcious, regular. Calyx tubular below, 5-cleft. Petals 5, oblong, equal, inserted on the summit of the calyx-tube. Stamens 10, distinct, short, inserted with the petals. Pod oblong, flattened, very large, pulpy inside, several-seeded. Seeds very large, flattish. — A rather large tree, with rough bark, stout branchlets, not thorny, and very large unequally 2-pinnate leaves. Flowers whitish, in axillary racemes. (Name from *γυμνός*, *naked*, and *κλάδος*, *a branch*, alluding to the stout branches destitute of spray.)

1. **G. Canadensis**, Lam. (KENTUCKY COFFEE-BEAN TREE.) Rich woods, by rivers, W. New York and westward. June. — Cultivated as an ornamental tree: timber valuable. Leaves 2°–3° long, with several large partial leaf-stalks bearing 7–13 ovate stalked leaflets, the lowest pair with single leaflets. Pod 6'–10' long, 2' broad; the seeds over $\frac{1}{2}$ ' across.

30. GLEDÍTSCHIA, L. HONEY LOCUST.

Flowers polygamous. Calyx of 3–5 spreading sepals, united at the base. Petals as many as the sepals, and equalling them, the 2 lower sometimes united. Stamens as many, distinct; inserted with the petals on the base of the calyx. Pod flat, 1-many-seeded, a sweet pulp usually surrounding the flat seeds. — Thorny trees, with abruptly 1–2-pinnate leaves, and inconspicuous greenish flowers in small spikes. (Named in honor of *Professor Gleditsch*, a botanist contemporary with Linnæus.)

1. **G. triacanthos, L.** (THREE-THORNED ACACIA, or HONEY LOCUST.) Thorns stout, usually triple or compound; leaflets lanceolate-oblong, somewhat serrate; pods linear, much elongated, often twisted, filled with sweet pulp between the seeds. — Rich woods, Penn. and southwestward. July. — Common in cultivation as an ornamental tree, and for hedges. The long and curved flat pods (1°–1½° in length) appear in autumn like large apple-parings, pendent from the branches.

ORDER 38. ROSÁCEÆ. (ROSE FAMILY.)

Plants with regular flowers, numerous (rarely few) distinct stamens inserted on the calyx, and 1–many pistils, which are quite distinct, or (in the Pear tribe) united and combined with the calyx-tube. Seeds (anatropous) 1–few in each ovary, without albumen. Leaves alternate, with stipules. — Calyx of 5 (rarely 3–4–8) sepals, united at the base, often appearing double by a row of bractlets outside. Petals as many as the sepals (rarely wanting), imbricated in the bud, and inserted with the stamens on the edge of a disk that lines the calyx-tube. Trees, shrubs, or herbs. This important family comprises three principal suborders.

Synopsis.**Suborder I. AMYGDÁLEÆ. (ALMOND FAMILY.)**

Calyx entirely free from the solitary ovary, deciduous. Style terminal. Fruit a drupe (stone-fruit). — Trees or shrubs, with simple leaves, the bark exuding gum, and the bark, leaves, and kernels yielding the peculiar flavor of prussic acid.

1. **PRUNUS.** Drupe with a flattish 2-edged smooth stone.

2. **CERASUS.** Drupe globular, with a rounded smooth stone.

Suborder II. ROSACEÆ proper.

Calyx free from the ovaries, but sometimes inclosing them in its tube. Pistils few - many (occasionally single).

Tribe 1. SPIRÆÆ. — Pistils mostly 5, forming few-seeded follicles in fruit: styles terminal.

3. SPIRÆA. Calyx 5-cleft. Petals obovate, equal.

4. GILLENIA. Calyx elongated, 5-toothed. Petals slender, unequal.

Tribe 2. DRYADEÆ. — Pistils numerous (rarely 1 - 2), forming seed-like achenia or little drupes in fruit. Calyx-tube dry in fruit; the lobes commonly valvate in the bud.

Subtribe 1. SANGUISORBEÆ. — Calyx-tube constricted at the throat. Petals often wanting. Stamens 4 - 15. Pistils 1 - 4, dry in fruit, inclosed in the calyx.

5. AGRIMONIA. Petals 5. Stamens 12 - 15. Pistils 2.

6. SANGUISORBA. Petals none. Stamens 4. Pistil 1: style terminal.

7. ALCHEMILLA. Petals none. Stamens and pistils 1 - 4: style lateral.

Subtribe 2. CHAMÆRHODEÆ. — Calyx open. Stamens and pistils 5 - 10: styles lateral. Fruit dry achenia.

8. SIBBALDIA. Stamens 5, alternate with the minute petals.

Subtribe 3. EUDRYADEÆ. — Calyx open. Stamens and pistils numerous. Fruit of dry achenia, tipped with terminal styles. Seed erect. (Radicle inferior.)

9. DRYAS. Calyx 8 - 9-parted. Petals 8 - 9. Styles persistent.

10. GEUM. Calyx 5-cleft. Achenia numerous: styles persistent.

11. WALDSTEINIA. Calyx 5-cleft. Achenia few: styles deciduous.

Subtribe 4. FRAGARIÆ. — Calyx open and flattish, bracteolate. Stamens and pistils numerous: styles often lateral, deciduous. Fruit of dry achenia. Seed suspended or ascending, inserted next the base of the style. (Radicle always superior.)

12. POTENTILLA. Receptacle flattish, dry. Petals deciduous, obovate or obcordate.

13. COMARUM. Receptacle convex, spongy. Petals acute, somewhat persistent.

14. FRAGARIA. Receptacle enlarged and juicy in fruit, edible.

Subtribe 5. DALIBARDEÆ. — Calyx open, not bracteolate. Stamens and usually the pistils numerous: styles terminal, deciduous. Achenia mostly fleshy or becoming little drupes. Seed suspended (ovules 2, collateral: radicle superior).

15. DALIBARDA. Fruit of 5 - 10 almost dry cartilaginous achenia.

16. RUBUS. Fruit of numerous (rarely few) pulpy drupaceous achenia, aggregated on a conical or elongated receptacle.

Tribe 3. ROSEÆ.—Pistils numerous, forming long achenia, which are inserted on the hollow receptacle that lines the urn-shaped and fleshy calyx-tube. Calyx-segments imbricated.

17. ROSA. Leaves pinnate: stipules cohering with the petiole.

Suborder III. POMEÆ.

Calyx-tube thick and fleshy in fruit (forming a *pome*), including and cohering with the 2-5 ovaries.

18. CRATÆGUS. Carpels bony in fruit, 1-seeded.

19. PYRUS. Carpels thin or cartilaginous in fruit, 2-seeded.

20. AMELANCHIER. Carpels cartilaginous, each divided into 2 cells by a partition: cells 1-seeded.

Suborder I. AMYGDÀLEÆ. ALMOND FAMILY.

1. PRÛNUS, Tourn. PLUM.

Calyx 5-cleft. Petals 5, spreading. Stamens 15-30. Ovary with 2 pendulous ovules. Drupe ovoid or oblong, usually covered with a bloom; the stone smooth, sharp-edged and pointed, and the margins mostly grooved. — Small trees or shrubs; the leaves serrate, rolled up in the bud. Flowers white, usually preceding the leaves, from lateral buds, the pedicels in simple umbel-like clusters. (The ancient classical name of the Plum.)

1. **P. marítima**, Wang. (BEACH PLUM) Low and straggling (2° - 5°); leaves ovate or oval, finely serrate, softly pubescent underneath; pedicels short, pubescent; fruit globular, purple or crimson with a bloom ($\frac{1}{2}$ '-1' in diameter). (*P. littoralis*, Bigelow.) — Varies, when at some distance from the coast, with the leaves smoother and thinner, and the fruit smaller. (*P. pygmæa*, Willd.) — Sea-beach and the vicinity, Massachusetts to New Jersey. April, May. — Fruit pleasant-tasted when fully ripe.

2. **P. Americàna**, Marsh. (WILD YELLOW PLUM.) Leaves ovate or obovate, conspicuously pointed, sharply and often doubly serrate, very veiny, smooth when mature; fruit roundish-oval ($\frac{1}{2}$ '-1' in diameter), nearly destitute of bloom. — River-banks, common: also cultivated, when the juicy fruit becomes pleasant-tasted, though with a tough acerb skin. It is yellow or orange, often tinged with red. Tree or bush thorny, 8° - 15° high.

3. **P. spinòsa**, L. (SLOE. BLACK THORN.) Branches thorny; leaves obovate-elliptical, downy beneath, sharply doubly-toothed; pedicels solitary; fruit (small) globular. — Sparingly naturalized: so also is

4. **P. instítia**, L. (BULLACE PLUM.) Branches thorny;

leaves ovate and lanceolate, downy underneath; pedicels in pairs; fruit globular, black with a bloom. — Near Boston and Cambridge.

P. DOMÉSTICA, L., is the common CULTIVATED PLUM.

2. CÉRASUS, Tourn., Juss. CHERRY.

Flowers, &c., as in the *Plum*. Drupe globular, without a bloom; the stone also almost globular, smooth. — Leaves folded in the bud. (The ancient name, from a town on the Black Sea.)

§ 1. *CERASUS* proper. — *Flowers in clusters from lateral buds, appearing before or with the leaves, as in the Plums.*

1. *C. pùmila*, Michx. (DWARF CHERRY.) Smooth, depressed and trailing; *leaves obovate-lanceolate, tapering to the base, somewhat toothed near the apex, whitish underneath*; flowers 2-4 together; fruit ovoid, dark red. — Blue hills of Milton, Massachusetts, *Greene*, Rhode Island, *Olney*, and from Vermont northward to Michigan. May. — Trailing over rocks or sandy banks; branches 6' - 18' high.

2. *C. Pennsylvànica*, Loisel. (WILD RED CHERRY.) *Leaves oblong-lanceolate, pointed, finely and sharply serrate, shining, green and smooth both sides*; flowers many in a cluster, on long pedicels; fruit globose, light red. — Rocky woods, common northward. May. — Tree 20° - 30° high, with light red-brown bark, and small fruit with thin and very sour flesh.

§ 2. *PÀDUS* — *Flowers in racemes at the end of leafy branches.*

3. *C. Virginiàna*, DC. (CHOKe CHERRY.) *Leaves oval or obovate, abruptly pointed, very sharply (often doubly) serrate with slender teeth, thin*; racemes short and close; petals roundish; fruit red turning to dark crimson. — River-banks, common. May. — A tall overhanging shrub, seldom a tree, with grayish bark; the fruit very austere and astringent till perfectly ripe. (*P. obovata*, *Bigelow*. *P. serotina*, of many authors.)

4. *C. serótina*, DC. (WILD BLACK CHERRY.) *Leaves lanceolate-oblong, taper-pointed, serrate with incurved short and callous teeth, thickish, shining above*; racemes elongated; petals obovate; fruit purplish-black. — Woods, common. — A fine large tree, with reddish-brown branches, furnishing valuable timber to the cabinet-maker. Fruit slightly bitter, but with a pleasant vinous flavor.

C. vulgàris and *C. sylvéstris* are the parents of the various cultivated Cherries.

ARMENIACA vulgàris, the APRICOT, PÉRSICA vulgàris, the PEACH, and *P. lævis*, the NECTARINE, are the principal remaining cultivated representatives of this suborder.

Suborder II. ROSACEÆ proper.

Tribe I. SPIRÆÆ. THE MEADOW-SWEET TRIBE.

3. SPIRÆA, L. MEADOW-SWEET.

Calyx 5-cleft, persistent. Petals 5, obovate, equal. Stamens 10-50. Pods (follicles) 3-12, several- (2-15-) seeded. — Flowers white or rose-color, rarely diceious. (Name probably from *σπειράω*, *to wind*, alluding to the fitness of the plants to be formed into garlands.)

§ 1. *PHYSOCÁRPOS*, Camb. — *Shrubs, with simple lobed leaves and umbel-like corymbs: pods inflated and diverging when grown, 2-4-seeded.*

1. *S. opulifolia*, L. (NINE-BARK.) Leaves roundish, somewhat 3-lobed and heart-shaped; pedicels very slender; pods 3-5, membranaceous. — Rocky river-banks, Maine to Wisconsin. June. — Shrub 4°-10° high, much branched, with white flowers, succeeded by membranaceous pods tinged with purple: the old bark loose and separating in thin layers.

§ 2. *SPIRÆA* proper. — *Shrubs, with simple leaves, the stipules obsolete: pods (mostly 5) not inflated, several-seeded.*

2. *S. corymbosa*, Raf. (FLAT-CLUSTERED MEADOW-SWEET.) Nearly smooth; leaves oval or ovate, cut-toothed towards the apex; *corymbs large and flat*, several times compound. — Alleghanies, Penn. and southward. June. — Stems little branched, 1°-2° high. Flowers white.

3. *S. salicifolia*, L. (WILLOW-LEAVED MEADOW-SWEET.) *Nearly smooth; leaves wedge-lanceolate, simply or doubly serrate; flowers in a crowded panicle; pods smooth.* (*S. alba*, Bigel.) — Bushy meadows along streams: also cultivated. July. — Shrub 2°-5° high: flowers white or tinged with purple.

4. *S. tomentosa*, L. (HARDHACK. STEEPLE-BUSH.) *Stems and lower surface of the ovate or oblong serrate leaves very woolly; flowers in short racemes crowded in a dense panicle; pods woolly.* — Low grounds and meadows, commonest in New England. July. — Shrub 3° high, the thickish leaves deep green above, and white or tawny beneath. Flowers rose-color.

§ 3. *ULMÀRIA*, Mœnch. — *Perennial herbs, with pinnate leaves and panicled cymose flowers: pods 6-8, 1-2-seeded.*

5. *S. lobata*, Murr. (QUEEN OF THE PRAIRIE.) Leaves interruptedly pinnate; the terminal leaflet very large, 7-9-parted, the lobes incised and toothed; stipules kidney-form; panicle compound-

clustered on a long naked peduncle, calyx reflexed. — Meadows and prairies, Penn. to Ohio and Michigan. June. — Stem 4°–8° high, smooth, angled. Flowers deep peach-blossom color. Very handsome in cultivation.

§ 4. *ARŪNCUS*, Seringe. — *Perennial herbs, with diœcious flowers, in slender spikes disposed in a long compound panicle; leaves 3-pinnate; the stipules obsolete; pods 3–5, several-seeded; pedicels reflexed in fruit.*

6. *S. Arŭncus*, L. (GOAT'S-BEARD.) Smooth; leaflets thin, lanceolate-oblong, or the terminal ones ovate-lanceolate, taper-pointed, sharply cut and serrate; flowers very numerous (small, white, the fertile greenish). — Rich damp woods, Catskill Mountains and southwestward. June. — A widely branched herb, 3° high.

S. FILIPĒNDULA, the DROPWORT, *S. ULMÀRIA*, the MEADOW-SWEET of Europe, *S. HYPERICIFŌLIA* (ITALIAN MAY), and one or two others, are common in gardens.

4. *GILLĒNIA*, Mœnch. INDIAN PHYSIC.

Calyx tubular-bell-shaped, constricted at the throat, 5-toothed; teeth erect. Petals 5, somewhat unequal, linear-lanceolate, elongated, inserted in the throat of the calyx. Stamens 10–20, included. Pods 5, included in the calyx, 2–4-seeded. — Perennial herbs, with almost sessile 3-foliolate leaves, the thin leaflets doubly serrate and incised. Flowers loosely panicle-corymbed, pale rose-color or white. (Derivation of the name unknown.)

1. *G. trifoliàta*, Mœnch. (BOWMAN'S ROOT.) Leaflets ovate-oblong, pointed, irregularly cut-serrate; stipules small, awl-shaped, entire. — Rich woods, from W. New York southward, and sparingly in the Western States. Also cultivated. June–Aug.

2. *G. stipulàcea*, Nutt. (AMERICAN IPECAC.) Leaflets lanceolate, deeply incised; stipules large and leaf-like, doubly incised. — W. Pennsylvania and New York: common throughout the Western States. June.

Tribe II. DRYÀDEÆ. THE BRAMBLE TRIBE.

5. *AGRIMŌNIA*, Tourn. AGRIMONY.

Calyx-tube top-shaped, contracted at the throat, armed with hooked bristles above, indurated and inclosing the fruit; the limb 5-cleft, closed after flowering. Petals 5. Stamens 12–15. Achenia 2: styles terminal. Seed suspended. — Perennial herbs, with interruptedly pinnate leaves and yellow flowers in slender

spiked racemes : bracts 3-cleft. (Name a corruption of *Argemonia*, of the same derivation as Argemone.)

1. **A. Eupatòria**, L. (COMMON AGRIMONY.) Stem and stalks hairy ; *leaflets* 5-7 with minute ones intermixed, oblong-obovate, coarsely toothed ; petals twice the length of the calyx. — Borders of woods, common. July - Sept. — Root sweet-scented.

2. **A. parviflòra**, Ait. (SMALL-FLOWERED AGRIMONY.) Stem and stalks bristly with brownish spreading hairs ; *leaflets* crowded, 11-19, with smaller ones intermixed, lanceolate, acute, deeply and regularly cut-serrate, as well as the stipules ; petals small. — Woods and glades, Pennsylvania and southwestward. July. — Plant 4°-5° high.

6. SANGUISÓRBA, L. GREAT BURNET.

Calyx petal-like, 3-bracted, the tube 4-angular, constricted ; the lobes 4, spreading. Petals none. Stamens 4 ; the filaments usually enlarging upwards. Pistils 1, rarely 2 : style slender, terminal : stigma pencil-form, tufted. Achenium included in the indurated 4-winged calyx-tube. Seed suspended. — Perennial (rarely annual) herbs, with unequally pinnate leaves, and small flowers, sometimes polygamous, in close spikes or heads. (Name from *sanguis*, blood, and *sorbeo*, to absorb ; the plants having been esteemed as vulneraries.)

1. **S. Canadénsis**, L. (CANADIAN BURNET.) Stamens much longer than the calyx ; spikes oblong, becoming cylindrical and elongated in fruit ; leaflets numerous, ovate or oblong-lanceolate, serrate, obtuse, heart-shaped at the base, stipellate ; stipules serrate, adhering to the petiole. — Bogs and wet meadows. Aug. - Oct. — A tall herb ; flowers white, sometimes purple.

POTÈRIUM SANGUISÓRBA, the COMMON BURNET of the gardens, has monœcious polyandrous flowers.

7. ALCHEMÍLLA, Tourn. LADY'S MANTLE.

Calyx-tube inversely conical, contracted at the top ; limb 4-parted, with as many alternate bractlets. Petals none. Stamens 1-4. Pistils 1-4 ; the slender style arising from near the base of the ovary ; the achenia included in the persistent calyx. — Low herbs, with palmately lobed or compound leaves, and small corymbed greenish flowers. (From *Alkemelyeh*, the Arabic name.)

1. **A. alpina**, L. Perennial; leaves all from the rootstock, 5-7-divided; leaflets wedge-lanceolate, satiny beneath, serrate towards the apex. — White Mountains of New Hampshire and Green Mountains, Vermont, according to Pursh; but no one else has found the plant in the country.

8. SIBBÁLDIA, L. SIBBALDIA.

Calyx flattish, 5-cleft, with 5 bractlets. Petals 5, linear-oblong, minute. Stamens 5, inserted alternate with the petals into the margin of the woolly disk which lines the base of the calyx. Achenia 5-10; styles lateral. — Low and depressed mountain perennials. (Dedicated to *Dr. Sibbald*, Prof. at Edinburgh at the close of the 17th century.)

1. **S. procumbens**, L. Leaflets 3, wedge-shaped, 3-toothed at the apex; petals yellow, shorter than the calyx. — Mountains of Vermont, according to Pursh (?). White Mts. of New Hampshire, *Oakes*, 1846. A dwarf, truly alpine plant, resembling a *Potentilla*.

9. DRYAS, L. DRYAS.

Calyx flattish, 8-9-parted. Petals 8-9, large. Stamens numerous. Achenia many, heaped on the dry receptacle; the persistent styles forming very long plumose tails. Seed erect. — Dwarf and matted slightly shrubby plants, with simple toothed leaves, and solitary large flowers. (Name from *Dryades*, the nymphs of the Oaks, the leaves resembling oak-leaves in miniature.)

1. **D. integrifolia**, Vahl. Leaves oblong-ovate, slightly heart-shaped, with revolute margins, nearly entire, whitened with down beneath, concealing the veins; flowers white. — White Mountains, New Hampshire, *Prof. Peck*, according to *Pursh*; but not since met with.

10. GEUM, L. AVENS.

Calyx bell-shaped or flattish, deeply 5-cleft, usually with 5 small bractlets at the sinuses. Petals 5. Stamens many. Achenia numerous, heaped on a conical or cylindrical dry receptacle, the long persistent styles forming hairy or jointed tails. Seed erect. — Perennial herbs, with pinnate or lyrate leaves. (Name from *γεύω*, to give an agreeable flavor, the roots being rather aromatic.)

§ 1. **GEUM** proper. — Styles jointed and bent near the middle, the

lower portion smooth and persistent, hooked at the end after the deflexed and mostly hairy upper joint falls away: head of fruit sessile: calyx-lobes reflexed.

1. **G. Virginiànum**, L. (WHITE AVENS.) Stem rather hairy below; root-leaves pinnate, lyrate, or simple and rounded; those of the stem 3-5-lobed or divided, softly pubescent; petals white, about the length of the calyx; receptacle of the fruit hairy. Also *G. album*, Willd. — Woods and meadows, very common. June-Aug. — Leaves very variable. Flowers many, quite small.

2. **G. macrophýllum**, Willd. (ROUGH YELLOW AVENS.) Bristly-haired, stout; root-leaves lyrate and interruptedly pinnate, with the terminal leaflet very large and round-heart-shaped; lateral leaflets of the stem-leaves 2-4, minute, the terminal roundish, 3-cleft, the lobes wedge-form and rounded; petals yellow, longer than the calyx; receptacle of fruit nearly naked. — Around the base of the White Mountains, N. Hampshire. June. — Stems 2°-3° high, leafy. Flowers smaller than in No. 3.

3. **G. strictum**, Ait. (TALL YELLOW AVENS.) Somewhat hairy; root-leaves interruptedly pinnate, the leaflets wedge-obovate; leaflets of the stem-leaves 3-5, rhombic-ovate or oblong, acute; petals yellow, longer than the calyx; receptacle downy. — Moist meadows, common northward. July. — Stem 3-5 feet high, with rather large loosely paniced flowers.

§ 2. **STÝLIPUS**, Raf. — *Styles smooth: head of fruit conspicuously stalked: bractlets of the calyx none: otherwise as § 1.*

4. **G. vérum**, Torr. & Gr. (WESTERN EARLY AVENS.) Somewhat pubescent; stems ascending, few-leaved, slender; root-leaves roundish heart-shaped and 3-5-lobed, or some of them pinnate, with the lobes cut; petals yellow, about the length of the calyx; receptacle smooth. — Thickets, Ohio and westward. April-June. Flowers small. Head of carpels soon protruded beyond the calyx on its slender stalk.

§ 3. **CARYOPHYLLÀTA**, Tourn. — *Style jointed and bent in the middle, the upper joint plumose: flowers large.*

5. **G. rivàle**, L. (WATER OR PURPLE AVENS.) Stems nearly simple, several-flowered, reversely hairy; root-leaves lyrate and interruptedly pinnate; those of the stem 1-2, and 3-foliolate or 3-lobed; petals inversely heart-shaped, contracted into a claw, purplish-orange; head of fruit stalked. — Bogs and wet meadows, especially northward. May. — Stems 2° high; the blossoms nodding, but the feathery fruiting heads upright. Calyx brown-purple.

§ 4. **SIEVÉRSIA**, Willd. — *Style not jointed, wholly persistent and straight: head of fruit sessile: flowers large.*

6. **G. triflorum**, Pursh. (ROCK AVENS.) Low, softly hairy; flowering stems nearly leafless; root-leaves interruptedly pinnate; the

leaflets very numerous and crowded, oblong-wedge-form, deeply cut-toothed; flowers 3 or more on long peduncles; *bractlets linear, longer than the calyx, as long as the oblong purplish petals; styles very long (2'), strongly plumose in fruit.* — Rocks, New Hampshire and N. New York (*Dr. Craze*) northward to Wisconsin, rare. May, June. — Stems 6' - 12' high. Calyx purple.

7. **G. Péckii**, Pursh. (PECK'S MOUNTAIN AVENS.) Somewhat smooth; leaves from the rootstock, large, roundish-kidney-form, crenately cut-toothed, with a set of minute lateral leaflets down the petiole; flowering stem nearly leafless, 3-5-flowered; *bractlets minute; petals round-obovate, spreading, yellow; styles hairy towards the base, naked above.* — Alpine summits of the White Mts. of New Hampshire. Aug. — Stems 6' - 20' high; the golden flowers handsome.

11. WALDSTEÍNIA, Willd. (COMARÓPSIS, DC.)

Calyx-tube inversely conical; the limb 5-cleft, with 5 often minute and deciduous bractlets. Petals 5. Stamens many, inserted into the throat of the calyx. Achenia 2-6, minutely hairy; the terminal slender styles deciduous from the base by a joint. Seed erect. — Low perennial herbs, with chiefly radical 3-5-lobed or divided leaves, and small yellow flowers on bracted scapes. (Named in honor of *Francis von Waldstein*, a German botanist.)

1. **W. fragarioides**, Tratt. (BARREN STRAWBERRY.) Low; leaflets 3, broadly wedge-form, crenately cut-toothed; scapes several-flowered; petals longer than the calyx. (*Dalibarda fragarioides, Michx.*) — Wooded hill-sides, common northward. May. — Leaf-stalks and scapes 4' - 8' high.

12. POTENTÍLLA, L. CINQUE-FOIL. FIVE-FINGER.

Calyx deeply 5-cleft, with as many bractlets at the sinuses, thus appearing 10-cleft. Petals 4-5, roundish or inversely heart-shaped, deciduous. Stamens many. Achenia many, collected in a head on the dry hairy receptacle: styles lateral or terminal, deciduous. — Herbs, or rarely shrubs, with compound leaves, and solitary or cymose flowers. Perennials, except No. 1. (Name a kind of diminutive from *potens*, powerful, alluding to the reputed medicinal power, of which in fact these plants possess very little, being mild astringents merely, like the rest of the tribe.)

§ 1. *Style terminal, or attached above the middle of the ovary.*

* *Leaves palmate : leaflets 3-5 : flowers yellow.*

1. **P. Norvégica**, L. (NORWAY CINQUE-FOIL.) Hairy, erect, forked above, *many-flowered*; leaflets 3, obovate-oblong, coarsely cut-serrate; calyx longer than the pale yellow petals; achenia wrinkled or ribbed. — A coarse and homely annual or biennial weed, in fields and cultivated grounds, certainly native northward. July - Sept.

2. **P. mínima**, Haller. (DWARF MOUNTAIN CINQUE-FOIL.) *Dwarf. tufted*, pubescent; stems mostly 1-flowered; leaflets 3, obovate, very obtuse, cut-toothed near the apex; petals longer than the calyx. (*P. Robbinsiana*, Oakes.) — Alpine summits of the White Mts., New Hampshire. July. — Plant 1' - 3' high: flowers small.

3. **P. Canadensis**, L. (COMMON CINQUE-FOIL OR FIVE-FINGER.) Hairy or pubescent, *procumbent and ascending*, producing runners; peduncles axillary, elongated, 1-flowered; leaflets 5, oblong or obovate-wedge-form, cut-toothed towards the apex; petals longer than the calyx. (*P. sarmentosa*, Muhl.) — Var. 1. PUMILA is a dwarf, early-flowering state, in sterile soil. Var. 2. SIMPLEX is a taller and greener state, with slender ascending stems. (*P. simplex*, Michx.) — Abounds among grass in dry fields, &c. April - Oct.

4. **P. argentea**, L. (SILVERY CINQUE-FOIL.) Low; stems ascending, *cymose at the summit, many-flowered*, white-woolly; leaflets 5, wedge-oblong, almost pinnatifid, entire towards the base, with revolute margins, green above, *white with silvery wool beneath*; petals longer than the calyx. — Dry barren fields, &c. June - Sept.

* * *Leaves odd-pinnate : flowers yellow.*

5. **P. Pennsylvanica**, L. (HOARY CINQUE-FOIL.) Stems erect, hairy or woolly; cymose at the summit, many-flowered; leaflets 5-9, oblong, obtuse, pinnatifid, silky-woolly with white hairs, especially beneath, the upper ones larger and crowded; petals scarcely longer than the calyx. — Pennsylvania? New Hampshire, Oakes, and northward. July. — Plant 1° - 2° high.

§ 2. *Style deeply lateral, attached near or below the middle of the ovary.*

6. **P. arguta**, Pursh. (CROWDED CINQUE-FOIL.) Stem erect, tall and stout, brownish-hairy, clammy towards the summit; leaves pinnate, the lowest 7-9-, the upper 3-7-foliolate; leaflets oval or ovate, incised or doubly serrate, downy underneath; flowers cymose-clustered; petals dull yellowish-white, longer than the calyx; disk glandular, thickened, somewhat 5-lobed; achenia glabrous, the thickened style spindle-shaped. — Rocky hills and banks, Maine to Michigan. July. — Stem mostly simple, 2° - 4° high.

7. **P. Anserina**, L. (SILVER WEED.) *Creeping by slender rooting runners*; ascending stems none; leaves all radical, pinnate; leaflets 9-19, with minute pairs interposed, oblong, pinnatifid-serrate, green and nearly smooth above, *silvery-white with silky down underneath*; stipules many-cleft; flowers solitary (yellow), on scape-like

peduncles as long as the leaves; achenia very hairy at the insertion, otherwise smooth. — Brackish marshes and borders of rivers and lakes, especially northward. June — Sept. — Leaves 6' — 12' long.

8. **P. fruticòsa**, L. (SHRUBBY CINQUE-FOIL.) Stem erect, very much branched, *bushy*; *leaves pinnate*; *leaflets* 5 — 7, crowded, oblong-lanceolate, *entire*, silky, especially beneath; stipules scale-like; *flowers numerous (yellow)*, terminating the branchlets; achenia and receptacle thickly clothed with very long hairs. (*P. floribunda*, Pursh.) — Bog-meadows, more common northward. June — Sept. — Shrub 2° — 4° high, with many handsome flowers.

9. **P. tridentàta**, Ait. (MOUNTAIN CINQUE-FOIL.) Stems low, rather woody and creeping at the base, ascending, several-flowered; *leaves palmate*; *leaflets* 3, wedge-oblong, nearly smooth, 3-toothed at the apex; petals white; achenia and receptacle very hairy. — Rocks, on mountains (Catskill, &c.), and in Maine near the level of the sea. June. — Stems 4' — 6' high: leaves thickish.

13. CÓMARUM, L. MARSH CINQUE-FOIL.

Calyx as in *Potentilla*, but dark-purplish inside. Petals 5, much shorter than the calyx, ovate-lanceolate, pointed, somewhat persistent. Stamens numerous, inserted on the thickened hairy disk: filaments persistent. Achenia many, heaped on the convex at length enlarged and spongy hairy receptacle: styles lateral, deciduous. — A stout perennial herb, ascending from the creeping base, with odd-pinnate leaves of 5 — 7 crowded lanceolate-oblong leaflets, minutely silky, and large purplish flowers. (Name arbitrarily borrowed from that applied by Theophrastus to an *Arbutus*.)

1. **C. palústre**, L. (*Potentilla palustris*, Scop., &c.) — Bogs, common northward. June. — Stems 1° — 2° high: root astringent.

14. FRAGÀRIA, Tourn. STRAWBERRY.

Flowers as in *Potentilla*. Styles deeply lateral. Receptacle in fruit much enlarged and conical, becoming pulpy and scarlet, bearing the minute dry achenia scattered over its surface. — Low perennials, with runners, and white cymose flowers on scapes. Leaves radical: leaflets 3, obovate-wedge-form, coarsely serrate. Stipules cohering with the base of the petiole, which with the scapes are usually hairy. (Name from the fragrance of the fruit.) — The two species are indiscriminately called WILD STRAWBERRY.

1. **F. Virginiàna**, Ehrh. *Achenia imbedded in the deeply pit-*

ted receptacle. — Fields and rocky places, common northward. April - June. — Scapes commonly shorter than the leaves, which are of a firm texture. Fruit roundish-ovoid.

2. **F. véscá**, L. *Achenia superficial on the conical or hemispherical fruiting receptacle* (not sunk in pits). — Fields and rocks, common and indigenous. — Leaves thinner; the wild fruit often long and slender.

15. DALIBÁRDA, L. DALIBARDA.

Calyx deeply 5-6-parted, 3 of the divisions larger and toothed. Petals 5, sessile, deciduous. Stamens many. Ovaries 5-10, becoming nearly dry seed-like drupes: styles terminal, deciduous. — Low perennials, with creeping and tufted stems, and roundish heart-shaped crenate leaves on slender petioles. Flowers 1-2, white, on scape-like peduncles. (Named in honor of *Dalibard*, a French botanist.)

1. **D. rèpens**, L. Depressed, in tufts, downy; petals spreading in the flower, converging and inclosing the fruit. — Wooded banks, common northward. June-Aug. — Leaves much like those of a stemless Violet.

16. RÛBUS, L. BRAMBLE.

Calyx 5-parted, without bractlets. Petals 5, deciduous. Stamens numerous. Achenia usually many, collected on a conical or oblong spongy or succulent receptacle, becoming small drupes: styles nearly terminal. — Perennial herbs, or somewhat shrubby plants, with white (rarely reddish) flowers, and edible fruit. (Name from the Celtic *rub*, red, from the color of the fruit of many species.)

§ 1. *Fruit, or collective mass of drupes, somewhat hemispherical, and falling off whole from the dry receptacle when ripe, or rarely of few grains which fall separately.* (RASPBERRY.)

* *Leaves simple: flowers large: prickles none.*

1. **R. odoràtus**, L. (PURPLE FLOWERING RASPBERRY.) *Stem shrubby; branches, stalks, and calyx bristly with glandular clammy hairs; leaves 3-5-lobed, the lobes all pointed and minutely toothed, the middle one prolonged; peduncles many-flowered; calyx-lobes tipped with a narrow appendage as long as themselves; petals rounded, purple rose-color; fruit flat, reddish.* — Rocky banks, common: often cultivated. June-Aug. — Stem 4° high. Leaves 4'-8' broad. Flowers very showy, 2' broad.

2. **R. Nutkànus**, Moçino. (WHITE FLOWERING RASPBERRY.) *Glandular*, but scarcely bristly; leaves almost equally 5-lobed, coarsely toothed; peduncles few-flowered; *petals broadly oval, white*. (*R. parviflorus*, Nutt.) — Upper Michigan, and northwestward along the Lakes. Resembles closely No. 1; but usually a smaller plant.

3. **R. Chamàmòrus**, L. (CLOUDBERRY.) *Nearly herbaceous, low, diacious; stem simple, 2-3-leaved, 1-flowered*; leaves roundish kidney-form, somewhat 5-lobed, serrate, wrinkled; calyx-lobes pointless; *petals obovate, white*; fruit of few grains, amber-color. — White Mountains of N. Hampshire near the limit of trees: also Lubeck, Maine, *Oakes*. July.

* * *Leaflets (pinnately) 3-5: petals small, erect, white.*

+ *Stems annual, herbaceous, not prickly: fruit of few grains.*

4. **R. triflorus**, Richards. (DWARF RASPBERRY.) Stems ascending or trailing, slender; leaflets 3 (or pedately 5), rhombic-ovate or ovate-lanceolate, acute at both ends, coarsely doubly serrate, thin, nearly smooth; peduncle 1-3-flowered. (*R. saxatilis*, Bigelow.) — Wooded hill-sides, common northward. June. — Flowering stems 8' - 12' high. Sepals and petals often 6-7.

+ + *Stems biennial, somewhat shrubby, prickly: fruit hemispherical.*

5. **R. strigòsus**, Michx. (WILD RED RASPBERRY.) *Stems upright*, and with the stalks, &c., beset with stiff straight bristles (some of them becoming weak hooked prickles), glandular when young, somewhat glaucous; leaflets 3-5, oblong-ovate, pointed, cut-serrate, whitish-downy underneath; petals as long as the sepals; *fruit light red*. — Thickets and hills, common northward. May. — Fruit ripening from June to Aug., finely flavored, but more tender and watery than the Garden or European Raspberry (*R. Idæus*) which it closely resembles. End leaflet often heart-shaped; the lateral sessile.

6. **R. occidentàlis**, L. (BLACK RASPBERRY. THIMBLE-BERRY.) *Glaucous all over; stems recurved, armed like the stalks, &c., with hooked prickles, not bristly*; leaflets 3 (rarely 5) ovate, pointed, coarsely doubly serrate, whitened-downy underneath; the lateral ones somewhat stalked; petals shorter than the reflexed sepals; *fruit nearly black*. — Thickets and fields, especially where the ground has been burned over. May. — Fruit ripe early in July, pleasant.

§ 2. *Fruit, or collective drupes, not separating from the juicy receptacle, mostly ovate or oblong, blackish.* (BLACKBERRY.)

7. **R. villòsus**, Ait. (COMMON OR HIGH BLACKBERRY.) *Shrubby, armed, upright or reclining, with stout curved prickles*; branchlets, stalks, and lower surface of the leaves *hairy and glandular*; leaflets 3 (or pedately 5), ovate, pointed, unequally serrate; the terminal one somewhat heart-shaped, conspicuously stalked; *flowers racemed, numerous*, bracts short; sepals linear-pointed, much shorter than the obovate-oblong spreading petals. — Var. 1. FRONDÒSUS: smoother and

much less glandular; flowers more corymbose, with leafy bracts; petals roundish. Var. 2. *HUMIFŪSUS*: trailing, smaller; peduncles few-flowered.— Borders of thickets, &c., common. May, June: the pleasant large fruit ripe in Aug. and Sept.— Plant very variable in size and aspect; the stems usually tall and furrowed.

8. **R. Canadensis**, L. (LOW BLACKBERRY. DEWBERRY.) *Shrubby, extensively trailing, slightly prickly*; leaflets 3 (or pedately 5–7), oval or ovate-lanceolate, mostly pointed, thin, *nearly smooth*, sharply cut-serrate; flowers racemed, with leaf-like bracts. (*R. trivialis*, Pursh, Bigel., &c.; not of Michx., which is a Southern species.) Bare rocky or gravelly soil, common. May; ripening its very large and sweet fruit earlier than No. 7.

9. **R. hispīdus**, L. (RUNNING SWAMP BLACKBERRY.) *Stems slender, somewhat shrubby, extensively procumbent, beset with small prickles turned backward*; leaflets 3 (or rarely pedately 5), *smooth*, thickish, mostly persistent, obovate, obtuse, coarsely serrate, entire towards the base; *peduncles leafless, several-flowered, often bristly*; *flowers small*. (*R. obovatis*, Michx., *R. sempervirens* and *R. setosus*, Bigelow.)— Wet woods, common. June.— Flowering stems or branches short, ascending, the sterile forming long runners. Fruit of a few large grains, red or purple, sour.

10. **R. cuneifolius**, Pursh. (SAND BLACKBERRY.) *Shrubby, low, upright, armed with stout recurved prickles*; *branchlets and lower surface of the leaves whitish-woolly*; leaflets 3–5, wedge-obovate, thickish, serrate towards the apex; peduncles 2–4-flowered; *petals large*.— Sandy woods, New York and southward near the coast. May–July, ripening its well-flavored black fruit in Aug.— Stems 1^o–3^o high.

Tribe III. ROSÆÆ. THE ROSE TRIBE.

17. ROSA, Tourn. ROSE.

Calyx-tube urn-shaped, contracted at the mouth, becoming fleshy in fruit; the lobes imbricated in the bud. Petals 5, inserted, with the numerous stamens, into the edge of the hollow thin disk that lines the calyx-tube and bears the numerous pistils over its whole inner surface. Styles nearly included: ovaries hairy, becoming bony achenia in fruit.— Shrubby and prickly, with odd-pinnate leaves, and stipules cohering with the petiole: stalks, foliage, &c., often bearing aromatic glands. (The ancient Latin name, from the Celtic *rhos*, red.)

* *Truly wild Roses. Leaflets smooth, at least the upper surface, not clothed with fragrant glands.*

1. **R. setigera**, Michx. (CLIMBING OR PRAIRIE ROSE.) *Stems climbing, armed with stout nearly straight prickles, not bristly; leaflets 3-5, ovate, acute, sharply serrate, smoothish or downy beneath; stalks and calyx glandular; flowers corymbed; sepals pointed; petals deep rose-color changing to white; styles cohering in a column as long as the stamens; fruit (hip) globular.* — Borders of prairies and thickets, Ohio to Wisconsin. July. — A fine species, the only American climbing Rose; the strong shoots growing 15°-20° in a season. Several varieties and hybrid forms are in cultivation.

2. **R. Carolina**, L. (SWAMP ROSE.) *Armed with stout hooked prickles, not bristly; leaflets 5-9, elliptical, often acute, dull above and pale beneath; stipules narrow; flowers in corymbs; calyx and peduncles glandular-bristly, the former with leaf-like appendages; fruit (hip) depressed-globular, somewhat bristly.* — Low grounds, common. July-Sept. — Bushes 6° high, many-flowered; the deep rose-colored petals inversely heart-shaped, as in the others.

3. **R. lucida**, Ehrh. (LOW WILD ROSE.) *Armed with unequal bristly prickles, which are mostly deciduous, the stouter persistent prickles nearly straight, slender; leaflets 5-9, elliptical, shining above, sharply serrate; stipules broad; peduncles 1-3-flowered, and with the appendaged calyx-lobes glandular-bristly; fruit depressed-globular, smooth when ripe.* — Common in dry soil or borders of swamps. May-July. — Stems 2° high; the flowers large in proportion.

4. **R. nitida**, Willd. (SHINING DWARF ROSE.) *Stems and stalks thickly clothed with very slender and straight bristly prickles; leaflets 5-9, lanceolate or narrowly oblong, very smooth and shining, serrate; stipules broadish, reaching to the lowest pair of leaflets; flowers solitary, the peduncle and calyx bristly; fruit globose.* — Low grounds, from Massachusetts northward, near the coast. June. — Stems 1° high; petals deep rose-color.

5. **R. blanda**, Ait. (EARLY WILD ROSE.) *Nearly unarmed, or with scattered straight deciduous prickles; leaflets 5-7, oval or oblong, obtuse, pale on both sides and minutely downy or hoary beneath, serrate; stipules large; flowers 1-3, the peduncles and calyx-tube smooth and glaucous; fruit globose, crowned with the persistent erect and connivent entire calyx-lobes.* — Rocks and banks, Vermont to Wisconsin, chiefly northward. May, June. — Stems 1°-3° high, prickly only towards the base; the branches reddish, like the Cinnamon Rose. Petals longer than the calyx, light rose-color.

* * *Naturalized species. Leaflets downy and beset with russet glands underneath, fragrant.*

6. **R. rubiginosa**, L. (TRUE SWEET-BRIER.) *Prickles numerous, the larger hooked, and the smaller awl-shaped; leaflets doubly serrate, rounded at the base; fruit pear-shaped or obovate, crowned with the persistent calyx-lobes.* — Road-sides and thickets, extensively naturalized. June-Aug.

7. **R. micrantha**, Smith. (SMALL-FLOWERED SWEET-BRIER.) *Prickles all uniform and hooked*; branchlets sparingly bristly; fruit (small) *elliptical and ovate, the calyx-lobes deciduous*. — Roadsides, &c., in E. New England, with No. 6, which it too closely resembles, but is regarded as distinct by most British Botanists.

Suborder III. POMEÆ. THE PEAR FAMILY.

18. CRATÆGUS, L. HAWTHORN. WHITE THORN.

Calyx-tube urn-shaped, the limb 5-cleft. Petals 5, roundish. Stamens many, or only 10 - 5. Styles 1 - 5. Fruit (calyx-tube) fleshy, containing 1 - 5 bony 1-seeded carpels. — Thorny shrubs or trees, with simple and mostly lobed leaves, and white (rarely rose-color) blossoms. (Name from *κράτος*, *strength*, on account of the hardness of the wood.)

* *Corymbs many-flowered.*

+ *Fruit small (deep red). Introduced.*

1. **C. Oxyacantha**, L. (ENGLISH HAWTHORN.) Smooth; leaves obovate, cut-lobed and toothed, wedge-form at the base; styles 1 - 3; fruit globose-ovoid. — More or less naturalized in the Atlantic States. May.

2. **C. cordata**, Ait. (WASHINGTON THORN.) Smooth; leaves broadly ovate, often heart-shaped, pointed, variously cut and serrate, mostly 3-lobed near the base; styles 5; fruit depressed-globose (not larger than peas). — Employed for hedges, especially in the Middle States; probably wild in W. Penn. Common farther south.

-- *Fruit larger, globular or pear-shaped, often eatable; calyx, with the edges of the leaves, &c., often glandular.*

3. **C. coccinea**, L. (SCARLET-FRUITED THORN.) Smooth or downy; leaves roundish-ovate, thin, sharply cut and toothed, 5 - 9-lobed, abrupt or heart-shaped at the base, on slender petioles; spines stout; styles 3 - 5; fruit bright red, globose. — Rocky banks, common. May. — A low, round-headed tree, with many varieties.

4. **C. tomentosa**, L. (BLACK OR PEAR THORN.) Leaves oval or ovate-oblong, narrowed abruptly at the base into a short margined petiole, cut-toothed towards the apex, smooth and furrowed above, woolly beneath when young, like the corymbs; styles 3; fruit orange-color, or yellow marked with red, pear-shaped. (*C. pyrifolia*, Ait.) — Thickets, common. May, June. — A tall shrub rather than a tree, with fragrant flowers and large leaves.

5. **C. punctata**, Jacq. (DOTTED THORN.) Leaves wedge-obovate, cut-serrate towards the apex, tapering into a slender petiole,

furrowed by the impressed straight veins, *downy beneath with close-pressed hairs* when young; styles 1-3; *fruit globose, dull red and yellowish, dotted*. — Thickets, common everywhere. May. — A low, round-headed tree, 10°-20° high, with small dull leaves and ash-colored branches.

6. **C. Crus-galli**, L. (COCKSPUR THORN.) Smooth; *leaves shining, thickish, wedge-obovate*, toothed towards the apex, with scarcely any petiole; styles 1-3; *fruit bright red*, round-pear-shaped. — Thickets. May, June. — Shrub or tree 10°-20° high; with firm dark green leaves very shining above, and slender sharp thorns often 2' long. — The best species for hedges in this country.

* * *Flowers solitary or nearly so at the end of the branches.*

7. **C. parvifolia**, Ait. (DWARF THORN.) Leaves thick and firm, oblong-wedge-form or spatulate, rounded at the apex, crenate, nearly sessile, roughish-downy, the upper surface shining when old; flowers short-stalked; calyx-lobes cut-toothed, as long as the petals; fruit roundish pear-shaped, greenish-yellow, somewhat hairy. — Dry or sandy soil, New Jersey and southward. May. — A rugged shrub, 3°-5° high, with a few long thorns. Calyx half as long as the ripe fruit.

19. PÏRUS, L. PEAR. APPLE.

Calyx-tube urn-shaped, the limb 5-cleft. Petals roundish or obovate. Stamens numerous. Styles 2-5. Fruit (pome) fleshy or berry-like, the 2-5 carpels of a parchment-like or cartilaginous texture, each 2-seeded. — Trees or shrubs, with handsome flowers in corymbed cymes. (The classical name of the Pear-tree.)

§ 1. MALUS, Tourn. — *Leaves simple: cymes simple and umbel-like: fruit fleshy, globular, sunk in at the attachment of the stalk.* (APPLE.)

1. **P. coronaria**, L. (SWEET-SCENTED CRAB-APPLE.) *Leaves ovate*, often rather heart-shaped, cut-serrate or lobed, smooth when old; *styles woolly and united at the base*. — Glades, W. New York and Penn. to Michigan. May. — Tree 20° high, with few, but very large, pale rose-colored fragrant blossoms, and translucent fragrant fruit, ripe in Sept.

2. **P. angustifolia**, Ait. (NARROW-LEAVED CRAB-APPLE.) *Leaves oblong or lanceolate*, often acute at the base, mostly toothed, smooth; *styles smooth and distinct*. — Glades, from Pennsylvania southward. April.

P. MALUS, the APPLE-TREE, is often found in deserted fields, &c.

P. COMMUNIS, the PEAR-TREE, represents another section of the genus.

§ 2. *ADENORACHIS*, DC.—*Leaves simple, the midrib beset with glands along the upper side: cymes compound: styles united at the base: fruit berry-like.*

3. *P. arbutifolia*, L. (CHOKE-BERRY.) Leaves oblong or obovate, finely serrate with callous teeth; fruit pear-shaped, or when ripe globular.—Var. 1. *ERYTHROCÁRPA* has the flower-clusters and lower surface of the leaves woolly, at least when young, and red or purple fruit. Var. 2. *MELANOCÁRPA* is nearly smooth, with purplish-black fruit.—Damp thickets, common. May, June.—Shrub 2°-3° high. Flowers white, or tinged with purple. Fruit small, mawkish.

§ 3. *SÓRBUS*, Tourn.—*Leaves odd-pinnate: cymes compound: styles separate: fruit berry-like.*

4. *P. Americàna*, DC. (AMERICAN MOUNTAIN-ASH.) Leaflets 13-15, oblong-lanceolate, pointed, sharply serrate with pointed teeth, smooth when full-grown; cymes large and flat.—Swamps and mountain woods, common northward: also a low, smaller-fruited variety on the Alleghanies southward. June.—A slender shrub or low tree, with white blossoms; greatly prized in cultivation for its ornamental clusters of scarlet fruit in autumn, remaining through the winter.—Very much like the European ROWAN-TREE (*P. aucupària*).

20. AMELÁNCHIER, Medic. JUNE-BERRY.

Calyx 5-cleft. Petals oblong, elongated. Stamens numerous, short. Styles 5, united below. Fruit (pome) berry-like, the 5 cartilaginous carpels each imperfectly divided into 2 cells by a partition from the back; the divisions 1-seeded.—Small trees or shrubs, with simple sharply serrated leaves and white flowers in racemes. (*Amelancier* is the popular name of *A. vulgaris* in Savoy.)

1. *A. Canadénsis*, Torr. & Gr. (SHAD-BUSH. SERVICE-BERRY.) Woolly when young, at length smooth: calyx-lobes triangular-lance-form; fruit globular, purplish, edible (sweet, ripe in June).—Varies exceedingly; the leading forms are, Var. 1. *BOTRYÀPIUM*: a tree, with the leaves soon smooth, ovate-oblong, sometimes heart-shaped at the base, pointed, very sharply serrate; flowers in long drooping racemes; the oblong petals 4 times the length of the calyx. (*Pyrus Botryàpium*, Willd.) Var. 2. *OBLONGIFÒLIA*: a shrub, with oblong leaves, usually woolly during flowering, the racemes and petals shorter. Var. 3. *ROTUNDIFÒLIA*: a shrub or tree, with broader leaves, 6-10-flowered racemes, and smaller petals than in var. 1. Var. 4. *ALNIFÒLIA*: shrub, with the roundish leaves very obtuse or notched at both ends, and serrate above the middle only, the racemes

dense and many-flowered; stamens very short. Var. 5. OLIGOCÁRPA: the most distinct of all, a shrub, growing in deep mountain swamps, with thin narrowly oval or oblong leaves, nearly smooth from the first, 2-4-flowered racemes, and broader petals scarcely thrice the length of the calyx. — River-banks, rocks, and low grounds. April, May.

CYDÒNIA VULGÀRIS, the QUINCE, differs from the rest of the family in having several seeds in each carpel.

CALYCÁNTHUS, the CAROLINA ALLSPICE, common in cultivation, represents a family near Rosaceæ, with fruit much like a rose-hip, although dry, but with opposite leaves, and coiled cotyledons.

ORDER 39. MELASTOMÀCEÆ. (MELASTOMA FAM.)

Myrtle-like plants, with opposite ribbed leaves, and anthers opening by pores at the apex; otherwise much as in the Evening Primrose Family. — All tropical, except the genus

1. RHÉXIA, L. DEER-GRASS. MEADOW BEAUTY.

Calyx-tube urn-shaped, coherent with the ovary below, at least at its angles, and continued above it, persistent, 4-cleft at the apex. Petals 4, convolute in the bud, oblique, inserted, along with the 8 stamens, on the summit of the calyx-tube. Anthers long, curved, 1-celled, mostly with a little spur on the back just at the attachment of the filament near the base, inverted in the bud. Style 1: stigma 1. Pod invested by the permanent calyx, 4-celled, with 4 many-seeded placentæ projecting from the central axis. Seeds coiled like a snail-shell, without albumen. — Low perennial herbs, often bristly, with sessile 3-5-nerved and bristledged leaves, and showy cymose flowers; the petals falling early. (Name from *ρήξις*, a rupture, applied to this genus for no obvious reason.)

1. **R. Virgínica**, L. Stem square, with wing-like angles; leaves oval-lanceolate, acute; petals bright purple. — Sandy swamps, Massachusetts southward, along the coast. July. — Flowers 1' broad.

2. **R. Mariàna**, L. Stem cylindrical; leaves linear-oblong, narrowed towards the base; petals pale purple. — Sandy swamps, N. Jersey southward.

ORDER 40. LYTHRACEÆ. (LOOSESTRIFE FAMILY.)

Herbs, with mostly opposite entire leaves, no stipules, the calyx inclosing, but free from, the 1-4-celled many-seeded ovary and membranous pod, and bearing the 4-7 deciduous petals and 4-14 stamens on its throat; the latter lower down. Style 1: stigma capitate, or rarely 2-lobed. — Flowers rarely irregular, axillary or whorled. Petals sometimes wanting. Pod often 1-celled by the early breaking away of the thin partitions: placentæ in the axis. Seeds anatropous, without albumen. — Branches usually 4-sided.

Synopsis.

* Flowers regular, or very nearly so.

1. AMMANNIA. Calyx short, 4-angled, not striate. Stamens 4.
2. LYTHRUM. Calyx cylindrical, striate. Stamens 5-14, nearly equal.
3. DECODON. Calyx short, bell-form. Stamens 10, the 5 opposite the petals shorter or later.

* * Flowers irregular: petals unequal.

4. CUPHEA. Calyx spurred or gibbous at the base. Stamens 12.

1. AMMIÁNIA, Houston. AMMANNIA.

Calyx globular or bell-shaped, 4-angled, 4-toothed, with a little horn-shaped appendage at each sinus. Petals 4 (purplish), small and deciduous, sometimes wanting. Stamens 4, short. Pod globular, 4-celled. — Low and inconspicuous smooth herbs, with opposite narrow leaves, and small greenish flowers in their axils. (Named after *Ammann*, a Russian botanist anterior to Linnæus.)

1. *A. humilis*, Michx. Leaves lanceolate or linear-oblong, tapering into a slight petiole, or the base somewhat arrow-shaped; flowers solitary or 3 together in the axils of the leaves, sessile; style very short. (Also *A. ramosior*, Michx. *Isnardia adscendens*, Hall! in *Eat.*) — Wet places near the coast, Connecticut southward, and in Michigan. Aug. — Stems 3' - 8' high.

2. LYTHRUM, L. LOOSESTRIFE.

Calyx cylindrical, striate, 4-7-toothed, with as many little processes in the sinuses. Petals 4-7. Stamens as many as the petals or twice the number, inserted low down on the calyx, nearly equal. Pod oblong, 2-celled. — Slender herbs, with opposite

or scattered mostly sessile leaves, and purple (rarely white) flowers. (Name from *λύθρον*, *blood*; perhaps from the crimson blossoms of some species.)

* *Stamens and petals 5-7: flowers solitary and nearly sessile in the axils of the mostly scattered upper leaves: proper calyx-teeth often shorter than the intermediate processes: smooth.*

1. **L. Hyssofîlia**, L. (LOW LOOSESTRIFE.) *Leaves oblong-linear, obtuse, longer than the inconspicuous flowers; petals (pale purple) 5-6.* ① — Marshes, coast of Massachusetts (and New York?), perhaps introduced. — Pale, 6' - 10' high.

2. **L. alâtum**, Pursh. (SLENDER LOOSESTRIFE.) *Tall and wand-like; branches with margined angles; leaves varying from oblong-ovate to lanceolate, mostly acute, the upper not longer than the flowers; petals (deep purple) 6.* † — Michigan and southward.

3. **L. lineàre**, L. (NARROW-LEAVED LOOSESTRIFE.) *Stem slender and tall, bushy at the top, two of the angles margined; leaves linear, short, chiefly opposite, obtuse, or the upper acute and scarcely longer than the flowers; calyx obscurely striate; petals (whitish) 6.* † — Brackish marshes, N. Jersey. Aug. — Stem 3° - 4° high.

* * *Stamens 12-14, twice the number of the petals: flowers crowded and whorled in an interrupted wand-like spike.*

4. **L. Salicària**, L. (SPIKED LOOSESTRIFE.) *Leaves lanceolate, heart-shaped at the base. — Wet meadows, Maine, E. Massachusetts, and Orange County, New York: also commonly cultivated.* July. — Plant more or less downy, tall: flowers large, purple.

3. DÉCODON, Gmel. SWAMP LOOSESTRIFE.

Calyx short, broadly bell-shaped, with 5 erect teeth and 5 longer and spreading horn-like processes at the sinuses. Petals 5, wedge-lanceolate. Stamens 10, five very long, the alternate five shorter and later. Pod globose, 3-celled. — A perennial herb, with recurved or reclining stems, and opposite or whorled lanceolate almost sessile leaves, with clustered pedicelled flowers in their axils. (Name from *δέκα*, *ten*, and *ὀδούς*, *a tooth*, from the 10-toothed calyx.)

1. **D. verticillàtum**, Ell. (*Lythrum verticillatum*, L.) — Marshes, common. July-Sept. — Smooth at the North, or downy: stems 3° - 8° long, 4 - 6-sided; the flowers purple, rather large.

4. CÛPHEA, Jacq. CUPHEA.

Calyx tubular, 12-ribbed, somewhat inflated below, gibbous or spurred at the base on the upper side, 6-toothed at the apex, and

usually as many little processes in the sinuses. Petals 6, very unequal. Stamens mostly 12, approximate in two sets, included, unequal. Ovary with a curved gland at the base next the spur of the calyx, 1-2-celled: style slender: stigma 2-lobed. Pod oblong, few-seeded, early opening through one side.—Flowers solitary, stalked. (Name from *κυφός*, *curved*, from the shape of the calyx, &c.)

1. **C. viscosissima**, Jacq. (CLAMMY CUPHEA.) Annual, very viscid-hairy, branching; leaves ovate-lanceolate, long-stalked, rough; petals ovate, short-clawed, purple.—Dry fields, New York to Penn., common southward. Aug.—Seeds rather large, borne on one side of the placenta (the partitions early vanishing), which is forced out the pod and the investing calyx through a longitudinal rupture, before the seeds are ripe.

ORDER 41. ONAGRACEÆ. (EVENING PRIMROSE FAM.)

Herbs, with 4-merous (sometimes 2-3-merous) flowers; the tube of the calyx cohering with the 2-4-celled ovary, its lobes valvate in the bud, or obsolete, the petals convolute in the bud, and the stamens as many or twice as many as the petals or calyx-lobes.—There are two suborders, viz.

Suborder I. ONAGRACEÆ proper.

Calyx-tube often prolonged beyond the ovary; the petals (rarely wanting) and stamens inserted on its summit. Pollen-grains connected by cobwebby threads. Style single, slender: stigma 2-4-lobed or capitate. Pod loculicidally 4-celled and 4-valved, or indehiscent: placentæ in the axis. Seeds anatropous, no albumen.

1. **EPILOBIUM**. Stamens 8. Petals 4. Seeds with a downy tuft at the apex.
2. **CENOTHERA**. Stamens 8. Petals 4. Calyx-tube prolonged. Seeds naked, numerous.
3. **GAURA**. Stamens 8. Petals 4. Calyx-tube much prolonged. Pod 1-4-seeded, indehiscent.
4. **LUDWIGIA**. Stamens 4. Petals 4, or none. Calyx-tube not prolonged. Pod many-seeded.
5. **CIRCÆA**. Stamens 2. Petals 2. Pod 2-seeded.

Suborder II. HALORAGEÆ.

Calyx-tube not at all prolonged, the lobes obsolete or none. Petals often none. Stamens 1-8. Pod or nut indehiscent, 1-4-celled,

with a solitary suspended seed in each cell. Albumen thin. — Marsh or water plants, with very small axillary sessile flowers, often monœcious or diœcious.

6. PROSERPINACA. Stamens 3. Fruit 3-sided, 3-celled.
7. MYRIOPHYLLUM. Stamens 4–8. Fruit 4-angled, 4-celled.
8. HIPPURIS. Stamen 1. Fruit 1-celled. Style slender.

Suborder I. ONAGRACEÆ proper.

1. EPILÒBIUM, L. WILLOW-HERB.

Calyx-tube not prolonged beyond the ovary; limb 4-cleft, deciduous. Petals 4. Stamens 8: anthers short. Pod long and linear, many-seeded. Seeds with a tuft of long hairs at the end. — Perennials, with nearly sessile leaves, and violet, purple, or white flowers. (Name composed of *ἐπι λοβοῦ ἴον*, viz., *a violet on a pod*.)

* *Flowers large in a long spike or raceme: petals widely spreading, clawed: stamens and style turned to one side: stigma with 4 long lobes: leaves scattered.*

1. **E. angustifolium**, L. (GREAT WILLOW-HERB.) Stem simple, tall (4°–7°); leaves lanceolate; style at length deflexed. — Fields, and especially in newly cleared land. July. — Flowers pink-purple, very showy. Pods hoary.

* * *Flowers small, corymbed or panicled: petals (white or rose-color), stamens, and style erect: stigma club-shaped: lower leaves opposite, entire or denticulate.*

2. **E. alpinum**, L. (ALPINE WILLOW-HERB.) *Low; smooth or nearly so, simple; leaves ovate or oblong; flowers solitary or few.* — High mountains of New Hampshire and N. New York.

3. **E. coloratum**, Muhl. (PURPLE-VEINED WILLOW-HERB.) *Nearly smooth; stem roundish, much branched, many-flowered; leaves chiefly opposite, lanceolate, acute, purple-veined or turning reddish; petals 2-cleft at the apex.* — Ditches, &c. July–Sept. — Plant 1°–3° high.

4. **E. mólle**, Torr. (DOWNY WILLOW-HERB.) *Soft-downy all over, strait, at length branching; leaves crowded, linear-oblong or lanceolate, blunt; petals notched.* — Bogs, Rhode Island to Michigan. Sept. — Flowers larger than in No. 3.

5. **E. palústre**, L. (SWAMP WILLOW-HERB.) *Minutely hoary with a crisped pubescence; stem slender, roundish, at length much branched; leaves lanceolate or linear, acutish at both ends; pods hoary.* — Bogs, chiefly northward, principally the narrow-leaved variety with white flowers. (*E. rosmarinifolium*, Pursh. *E. squamatum*, Nutt.)

2. *ÆNOThÈRA*, L. EVENING PRIMROSE.

Calyx-tube prolonged beyond the ovary, deciduous; the lobes 4, reflexed. Petals 4. Stamens 8: anthers mostly linear. Pod 4-valved, many-seeded. Seeds naked.—Leaves alternate. (Name from *oĩvos*, *wine*, and *θήρα*, *a chase*: application uncertain.)

§ 1. *ONλGRA*, Tourn.—*Annuals or biennials: flowers nocturnal, odorous, opening but once, often fading pink or rose-color: pods cylindrical, closely sessile.*

1. *Æ. biennis*, L. (COMMON EVENING PRIMROSE.) Erect, mostly hairy; leaves ovate-lanceolate, acute, obscurely toothed; flowers in a terminal rather leafy spike; calyx-tube much prolonged; petals inversely heart-shaped (light yellow); *pods oblong*, somewhat tapering above.—Varies greatly; as Var. 1. *MURICATA*, with rough-bristly stem and pods, and petals rather longer than the stamens. Var. 2. *GRANDIFLORA*, with larger and more showy petals. Var. 3. *PARVIFLORA*, with petals about the length of the stamens. Var. 4. *CRUCIATA*, with singularly small and narrow linear-oblong petals, shorter than the stamens, and smooth pods.—Common everywhere. June—Sept.

2. *Æ. sinuata*, L. (SMALL EVENING PRIMROSE.) Hairy, low, ascending, or at length procumbent; leaves oblong or lanceolate, sinuate-toothed, often pinnatifid, the lower petioled; flowers (small) axillary; petals not longer than the stamens (pale yellow fading rose-color); *pods cylindrical, elongated*.—Sandy fields, New Jersey and southward, principally a dwarf state. June.

§ 2. *ÆnoThÈrium*, Seringe.—*Biennials or perennials: flowers diurnal (yellow): pods club-shaped, with 4 strong or winged angles and 4 intermediate ribs.*

3. *Æ. fruticosa*, L. (SUNDROPS.) Hairy or nearly smooth; leaves lanceolate or oblong; raceme corymbed, naked below; petals broadly obovate, longer than the calyx-lobes and stamens; *pods oblong-club-shaped, 4-winged, longer than the pedicels*. ♀ — Open places, common, especially westward. June—Aug.—Plant 1°–3° high, with several varieties. Corolla 1½' broad.

4. *Æ. riparia*, Nutt. (RIVER SUNDROPS.) Scarcely pubescent; leaves linear-lanceolate, elongated, tapering below and somewhat stalked; flowers (large) in a rather leafy at length elongated raceme; petals slightly obovate; *pods oblong-club-shaped, slender-pedicelled, scarcely 4-winged*. ② — River-banks and swamps. Quaker-bridge, New Jersey, and southward.

5. *Æ. linearis*, Michx. (NARROW-LEAVED EVENING PRIMROSE.) Slender, minutely hoary-pubescent; leaves linear; flowers

(rather large) somewhat corymbed at the end of the branches; *Pods* obovate, hoary, scarcely 4-winged at the summit, tapering into a slender pedicel. — Montauk Point, Long Island. June. — Plant 1° high, bushy-branched: flowers 1' wide.

6. **Œ. chrysántha**, Michx. (LOW GOLDEN EVENING PRIMROSE.) Slender, smooth or pubescent; leaves lanceolate, rather blunt; flowers crowded or at first corymbed; *petals* obovate, notched at the end (orange-yellow), longer than the stamens; *Pods* all pedicelled, oblong-club-shaped, scarcely wing-angled. ②? — Banks, Oswego, New York, to Michigan. July. — Stem 12' - 15' high; flowers larger than in No. 7.

7. **Œ. pùmila**, L. (DWARF EVENING PRIMROSE.) Almost smooth, small; leaves lanceolate or oblanceolate, mostly obtuse; flowers in a loose and prolonged leafy raceme; *petals* obcordate (pale yellow) scarcely longer than the stamens; *Pods* almost sessile, oblong-club-shaped, scarcely wing-angled. ② or 4? — Dry fields, common northward. June. — Stems mostly simple, 5' - 12' high: the corolla ½' broad.

3. GAÛRA, L. GAURA.

Calyx-tube much prolonged beyond the ovary, deciduous; the lobes 4 (rarely 3) reflexed. Petals clawed, unequal or turned to the upper side. Stamens mostly 8, often turned down, as also the long style. Stigma 4-lobed. Fruit hard and nut-like, 3-4-ribbed or angled, indehiscent or nearly so, usually becoming 1-celled and nearly 1-4-seeded. Seeds naked. — Leaves alternate, sessile. Flowers rose-color or white, changing to reddish, in wand-like spikes or racemes; in our species quite small, so that the name, from γαῦρος, *superb*, does not appear very appropriate.

1. **G. biennis**, L. *Soft-hairy or downy; leaves oblong-lanceolate, acute, denticulate; fruit oval or oblong, nearly sessile, ribbed.* ② — Dry banks, New York and westward. Aug. — Stem 3° - 8° high, the flowers crowded.

2. **G. filipes**, Spach. *Nearly smooth; stem slender; leaves linear, mostly toothed, tapering at the base; branches of the panicle very slender, naked; fruit obovate-club-shaped, 4-angled at the summit, slender-pedicelled.* — Open places, Ohio and westward. Aug. — Stem 2° - 4° high: flowers loose.

4. LUDWÍGIA, L. FALSE LOOSESTRIFE.

Calyx-tube not prolonged at all beyond the ovary; the lobes 4, usually persistent. Petals 4, often small or wanting. Stamens

4. Pod short or cylindrical, many-seeded. Seeds minute, naked. — Perennial: flowers axillary. (Named in honor of *Ludwig*, Professor of Botany at Leipsic, contemporary with Linnæus.)

* *Leaves alternate, sessile: flowers peduncled: petals large, yellow.*

1. **L. alternifolia**, L. (SEED-BOX.) Smooth or nearly so, branched; leaves lanceolate, acute or pointed at both ends; petals scarcely as long as the ovate-lanceolate pointed calyx-lobes; pods cubical, rounded at the base, wing-angled. — Swamps, chiefly southward or near the coast. Aug. — Plant 3° high. Pods opening first by a hole at the end where the style falls off, afterwards splitting in pieces.

2. **L. hirtella**, Raf. (HAIRY SEED-BOX) Hairy all over; stems nearly simple; leaves ovate-oblong, or the upper lanceolate, blunt at both ends; petals rather longer than the lance-ovate calyx-lobes; pods slightly wing-angled, shaped nearly as in the last. — Moist pine barrens, New Jersey and southward: not common. June-September.

* * *Leaves alternate, sessile: flowers sessile: petals minute or none.*

3. **L. sphærocârpa**, Ell. Nearly smooth, much branched; leaves lanceolate, acute, tapering at the base; flowers solitary, without bractlets; petals mostly wanting; pods globular, not longer than the calyx-lobes, very small. — Wet swamps, Massachusetts (Tewksbury, Greene), New York (Peekskill, R. I. Browne), and New Jersey; thence southward.

4. **L. polycârpa**, Short & Peter. Smooth, much branched; leaves narrowly lanceolate, acute at both ends; flowers often clustered in the axils, without petals; bractlets on the base of the 4-sided top-shaped pod, which is longer than the calyx-lobes. — Swamps from Michigan southward. Aug. — Stem 1°-3° high, sometimes with runners.

5. **L. lineàris**, Walt. Smooth, low and slender, often branched, with narrow lanceolate or linear leaves; bearing short runners with obovate leaves; flowers solitary, usually with (greenish-yellow) petals; bractlets minute; pods elongated top-shaped, 4-sided, much longer than the calyx. — Bogs, pine barrens of New Jersey and southward. Aug.

* * * *Leaves opposite, petioled: flowers sessile, solitary: petals none or small. (Isnardia, L.)*

6. **L. palústris**, Ell. (WATER PURSLANE.) Smooth, low; stems procumbent at the base, rooting or floating; leaves ovate or oval, tapering into a slender petiole; calyx-lobes very short; pods oblong, 4-sided, not tapering at the base. (*Isnardia palustris*, L.) — Ditches, common, July - Oct. — Petals rarely present, small and reddish when the plant grows out of water.

5. CIRCÆA, Tourn. ENCHANTER'S NIGHTSHADE.

Calyx-tube slightly prolonged, the end filled by a cup-shaped disk, deciduous : lobes 2. Petals 2, inversely heart-shaped. Stamens 2. Pod reflexed, obovate, 2-celled, 2-seeded, bristly with hooked hairs. — Low inconspicuous perennials, with opposite thin leaves on slender petioles, and small whitish flowers in racemes. (Named from *Circe*, the enchantress.)

1. **C. Lutetiàna**, L. *Stem mostly pubescent; leaves ovate, slightly heart-shaped, pointed, slightly toothed; bracts none; hairs of the fruit bristly.* — Moist woodlands. July. — Stem 1°–2° high.

2. **C. alpina**, L. *Low, smooth and weak; leaves heart-shaped, shining, coarsely toothed; bracts minute; hairs of the fruit soft and slender.* — Cold woods among mosses, common northward. July. — Plant 3'–8' high, with very thin leaves on longer stalks than in No. 1.

Suborder II. HALORÀGEÆ. THE WATER-MILFOILS.

6. PROSERPINÀCA, L. MERMAID-WEED.

Calyx-tube 3-sided, the limb 3-parted. Petals none. Stamens 3. Stigmas 3. Fruit bony, 3-angled, 3-celled, 3-seeded, nut-like. — Low perennial herbs, with the stems creeping at the base (whence the name, from *proserpo*, to creep), alternate leaves, and small perfect flowers sessile in the axils, solitary or 3–4 together.

1. **P. palústris**, L. *Leaves lanceolate, sharply serrate, the lower pectinately-cut when immersed in water; fruit sharply 3-angled.* — Wet swamps. June–Aug. — Stigmas purple, cylindrical.

2. **P. pectinàcea**, Lam. *Leaves all pectinate, the divisions linear-awl-shaped; fruit rather obtusely angled.* — Sandy swamps, chiefly eastward. Smaller than the last.

7. MYRIOPHYLLUM, Vaill. WATER-MILFOIL.

Flowers monœcious or polygamous. Calyx of the sterile flowers 4-parted, of the fertile 4-toothed. Petals 4, or none. Stamens 4–8. Fruit nut-like, 4-celled, deeply 4-lobed : stigmas 4, recurved. — Mostly immersed aquatics, perennial. Leaves crowded, often whorled; those under water pinnately parted into capillary divisions. Flowers sessile in the axils of the upper leaves; the uppermost staminate. (Name from *μυρίος*, a thousand, and *φύλλον*, a leaf.)

* *Stamens 8: petals deciduous: carpels even: leaves whorled in threes.*

1. **M. spicatum**, L. Leaves all pinnately parted and capillary, except the floral ones or bracts, which are ovate and entire or toothed, chiefly shorter than the flowers, which thus appear to form an interrupted leafless spike. — Deep water, common. July, Aug. — Stems long, slender.

2. **M. verticillatum**, L. Lower leaves as in No. 1; the floral ones much longer than the flowers, pectinate-pinnatifid. — Ponds, New York and westward. Stoutier than the last.

* * *Stamens 4: petals rather persistent: carpels 1-2-ridged and roughened on the back: leaves whorled in fours and fives, the lower with very slender capillary divisions.*

3. **M. heterophyllum**, Michx. Stem rather stout; floral leaves ovate and lanceolate, thick, crowded, sharply serrate, the lowest pinnatifid; fruit obscurely roughened. — N. New York and westward along the Great Lakes. — Stoutier than the foregoing.

4. **M. scabratum**, Michx. Stem rather slender; lower leaves pinnately parted with few capillary divisions; floral leaves linear (rarely scattered) pectinate-toothed or cut-serrate; carpels strongly 2-ridged and roughened on the back. — Shallow ponds, Ohio and southward. Block Island, Rhode Island, Robbins.

* * * *Stamens 4: petals rather persistent: carpels even on the back: leaves chiefly scattered or wanting.*

5. **M. ambiguum**, Nutt. Immersed leaves pinnately parted into about 10 very delicate capillary divisions; the emerging ones pectinate, or the upper floral linear and sparingly toothed or entire; flowers mostly perfect; fruit (minute) smooth. — Var. 1. NATANS: stems floating, prolonged. Var. 2. CAPILLACEUM: stems floating, long and very slender; leaves all immersed and capillary. Var. 3. LIMOSUM: small, rooting in the mud; leaves all linear, incised, toothed, or entire. — Ponds and ditches, Massachusetts to New Jersey and Penn., near the coast.

6. **M. tenellum**, Bigelow. Stems nearly leafless and scape-like, tufted and rooting at the base, upright, simple; bracts small, entire; flowers alternate, monœcious; fruit smooth. — Border of ponds, Maine to New York, chiefly near the coast. July. — A peculiar plant, 4' - 10' high, with shorter sterile shoots.

8. HIPPURIS, L. MARE'S-TAIL.

Calyx entire. Petals none. Stamen 1, inserted on the edge of the calyx. Style single, thread-shaped, stigmatic down one side, received in the groove between the lobes of the anther. Fruit nut-like, 1-celled, 1-seeded. — Perennial aquatics, with sim-

ple entire leaves in whorls, and minute flowers sessile in the axils, perfect or polygamous. (Name from ἵππος, a horse, and οὐρά, a tail.)

1. **H. vulgàris**, L. Leaves in whorls of 8 or 12, linear, acute. — Ponds and springs, New York, &c., northward, rare. — Plant 1° high, fleshy.

ORDER 42. CACTÀCEÆ. (CACTUS FAMILY.)

Fleshy and thickened leafless plants of peculiar aspect, globular or columnar and many-angled, or flattened and jointed, usually with prickles. Flowers solitary, sessile; the sepals and petals numerous, imbricated in several rows, adherent to the 1-celled ovary. — Stamens numerous, with long and slender filaments, inserted on the inside of the tube or cup formed by the union of the sepals and petals. Style 1: stigmas numerous. Fruit a 1-celled berry, with numerous seeds on several parietal placentæ. Albumen none.

1. **OPÚNTIA**, Tourn. PRICKLY PEAR.

Sepals and petals not prolonged into a tube, spreading, the inner roundish. Berry often prickly. — Stem composed of flat and usually broad joints, bearing clusters of bristles often with spines intermixed, arranged in a spiral order. (A name of Theophrastus, originally applied to some very different plant.)

1. **O. vulgàris**, Mill. Stems low, prostrate-spreading, of obovate joints, armed with short barbed bristles, rarely with a few spines; flowers sulphur-yellow; fruit nearly smooth, eatable. — Sandy fields and dry rocks, Nantucket to New Jersey and southward, usually near the coast. June.

ORDER 43. GROSSULÀCEÆ. (CURRANT FAMILY.)

Low shrubs, sometimes prickly, with alternate palmately lobed leaves, a 5-lobed calyx cohering with the 1-celled ovary, and bearing 5 small petals and 5 stamens. Fruit a 1-celled berry, with 2-parietal placentæ, crowned with the shrivelled remains of the calyx. Seeds anatropous, with a minute embryo at the base of hard albumen.

1. RIBES, L. CURRANT. GOOSEBERRY.

Stamens mostly short and included, inserted alternately with the petals on the throat of the calyx. Styles 2, distinct or united. Ripe seeds (numerous) enveloped in a gelatinous coat. — Leaves often clustered in the axils, with the flowers from the same clusters or from separate buds. (Name of Arabic origin.)

§ 1. *GROSSULARIA*, Tourn. (Gooseberry.) — Stems mostly bearing thorns at the base of the leaf-stalks or clusters, and often with scattered bristly prickles: berries prickly or smooth.

* Peduncles 1-3-flowered: leaves roundish, heart-shaped, 3-5-lobed.

1. **R. Cynósbati**, L. (PRICKLY GOOSEBERRY.) Leaves pubescent; peduncles slender, 2-3-flowered; stamens and undivided style not longer than the broad calyx. — Rocky woods, very common northward. May. — Spines various, strong. Berry large, armed with long prickles like a burr, or rarely smooth.

2. **R. hirtellum**, Michx. (SHORT-STALKED WILD GOOSEBERRY.) Leaves somewhat pubescent beneath; peduncles very short, 1-2-flowered, deflexed; stamens and 2-cleft style scarcely longer than the bell-shaped (purplish) calyx; fruit smooth. — N. England to Michigan, common. May. — Stems either smooth or prickly, and with very short thorns, or none. Berry purple, pleasant. — This is the commonest smooth gooseberry of N. England, &c., and usually passes for *R. triflorum*, Willd., which name belongs to the next.

3. **R. rotundifolium**, Michx. (SLENDER-STALKED SMOOTH GOOSEBERRY.) Leaves nearly smooth; peduncles slender, 1-2-flowered; stamens and 2-parted style slender, longer than the narrow cylindrical calyx; fruit smooth. Rocks, W. Massachusetts to Penn. and Michigan. June. — Leaves rounded, with very short and blunt lobes, often rather wedge-form at the base. Thorns short. Berries sweet and pleasant.

* * Racemes 5-9-flowered, loose, slender, nodding.

4. **R. lacustre**, Poir. (SWAMP GOOSEBERRY.) Young stems clothed with bristly prickles, and with several weak thorns; leaves heart-shaped, 3-5-parted, with the lobes deeply cut; calyx broad and flat; stamens and style not longer than the petals; fruit bristly (small, unpleasant). — Cold woods and swamps, common northward. June.

§ 2. *RIBESIA*, Berl. (Currant.) — Neither prickly nor thorny: flowers in racemes: berries never prickly. (Flowers greenish.)

5. **R. prostratum**, L'Her. (FETID CURRANT.) Stems reclined; leaves deeply heart-shaped, 5-7-lobed, smooth; the lobes ovate, acute, doubly serrate; racemes erect, slender; calyx flattish; pedicels and the (pale-red) fruit glandular-bristly. (*R. rigens*, Michx.)

— Cold damp woods and rocks, common northward. May. — The bruised plant and berries exhale an unpleasant odor.

6. **R. flóridum**, L. (WILD BLACK CURRANT.) *Leaves sprinkled with resinous dots, slightly heart-shaped, sharply 3-5-lobed, doubly serrate; racemes drooping, downy; bracts longer than the pedicels; calyx tubular-bell-shaped (yellowish-green) smooth; fruit round-ovoid, black, smooth.* — Woods, common. May. — Much like the *Garden Black Currant*, which the berries resemble in smell and flavor. Flowers large.

7. **R. rùbrum**, L. (RED CURRANT.) Stems straggling or reclined; leaves somewhat heart-shaped, obtusely 3-5-lobed, serrate, downy beneath when young; *racemes from lateral buds distinct from the leaves, drooping; calyx flat; fruit globose, smooth, red.* — Cold damp woods and bogs, N. Hampshire to Wisconsin, exclusively northward. Same as the common *Red Currant* of the gardens.

R. àUREUM, Pursh, the **YELLOW-FLOWERED** or **MISSOURI CURRANT**, now a very common ornamental shrub in cultivation, is remarkable for the spicy fragrance of its early blossoms.

ORDER 44. PASSIFLORÀCÆÆ.

Vines, climbing by tendrils, with perfect flowers, 5 monadelphous stamens, and a stalked 1-celled ovary free from the calyx, with 3 or 4 parietal placentæ, and as many club-shaped styles; represented by the typical genus,

1. PASSIFLÒRA, L. PASSION-FLOWER.

Calyx of 5 sepals united at the base, imbricated in the bud, the throat crowned with a double or triple fringe. Petals 5, arising from the throat of the calyx. Stamens 5: their filaments united in a tube which sheathes the long stalk of the ovary, separate and spreading above: anthers large, fixed by the middle. Fruit a large fleshy berry, many-seeded; the anatropous albuminous seeds invested by a pulpy covering. Seed-coat brittle, grooved.— Leaves alternate, palmately lobed, generally with stipules. Peduncles axillary, mostly 1-flowered, jointed. (Name, from *passio*, passion, and *flos*, a flower, given by the early missionaries in S. America to these flowers, in which they fancied a representation of the implements of the crucifixion.)

1. **P. lùtea**, L. Smooth, slender; leaves obtusely 3-lobed at the summit, the lobes entire; petiole glandless; stipules minute;

flowers greenish-yellow (small); petals narrow. — Damp thickets, Ohio, and southward. July — Sept. — Flowers 1', the fruit $\frac{1}{2}$ ' in diameter. — The handsome *P. INCARNATA* of the South is to be sought in W. Pennsylvania.

ORDER 45. CUCURBITACEÆ. (GOURD FAMILY.)

Herbaceous mostly succulent vines, with tendrils, diœcious or monœcious (often monopetalous) flowers, the calyx-tube cohering with the 1-3-celled ovary, and the 5 (rarely 3) stamens more or less united by their tortuous anthers as well as by the filaments. Fruit (pepo) fleshy, sometimes membranaceous. — Ovary more or less perfectly 3- (rarely 2-) celled by the approximation or meeting of the partitions which bear the placentæ, these diverging and revolute so as commonly to bring the apex of the seeds back nearly into contact with the walls of the ovary; sometimes strictly 1-celled: stigmas 2-3. Fruit often 1-celled by obliteration. Seeds large and flat, anatropous, with no albumen. Cotyledons leaf-like. Leaves alternate, palmately lobed or veined.

1. *SICYOS*, L. ONE-SEEDED STAR-CUCUMBER.

Flowers monœcious. Petals 5, united below into a bell-shaped or flattish corolla. Stamens 5, all cohering in a tube, or at length separating into 2 parcels of two each and an odd one. Ovary 1-celled, with a single suspended ovule: style slender: stigmas 3. Fruit ovate, membranaceous, filled by the single seed, covered with barbed prickly bristles which are readily detached. — Climbing annuals, with whitish flowers; the sterile and fertile mostly from the same axils, the former corymbed, the latter in a capitate cluster, long-peduncled. (The Greek name for the Cucumber.)

1. *S. angulatus*, L. Leaves roundish heart-shaped and 5-angled-lobed, the lobes minutely toothed, pointed; stem, stalks, and fruit beset with clammy hairs. — River-banks. July — Sept.

2. *ECHINOCÝSTIS*, Torr. & Gr. WILD BALSAM-APPLE.

Flowers monœcious. Petals 6, lanceolate, united at the base into an open spreading corolla. Stamens 3, separable into 2 sets.

Ovary 2-celled, with 2 erect ovules in each cell: stigma broad. Fruit a large globose-ovoid membranaceous pod, clothed with weak prickles, dry when ripe, bursting at the end, 2-celled, 4-seeded, the inner part fibrous-netted. Seeds large, obovate-oblong. — An annual rank and tall-climbing plant, nearly smooth, with sharply 5-lobed thin leaves, and very numerous and small greenish-white flowers; the sterile in compound racemes often 1° long, the fruitful in small clusters or solitary, from the same axils. (Name composed of *ἐχῖνος*, a hedgehog, and *κύστις*, a bladder, from the prickly covering of the bladdery fruit.)

1. **E. lobàta**, Torr. & Gr. (*Sicyos*, Michx. *Momórdica echinàta*, Muhl.) — Rich soil along rivers, W. New England to Wisconsin. July — Oct. — Lobes of the leaves triangular, pointed. Fruit 1½' long.

CŪCUMIS SATIVUS, the CUCUMBER; C. MÈLO, the MUSK-MELON, C. CITRÚLLUS, the WATER-MELON; CUCÚRBITA PÈPO, the PUMPKIN, C. MELOPÈPO, the ROUND SQUASH, C. VERRUCÒSA, the LONG SQUASH; C. AURÁNTIA, the ORANGE GOURD; LAGENÀRIA VULGÀRIS, the BOTTLE GOURD, and MOMÓRDICA BALSÁMINA, the BALSAM APPLE, are the most familiar cultivated representatives of this family.

ORDER 46. CRASSULÀCEÆ. (ORPINE FAMILY.)

Succulent herbs, with perfectly symmetrical flowers; viz. the petals and pistils equalling the sepals in number (3–20), and the stamens the same or double their number. — Sepals persistent, more or less united at the base. Petals imbricated in the bud (rarely wanting), inserted, with the distinct stamens, on the base of the calyx. Pistils distinct (united below in Penthorum), usually with a little scale at the base of each. Pods (follicles) opening along the inner suture. Seeds anatropous: the embryo surrounded by thin albumen. Flowers usually cymose, small. Leaves chiefly sessile.

Synopsis.

* Pistils entirely separate. (True Crassulaceæ.)

1. TILLEA. Sepals, petals, stamens, and pistils 3 or 4, distinct.
 2. SEDUM. Sepals, petals, and pistils 5–4, distinct. Stamens 10–8.
- * * Pistils united below into a 5-celled pod.
3. PENTHORUM. Sepals 5. Petals none. Stamens 10.

1. **TILLÆA**, L. **TILLÆA**.

Sepals, petals, stamens, and pistils 3-4. Pods 2-many-seeded. — Very small tufted annuals, with opposite entire leaves and axillary flowers. (Named in honor of *Tilli*, an early Italian botanist.)

1. **T. simplex**, Nutt. Rooting at the base; leaves linear-oblong, their bases somewhat confluent; flowers solitary, nearly sessile; calyx half the length of the (greenish-white) petals and narrow 8-10-seeded pods, the latter with a scale at the base of each. (*T. ascendens*, *Eaton*.) — Muddy river-banks, Nantucket (*Oakes*), and New Haven, Connecticut, to Philadelphia. July-Sept. — Plant 1'-2' high.

2. **SÈDUM**, L. **STONE-CROP**. **ORPINE**.

Sepals and petals 5, or rarely 4. Stamens 10, or rarely 8. Pods many-seeded; a little scale at the base of each. — Chiefly perennial, smooth and thick-leaved herbs, with the flowers cymose or one-sided. (Name from *sedeo*, to sit, alluding to the manner in which these plants fix themselves upon rocks and walls.)

1. **S. ternatum**, Michx. (**THREE-LEAVED STONE-CROP**.) Low and spreading, creeping at the base; lower leaves whorled in threes, wedge-obovate; the uppermost scattered, oblong; cyme 3-spiked, spreading, with the 1-sided flowers octandrous, the solitary central flower 10-androus; stamens shorter than the linear-lanceolate (white) petals. Rocky woods, Pennsylvania and Ohio: also common in gardens. May, June.

2. **S. telephioides**, Michx. (**AMERICAN ORPINE**.) Stems stout, erect (6'-12' high), leafy to the top; leaves scattered, lanceolate or obovate, sparingly toothed or entire, tapering to the base; flowers in a terminal capitate cyme, 10-androus; petals ovate-lanceolate, purplish-white. — Rocks throughout the Alleghanies from Maryland southward, and probably in Pennsylvania: but in New York naturalized specimens of the following nearly allied species have probably been mistaken for it.

3. **S. Telèphium**, L. (**GARDEN ORPINE, or LIVE-FOR-EVER**.) Stems erect, leafy to the top, tall; leaves scattered, oval, obtuse, serrate, somewhat tapering at the base; cymes dense, compound; petals purple. — Straying from gardens, and naturalized in a few places.

S. PULCHÉLLUM, Michx., a handsome species with linear leaves and rose-purple flowers, is to be sought in S. W. Pennsylvania.

3. PENTHÖRUM, Gronov. DITCH STONE-CROP.

Sepals 5. Petals rare, if any. Stamens 10. Pistils 5, united below, so as to form a 5-angled, 5-horned, and 5-celled pod, which opens by the separation of the beaks, many-seeded. — Upright weed-like perennials, not fleshy like the rest of the family, with scattered leaves, and yellowish-green flowers loosely spiked along the upper side of the naked branches of the cyme, which are coiled at the end as in a Heliotrope. (Name from *πέντε*, *five*, and *ὄρος*, *a rule or mode*, probably from the quinary order of the flower.)

1. **P. sedoides**, L. Leaves lanceolate, acute at both ends. — Ditches by road-sides and wet places everywhere. July–Oct. — About 1° high, homely.

ORDER 47. **SAXIFRAGACEÆ**. (SAXIFRAGE FAMILY.)

Herbs or shrubs, with the pistils fewer than the petals or divisions of the calyx (usually 2, united below and separate or separating at the top); and the petals with the (mostly 5–10) stamens inserted on the calyx, which is either free or more or less adherent to the ovary. — Calyx withering-persistent. Petals rarely none. Pods several – many-seeded. Seeds small, anatropous, with a slender embryo in the albumen.

Synopsis.Suborder 1. **SAXIFRAGEÆ**. THE TRUE SAXIFRAGE FAM.

Herbs; the petals imbricated (very rarely convolute) in the bud. Pod 2-beaked. Calyx free or partly adherent.

* Petals 5 (or rarely 4–6).

1. **SAXIFRAGA**. Stamens 10. Pod 2-celled, or 2 nearly separate pods.
2. **SULLIVANTIA**. Stamens 5. Pod 2-celled. Seeds wing-margined.
3. **HEUCHERA**. Stamens 5. Pod 1-celled. Seeds oval, marginless.
4. **MITELLA**. Stamens 10. Pod 1-celled. Petals pinnatifid.
5. **TIARELLA**. Stamens 10. Pod 1-celled. Petals entire.

* * Petals wanting.

6. **CHRYSOSPENIUM**. Stamens 8–10. Pod 1-celled, obcordate.

Suborder 2. **ESCALLONIEÆ?**

Shrubs: leaves alternate. Petals valvate in the bud.

7. **ITEA**. Calyx free from the 2-celled ovary. Petals and stamens 5.

Suborder 3. HYDRANGEÆ. THE HYDRANGEA FAMILY.

Shrubs: leaves opposite. Petals valvate in the bud. Calyx-tube coherent with the ovary.

8. HYDRANGEA. Calyx 4-5-toothed. Stamens 8-10. Pod 2-beaked.

The Suborder 4. PHILADELPHIÆ consists of the genus PHILADÉLPHUS (MOCK ORANGE, also wrongly named *Syringa*), of which two or three species are commonly cultivated as ornamental shrubs.

Suborder I. SAXIFRAGÆ. THE TRUE SAXIFRAGE FAM.

1. SAXIFRAGA, L. SAXIFRAGE.

Calyx free from, or cohering with, the base of the ovary, deeply 5-cleft. Petals 5, entire. Stamens 10. Styles 2. Pod 2-beaked, 2-celled, opening down or between the beaks; or sometimes 2 almost separate follicles. Seeds numerous, with a close coat. — Chiefly perennial herbs, with the root-leaves clustered, those of the stem alternate. (Name from *saxum*, a rock, and *frango*, to break; most species rooting in the clefts of rocks.)

* *Stems leafy: calyx coherent with the lower part of the pod.*

1. **S. rivularis**, L. (ALPINE BROOK SAXIFRAGE.) Small; stems weak, ascending, 3-5-flowered; lower leaves rounded, 3-5-lobed, on slender petioles, the upper lanceolate; petals white, ovate. — Alpine region of Mount Washington, New Hampshire, Oakes. Very rare.

2. **S. aizoides**, L. (YELLOW MOUNTAIN SAXIFRAGE.) Low, in tufts; stems ascending, very leafy below, with few or several corymbose flowers; leaves linear-lanceolate, fleshy, more or less ciliate; petals yellow, spotted with orange, oblong. — Rocky moist banks of Fish Creek at Taberg, Oneida County, New York, Knieskern and Vasey, 1846.

* * *Leaves all clustered at the root: flowers on a scape; the panicle clammy-pubescent.*

3. **S. Aizoon**, Jacq. Leaves persistent, spatulate, with white cartilaginous toothed margins; calyx partly adherent; petals obovate, cream-color, often spotted at the base. — Moist rocks, Upper Michigan, Pitcher. — Scapes 5'-10' high, sometimes few-leaved below.

4. **S. Virginiensis**, Michx. (EARLY SAXIFRAGE.) Low; leaves obovate or oval-spatulate, narrowed into a broad petiole, crenate-toothed, thickish; flowers in a clustered cyme which is at length open and loosely panicked; lobes of the slightly adherent calyx erect, not half the length of the oblong obtuse (white) petals; pods 2, united

merely at the base, divergent. — Exposed rocks, common. April – June. — A well-known and pretty species: tips of the calyx and fruit purplish.

5. **S. Pennsylvànica**, L. (SWAMP SAXIFRAGE.) Large; *leaves oblanceolate, obscurely toothed*, narrowed at the base into a short and broad petiole; cymes in a large oblong panicle, at first clustered; lobes of the nearly free *calyx recurved, about the length of the linear-lanceolate (greenish) small petals; filaments awl-shaped*; pods at length divergent. — Bogs, common. May, June. — Leaves 4' – 8', the scape at length 2' long. A homely species.

6. **S. eròsa**, Pursh. (LETTUCE SAXIFRAGE.) *Leaves oblong or oblanceolate, obtuse, sharply toothed*, tapering into a margined petiole; scape slender; panicle elongated, loosely flowered, pedicels slender; *calyx reflexed, entirely free, nearly as long as the oval obtuse (white) petals; filaments club-shaped*; pods 2, nearly separate, diverging. (S. Wolleàna, Torr. & Gr.) Cold mountain brooks, Penn. (near Bethlehem, Mr. Wolle), and throughout the Alleghanies southward. June. — Leaves 8' – 12', the upright scape 1° – 3°, high.

2. SULLIVÀNTIA, Torr. & Gr. SULLIVANTIA.

Calyx bell-shaped, cohering below with the base of the ovary, 5-cleft. Petals 5, entire, acutish. Stamens 5, shorter than the petals. Pod 2-celled, 2-beaked, many-seeded, opening between the beaks: the seeds wing-margined, imbricated upwards. — A low and reclined-spreading perennial herb, with rounded and cut-toothed, or slightly lobed, smooth leaves, on slender petioles, and small white flowers in a branched loosely cymose panicle on a nearly leafless slender scape. Peduncles and calyx glandular: pedicels recurved in fruit. (Dedicated to the distinguished botanist who discovered it.)

1. **S. Ohìonis**, Torr. & Gr. (*Gray, Chloris Bor.-Am., tab. 6.*) — Limestone cliffs, Highland County, Ohio. June. Scapes 8' – 12' long. Leaves 2' across.

3. HEUCHÈRA, L. ALUM-ROOT.

Calyx bell-shaped, cohering at the base with the ovary, 5-cleft. Petals 5, spatulate, small, entire, erect. Stamens 5. Styles 2. Pod 1-celled, with 2 parietal many-seeded placentæ, 2-beaked, opening between the beaks. — Perennials, with the round heart-shaped leaves principally from the rootstock; those on the scapes, if any, alternate. Flowers in small clusters disposed in a prolong-

ed mostly loose panicle, greenish-white, tinged with purple. (Named in honor of *Heucher*, an early German botanist.)

1. **H. Americana**, L. *Hairy-pubescent*, the scape with somewhat clammy hairs; lobes of the leaves short and rounded; *panicle loose*; *stamens at length much longer than the regular calyx*. — Rocky woodlands, Connecticut to Ohio southward. June. — Scape 2° - 4° high: flowers quite small.

2. **H. pubescens**, Pursh. *Scape minutely granular-pubescent*, or smooth below, often 2-4-leaved; lobes of the leaves rounded, sharply toothed with broad pointed teeth, ciliate with bristly hairs, otherwise almost smooth; *panicle contracted*; *stamens shorter than the somewhat unequal erect lobes of the calyx*. — Mountains of Penn. and southward. June. — Flowers thrice the size of No. 1.

4. MITÉLLA, Tourn. MITRE-WORT. BISHOP'S-CAP.

Calyx short, coherent with the base of the ovary, 5-cleft. Petals 5, slender, pinnatifid. Stamens 10, included. Styles 2, very short. Pod short, 2-beaked, 1-celled with 2 parietal or rather basal several-seeded placentæ, 2-valved at the summit. — Low and slender perennials, with round heart-shaped leaves from the root-stock or runners, on slender petioles; those on the scapes opposite, if any. Flowers small, in a simple slender raceme or spike. (Name a diminutive from *μίτρα*, a *mitre*, or *cap*, from the form of the young pod.)

1. **M. diphýlla**, L. (COMMON MITRE-WORT.) *Leaves heart-shaped, acute*, somewhat 3-5-lobed, toothed, *those on the many-flowered-scape 2, opposite, nearly sessile* (12' - 20' high). — Hill-sides in rich woods, W. N. England to Wisconsin. May. — Flowers white, in a raceme 6' - 8' long: plant hairy.

2. **M. nûda**, L. (SMALL MITRE-WORT.) Small and slender; *leaves rounded or kidney-form*, deeply and doubly crenate; *scape usually leafless, few-flowered*, very slender (4' - 6' high). (*M. cordifolia*, Lam. *M. prostrata*, Michx.) — Deep moist woods with mosses, Maine to Wisconsin, northward. May - July. — A delicate little plant, shooting forth runners in summer. Blossoms greenish.

5. TIARÉLLA, L. FALSE MITRE-WORT.

Calyx bell-shaped, nearly free from the ovary, 5-parted. Petals 5, with claws, entire. Stamens 10, long and slender. Styles 2. Pod membranaceous, 1-celled, 2-valved, the valves very unequal. Seeds few, at the base of each placenta, globular. — Perennials,

flowers white. (Name a diminutive from *τιᾶρα*, a *tiara*, or Oriental head-dress, or turban, from the form of the pod, or rather pistil, which is like that of *Mitella*, to which the name of *Mitre-wort* properly belongs.)

1. **T. cordifolia**, L. Leaves from the rootstock or summer runners heart-shaped, sharply lobed and toothed, sparsely hairy above, downy beneath; scape leafless; raceme simple; petals oblong. — Rich rocky woods, Maine to Wisconsin, chiefly northward. April, May. — A handsome plant in flower, 6' - 12' high.

6. CHRYSOSPLENIUM, Tourn. GOLDEN SAXIFRAGE.

Calyx-tube coherent with the ovary; the blunt lobes 4 - 5, yellow within. Petals none. Stamens 8 - 10, very short, inserted on a conspicuous disk. Styles 2. Pod inversely heart-shaped or 2-lobed, flattened, very short, 1-celled, with 2 parietal placentæ, 2-valved at the top, many-seeded. — Low and small smooth herbs growing in brooks and springy places, with fleshy leaves, and small solitary or leafy-cymed flowers. (Name compounded of *χρυσός*, *golden*, and *σπλήν*, *the spleen*, probably from some reputed medicinal qualities.)

1. **C. Americanum**, Schwein. (AMERICAN GOLDEN SAXIFRAGE.) Stems slender, diffusely spreading, forking; leaves principally opposite, roundish or somewhat heart-shaped, obscurely crenate-lobed; flowers distant, inconspicuous, nearly sessile (greenish tinged with yellow or purple). ♀ — Common, April, May. — An inconspicuous plant, smaller than the European *C. oppositifolium*. Anthers orange.

Suborder II. ESCALLONIÆ?

7. ÍTEA, L. ÍTEA.

Calyx 5-cleft, free from the ovary. Petals 5, lanceolate, much longer than the calyx, and longer than the 5 stamens. Pod oblong, 2-grooved, 2-celled, tipped with the 2 united styles, 2-parted (septicidal) when mature, several-seeded. — Shrub, with simple alternate and minutely serrate oblong pointed leaves, and white flowers in simple spike-like racemes. (The Greek name of the Willow.)

1. **I. Virgínica**, L. — Wet places, New Jersey and southward. June. — Shrub 3° - 8° high.

Suborder III. HYDRÁNGEÆ. THE HYDRANGEA FAMILY.

S. HYDRÁNGEA, Gronov. HYDRANGEA.

Calyx-tube hemispherical, 8 - 10-ribbed, coherent with the ovary; the limb 4 - 5-toothed. Petals ovate. Stamens 8 - 10, slender. Pod crowned with the 2 diverging styles, 2-celled below, many-seeded, opening by a hole between the styles. — Shrubs, with opposite petioled leaves, and numerous flowers in compound cymes. The marginal flowers are usually sterile and radiant, consisting merely of a membranaceous and colored flat and dilated calyx, showy. (Name from ὕδωρ, *water*, and ἄγγος, *a vase*, probably in allusion to the vase-like shape of the pods.)

1. **H. arboréscens**, L. (WILD HYDRANGEA.) Smooth, or nearly so; leaves ovate, rarely heart-shaped, pointed, serrate, green both sides; cymes flat. — Rocky banks, N. Penn. (on the Susquehannah, *Carey*) and southward. July. — Flowers often all fertile, rarely all radiant, like the *Garden Hydrangea*.

ORDER 48. HAMAMELÀCEÆ. (WITCH-HAZEL FAM.)

Shrubs, with alternate simple leaves, the calyx cohering with the base of the ovary; which consists of 2 pistils united at the base, and forms a 2-beaked woody pod opening at the summit, 2-celled below, with a single pendulous bony (anatropous) seed in each cell. — Petals 4 - 5, and stamens 4 - 24, inserted on the calyx. Embryo surrounded by albumen. Flowers clustered, often polygamous.

1. **HAMAMELIS**, L. WITCH-HAZEL.

Flowers in little axillary clusters or heads, usually surrounded by a scale-like 3-leaved involucre. Calyx 4-parted, and with 2 or 3 bractlets at its base. Petals 4, strap-shaped, long and narrow. Stamens 8, very short; the 4 alternate with the petals anther-bearing, the others imperfect and scale-like. Styles 2, short. Pod opening loculicidally from the top; the outer coat separating from the inner, which incloses the seeds, but soon bursts elastically into two pieces. — Tall shrubs, with short-petioled straight-veined leaves, and yellow flowers. (From ἄμα, *like to*, and μηλís, *an*

apple-tree; a name anciently applied to the Medlar or some other tree resembling the Apple, which the Witch-Hazel does not.)

1. **H. Virgínica**, L. Leaves obovate or oval, with wavy-toothed margins, somewhat downy when young. — Damp woods, common: blossoming in Oct. and Nov., when the leaves are falling, and maturing its seeds the next summer.

ORDER 49. **UMBELLÍFERÆ.** (PARSLEY FAMILY.)

Herbs, with the flowers in umbels, the calyx entirely adherent to the ovary, the 5 petals and 5 stamens inserted on the disk that crowns the ovary and surrounds the base of the 2 styles. Fruit consisting of 2 seed-like dry carpels. — Limb of the calyx obsolete or a mere 5-toothed border. Petals mostly with the point inflexed. Fruit of 2 carpels (called *mericarps*) cohering by their inner face (the *commissure*), when ripe separating from each other and usually suspended from the summit of a slender prolongation of the axis (*carpophore*): each carpel marked lengthwise with 5 *primary ribs*, and often with 5 intermediate (*secondary*) ones; in the *interstices* or intervals between them are commonly lodged the oil-tubes (*vittæ*) which are longitudinal canals in the substance of the fruit, containing aromatic oil.* Seeds solitary and suspended from the summit of each cell, anatropous, with a minute embryo in hard horn-like albumen. — Stems usually hollow. Leaves alternate, mostly compound, the petioles expanded or sheathing at the base. Umbels usually compound, when the secondary ones are termed *umbellets*: both often subtended by a whorl of bracts (*involucre* and *involucels*).

Synopsis.

I. Inner face of the seed flat or nearly so (not excavated).

* Umbels simple or imperfect, sometimes proliferous.

1. **HYDROCOTYLE.** Fruit orbicular, flattened. Leaves roundish.

2. **CRANTZIA.** Fruit globular. Leaves linear, fleshy.

* These are brought into view in a cross-section of the fruit.

- * * Umbels or umbellets capitate, imperfect. Calyx-lobes large.
3. *SANICULA*. Fruit clothed with hooked prickles.
4. *ERYNGIUM*. Fruit clothed with scales. Flowers in thick heads.
- * * * Umbels compound and perfect.
- Fruit beset with bristly prickles, not flat.
5. *DAUCUS*. Fruit with weak prickles in single rows on the ribs.
- → Fruit smooth: the carpels strongly flattened on the back and winged at the edge (next to the commissure).
- → Margin of the fruit single-winged.
6. *POLYTÆNIA*. Fruit surrounded with a broad and tumid corky margin, nearly ribless on the back.
7. *HERACLEUM*. Fruit broadly wing-margined: the carpels minutely 5-ribbed on the back: lateral ribs close to the margin. Flowers white, the marginal somewhat radiant.
8. *PASTINACA*. Fruit wing-margined: ribs of the carpels as in No. 7. Flowers yellow, not radiant.
9. *ARCHEMORA*. Fruit broadly winged: the 5 ribs on the back approximate and equidistant. Flowers white.
- → → Margin of the fruit double-winged.
10. *ARCHANGELICA*. Carpels merely 3-ridged on the back. Seed coated with oil-tubes.
11. *CONIOSELINUM*. Carpels narrowly 3-winged on the back.
- → → Fruit smooth, not flattened, the cross-section nearly orbicular; the carpels each with 5 equal wings or strongly projecting ribs.
12. *ÆTHUSA*. Fruit ovate-globose: carpels with 5 sharply keeled ridges, and single oil-tubes in the interstices.
13. *LIGUSTICUM*. Fruit elliptical: carpels with 5 sharp almost winged ridges, and several oil-tubes in each interstice.
14. *THASPIUM*. Fruit elliptical or ovoid: carpels 5-winged. Flowers yellow or dark-purple.
- → → → Fruit smooth, compressed laterally or contracted at the sides, wingless.
15. *ZIZIA*. Flowers yellow. Fruit oval or somewhat twin, 5-ribbed. Leaves dissected.
16. *BUPLEURUM*. Flowers yellow. Fruit ovoid-oblong: the carpels somewhat 5-ribbed. Leaves simple.
17. *DISCOPLEURA*. Flowers white. Fruit ovoid: the lateral ribs united with a corky margin. Leaves very finely cut.
18. *CICUTA*. Flowers white. Fruit subglobose, twin. Leaves 2-3-ternate.
19. *SIMUM*. Flowers white. Fruit ovate-globose. Leaves all simply pinnate.
20. *CRYPTOTÆNIA*. Flowers white. Fruit oblong. Leaves 3-parted.

II. Inner face of the seed hollowed out lengthwise, or the margins involute. (Umbels compound.)

21. *CHÆROPHYLLUM*. Fruit linear-oblong, narrowed at the apex.
 22. *OSMORRHIZA*. Fruit linear-club-shaped, tapering below.
 23. *CONIUM*. Fruit ovate, flattened at the sides: ribs wavy.
 24. *EULOPHUS*. Fruit ovoid, somewhat twin, nearly ribless.

III. Inner face of the seed hollowed in the middle, or the margins curved inwards at the top and bottom.

25. *ERIGENIA*. Fruit twin; carpels nearly kidney-form. Umbellets few-flowered.

1. **HYDROCÓTYLE**, Tourn. MARSH PENNYWORT.

Calyx-teeth obsolete. Fruit flattened laterally, orbicular or shield-shaped; the carpels 5-ribbed, two of the ribs (the lateral) enlarged and often forming a thickened margin: oil-tubes none. — Low and smooth marsh perennials, with slender stems creeping or rooting in the mud, and round shield-shaped or kidney-form leaves. Flowers small, white, in simple umbels or clusters, which are either single or proliferous. (Name from ὕδωρ, *water*, and κοτίλη, *a bowl or flat cup*, the peltate leaves of several species being somewhat cup-shaped.)

* *Stems spreading and branching: umbels and flowers nearly sessile.*

1. **H. Americana**, L. Leaves rounded kidney-form, doubly crenate, somewhat lobed; flowers 3-5 together in sessile clusters; fruit orbicular. — Shady springy places. June - Aug. — Branches prolonged and slender, runner-like. Leaves very thin.

* * *Umbels on scape-like naked peduncles arising, with the leaves, from the joints of the prolonged creeping and rooting stems.*

2. **H. ranunculoides**, L. Leaves round-renaliform, 3-5-cleft, the lobes crenate; peduncles much shorter than the petioles; umbel 5-10-flowered; pedicels very short; fruit orbicular, scarcely ribbed. — Penn. and southward.

3. **H. interrúpta**, Muhl. Leaves peltate in the middle, orbicular-crenate; peduncles about the length of the leaves, bearing clusters of few and sessile flowers interruptedly along its length; fruit broader than long, and notched at the base. — New Bedford, Massachusetts: common in the S. States.

4. **H. umbellàta**, L. Leaves peltate in the middle, orbicular, notched at the base, doubly crenate; peduncle elongated, bearing a single many-flowered umbel (sometimes proliferous with 2 or 3 um-

bels); pedicels slender; fruit notched at the base and apex. Massachusetts and Albany, New York, thence southward near the coast. — Scapes 3' - 9' high.

2. CRÁNTZIA, Nutt. CRANTZIA.

Calyx-teeth obsolete. Fruit globose; the carpels hollowed on the inner face, 5-ribbed, three of the ribs on the back, narrow, the lateral ones thickened and corky: an oil-tube in each interstice. — Minute plants, creeping and rooting in the mud, with the aspect of *Hydrocotyle*, but with fleshy nearly terete leaves, marked with cross divisions. Umbels few-flowered, simple. (Named in honor of *Prof. Crantz*, an Austrian botanist of the 18th century.)

1. *C. lineàta*, Nutt. (*Hydrocotyle lineata*, Michx.) Leaves somewhat club-shaped, very obtuse. — Brackish marshes, Massachusetts to N. Jersey. July. — Leaves and scapes 1' - 2' long: flowers white, pedicelled.

3. SANÍCULA, Tourn. SANICLE. BLACK SNAKE-ROOT.

Calyx-teeth manifest, persistent. Fruit globular, the carpels not separating spontaneously, ribless, thickly clothed with hooked prickles, each with 5 oil-tubes. — Perennial herbs, with palmately-lobed or parted leaves, those from the root long-petioled. Umbels irregular or compound, the flowers (greenish or yellowish) capitate in the umbellets, perfect, with staminate ones intermixed. Involucre and involuclers few-leaved. (Name from *sano*, to heal.)

1. *S. Canadénsis*, L. Leaves 3-5- (the upper only 3-) parted; *sterile flowers few, scarcely pedicelled*, shorter than the fertile ones; *styles shorter than the prickles of the fruit*. — Copses. June - Aug. — Plant 1° - 2° high, with thin leaves; their divisions wedge-obovate or oblong, sharply cut and serrate, the lateral mostly 2-lobed. Fruits about 3 in each umbellet.

2. *S. Marilándica*, L. Leaves all 5-7-parted; *sterile flowers numerous, on slender pedicels*, about the length of the fertile; *styles elongated and conspicuous, recurved*. — Woods and copses, common. — Stem 2° - 3° high; the leaves more rigid and with narrower divisions than in the former, with almost cartilaginous teeth. Fruits several in each umbellet.

4. ERÝNGIUM, Tourn. BUTTON SNAKE-ROOT.

Calyx-teeth manifest, persistent. Styles slender. Fruit top-

shaped, covered with little scales or tubercles, without ribs or oil-tubes. — Chiefly perennials, with coriaceous, toothed, cut, or prickly leaves, and blue or white bracted flowers closely sessile in dense heads. (A name used by Dioscorides, of uncertain origin.)

1. **E. aquaticum**, L. *Leaves* linear, taper-pointed, *grass-like, nerved, bristly-fringed*; leaflets of the involucre mostly entire and shorter than the heads. ① — Moist barrens, &c., New Jersey to Ohio. July. — Stem 2°–4° high, nearly simple.

2. **E. Virginianum**, Lam. *Leaves* linear-lanceolate, *serrate with hooked or somewhat spiny teeth*; leaflets of the involucre cleft or spiny-toothed, longer than the heads. ② — Swamps, New Jersey and southward. — Heads cymose at the summit of the simple stem, pale blue, or nearly white. Leaves less rigid than in the preceding, veined.

5. DAÛCUS, Tourn. CARROT.

Calyx 5-toothed. Corolla irregular. Fruit ovoid or oblong; the carpels scarcely flattened on the back, with 5 primary slender bristly ribs, two of which are on the inner face, and 4 equal more or less winged secondary ones, each bearing a single row of slender bristly prickles: an oil-tube under each of these ribs. — Biennials, with finely 2–3-pinnate or pinnatifid leaves, cleft involucre, and concave umbels, dense in fruit. (The ancient Greek name.)

1. **D. Carota**, L. (COMMON CARROT.) Stem bristly; involucre pinnatifid, nearly the length of the umbel; fruit oblong-oval. — Naturalized in fields. July–Sept. — Flowers white or cream-color, the central one of each umbellet abortive and dark purple. Umbel in fruit resembling a bird's nest.

6. POLYTÆNIA, DC. POLYTÆNIA.

Calyx 5-toothed. Fruit oval, very flat, with an entire broad and thickened corky margin, very obscurely ribbed on the impressed back: oil-tubes 2 in each interstice, and many also in the corky margin. — A smooth herb, resembling a Parsnip, with 2-pinnate leaves, the uppermost opposite and 3-cleft, no involucre, bristly involucels, and bright yellow flowers. (Name from πολύς, *many*, and ταινία, *a fillet*, alluding to the numerous vittæ or oil-tubes.)

1. **P. Nuttállii**, DC.—Prairies, Michigan, and southward and westward. May. — Stem 2°–3° high.

7. HERACLÈUM, L. COW-PARSNIP.

Calyx-teeth minute. Fruit as in *Pastinaca*, but the oil-tubes shorter than the carpels and club-shaped. Petals (white) inversely heart-shaped, the outer commonly larger and radiant, appearing 2-cleft. — Stout perennials, with broad sheathing petioles and large flat umbels. Involucre deciduous: involucels many-leaved. (Dedicated to *Hercules*.)

1. **H. lanàtum**, Michx. Woolly; stem grooved; leaves 1–2-ternately compound; leaflets somewhat heart-shaped; fruit nearly orbicular. — Moist ground. June. — A very large strong-scented plant, 4°–8° high, in some places wrongly called *Masterwort*.

8. PASTINÀCA, Tourn. PARSNIP.

Calyx-teeth obsolete. Fruit oval, flat, with a thin entire winged margin; the carpels minutely 5-ribbed, three of the ribs equidistant on the back, the lateral ones distant from them and contiguous to the margin: an oil-tube in each interstice running the whole length of the fruit. Petals yellow, roundish, entire, none radiant. — Chiefly biennials, with spindle-shaped roots, and pinnately compound leaves. Involucre and involucels small or none. (The Latin name, from *pastus*, food.)

1. **P. sativa**, L. (COMMON PARSNIP.) Stem grooved, smooth; leaflets ovate or oblong, obtuse, cut-toothed, somewhat shining above. — Fields, &c., escaped from cultivation, naturalized. July.

9. ARCHÉMORA, DC. COWBANE.

Calyx 5-toothed. Fruit with a broad winged margin, oval; the carpels with 5 obtuse and approximated equidistant ribs on the back: oil-tubes one in each interstice, and 4–6 on the inner face. — Smooth perennials, with rather rigid leaves of 3–9 lanceolate or linear leaflets. Involucre nearly none: involucels of numerous small leaflets. Flowers white. (Name applied to this poisonous umbelliferous plant in fanciful allusion to *Archemorus*, who is said to have died from eating parsley. DC.)

1. **A. rígida**, DC. Leaves simply pinnate; leaflets 3–9, varying from lanceolate to ovate-oblong, entire or remotely toothed, or, in Var. *AMBIGUA*, linear, long and narrow. — Swamps, N. Jersey

and W. N. York to Michigan. Aug. — Plant 2° - 5° high, the foliage variable.

10. ARCHANGÉLICA, Hoffm. ARCHANGELICA.

Calyx-teeth short. Fruit flattened; the carpels each 3-ribbed on the back and winged at the margins, forming a double winged border to the fruit: the seed separating, and coated all over with the numerous oil-tubes. — Stout and often very large perennials, with 1 - 2-pinnately compound leaves, and usually ample inflated petioles: leaflets ovate or oblong, toothed. Involucre scarcely any: involucels many-leaved. Flowers greenish or white. (So named from its highly esteemed qualities.)

1. **A. atropurpùrea**, Hoffm. (GREAT ANGELICA.) *Smooth*; stem dark purple; leaves 2 - 3-ternately compound; the leaflets pinnate, 5 - 7, sharply cut-serrate, acute, pale beneath; petioles much inflated; involucels very short; *fruit smooth*. (*Angélica triquinàta, Michx.*) — Low river-banks. June. — Stem very stout, 3° - 6° high, hollow. Flowers greenish-white. Plant strong-scented; a popular aromatic.

2. **A. peregrina**, Nutt. Stem downy at the summit; leaves ternately divided, the leaflets 5, ovate, acute, cut-serrate; involucels about as long as the umbellets; *fruit with thickened but scarcely winged lateral ribs*. — Coast of Massachusetts, *Dr. Pickering*. Little known.

3. **A. hirsùta**, Torr. & Gr. *Woolly or downy* at the top, rather slender; leaves twice pinnately or ternately divided; leaflets thickish, ovate-oblong, often blunt, serrate; involucels nearly as long as the umbellets; peduncles and *fruit downy*. (*Angélica triquinàta, Nutt.*) — Dry open woods, New York to Ohio, July. — Stem 2° - 5° high: flowers white.

ANGÉLICA CURTISII, *Buckley*, which has been detected as far north as Cheat Mountain, Virginia, is to be sought in the high mountains of Pennsylvania.

11. CONIOSELÏNUM, Fischer. HEMLOCK PARSLEY.

Calyx-teeth obsolete. Fruit oval; the carpels convex-flattish and narrowly 3-winged on the back, and more broadly winged at the margins: oil-tubes in the substance of the pericarp 1 - 3 in each of the interstices and several on the inner face. — Smooth herbs, with finely 2 - 3-pinnately compound thin leaves, inflated petioles, and white flowers. Involucre scarcely any: leaflets of the involucels awl-shaped. (Name compounded of *Cònium*, the

Hemlock, and *Scānum*, Milk-Parsley, from its resemblance to these two genera.)

1. **C. Canadēse**, Torr. & Gr. Leaflets pinnatifid, the lobes linear-oblong, acute; fruit longer than the pedicels. ♀ — Swamps, Vermont to Wisconsin northward. Aug. — Plant 2° - 4° high, in foliage somewhat resembling the Poison Hemlock.

12. ÆTHÛSA, L. FOOL'S PARSLEY.

Calyx-teeth obsolete. Fruit ovate-globose; the carpels each with 5 thick sharply-keeled ridges: interstices with single oil-tubes. — Annual poisonous herbs, with 2-3-ternately compound and many-cleft leaves, the divisions pinnate, and white flowers. (Name from *αἶθω*, *to burn*, from the acrid taste.)

1. **Æ. Cynāpium**, L. Divisions of the leaves wedge-lanceolate, rather obtuse; involucre none; involucels 3-leaved, long and narrow, hanging. — About cultivated grounds, naturalized. July. — A fetid poisonous herb, with much the aspect of Poison Hemlock, but with dark-green foliage, long hanging involucels, and unspotted stem.

13. LIGÛSTICUM, L. LOVAGE.

Calyx-teeth small or minute. Fruit elliptical, round on the cross section, or slightly compressed: the carpels each with 5 sharp and projecting or narrowly winged ridges: interstices and inner face with many oil-tubes. — Perennials, with aromatic roots and fruit, 2-3-ternately compound leaves, and white flowers. (Named from the country *Liguria*, where the officinal *Lovage* of the gardens, *L. Levisticum*, abounds.)

1. **L. Scoticum**, L. (SCOTCH LOVAGE.) Stem nearly simple; leaves 2-ternate; leaflets rhombic-ovate, coarsely toothed or cut; leaflets of the involucre and involucels linear; calyx-teeth distinct. — Edge of salt marshes, from Rhode Island to Maine. Aug. — Plant smooth, 2° high: root acrid but aromatic.

2. **L. actæifolium**, Michx. (NONDO. ANGELICO.) Stem tall, branched above; the numerous umbels forming a loose and naked somewhat whorled panicle, all the lateral ones mostly barren; leaves 3-ternate; leaflets broadly ovate, equally serrate, the end ones often 3-parted; calyx-teeth minute; ribs of the fruit wing-like. — Topsfield and Scituate, Massachusetts, *Oakes and Russell*. I have not seen it from N. England: it doubtless grows in S. W. Pennsylvania, as it abounds in the mountains southward. July. — Plant 3° - 6° high, with a long, very aromatic root.

14. THÁSPIUM, Nutt. MEADOW PARSNIP.

Calyx minutely 5-toothed. Fruit elliptical, or ovoid, the cross section roundish, not contracted at the sides: the carpels with 5 equidistant winged ribs: interstices with single oil-tubes. Involucre none: involucels few-leaved. — Perennials with 1-3-ternately compound leaves, and yellow or dark-purple flowers. (Name a play upon that of the allied genus *Thapsia*, which was so called because it was found on the island Thapsus.)

* *Dorsal wings of the fruit often alternately shorter.*

1. **T. barbinòde**, Nutt. Stem tall and branching, *downy on the joints*; leaves 2-3-ternately compound; leaflets wedge-ovate, acute, unequally cut-serrate, entire towards the base; flowers yellow; fruit elliptical. — River-banks, W. New York and N. Pennsylvania, to Wisconsin. June.

* * *Wings of the fruit equal.*

2. **T. àureum**, Nutt. Stem smooth; leaves ternately, or the middle ones 2-ternately divided, with oblong-lanceolate leaflets, finely serrate with cartilaginous teeth; the root-leaves often simple and rounded heart-shaped; flowers yellow; fruit oval. (Also *Smýrnium cordatum*, *Walt.*, &c.) — Banks and moist meadows, W. New York to Wisconsin. June. — Leaflets very smooth, thickish; the larger often heart-shaped, and the upper wedge-shaped at the base.

3. **T. atropurpùreum**, Nutt. Smooth or slightly pubescent; root-leaves simple and heart-shaped, or often like the others ternately divided, with the leaflets heart-ovate and oblong-ovate, crenate-serrate; flowers dark purple; fruit strongly winged, as broad as long. — Rocky hills and woods, S. New York to Penn. June. — Plant 1° - 2° high.

15. ZÍZIA, Koch. GOLDEN ALEXANDERS.

Calyx minutely 5-toothed. Fruit ovate or oval, flattened laterally or contracted at the junction of the carpels, so as to appear somewhat twin; each carpel with 5 equal narrow ribs, which are not at all winged: oil-tubes 1-3 in each interstice. — Smooth yellow-flowered perennials, with the aspect and characters of *Thaspium*, except the fruit. (Named in honor of *Zizii*, a German botanist.)

* *Interstices of the fruit with single oil-tubes.*

1. **Z. cordàta**, Koch. Root-leaves simple, heart-shaped, rarely lobed, crenate-serrate; those of the stem scarcely petioled, 3-divided, the leaflets ovate or oblong, serrate; fruit short oval. — Copses, com-

mon, especially southeastward. May, June. — Plant with much the appearance of *Thaspium aureum*.

2. **Z. aûrea**, Koch. *Lower and root-leaves once, the upper twice, ternately divided*; leaflets oblong-lanceolate, acute, sharply serrate and often cut, the end ones tapering into a wedge-form base or winged stalk; fruit oval. — Woods and river-banks, Massachusetts to Michigan. June. — Plant 2° high: umbel rather dense.

* * Oil-tubes 3 in each interstice of the scarcely ribbed fruit.

3. **Z. integerrima**, DC. Leaves all 2-3-ternately divided; leaflets ovate or oblong, entire, obtuse, pale beneath; rays of the umbel long and slender; fruit rather narrow-oval. — Rocky copses, W. Vermont to Michigan. June.

16. BUPLEÛRUM, Tourn. THOROUGH-WAX.

Calyx-teeth obsolete. Fruit ovate-oblong, flattened laterally or somewhat twin, the carpels 5-ribbed, with or without oil-tubes. Plants with simple entire leaves and yellow flowers. (Name from βοûς, an ox, and πλευρόν, a rib; it is uncertain why so called.)

1. **B. rotundifolium**, L. Leaves broadly ovate, perfoliate; involucre none; involucels of 5 ovate leaflets, longer than the umbellets. — Escaped from gardens, and sparingly naturalized in New York and Pennsylvania.

17. DISCOPLÈÛRA, DC. MOCK BISHOP-WEED.

Calyx-teeth awl-shaped. Fruit ovate; the carpels each with 3 slender sharp ribs on the back, and 2 broad lateral ones united with a thickened corky margin: interstices with single oil-tubes. — Smooth and slender branched annuals, with the leaves finely dissected into bristle-form divisions, and white flowers. (Name from δίσκος, a disk, and πλευρόν, a rib.)

1. **D. capillacea**, DC. Umbel few-rayed; leaflets of the involucre 3-5-cleft; involucels longer than the umbellets. — Brackish swamps, Massachusetts to New Jersey and southward. July-Oct. — Plant 6'-20' high: flowers and fruit small.

18. CICÛTA, L. WATER HEMLOCK.

Calyx minutely 5-toothed. Fruit subglobose, a little contracted at the sides, the carpels with 5 flattish and strong ribs: interstices with single oil-tubes. — Marsh smooth perennials, very poisonous, with thrice pinnately or ternately compound leaves, the veins of the lanceolate leaves terminating in the notches. Involucre few-

leaved: involuclers many-leaved. Flowers white. (The ancient Latin of the Hemlock.)

1. **C. maculàta**, L. (SPOTTED COWBANE. MUSQUASH-ROOT, &c.) Stem streaked with purple, stout; leaflets *oblong-lanceolate*, *coarsely serrate*, sometimes lobed, pointed. — Swamps, common. Aug. — Plant 3° - 6° high, coarse; the root a deadly poison.

2. **C. bulbífera**, L. (BULB-BEARING WATER HEMLOCK.) Leaflets *linear*, remotely toothed or cut-lobed; upper *axils bearing clusters of bulblets*. — Swamps, rather common: but seldom ripening fruit.

19. SÌUM, L. WATER PARSNIP.

Calyx-teeth small or minute. Fruit ovate or globular, flattish or contracted at the sides; the carpels with 5 rather obtuse ribs: interstices usually with several oil-tubes. — Marsh or aquatic perennials, poisonous, with grooved-angled stems, simply pinnate leaves, and lanceolate serrate leaflets, or the immersed ones cut into capillary divisions. Involucre several-leaved. Flowers white. (Name supposed to be from the Celtic *siu*, water, from their habitation.)

1. **S. latifolium**, L. Leaflets broadly lanceolate, pointed, serrate; involucre many-leaved; calyx-teeth conspicuous. — Wet swamps. July - Sept. — Plant 2° - 5° high. Leaflets 7 - 11.

2. **S. lineàre**, Michx. Leaflets narrowly lanceolate or linear, finely and sharply serrate; calyx-teeth minute; fruit very strongly ribbed. — Wet swamps. July - Sept. — Probably the plants of the United States principally belong to this species, rather than to the preceding.

20. CRYPTOTÀENIA, DC. HONEWORT.

Calyx-teeth obsolete. Fruit oblong, contracted at the sides; the carpels equally 5-ribbed: oil-tubes very slender, one in each interstice and one under each rib. — A perennial smooth herb, with thin 3-foliolate leaves, umbels and umbellets with very unequal rays, no involucre and few-leaved involuclers. Flowers white. (Name composed of *κρυπτός*, *hidden*, and *ταυρία*, *a fillet*, from the concealed oil-tubes.)

1. **C. Canadènze**, DC. (*Sison Canadense*, L.) Rich woods, common. June - Sept. — Plant 2° high. Leaflets large, ovate, pointed, doubly serrate, the lower lobed.

21. CHÆROPHÝLLUM, L. CHERVIL.

Calyx-teeth obsolete. Fruit linear or oblong, pointed but not beaked, contracted at the sides; the carpels 5-ribbed: inner face deeply furrowed lengthwise: interstices with single oil-tubes. — Leaves decomposed; the leaflets lobed or toothed: involucre scarcely any: involucels many-leaved. Flowers chiefly white. (Name from *χαίρω*, to gladden, and *φύλλον*, a leaf, alluding to the agreeable aromatic odor of the foliage.)

1. **C. procumbens**, Lam. Stems slender (6' - 18'), spreading, a little hairy; lobes of the pinnatifid leaflets obtuse, oblong; umbels few-rayed (sessile or peduncled); fruit narrowly oblong, with narrow ribs. — Moist copses, New Jersey to Ohio; not common. May.

22. OSMORRHIZA, Raf. SWEET CICELY.

Calyx-teeth obsolete. Fruit linear-oblong, angled, tapering downwards into a stalk-like base, contracted at the sides, crowned with the styles; the carpels with sharp upwardly bristly ribs, inner face with a deep bristly channel: oil-tubes none. — Perennials, with thick very aromatic roots, and large 2 - 3-ternately compound leaves; the leaflets ovate, pinnatifid-toothed or cut. Involucre and involucels few-leaved. Flowers white. (Name from *ὄσμη*, a scent, and *ρίζα*, a root, in allusion to the sweet anise-like flavor of the latter.)

1. **O. longistylis**, DC. (SMOOTHER SWEET CICELY.) *Styles slender, nearly as long as the ovary; leaflets sparingly pubescent or smooth when old, short-pointed, cut-toothed, sometimes lobed.* — Rich moist woods, commonest northward. May, June. — Plant 3' high, branching.

2. **O. brevistylis**, DC. (HAIRY SWEET CICELY.) *Styles conical, not longer than the breadth of the ovary; fruit somewhat tapering at the summit; leaflets downy-hairy, taper-pointed, pinnatifid-cut.* — Moist rocky woods, commoner than the last, which it much resembles.

23. CÒNIUM, L. POISON HEMLOCK.

Calyx-teeth obsolete. Fruit ovate, flattened at the sides, the carpels with 5 prominent wavy ribs, and no oil-tubes: inner face with a deep narrow groove. — Biennial poisonous herbs, with large decomposed leaves. Involucre and involucels 3 - 5-leaved, the

latter 1-sided. Flowers white. (Κώνειον, the Greek name of the Hemlock by which criminals and philosophers were put to death at Athens.)

1. **C. maculatum**, L. Smooth; stem spotted; leaflets lanceolate, pinnatifid; involucels shorter than the umbellets. — Waste places, naturalized. July. — A large branching herb; the pale green leaves exhale a disagreeable odor when bruised. A virulent narcotico-acrid poison, used in medicine.

24. EULOPHUS, Nutt. EULOPHUS.

Calyx-teeth small. Fruit ovoid, contracted at the sides and somewhat twin; the carpels smooth, indistinctly ribbed, and with a close row of oil-tubes: inner face channelled: the cross section of the seed semilunar. — A slender and smooth perennial, with the leaves 2-ternately divided into narrow linear leaflets or lobes. Involucre scarcely any: involucels short and bristle-form. Flowers white. (Name from εὖ, *well*, and λόφος, *a crest*, not well applied to a plant which has no crest at all.)

1. **E. Americànus**, Nutt. — Darby plains, near Columbus, Ohio, *Sullivant*. July. — Root a cluster of small tubers. Stem 2° - 4° high.

25. ERIGÈNIA, Nutt. ERIGENIA.

Calyx-teeth obsolete. Petals obovate or spatulate, flat, entire. Fruit twin; the carpels nearly kidney-form, with 5 very slender ribs, and several small oil-tubes in the interstices: inner face hollowed into a broad deep cavity. — A small and smooth vernal plant, producing a simple stem from a deep round tuber bearing one or two 2 - 3-ternately divided leaves, and a somewhat imperfect and leafy bracted compound umbel. Flowers few, white. (Name from ἡριγενής, *born in the spring, vernal*.)

1. **E. bulbosa**, Nutt. — Alluvial soil, Wisconsin to W. Penn. and Buffalo, New York. March, April.

The cultivated representatives of this family, not enumerated above, are chiefly the PARSLEY (*Àpium Petroselinum*), CELERY (*A. graveolens*), DILL (*Anèthum graveolens*), FENNEL (*A. Faniculum*), CARAWAY (*Càrum Càrui*), and CORIANDER (*Coriàndrum sativum*).

ORDER 50. ARALIACEÆ. (SPIKENARD FAMILY.)

Herbs or shrubs, with the same characters as Umbelliferæ, but with usually more than 2 styles, and the fruit a 3-several-celled drupe. Albumen nearly fleshy. Petals flat.

1. ARALIA, L. SPIKENARD. WILD SARSAPARILLA.

Flowers mostly perfect. Calyx-teeth 5, short. Petals, stamens, and styles 5. Fruit a berry-like 5-lobed, 5-celled, and 5-seeded (blackish) drupe. — Shrubs, low trees, or perennial herbs, with large 2-3-ternately or pinnately compound leaves, and paniced umbels. Flowers greenish white. (Derivation unknown.)

1. *A. racemosa*, L. (SPIKENARD.) *Herbaceous; stem widely branched, leafy; leaflets heart-ovate, pointed, doubly serrate, slightly downy; umbels small and very numerous, clustered in large doubly compound racemed panicles. — Rich woodlands. July. — Well known for its spicy aromatic large roots.*

2. *A. nudicaulis*, L. (WILD SARSAPARILLA.) *Herbaceous, smooth; stem very short, the single long-stalked leaf next the ground; leaflets oblong-ovate or oval, pointed, serrate, 5 on each division; scape naked, bearing 3 umbels. — Moist woodlands. May, June. — The aromatic horizontal roots, which are several feet long, are employed as a substitute for the officinal Sarsaparilla. Leaf-stalk 1° high.*

3. *A. hispida*, Michx. (BRISTLY SARSAPARILLA.) *Bristly and slightly shrubby at the base; stem low; leaves twice pinnate; leaflets oblong-ovate, acute, cut-serrate; umbels several in a stalked corymb. — Rocky places. June. — Stem 1°-2° high.*

4. *A. spinosa*, L. (ANGELICA-TREE.) *Shrub, or a low tree; stem and stalks of the very large 2-3-pinnate leaves prickly; leaflets ovate, pointed, serrate, pale beneath; umbels in a branched panicle. — S. Pennsylvania and southward: common in cultivation. July, August.*

2. PANAX, L. GINSENG.

Flowers polygamous. Calyx-teeth obsolete. Petals and stamens 5. Styles 2-3. Fruit a 2-3-lobed, 2-3-celled, and 2-3-seeded drupe, often fleshy. — Chiefly perennial herbs, with greenish-white flowers; our species with single simple umbels on a long peduncle, and only 3 stem-leaves in a whorl. (Name from *πᾶν, all*, and *ἄκος, a medicine*, i. e. a panacea.)

1. **P. quinquefòlium**, L. (GINSENG.) *Root spindle-shaped, often forked; leaflets 5, or 7, long-stalked, obovate-oblong, pointed, the lateral ones smaller; peduncle as long as the leaf-stalks; styles 2; fruit flattened, crimson.* — Rich woods, and mountain-sides, not common. July.

2. **P. trifòlium**, L. (DWARF GINSENG. GROUND-NUT.) *Root globular; leaflets 3-5, lanceolate-oblong, not stalked; peduncle as long as the leaves; styles 3; fruit yellowish.* — Moist woods, common northward. — Stem 4' - 8' high: the tuber deep in the ground, pungent to the taste, but not aromatic like the Ginseng.

ORDER 51. CORNACEÆ. (DOGWOOD FAMILY.)

Shrubs, low trees, or rarely herbaceous, with simple mostly opposite and entire leaves: the calyx coherent with the ovary, which bears upon the margin of the disk which crowns its summit the 4 petals (valvate in the bud) and 4 stamens. — Style single, slender: stigma capitate: ovary 2-celled with a single anatropous ovule suspended from the apex of each cell. Fruit a globose 2-celled and 2-seeded drupe. Embryo nearly the length of the fleshy albumen.

1. CÓNUS, Tourn. DOGWOOD. CORNEL.

Calyx minutely 4-toothed. Petals oblong, spreading. Filaments slender. Drupes berry-like, separate. — Flowers white or whitish. Bark bitter and tonic. (Name from *cornu*, a horn, on account of the hardness of the wood, or, perhaps, of the stone of the fruit.)

* *Flowers in open cymes: involucre none: fruit globose: shrubs.*

1. **C. alternifòlia**, L. (ALTERNATE-LEAVED CORNEL.) *Branches greenish streaked with white, alternate; leaves crowded and somewhat alternate, oval, long-pointed, acute at the base, whitish and minutely pubescent underneath; fruit deep blue.* — Hill-sides in copses. May, June. — Shrub 8° - 20° high, tree-like, generally throwing its branches to one side in a flattish top, and with broad, very open cymes. Differs from all the rest in the somewhat alternate leaves.

2. **C. circinàta**, L'Her. (ROUND-LEAVED CORNEL.) *Branches greenish, warty-dotted; leaves round-oval, abruptly pointed, woolly underneath; cymes flat; fruit light blue.* — Copses. June. Shrub

6° - 10° high. Leaves larger than in the other species, 4' - 5' in diameter.

3. **C. sericea**, L. (SILKY CORNEL.) *Branches purplish; the branchlets, stalks, and lower surface of the narrowly ovate or elliptical pointed leaves silky-downy (often rusty) cymes flat, close; calyx-teeth lanceolate; fruit pale blue.* — Wet places along streams, common. June. Shrub 4° - 10° high. Leaves pale and dull. Flowers yellowish-white.

4. **C. stolonifera**, Michx. (RED-OSIER CORNEL.) *Branches, especially the osier-like annual shoots bright red-purple, smooth; leaves ovate, rounded at the base, abruptly short-pointed, roughish with a minute close pubescence on both sides, whitish underneath; cymes small and flat, nearly smooth; fruit white or lead-color.* — Bogs, and wet banks of streams, common, especially northward; the "Osier rouge" of the Canadians. It multiplies by prostrate or subterranean suckers, and forms large dense clumps, 3° - 6° high. June.

5. **C. paniculata**, L'Her. (PANICLED CORNEL.) *Branches gray, smooth; leaves ovate-lanceolate, taper-pointed, acute at the base, whitish but not downy beneath; cymes convex, loose, often panicled; fruit white, depressed-globose.* — Thickets and hill-sides. June. — Shrub 4° - 8° high, very much branched, bearing a profusion of pure white blossoms.

* *Flowers in heads, or close clusters, which are surrounded by a petal-like 4-leaved involucre; fruit bright red.*

6. **C. florida**, L. (FLOWERING DOGWOOD.) *Leaves ovate, pointed, acutish at the base, when young downy beneath; leaves of the involucre inversely heart-shaped, white, sometimes tinged with rose-color; flowers and fruit in a close head.* — Rocky woods. May, June. — Tree 12° - 30° high, very showy in flower, scarcely less so in fruit.

7. **C. Canadensis**, L. (DWARF CORNEL. BUNCHBERRY.) *Stems low and simple (5' - 7' high) from a slender creeping and subterranean rather woody trunk; leaves scarcely petioled, the lower scale-like; the upper apparently whorled in sixes or fours, ovate or oval, pointed; leaves of the involucre ovate, surrounding the inconspicuous capitate cluster of flowers; fruit globular.* — Damp cold woods. May - July. — Involucre greenish-white 1' broad: flowers greenish. Fruit berry-like, nearly tasteless.

Division II. MONOPÉTALOUS EXÓGENOUS PLANTS.

Floral envelopes consisting of both calyx and corolla, the latter composed of more or less united petals, that is, monopetalous. (The calyx in Compositæ, &c., is mostly reduced to a pappus, or to teeth, scales, or a mere border, or even to a mere covering of the surface of the ovary. In some plants of the Heath and Holly Families, and in the Thrift, &c., the petals are nearly or quite separate.)

ORDER 52. CAPRIFOLIACEÆ. (HONEYSUCKLE FAM.)

Shrubs, or rarely herbs, with opposite leaves, no stipules, the calyx-tube coherent with the 2-5-celled ovary; the stamens as many as (or one fewer than) the lobes of the tubular or wheel-shaped corolla, and inserted on its tube.— Fruit a berry, drupe, or pod. Seeds anatropous, with a small embryo in fleshy albumen.

Synopsis.

Tribe 1. LONICEREÆ. — Corolla tubular, often irregularly cleft. Style slender: stigma capitate.

1. LINNÆA. Stamens 4, one fewer than the lobes of the corolla. Fruit dry, 3-celled, 1-seeded.
2. SYMPHORICARPUS. Stamens 4-5, as many as the lobes of the bell-shaped regular corolla. Berry 4-celled, 2-seeded.
3. LONICERA. Stamens 5, as many as the lobes of the tubular or irregular corolla. Berry several-seeded.
4. DIERVILLA. Stamens 5. Corolla funnel-form, nearly regular. Pod 2-celled, 2-valved, many-seeded.
5. TRIOSTEUM. Stamens 5. Corolla gibbous at the base. Fruit a 3-5-celled bony drupe.

Tribe 2. SAMBUCEÆ. — Corolla wheel-shaped or urn-shaped, regular, deeply 5-lobed. Stigmas 3, rarely 5, sessile. Flowers in cymes.

6. SAMBUCUS. Fruit berry-like, containing 3 seed-like nutlets. Leaves pinnate.
7. VIBURNUM. Fruit a 1-celled 1-seeded flattish drupe, with a thin pulp. Leaves simple.

Tribe I. LONICERÆ. THE HONEYSUCKLE TRIBE.

1. LINNÆA, Gronov. LINNÆA. TWIN-FLOWER.

Calyx-teeth 5, awl-shaped, deciduous. Corolla narrow bell-shaped, almost equally 5-lobed. Stamens 4, two of them shorter, inserted towards the base of the corolla. Ovary 3-celled, only one of the cells with a fertile ovule; so that the small dry pod is 3-celled but only 1-seeded, two of the cells being empty. — A slender creeping and trailing little evergreen, somewhat hairy, with rounded-oval sparingly crenate leaves contracted at the base into short petioles, and thread-like upright peduncles forking into 2 pedicels at the top, each bearing a delicate and fragrant nodding flower. Corolla purple rose-color and whitish, reddish and hairy inside. (Dedicated to the immortal Linnæus, who first pointed out its characters, and with whom this humble but charming plant was an especial favorite.)

1. **L. boreàlis**, Gronov. — Moist mossy woods; common northward, but towards the south only found along mountains or in cold bogs. June.

2. SYMPHORICÁRPUS, Dill. (SYMPHÒRIA, *Pèrs.*)

Calyx-teeth short, persistent on the fruit. Corolla bell-shaped, nearly regularly 4–5-lobed, with as many short stamens inserted into its throat. Ovary 4-celled, only 2 of the cells with a fertile ovule; the berry therefore 4-celled and 2-seeded. Seeds bony. — Low and branching upright shrubs, with oval short-petioled leaves, which are downy underneath and entire, or wavy-toothed on the young shoots. Flowers white, tinged with rose-color, in close short spikes or clusters. (Name composed of *συμφορέω*, to bear together, and *καρπός*, fruit; from the clustered berries.)

1. **S. occidentàlis**, R. BROWN. (WOLF-BERRY.) Flowers in dense terminal and axillary spikes; corolla much bearded within; the *stamens and style protruded; berries white.* — Fort Gratiot, Michigan, and northward. — Flowers larger and more funnel-form, and stamens longer, than in the next.

2. **S. racemòsus**, Michx. (SNOW-BERRY.) *Flowers collected in a loose and somewhat leafy interrupted spike at the end of the branches; corolla bearded inside; berries large, bright white.* — Rocky banks, from the Vermont shore of L. Champlain to Wisconsin: common in cultivation. June–Sept. Berries remaining till winter.

3. **S. vulgàris**, Michx. (INDIAN CURRANT. CORAL-BERRY.) *Flowers in small close clusters in the axils of nearly all the leaves; corolla sparingly bearded; berries small, dark red.* — Rocky banks, W. New York and Penn. to Wisconsin: also cultivated. July.

3. **LONICÈRA**, L. HONEYSUCKLE. WOODBINE.

Calyx-teeth very short. Corolla tubular or funnel-form, often gibbous at the base, irregularly or nearly regularly 5-lobed. Stamens 5. Ovary 2-3-celled. Berry several-seeded. Leaves entire. Flowers often showy and fragrant. (Named in honor of *Lonicer*, a German botanist of the 16th century.)

§ 1. **CAPRIFOLIUM**, JUSS. — *Climbing or twining shrubs, with the flowers in sessile whorled clusters from the axils of the (often connate) upper leaves, and forming interrupted terminal spikes: calyx-teeth persistent on the berry.*

* *Corolla trumpet-shaped, almost regularly and equally 5-lobed.*

1. **L. sempérvirens**, Ait. (TRUMPET HONEYSUCKLE.) *Flowers in somewhat distant whorls; leaves oblong, pale beneath; the lower petioled, the uppermost pairs united round the stem.* — Copses, New York (near the city) and southward: common also in cultivation. May-*Oct.* — Leaves deciduous at the north. Corolla inodorous, nearly 2' long, scarlet outside, yellowish within: a variety has pale yellow blossoms.

* * *Corolla ringent: the lower lip narrow, the upper broad and 4-lobed.*

2. **L. gràta**, Ait. (AMERICAN WOODBINE.) *Leaves obovate, smooth, glaucous beneath, the 2 or 3 upper pairs united, flowers whorled in the axils of the uppermost leaves or leaf-like connate bracts; corolla smooth (whitish with a purple tube, fading yellowish), not gibbous at the base.* — Rocky woodlands, New York and Penn., and southwestward: also cultivated. May. — Flowers fragrant.

3. **L. flàva**, Sims. (YELLOW HONEYSUCKLE.) *Leaves smooth, pale and glaucous both sides, thickish, obovate or oval, the 2-4 upper pairs united; flowers in closely approximate whorls; tube of the smooth (light yellow) corolla slender, not gibbous; filaments smooth.* — Rocky banks. Catskill Mountains (*Pursh*), Ohio, and Wisconsin: a variety with rather short flowers. June.

4. **L. parviflòra**, Lam. (SMALL HONEYSUCKLE.) *Leaves smooth, elliptical or oblong, green above, very glaucous beneath, the upper pairs united, all closely sessile; flowers in 2 or 3 closely approximate whorls raised on a peduncle; corolla short, gibbous at the base, smooth outside (greenish-yellow tinged with dull purple); filaments rather hairy below.* — Var. **DOUGLÀSII** has the leaves greener and more or less downy underneath when young, and the more purple

corolla often sparingly pubescent. — Rocky banks, W. New England to Wisconsin: the variety chiefly in the North and West. June. — A low species: leaves thickish; the margins often wavy and revolute.

5. **L. hirsuta**, Eaton. (HAIRY HONEYSUCKLE.) *Leaves pale, not glaucous, downy-hairy beneath*, and slightly so above, as well as the branches, veiny, broadly oval; the uppermost united, the lower short-petioled; flowers in approximate whorls; *tube of the (pale yellow) clammy-pubescent corolla gibbous* at the base, slender; filaments hairy at the base. — Damp copses and rocks, Maine and W. New England northward to Wisconsin. July. — Climbing extensively; a coarse large-leaved species.

§ 2. **Xylósteon**, Juss. — *Upright bushy shrubs: leaves distinct: peduncles axillary, single, 2-bracted and 2-flowered at the summit; the two berries sometimes united into one: calyx-teeth not persistent.*

6. **L. ciliata**, Muhl. (FLY-HONEYSUCKLE.) Branches straggling; *leaves oblong-ovate, often heart-shaped, distinctly petioled*, thin, downy beneath; *peduncles shorter than the leaves*; bracts minute; corolla funnel-form, gibbous at the base (greenish-yellow) the lobes almost equal; *berries separate (red)*. — Rocky woods, common northward. May.

7. **L. cærúlea**, L. (MOUNTAIN FLY-HONEYSUCKLE.) Low; branches upright; *leaves oval*, downy when young; *peduncles very short; bracts awl-shaped, longer than the ovaries of the two flowers which are united into one (blue) berry.* (*Xylósteum villòsum*, Michx.) — Mountain woods and bogs, W. Massachusetts, N. Hampshire, Northern New York, northward: also Wisconsin. May. — Shrub 1° - 2° high. Flowers yellowish, smaller than in No. 8.

8. **L. oblongifolia**, Muhl. (SWAMP FLY-HONEYSUCKLE.) Branches upright; *leaves oblong*, downy when young, smooth when old; *peduncles long and slender; bracts almost none; corolla deeply 2-lipped; berries (purple) formed by the union of the two ovaries.* — Bogs, N. and W. New York to Wisconsin. May, June. — Shrub 3° - 4° high. Leaves 2' - 3' long. Corolla ½' long, yellowish-white.

L. **TATÁRICA**, the TARTARIAN HONEYSUCKLE; L. **CAPRIFOLIUM**, the COMMON HONEYSUCKLE; and L. **PERICLYMENUM**, the true WOODBINE, are the commonly cultivated species.

† 4. **DIERVÍLLA**, Tourn. BUSH HONEYSUCKLE.

Calyx-tube tapering at the summit; the lobes slender, awl-shaped, persistent. Corolla funnel-form, 5-lobed, almost regular. Stamens 5. Pod ovoid-oblong, pointed, 2-celled, 2-valved, septical, many-seeded. — Low upright shrubs, with ovate or oblong and pointed serrate leaves, and cymosely 3 - several-flowered pe-

duncles from the upper axils, or terminal. (Named in compliment to *M. Dierville*, who sent this species from Canada to Tournefort.)

1. **D. trifida**, Mœnch. Leaves oblong-ovate, taper-pointed, petioled; peduncles mostly 3-flowered; pod long-beaked. (*D. Canadensis*, *Muhl.*) — Rocks, common, especially northward. June - Aug. — Flowers honey-color, not showy. Style exserted.

5. **TRIÓSTEUM**, L. FEVER-WORT. HORSE-GENTIAN.

Calyx-lobes linear-lanceolate, leaf-like, persistent. Corolla tubular, gibbous at the base, somewhat equally 5-lobed, scarcely longer than the calyx. Stamens 5. Ovary mostly 3-celled, in fruit forming a rather dry drupe, containing as many angled and ribbed 1-seeded bony nuts. — Coarse hairy perennial herbs, leafy to the top; with the ample entire pointed leaves tapering to the base, but connate round the simple stem. Flowers sessile, and solitary or clustered in the axils. (Name from *τρῆίς*, *three*, and *ὀστέον*, *a bone*, alluding to the three bony seeds, or rather nuts.)

1. **T. perfoliatum**, L. *Softly hairy; leaves oval, abruptly narrowed below, downy beneath; flowers dull brownish-purple, mostly clustered in the axils.* — Rich woodlands, not rare. June. — Stem 2° - 4° high. Fruit orange-color, $\frac{1}{2}$ ' long.

2. **T. angustifolium**, L. *Bristly-hairy; leaves lanceolate, tapering to the base; flowers greenish-cream-color, mostly single in the axils.* — S. Pennsylvania and westward. Smaller than the last.

Tribe II. SAMBŪCEÆ. THE ELDER TRIBE.

6. **SAMBŪCUS**, Tourn. ELDER.

Calyx-lobes minute, or obsolete. Corolla urn-shaped, with a broadly spreading 5-cleft limb. Stamens 5. Stigmas 3. Fruit a berry-like juicy drupe, containing 3 little nutlets like seeds. — Shrubby plants, with a rank smell when bruised, pinnate leaves, serrate pointed leaflets, and numerous small and white flowers in compound cymes. (Name from *σαμβύκη*, an ancient musical instrument, supposed to have been made of Elder-wood.)

1. **S. Canadensis**, L. (COMMON ELDER.) Stems scarcely woody (5° - 10° high); *leaflets 7 - 11, oblong, smooth, the lower often 3-parted; cymes flat, 5-parted; fruit black-purple.* — Fence-rows and borders of thickets. June.

2. **S. pùbens**, Michx. (RED-BERRIED ELDER.) Stems woody, the bark warty; *leaflets 5 - 7, ovate-lanceolate, downy underneath;*

cymes panicled, convex or pyramidal; fruit bright red.— Rocky woods, chiefly northward. May: the fruit ripening in June. A white-berried variety is said to occur.— Stem generally lower than the last, but more woody, often round-topped and tree-like.

7. VIBURNUM, L. ARROW-WOOD. LAURESTINUS.

Calyx 5-toothed. Corolla spreading, deeply 5-lobed. Stamens 5. Stigmas 3. Fruit a 1-celled, 1-seeded drupe, with thin pulp and a crustaceous flattened stone. — Shrubs, with simple petioled leaves, and white (sessile) flowers in flat compound cymes. (The classical Latin name, of unknown meaning.)

§ 1. LENTAGO, DC. — *Flowers all alike and perfect. (Fruit blue or black when ripe, glaucous.)*

* *Leaves entire, or merely toothed, not lobed.*

1. **V. nudum, L.** (WITHE-ROD.) *Leaves thickish, oval, oblong or lanceolate, dotted beneath, like the short petioles and cymes, with small brownish scales, smooth above, not shining, the margins entire or wavy-crenate; cyme short peduncled; fruit round-ovoid.* — Var.

1. CLAYTONI, has the leaves nearly entire, and the veins somewhat prominent underneath, and grows in swamps from Massachusetts near the coast to New Jersey and southward. Var. 2. CASSINOIDES (V. pyriform, Pursh, &c.), has more opaque and often toothed leaves; and grows in cold swamps everywhere northward. May, June. — Shrub 6° - 10° high.

2. **V. prunifolium, L.** (BLACK HAW. SLOE-LEAVED VIBURNUM.) *Leaves broadly oval, obtuse at both ends, finely and sharply serrate, shining above, smooth; petioles naked; cymes sessile; fruit ovoid-oblong.* — Dry copses, S. New York to Ohio. May. — A tree-like shrub, very handsome in flower and foliage.

3. **V. Lentago, L.** (SWEET VIBURNUM.) *Leaves ovate, strongly pointed, closely and very sharply serrate, smooth, the long margined petioles with the midrib and branches of the sessile cyme sprinkled with rusty glands when young; fruit oval.* — Copses, common. May, June. — Tree 15° - 20°, very handsome; the fruit ½' long, turning from scarlet to blue-black, and edible in autumn.

4. **V. dentatum, L.** (ARROW-WOOD.) *Smooth; leaves broadly ovate, coarsely and sharply toothed, strongly straight-veined, on slender petioles; cymes peduncled; fruit (small) ovoid-globose.* — Low grounds, common. June. — Shrub 5° - 10° high, with ash-colored bark; the pale leaves often with hairy tufts in the axils of the strong veins underneath.

5. **V. pubescens, Pursh.** (DOWNY ARROW-WOOD.) *Leaves ovate or oblong-ovate, acute or pointed, coarsely toothed, rather strong-*

ly straight-veined, *the lower surface and the very short petioles velvety-downy*; cymes peduncled; fruit ovoid. — Rocks, W. Vermont to Wisconsin, chiefly northward. — Shrub straggling, 2° - 4° high.

* * *Leaves 3-lobed, roundish; the lobes pointed.*

6. **V. acerifolium**, L. (MAPLE-LEAVED ARROW-WOOD.) *Leaves 3-ribbed and roundish or heart-shaped at the base, downy underneath, coarsely and unequally toothed, the veins and stalks hairy; cymes long-peduncled, many-flowered; fruit oval; filaments long.* — Rocky woods, common. June. — Shrub 3° - 5° high.

7. **V. pauciflorum**, Pylaie. *Smooth, or nearly so; leaves mostly truncate and 5-ribbed at the base, with 3 short lobes at the summit, unequally serrate throughout; cymes small and simple, peduncled; filaments shorter than the corolla.* — Cold woods, mountains of N. Hampshire to N. New York; also in Wisconsin and northward. (V. Oxycoccus, var. eradiatum, Oakes.) — A low straggling shrub, with larger leaves than in No. 6, serrate all round and less deeply lobed than in No. 7; of which it surely is not a variety, although it has the short stamens of the next section.

§ 2. **ÓPULUS**, Tourn. — *Marginal flowers of the cyme destitute of stamens and pistils, and with corollas many times larger than the others, forming a ray, as in Hydrangea.*

8. **V. Ópulus**, L. (CRANBERRY-TREE.) *Nearly smooth, upright; leaves strongly 3-lobed, broadly wedge-shaped or truncate at the base, the spreading lobes pointed, toothed on the sides, entire in the sinuses; petioles bearing stalked glands at the base; cymes peduncled; fruit ovoid, red.* (V. Oxycoccus and V. édule, Pursh.) — Shrub 5° - 10° high, very showy in flower. The acid fruit is used as a (poor) substitute for cranberries, whence the name *High Cranberry-bush*, &c. — The well-known SNOW-BALL TREE, or GUELDER-ROSE, is a cultivated European variety, with the whole cyme turned into large sterile flowers.

9. **V. lantanoïdes**, Michx. (HOBBLE-BUSH, AMERICAN WAYFARING-TREE.) *Leaves round-ovate, abruptly pointed, heart-shaped at the base, closely serrate, many-veined; the veins and veinlets underneath, along with the stalks and branchlets, very scurfy with rusty-colored tufts of minute down; cymes sessile, very broad and flat; fruit ovoid, crimson turning blackish.* — Cold moist woods, common northward. May. — A straggling shrub; the decumbent branches often taking root. Flowers handsome. Leaves 3' - 6' across.

ORDER 53. RUBIACEÆ. (MADDER FAMILY.)

Shrubs or herbs, with opposite entire leaves connected by interposed stipules, or rarely whorled without apparent stipules; the calyx coherent with the 2- (rarely 3-4-) celled

ovary, or in one group free; the stamens as many as the lobes of the regular corolla (3–5), and inserted on its tube. — Fruit various. Seeds anatropous or amphitropous, with copious hard albumen.

Synopsis.

Suborder I. STELLATÆ. THE TRUE MADDER FAMILY.

Leaves whorled, with no apparent stipules. Ovary entirely coherent with the calyx-tube. Calyx valvate in the bud. — Herbs or scarcely woody plants.

1. GALIUM. Corolla wheel-shaped, 4- (or rarely 3-) parted. Fruit twin, 2-seeded.

Suborder II. CINCHONEÆ. THE CINCHONA FAMILY.

Leaves opposite, with stipules between them. Ovary coherent with the calyx-tube, or the apex rarely free.

2. DIODIA. Corolla funnel-form. Fruit dry, twin, 2-seeded.
3. CEPHALANTHUS. Corolla tubular. Fruit dry. Flowers capitate.
4. MITCHELLA. Flowers twin. Fruit a double berry.
5. HEDYOTIS. Corolla various. Fruit a 2-celled many-seeded pod, the upper part often free from the calyx.

Suborder III. LOGANIEÆ.

Leaves opposite, with stipules between them, united with the petioles. Ovary free from the calyx. Corolla not convolute in the bud.

6. SPIGELIA. Corolla tubular-funnel-form. Pod twin, few-seeded.

Suborder I. STELLATÆ. THE TRUE MADDER FAMILY.

1. GÀLIUM, L. BEDSTRAW. CLEAVERS.

Calyx-teeth obsolete. Corolla 4-parted, rarely 3-parted, wheel-shaped. Stamens 4, rarely 3, short. Styles 2. Fruit dry, or a little fleshy, globular, twin, separating when ripe into the 2 seed-like, indehiscent, 1-seeded carpels. — Slender herbs, with small cymose flowers, square stems, and whorled leaves: the roots often containing a red coloring matter. (Name from γάλα, *milk*, which some species are used to curdle.)

* *Annual: leaves about 8 in a whorl: peduncles few-flowered.*

1. **G. Aparine**, L. (CLEAVERS. GOOSE-GRASS.) Stem weak and reclining, bristle-prickly backwards, hairy at the joints; leaves

lanceolate, tapering to the base, short-pointed; peduncles axillary, 1-2-flowered; flowers white; fruit (*large*) bristly with hooked prickles. — Moist thickets. June. — Stems 2°-6° long; leaves 1'-2' long, rough on the margins and midrib.

* * Perennial: leaves 4-6 (in the last species 8) in a whorl.

→ Peduncles axillary and terminal, few-flowered: flowers white or sometimes greenish.

2. **G. asprillum**, Michx. (ROUGH BEDSTRAW.) Stem weak, much branched, rough backwards, with hooked prickles, leaning on bushes; leaves in whorls of 6, or 4-5 on the branchlets, oval-lanceolate, pointed, with almost prickly margins and midrib; peduncles many, short, 2-3 times forked; fruit usually smooth. — Low thickets. July. — Stems reaching the height of 4°-5°; the branchlets covered with numerous but very small white flowers.

3. **G. concinnum**, Torr. & Gr. (COMELY BEDSTRAW.) Stems low, diffuse, with minutely roughened angles; leaves all in whorls of 6, linear, slightly pointed, veinless, the margins upwardly roughened; peduncles slender, 2-3 times forked, somewhat paniced at the summit; pedicels short; fruit smooth. — Dry soil, Ann Arbor, Michigan. June. — Plant 6'-12' high, slender, but rather rigid, not turning blackish in drying, like the rest of these species.

4. **G. trifidum**, L. (SMALL BEDSTRAW.) Stems weak, ascending, branching, roughened backwards on the angles; leaves in whorls of 4 to 6, linear or oblanceolate, obtuse, the margins and midrib rough; peduncles 1-3-flowered; pedicels slender; corolla-lobes and stamens often 3; fruit smooth. — Var. 1. TINCTORIUM: stem stouter with nearly smooth angles, and the parts of the flower usually in fours. Var. 2. LATIFOLIUM (G. obtusum, Bigel.): stem smooth, widely branched; leaves elliptical or oblong, quite rough on the midrib and margins. — Swamps and low grounds; common, and very variable, 5'-20' high. June-Aug.

5. **G. triflorum**, Michx. (SWEET-SCENTED BEDSTRAW.) Stem weak, reclining or prostrate, bristly-roughened backwards on the angles, shining; leaves 6 in a whorl, elliptical-lanceolate, bristle-pointed, with slightly roughened margins; peduncles 3-flowered, the flowers all pedicelled; fruit bristly with hooked hairs. — Rich woodlands, common. July. — Stem 1°-4° long; leaves 1'-2' long. Lobes of the greenish corolla pointed.

→→ Peduncles several-flowered: flowers dull purple or brownish (rarely cream-color): petals pointed: fruit densely hooked-bristly.

6. **G. pilosum**, Ait. (HAIRY BEDSTRAW.) Stem ascending, somewhat simple, hairy; leaves in fours, oval, dotted, hairy, scarcely 3-nerred; peduncles twice or thrice 2-3-forked, the flowers all pedicelled. — Dry copses, Vermont and Rhode Island to Pennsylvania. June-August.

7. **G. circæzans**, Michx. (WILD LIQUORICE.) Smooth or downy, erect or ascending; *leaves in fours, oval, mostly obtuse, 3-nerved, ciliate; peduncles usually once forked, the branches elongated and widely diverging in fruit, and bearing several remote flowers on very short lateral pedicels, reflexed in fruit.* — Rich woods. June – Aug. — About 1° high. The var. **MONTANUM** is a dwarf, broad-leaved form, from mountain woods.

8. **G. lanceolatum**, Torr. (LANCE-LEAVED WILD LIQUORICE.) *Leaves in fours, lanceolate or ovate-lanceolate, tapering to the apex, slightly ciliate.* (G. Torrèyi, Bigelow.) — Woodlands: like the last, which it nearly approaches; but the leaves are generally twice the length and narrower.

+++ *Peduncles many-flowered, in close terminal panicles.*

9. **G. boreale**, L. (NORTHERN BEDSTRAW.) Stem upright, smooth; *leaves in fours, linear-lanceolate, 3-nerved; panicle elongated; flowers white; fruit minutely bristly, sometimes smooth.* — Rocky banks of streams. June – Aug. — Plant 1° – 2° high.

10. **G. vèrum**, L. (YELLOW BEDSTRAW.) Stem upright, slender; *leaves in eights, linear, grooved above, roughish, deflexed; flowers yellow, crowded; fruit smooth.* — Dry fields, introduced. Roxbury, &c., Massachusetts. July.

G. TRICORNE, which has the aspect of *G. Aparine*, but with granulated, not bristly, fruit, on recurved peduncles, is sometimes found in fields of barley, introduced with the grain from Europe.

RUBIA TINCTORIA, L., the **MADDER**, has a berry-like fruit; the parts of the flower generally 5.

Suborder II. CINCHONÆ. THE CINCHONA FAMILY.

2. **DIODIA**, L. BUTTON-WEED.

Calyx-short, 2-4-lobed, persistent. Corolla funnel-form, 4-lobed. Stamens 4. Fruit dry, 2-celled, splitting at maturity into 2 crustaceous and closed 1-seeded carpels. — Low herbs, with linear or lanceolate opposite leaves, often clustered so as to appear whorled; the scale-like stipules fringed with bristles. (Name from *diòdos*, a way; the species being weeds growing by the wayside, and in waste places.)

1. **D. tères**, Walt. Annual, branched from the base, diffusely spreading; leaves linear, rigid; flowers sessile and solitary or 2-3 together in the axils; corolla (whitish) much longer than the 4 calyxlobes; fruit ovoid-top-shaped, much shorter than the bristles of the

stipules.—Sandy fields, New Jersey and southward. Aug.—An inconspicuous plant, 4'–12' high.

3. CEPHALÁNTHUS, L. BUTTON-BUSH.

Calyx-tube inversely pyramidal, the limb 4-toothed. Corolla tubular, 4-toothed. Style thread-form, much protruded. Stigma capitate. Fruit dry and hard, inversely pyramidal, 2–4-celled, separating from the base upward into 2–4 closed 1-seeded portions.—Shrubs, with the flowers densely aggregated in spherical peduncled heads. Flowers white. (Name composed of κεφαλή, *a head*, and άνθος, *a flower*.)

1. **C. occidentàlis**, L. Mostly smooth; leaves petioled, ovate-oblong, pointed, opposite or whorled in threes, with short intervening stipules.—Wet places, forming thickets along streams and ponds, 4°–10° high. July–Aug.

4. MITCHÉLLA, L. PARTRIDGE-BERRY.

Flowers in pairs, with their ovaries united. Calyx 4-toothed. Corolla funnel-form, 4-lobed; the lobes spreading, densely bearded inside. Stamens 4. Style slender: stigmas 4. Fruit a dry berry-like double drupe, crowned with the calyx-teeth of the two flowers, each containing 4 small and seed-like bony nutlets.—Smooth and trailing evergreen herbs, with round-ovate petioled leaves, minute stipules, white fragrant flowers often tinged with rose-color, and bright scarlet edible (but nearly tasteless) dry berries, which remain over winter. Parts of the flower occasionally in threes, fives, or sixes. (This very pretty plant commemorates *Dr. John Mitchell*, an early correspondent of Linnæus, and an excellent botanist, who resided in Virginia.)

1. **M. rèpens**, L. Leaves often slightly heart-shaped, dark green and shining, usually variegated with whitish lines; peduncles 2-flowered.—Dry woods, creeping about the foot of trees. June, July.—Some plants bear flowers with exserted stamens and included styles; others, conversely, those with included stamens and exserted style. *Torrey*.

5. HEDYÒTIS, L. DWARF PINK. BLUETS.

Calyx 4-lobed, persistent. Corolla funnel-form, salver-form, or wheel-shaped, the limb 4-parted, Stamens 4. Stigmas 2. Pod often free at the top and rising above the calyx, 2-celled, many-

seeded, opening loculicidally across the summit. — Mostly small herbs, with small stipules united to the petioles. (Name from ἡδύς, *sweet*, and οὔς, ὠρός, *an ear*, of no obvious application. — *Houstonia*, now included in this genus, was dedicated to Dr. Houston, an early English botanist.)

§ 1. *ELATINÉLLA*, Torr. & Gr. — *Corolla wheel-shaped, much shorter than the leaf-like calyx-lobes: style scarcely any: pod wholly invested by the adherent calyx, many-seeded: stipules 2-pointed.*

1. *H. glomeràta*, Ell. Stems branched and spreading, hairy; leaves oblong, narrowed at the base, smoothish; flowers (inconspicuous) clustered in the axils; corolla white. ① — Mostly in brackish swamps, New York near the city, and New Jersey southward. A homely plant, 2' – 12' high.

§ 2. *AMPHIÒTIS*, DC. — *Corolla funnel-form, longer than the calyx-teeth: pod globular or ovoid, the upper half free from the calyx, with 4–15 seeds in each cell: perennial, upright: stem-leaves sessile: flowers in terminal 2–3-forked or paniced few-flowered cymes; some plants with exserted stamens and short included style, others with deeply included stamens and exserted style!*

2. *H. purpùrea*, Torr. & Gr. *Pubescent; leaves ovate or lanceolate, closely sessile, 3–5-nerved; calyx-lobes longer than the pod.* — Woodlands, W. Penn. and Ohio southward. May – July. — Stems 8' – 15' high. Flowers 3–7 in a cluster, pink-purple.

3. *H. ciliolàta*, Torr. *Low, nearly smooth; stems tufted, the thickish oval or spatulate and ciliate root-leaves in close rosettes; stem-leaves oblong-linear, obtuse, obscurely 1-nerved; calyx-lobes not longer than the pod.* — Rocky banks, N. New York (Oswego), and Niagara to Michigan along the Lakes. May – July. — Plant 3' – 6' high, with lilac or pink, handsome blossoms.

4. *H. longifòlia*, Hook. *Rather low, smooth; stems somewhat tufted; leaves all lanceolate or linear-lanceolate, mostly acute at both ends, not ciliate; 1-nerved; calyx-lobes scarcely as long as the pod.* — Var. *TENUIFÒLIA* has narrower leaves, many spreading and slender branches, with thread-like peduncles. — Shaded banks, Maine to Michigan; the var. only in W. States. June. — Stems 5' – 10' high, bluish-white or pale purplish.

§ 3. *HOUSTONIA*, L. — *Corolla nearly salver-form, with a long tube: pod somewhat 2-lobed at the broad summit, which is free from the calyx: the cells 8–20-seeded: delicate perennials or biennials, with terminal and axillary slender 1-flowered peduncles: the stamens and style conversely of different lengths in different individuals, as in § 2.*

5. *H. cærùlea*, Hook. (BLUETS.) *Smooth; stems numerous, slender, upright, sparingly branched; leaves oblong-spatulate,*

tapering to a slender base; peduncles long and slender. — Grassy moist banks, common. May–Sept. — A very delicate little herb, 3'–5' high, producing in spring a profusion of handsome bright blue blossoms fading to white, with a yellow eye.

Suborder III. LOGANIÈÆ.

6. SPIGÈLIA, L. PINK-ROOT. WORM-GRASS.

Calyx 5-parted, persistent; the lobes slender. Corolla tubular-funnel-form, 5-lobed at the summit, valvate in the bud. Stamens 5: anthers linear. Style slender, hairy above, jointed near the middle. Pod short, twin, flattened, separating at maturity from the base into 2 carpels, which open loculicidally, few-seeded. — Chiefly herbs, with the opposite leaves united by means of the stipules, and the flowers in spikes or 1-sided cymes. (Named in honor of *Prof. Spigelius*, who wrote on botany at the beginning of the 17th century.)

1. *S. Marilandica*, L. Stems upright, simple; leaves sessile, ovate-lanceolate, acute or pointed, roughish-hairy on the margin and ribs; spike 3–8-flowered; tube of the corolla 4 times the length of the calyx, the lobes lanceolate; anthers and style exerted. ♀ — Rich woods, Pennsylvania to Wisconsin and southward. June, July. — Stems 6'–15' high: corolla 1½' long, red or scarlet outside, yellowish within. — A well-known officinal anthelmintic, and a showy plant.

ORDER 54. VALERIANÀCEÆ. (VALERIAN FAMILY.)

Herbs, with opposite leaves and no stipules; the calyx-tube coherent with the ovary, which has one fertile 1-ovuled cell and 2 abortive or empty ones; the stamens distinct, 2–3, fewer than the lobes of the corolla, and inserted on its tube. — Corolla tubular or funnel-form, often irregular, mostly 5-lobed, the lobes imbricated in the bud. Style slender: stigmas 1–3. Fruit indehiscent, 1-celled (the two empty cells of the ovary disappearing), or 3-celled, two of them empty, the other 1-seeded. Seed suspended, anatropous, with a large embryo and no albumen. — Flowers in paniced or clustered cymes.

1. VALERIANA, Tourn. VALERIAN.

Limb of the calyx of several plumose bristles (like a pappus) which are rolled up inwards in flower, and unrolling and spreading on the seed-like 1-celled fruit. Corolla gibbous at the base, the 5-lobed limb nearly regular. Stamens 3. — Perennial herbs, with deep and thickened strong-scented roots, and simple or pinnate leaves. (Name from *valere*, to have efficacy, alluding to the medicinal qualities.)

* *Root fibrous: leaves thin.*

1. *V. pauciflora*, Michx. Smooth, slender; *root-leaves ovate, heart-shaped, toothed*, pointed, sometimes with 2 small lateral divisions; stem-leaves pinnate, with 3-7 ovate mostly toothed leaflets; paniced cymes few-flowered; tube of the (pale pink) *corolla long and slender*; fruit ribbed with 3 close lines on one side, and 3 distant ones on the other. — Woodlands, Ohio and southward. June.

2. *V. sylvatica*, Richards. Smooth or minutely pubescent; *root-leaves ovate or oblong, entire*, rarely with 2 small lobes; stem-leaves pinnate, with 5-11 oblong-ovate or lanceolate nearly entire leaflets; cyme at first close, many-flowered; *corolla inversely conical* (rose-color); fruit 3-nerved on one side, 1-nerved on the other. — Cedar swamps, W. Vermont and New York to Michigan, northward. June. — Plant 2° - 3° high.

* * *Root spindle-shaped, large and deep: leaves thickish.*

3. *V. ciliata*, Torr. & Gr. Stem very smooth, wand-like; leaves rather fleshy, densely woolly-ciliate (when young sometimes minutely downy all over); those from the root lanceolate or spatulate, tapering into a sheathing base, entire, sometimes pinnatifid; those of the stem (1-2 pairs) sessile, pinnately 3-9-parted; the divisions linear; flowers in an elongated compound panicle; corolla very short (greenish-white); fruit 3-ribbed on one side, 1-ribbed on the other. — Swamps and moist prairies, Ohio to Wisconsin, northward. June. — Root 6' - 12' long. Stem 2° - 4° high. Flowers polygamous, the pistillate smaller.

2. FÉDIA, Gærtn. (VALERIANÉLLA.) CORN-SALAD.

Limb of the calyx toothed or obsolete. Corolla somewhat irregular, or in our species regular or nearly so, and equally 5-lobed, funnel-form. Stamens 3. Fruit 3-celled, two of the cells empty and sometimes confluent into one, the other 1-seeded. — Annuals and biennials, with forking stems, oblong and rather succulent sessile leaves, entire or toothed near the base, and white or whitish clustered-cymose small flowers, somewhat involucrate with bracts.

(Name of uncertain derivation.) — Our species all have the limb of the calyx obsolete, and are so much alike in aspect, flowers, &c., that good characters are only to be taken from the fruit.

1. **F. olitòria**, Vahl. *Fruit compressed, oblique, at length broader than long, the cross section elliptical, with a corky or spongy mass at the back of the fertile cell nearly as large as the (often confluent) empty cells; flowers bluish.* — Fields, Penn.? and southward; introduced from Europe. — Plant 4'–10' high. Also called, like the other species, *Lamb-Lettuce*.

2. **F. Fagopyrum**, Torr. & Gr. *Fruit ovate-triangular, smooth, not grooved between the (at length confluent) empty cells, which form the anterior angle, and are much smaller than the broad and flat fertile one; flowers white.* — Low grounds, W. New York to Ohio and Michigan. May, June. — Plant 1°–2° high.

3. **F. radiàta**, Michx. *Fruit ovoid, downy (rarely smooth), obtusely and unequally somewhat 4-angled; the empty cells parallel and contiguous but with a deep groove between them, rather narrower than the flattish fertile cell.* — Low grounds, Ohio and Michigan, and southward.

4. **F. umbilicàta**, Sulliv. *Fruit globular-ovate, smooth; the much inflated sterile cells wider and many times thicker than the flattish fertile one, contiguous, and when young with a common partition, when grown, indented with a deep circular depression in the middle opening into the confluent sterile cells; bracts not ciliate.* — Moist grounds around Columbus, Ohio, *Sullivant*. (*Sill. Jour.*, Jan. 1842.)

5. **F. patellària**, Sulliv. *Fruit smooth, circular, platter-shaped or disk-like, slightly notched at both ends, the flattened-concave sterile cells widely divergent, much broader than the fertile one and forming a kind of wing around it when ripe.* — Low grounds, Columbus, Ohio, *Sullivant*: now first described. — Plant 1°–2° high, resembling the last, but with a very different fruit.

ORDER 55. DIPSÀCEÆ. (TEASEL FAMILY.)

Herbs, with opposite or whorled leaves, no stipules, and the flowers in dense heads, surrounded by an involucre, as in the Composite Family; but the stamens are distinct, and the suspended seed has albumen. — Represented by the *Scaebious* (cultivated) and the following genus.

1. DÍPSACUS, Tourn. TEASEL.

Involucre many-leaved, longer than the chaffy, leafy-tipped, and pointed bracts among the densely capitate flowers: each flower

with a 4-leaved calyx-like involucre investing the ovary and fruit (achenium). Calyx-tube coherent with the ovary, the limb cup-shaped, without a pappus. Corolla nearly regular, 4-cleft. Stamens 4, inserted on the corolla. Style slender. — Stout and coarse biennials, hairy or prickly, with large oblong heads. (Name from $\delta\psi\acute{\alpha}\omega$, *to thirst*, probably because the united cup-shaped bases of the leaves in some species hold water.)

1. **D. sylvéstris**, Mill. (WILD TEASEL.) Prickly; leaves lance-oblong, toothed, or the uppermost entire; leaves of the involucre slender, longer than the head; bracts (chaff) tapering into a long flexible awn with a straight point. — Naturalized by road-sides. Aug.

D. FULLÓNUM, the FULLER'S TEASEL, which has a shorter involucre, and stiff chaff to the heads, with hooked points, used for raising a nap upon woollen cloth, is occasionally cultivated.

ORDER 56. COMPÓSITÆ. (COMPOSITE FAMILY.)

Flowers in close heads (the compound flower of the older botanists), upon a common receptacle, surrounded by an involucre, with 5 (rarely 4) stamens inserted on the corolla, their anthers united in a tube (syngenesious). — Calyx-tube united with the 1-celled ovary, the limb (*pappus*) crowning its summit in the form of bristles, awns, scales, teeth, &c., or cup-shaped, or else entirely absent. Corolla either strap-shaped or tubular; in the latter chiefly 5-lobed, valvate in the bud, the veins bordering the margins of the lobes. Style 2-cleft at the apex. Fruit seed-like (*achenium*), dry, containing a single erect anatropous seed, with no albumen. — An immense family, chiefly herbs in temperate regions, without stipules, with perfect, polygamous, monœcious or dicecious flowers. The flowers with a strap-shaped (*ligulate*) corolla are called *rays* or *ray-flowers*: the head which presents such flowers, either throughout or at the margin, is *radiate*. The tubular flowers compose the *disk*; and a head which has no ray-flowers is said to be *discoid*. The leaves of the involucre, of whatever form or texture, are termed *scales*. The bracts or scales which often grow on

the receptacle among the flowers are called the *chaff*: when these are wanting the receptacle is *naked*.

* * * The technical characters of the tribes, derived from the style and stigmas, being of difficult application, an artificial analysis, founded on more obvious distinctions, is here introduced for the assistance of the learner, in place of the ordinary synopsis. The proper natural arrangement is followed in the text, and is indicated by the numbers affixed to the genera.

Suborder I. TUBULIFLORÆ.

Corolla tubular in all the perfect flowers, regularly 5- (rarely 3-4-) lobed; the ligulate or ray-flowers, when present, either pistillate only, or neutral (with neither stamens nor pistil), and occupying the border.

* Rays none; the flowers all tubular. (*Coreopsis*, *Bidens*, and *Senecio* have some species which are destitute of rays.)

+ Flowers all perfect and alike.

++ Pappus of naked capillary bristles.

1. VERNONIA. Heads many-flowered. Pappus double; the outer a row of stout bristles much shorter than the achenium.
57. LAPPALIA. Heads many-flowered. Pappus simple, of separate bristles. Involucre burr-like, armed with hooked prickles.
56. ONOPORDON. Heads many-flowered. Pappus simple, the bristles united at the base into a horny ring. Involucre armed with straight prickles.
50. CACALIA. Heads 5-30-flowered. Pappus of very fine and copious soft bristles. Scales of the involucre in a single row. Leaves alternate.
6. EUPATORIUM. Heads 3-many-flowered. Pappus of scanty and roughish slender bristles. Scales of the involucre 8-many. Receptacle flat. Leaves chiefly opposite. Not climbers.
7. MIKANIA. Heads 4-flowered. Pappus, &c., as in the last. Scales of the involucre 4. Receptacle small, flat. Climbers.
8. CONOCLINIUM. Heads many-flowered. Receptacle conical, otherwise as in Eupatorium.
19. BIGELOVIA. Heads 3-4-flowered. Pappus of capillary roughish bristles. Scales of the club-shaped involucre 10-14, appressed, rigid. Receptacle pointed. Leaves alternate.
- +++ Pappus of plumose or bearded bristles.
55. CIRSIUM. Heads many-flowered. Pappus plumose below. Involucre greatly imbricated. Achenia oblong. Corolla 5-cleft. Plant prickly.
5. KUHNIA. Heads 10-25-flowered. Pappus strongly plumose. Involucre slightly imbricated. Achenia cylindrical, many-striate. Corolla 5-toothed.
4. LIATRIS. Heads few-many-flowered. Pappus plumose or barbellate. Achenia tapering to the base. Corolla 5-cleft.

+++++ Pappus of hard scales or chaffy bristles.

3. *SCLEROLEPIS*. Head many-flowered, solitary. Pappus of 5 short and obtuse scales. Leaves whorled.

2. *ELEPHANTOPUS*. Heads 3-5-flowered, aggregated in dense clusters. Pappus of few rigid bristles which are dilated at the base. Leaves alternate.

+ + Flowers of two sorts in the same head.

+ Pappus of rigid bristles. Receptacle clothed with bristles. Corolla in all the flowers 5-cleft.

54. *CNICUS*. Involucre imbricated, prickly. Marginal flowers slender, sterile. Pappus of 10 long and 10 shorter bristles, and 10 very short teeth.

53. *CENTAUREA*. Involucre imbricated, the scales fringed or appendaged. Marginal flowers much larger, sterile. Pappus of stiff, often short bristles.

+++ Pappus of five capillary bristles. Corolla of the outer (pistillate) flowers filiform, 2-3-toothed or truncate; of the central 4-5-lobed.

= Involucre not dry and scarious: receptacle naked.

49. *ERECHTHITES*. Scales of the involucre in a single row, greenish. Pappus bright white, very soft.

22. *PLUCHEA*. Scales of the involucre imbricated, purplish.

= = Involucre of scarious, dry, and thin scales. Woolly herbs.

46. *GNAPHALIUM*. Receptacle flat, naked. Pappus scanty in all the flowers.

48. *FILAGO*. Receptacle columnar, with a chaffy scale like those of the involucre subtending each fertile flower: the central flowers only with pappus.

+++++ Pappus none, or minute: exterior flowers pistillate.

44. *TANACETUM*. Pappus a minute crown or cup. Achenia angled. Exterior flowers 3-toothed. Involucre imbricated.

45. *ARTEMISIA*. Pappus none. Achenia obovoid. Exterior flowers 3-toothed. Involucre imbricated. Receptacle naked.

27. *IVA*. Pappus none. Scales of the involucre in one row, often united. Receptacle with slender chaff. Corolla of the fertile flowers very small.

11. *ADENOCAULON*. Pappus none. Scales of the involucre in one row. Receptacle naked. Corolla of the pistillate and staminate flowers (each 4-5) both alike, 4-5-lobed.

- - - Flowers of two kinds, occupying different heads: corolla of the fertile flowers very slender or none.

+ Involucres, &c., of the fertile and sterile heads nearly alike, and both many-flowered.

47. *ANTENNARIA*. Pappus of slender bristles, club-shaped in the sterile flowers. Involucre dry and scarious.

21. *BACCHARIS*. Pappus soft and capillary, much elongated in the fertile flowers.
- +++ Involucres of the fertile and sterile flowers very dissimilar; the former closed, 1-2-flowered; the latter racemed, flat.
28. *AMBROSIA*. Fertile involucre seed-like, pointed, 1-seeded.
29. *XANTHIUM*. Fertile involucre burr-like, clothed with hooked prickles, 2-celled, 2-seeded.
- * * Heads radiate: the disk-flowers tubular and perfect, rarely sterile: those of the border ligulate, pistillate, or neutral.
- + Pappus of capillary bristles. Receptacle naked.
- ++ Rays small and inconspicuous so that the head appears discoid, or very slender, in several-many rows. (One section of *Erigeron* might be referred here.)
9. *NARDOSMIA*. Heads somewhat diœcious. Flowers purplish or whitish. Heads corymbed.
10. *TUSSILAGO*. Head (single) with many rows of narrow rays, and few disk-flowers, yellow.
- +++ Rays in one marginal row, or nearly so, not yellow (as are mostly the disk-flowers).
- = Rays fertile.
15. *ERIGERON*. Scales of the involucre nearly equal and in one row, narrow. Rays very many. Pappus simple or double, not copious.
16. *DIPLOPAPPUS*. Scales of the involucre unequal, imbricated. Rays 8-12. Pappus double, the outer very short.
13. *SERICOCARPUS*. Scales of the top-shaped or club-shaped involucre closely imbricated, 12-15-flowered. Rays about 5. Pappus simple. Achenia inversely pyramidal, very silky.
14. *ASTER*. Scales of the (many-flowered) involucre imbricated. Pappus simple. Achenia flattened.
- == Rays sterile.
12. *GALATELLA*. Involucre imbricated. Rays 3-12. Disk-corollas deeply cleft. Achenia silky.
- ++++ Rays in one marginal row, yellow, as well as the disk-flowers.
- = Involucre imbricated.
18. *SOLIDAGO*. Rays few and short. Pappus simple.
23. *INULA*. Rays very numerous and narrow. Pappus simple.
20. *CHRYSOPSIS*. Pappus double; the exterior short, chaffy-bristly.
- == Involucre of nearly equal scales in 1-2 rows.
51. *SENECIO*. Pappus of very soft and slender bristles. Leaves alternate.
52. *ARNICA*. Pappus of rather rigid almost barbellate bristles. Leaves opposite.

- Pappus of short stout bristles, awns, or scales, or none. Receptacle naked.
17. *BOLTONIA*. Achenia flat, margined, tipped with a tuft of small bristles and 2-3 stouter awl-shaped ones. Rays white or purplish.
43. *LEUCANTHEMUM*. Achenia terete, ribbed. Pappus mostly none. Rays white. Receptacle flat.
39. *HELENIUM*. Achenia inversely pyramidal. Pappus of 5-8 thin scales. Rays yellow. Receptacle globular.
- +++ Pappus of few scales, teeth, or awns, or cup-shaped, or none. Receptacle chaffy.
- ++ Ray-flowers fertile; those of the disk all sterile.
25. *POLYMNIA*. Achenia obovoid, turgid, wingless: pappus none.
26. *SILPHIUM*. Achenia flat, wing-margined, notched or 2-toothed at the summit.
- +++ Ray-flowers sterile (neutral), those of the disk fertile.
= Receptacle conical or columnar.
40. *MARUTA*. Achenia obovoid, ribbed. Pappus none. Receptacle chaffy only at the top. Rays white.
31. *ECHINACEA*. Achenia 4-angled. Pappus a cup-like border. Chaff with a projecting cartilaginous apex. Rays purple.
32. *RUDBECKIA*. Achenia 4-angled. Pappus a minute border. Chaff concave. Rays yellow.
33. *LEPACHYS*. Achenia flattened laterally, margined, obscurely 1-2-toothed at the apex. Pappus none. Chaff truncate.
== Receptacle flat or convex.
34. *HELIANTHUS*. Achenia lenticular, flattened laterally, wingless. Pappus of 2 deciduous awl-shaped chaffy scales.
35. *ACTINOMERIS*. Achenia much flattened laterally, winged. Pappus of 2 persistent awns.
36. *COREOPSIS*. Achenia flattened parallel with the scales of the (double) involucre. Pappus of 2 teeth, scales, or awns which are not barbed backward.
37. *BIDENS*. Achenia flattened parallel with the scales of the (double) involucre, or beaked, tipped with 2-6 persistent backwardly barbed awns.
++++ Ray and disk-flowers both fertile.
38. *VERBESINA*. Achenia much flattened laterally, tipped with a pappus of 2 awns.
30. *HELIOPSIS*. Achenia 4-angular. Pappus none. Receptacle conical. Leaves opposite.
24. *ECLIPTA*. Achenia 2-4-sided. Pappus an obscure crown. Receptacle flat. Leaves opposite.
41. *ANTHEMIS*. Achenia nearly terete. Pappus almost none. Receptacle conical. Rays many.

42. *ACHILLEA*. Achenia flattened parallel with the scales of the involucre. Pappus none. Receptacle flat or small. Rays few.

Suborder II. LIGULIFLORÆ.

Flowers all perfect, with ligulate corollas throughout.

* Pappus none.

58. *LAMPSANA*. Involucre cylindrical, of 8 scales, 8-12-flowered.
* * Pappus chaffy, or of both chaff and bristles.
59. *CICHORIUM*. Pappus a small crown of little bristle-form scales.
60. *KRIGIA*. Pappus of 5 broad chaffy scales, and 5 bristles.
61. *CYNTHIA*. Pappus double; the outer short, of many minute chaffy scales, the inner of numerous long capillary bristles.
* * * Pappus plumose.
62. *LEONTODON*. Bristles of the pappus several, enlarged at the base.
* * * * Pappus composed entirely of capillary bristles, not plumose.
+ Pappus tawny or dirty white: achenia not flattened or beaked.
63. *HIERACIUM*. Achenia oblong: pappus a single series. Flowers yellow. Scales of the involucre unequal.
64. *NABALUS*. Achenia cylindrical: pappus copious. Flowers whitish or purplish. Scales of the involucre equal.
+ + Pappus bright white (except one *Mulgedium*).
65. *TROXIMON*. Achenia linear-oblong, not beaked. Pappus of copious and unequal bristles, some of them rigid.
66. *TARAXACUM*. Achenia long-beaked, terete, ribbed. Pappus soft.
67. *LACTUCA*. Achenia abruptly long-beaked, flat. Pappus soft.
68. *MULGEDIUM*. Achenia flattish, with a short and thick beak. Pappus soft, in one species tawny. Flowers blue.
69. *SONCHUS*. Achenia flattish, beakless. Pappus very soft and fine. Flowers yellow.

Suborder I. TUBULIFLORÆ.

Tribe I. VERNONIACEÆ. THE IRON-WEED TRIBE.

Heads discoid; the flowers all alike, perfect, tubular. Branches of the style slender and thread-form or bristle-form, acute, hairy all over, the stigmatic lines only on the lower part. (Corolla often slightly irregular.)

1. *VERNONIA*, Schreb. IRON-WEED.

Heads 15-many-flowered, in corymbose cymes. Involucre shorter than the flowers, of many appressed closely imbricated scales. Receptacle naked. Achenia cylindrical, ribbed. Pappus

double; the outer of very short little scale-like bristles; the inner of copious capillary bristles. — Perennial herbs, with alternate leaves and mostly purple flowers. (Named in honor of *Mr. Vernon*, an early English botanist who travelled in this country.)

1. **V. noveboracensis**, Willd. *Scales of the involucre tipped with a long bristle-form or awl-shaped spreading appendage or awn*; in some varieties merely pointed. — Low grounds near the coast, Maine to N. Jersey; and river-banks in the Western States. Aug. — A tall coarse weed with lanceolate various leaves.

2. **V. fasciculata**, Michx. *Scales of the involucre (all but the lowest) rounded and obtuse, without appendage*. — Prairies and river-banks, Ohio and westward. Aug. — Tall, with narrowly or broadly lanceolate leaves, and mostly crowded heads; but very variable.

2. ELEPHANTOPUS, L. ELEPHANT'S-FOOT.

Heads 3–5-flowered, clustered into compound heads. Involucre narrow and flattened, of 8 oblong dry scales. Achenia many-ribbed. Pappus of stout bristles, chaffy-dilated at the base. — Perennials, with alternate leaves and purplish flowers. (Name composed of *ἔλεφας*, *elephant*, and *πούς*, *foot*.)

1. **E. carolinianus**, Willd. Somewhat hairy, corymbose above, leafy; leaves ovate-oblong, thin. — Dry soil. Pennsylvania and southward.

Tribe II. EUPATORIACEÆ. THE EUPATORIUM TRIBE.

Branches of the style obtuse or club-shaped, usually elongated, minutely pubescent above on the outside; the stigmatic lines obscure within below the middle. Anthers without tails at the base.

Subtribe 1. EUPATORIÈÆ. — Heads discoid. Flowers all alike, perfect and tubular, almost never yellow.

3. SCLERÓLEPIS, Cass. SCLEROLEPIS.

Head single, many-flowered. Scales of the involucre linear, equal, in 1–2 series. Corolla 5-toothed. Achenia 5-angled. Pappus a single row of almost horny oval and obtuse scales. — A smooth aquatic perennial, with simple stems, rooting at the base, bearing linear entire leaves in whorls of 5 or 6, and terminated by a head of flesh-colored flowers. (Name from *σκληρός*, *hard*, and *λεπίς*, *a scale*, alluding to the hard pappus.)

1. **S. verticillata**, Cass. (Sparganóphorus, Michx.)—Pine barrens, New Jersey and southward. Aug.

4. **LIÀTRIS**, Schreb. BUTTON SNAKE-ROOT.

Head several-many-flowered. Scales of the involucre imbricated, appressed. Receptacle naked. Corolla 5-lobed, the lobes slender. Achenia slender, tapering to the base, about 10-ribbed. Pappus of 15-40 capillary bristles, which are manifestly plumose, or only barbellate. — Perennial herbs, chiefly with simple wand-like stems rising from a round or oblong tuber, with many narrow and rigid alternate entire leaves, and the heads of handsome rose-purple flowers disposed in an elongated spike or raceme; often resinous-dotted. (Derivation unknown.)

* *Pappus very plumose: corolla hairy within: heads many-flowered.*

1. **L. squarròsa**, Willd. (BLAZING STAR, &c.) Often hairy; leaves linear, elongated; heads few; *scales of the involucre numerous, with elongated and leaf-like spreading tips*, or the innermost merely pointed. — Dry soil, Pennsylvania and westward. Aug. — Stem 1°-3° high.

2. **L. cylindràcea**, Michx. Commonly smooth; leaves linear; *heads few (1-9), cylindrical-club-shaped; scales of the involucre all with short and rounded appressed tips*. — Dry open places, Niagara Falls, Michigan, and Wisconsin. Aug. — Stem 6'-18' high. (*L. flexuòsa*, Thomas.)

* * *Pappus merely barbellate (not evidently plumose to the naked eye): corolla smooth inside.*

3. **L. scariòsa**, Willd. Stem stout, pubescent, or hoary; *leaves (smooth, rough, or pubescent) lanceolate; the lowest oblong-lanceolate or obovate-oblong, tapering into a petiole; heads few or many, large, 30-40-flowered; scales of the somewhat spherical involucre obovate or spatulate, with dry and scarious often colored tips or margins*. — Dry sandy soil, N. England to Wisconsin. Sept. — Plant 2°-5° high: heads 1' broad.

4. **L. spicàta**, Willd. Smooth or somewhat hairy; stems wand-like, very leafy; leaves linear, the lower 3-5-nerved; heads densely crowded in a long spike, 8-12-flowered; *scales of the cylindrical-bell-shaped involucre oblong or oval, obtuse, appressed, with slight scarious (purplish) margins; achenia pubescent or smoothish*. — Moist grounds, S. New York to Michigan. Aug. — Stem 2°-5° high, mostly stout. Involucre somewhat resinous.

5. **L. graminifòlia**, Willd. Hairy or smoothish; stem wand-like, slender, leafy; leaves linear, elongated, 1-nerved; heads several or numerous, in a spike or raceme; 7-12-flowered; *scales of*

the obconical or obovoid involucre spatulate or oblong, obtuse, appressed; achenia hairy. — Pine barrens of New Jersey, in moist sand; only the var. DUBIA. Spike or raceme sometimes branched and paniced.

5. KÜHNIA, L. KUHNIA.

Heads 10 – 25-flowered. Scales of the involucre few and loosely imbricated, lanceolate. Corolla slender, 5-toothed. Achenia cylindrical, many-striate. Pappus a single row of very plumose (white) bristles. — A perennial herb, with mostly alternate lanceolate leaves, resinous-dotted, and paniculate-corymbose heads of nearly white flowers. (Dedicated to *Dr. Kuhn*, of Pennsylvania, who brought the living plant to Linnæus.)

1. **K. eupatorioides**, L. Leaves varying from broadly lanceolate and toothed, to linear and entire. — Dry soil, N. Jersey, Pennsylvania, and southward. Sept.

6. EUPATORIUM, Tourn. THOROUGHWORT.

Heads 3 – many-flowered. Involucre cylindrical or bell-shaped. Receptacle flat. Corolla 5-toothed. Achenia 5-angled. Pappus a single row of slender capillary barely roughish bristles. — Perennial herbs, often sprinkled with bitter resinous dots, with generally corymbose heads of white, bluish, or purple blossoms, appearing near the close of summer. (Dedicated to *Eupator Mithridates*, who is said to have used a species of the genus in medicine.)

* Heads cylindrical, 5 – 10-flowered; the purplish scales numerous, closely imbricated in several rows, of unequal length, slightly striate: stout herbs with ample mostly whorled leaves, and flesh-colored flowers.

1. **E. purpureum**, L. (JOE-PYE WEED. TRUMPET-WEED.) Stems tall and stout, simple; leaves 3 – 6 in a whorl, oblong-ovate or lanceolate, pointed, very veiny, roughish, toothed; corymbs very dense and compound. — Varies greatly in size (2° – 12° high), with spotted or unspotted, and often dotted stems, &c., and includes many nominal species. — Low grounds, common.

* * Heads 5 – 20-flowered: involucre of 8 – 15 more or less imbricated and unequal scales: flowers white.

+ Leaves opposite, or sometimes the uppermost alternate, sessile or nearly so: heads 5- (rarely 6 – 8-) flowered.

2. **E. hyssopifolium**, L. Minutely pubescent; leaves narrow, linear or lanceolate, elongated, obtuse, 1 – 3-nerved, entire, or the

lower sparingly toothed, often crowded in the axils or whorled, *acute at the base*; *scales of the involucre obtuse*. — Sterile soil, Massachusetts to Penn. and southward near the coast. — Plant 1° - 2° high.

3. **E. leucòlepis**, Torr. & Gr. Minutely pubescent; stem simple; *leaves linear-lanceolate, closely sessile, 1-nerved, obtuse, serrate, rough both sides*; corymb hoary; scales of the involucre with white and scarious acute tips. — Sandy bogs, Long Island and New Jersey. — Leaves not clustered in the axils.

4. **E. altissimum**, L. Stem stout and tall (3° - 7° high), *downy*; *leaves lanceolate, tapering at both ends, conspicuously 3-nerved*, entire or toothed above the middle, the uppermost alternate; corymbs numerous, dense; *scales of the involucre obtuse*, shorter than the flowers. — Dry soil, Penn. to Wisconsin. — Leaves 3' - 4' long, somewhat like those of a *Solidago*.

5. **E. álbum**, L. *Roughish-hairy*; *leaves oblong-lanceolate, coarsely-toothed, veiny*; heads clustered in the corymb; *scales of the involucre* closely imbricated, rigid, narrowly lanceolate, *pointed, white and scarious above, longer than the flowers*. — Sandy and barren places, New Jersey and southward. — Stem 2° high: heads very white.

6. **E. teucrifòlium**, Willd. Roughish-pubescent; *leaves ovate-oblong and ovate-lanceolate*, obtuse or truncate at the base, slightly triple-nerved, veiny, *coarsely toothed towards the base, the upper ones alternate*; branches of the corymb few, unequal; *scales of the involucre oblong-lanceolate, rather obtuse, at length shorter than the flowers*. (*E. verbenæfòlium, Michx.*) — Low grounds, Massachusetts to N. Jersey and southward near the coast. — Stem 2° - 3° high: leaves sometimes cut into a few very deep teeth.

7. **E. rotundifòlium**, L. Downy-pubescent; *leaves roundish-ovate, obtuse*, truncate or slightly heart-shaped at the base, deeply crenate-toothed, triple-nerved, veiny, roughish; corymb large and dense; *scales of the (5-flowered) involucre linear-lanceolate, slightly pointed*. — Dry soil, Rhode Island to New Jersey near the coast, and southward. — Leaves 1' - 2' long.

8. **E. pubéscens**, Muhl. Pubescent; *leaves ovate, mostly acute, slightly truncate at the base, serrate-toothed, somewhat triple-nerved, veiny*; *scales of the 7 - 8-flowered involucre lanceolate, acute*. (*E. ovatum, Bigel.*) — Massachusetts to New Jersey, near the coast. — Like the last, but larger, &c.

9. **E. sessilifòlium**, L. Stem tall (4° - 6°) and *smooth, branching*; *leaves lanceolate or ovate-lanceolate, tapering from near the rounded sessile base to the sharp point, serrate, veiny, smooth*; corymb very compound, pubescent; *scales of the 5- (or 5 - 12-?) flowered involucre oval and oblong, obtuse*. — Copses and banks, Massachusetts to Wisconsin. — Leaves 3' - 6' long.

← ← Heads 10 - 15-flowered: leaves opposite, clasping or united at the base, divaricate: corymbs very compound and large.

10. **E. resinòsum**, Torr. *Minutely velvety-downy; leaves linear-lanceolate, elongated, serrate, partly clasping at the base, tapering to the point, slightly veiny beneath; scales of the involucre oval, obtuse.* — Wet pine barrens, New Jersey. — Stems in tufts, 2° - 3° high. Leaves 4' - 6' long, adhering to paper in drying, from the copious resinous globules.

11. **E. perfoliàtum**, L. (THOROUGHWORT OR BONESET.) Stem stout, hairy; leaves lanceolate, elongated, united at the base around the stem (connate-perfoliate), tapering to a slender point, serrate, very veiny, wrinkled, downy beneath; scales of the involucre linear-lanceolate. — Low grounds, common, and well known. — Varies with the heads 30 - 40-flowered.

* * * Heads 8 - 30-flowered; the scales of the involucre nearly equal and in one row: leaves opposite, ovate, petioled, triple-nerved and veiny, not resinous-dotted: flowers white.

12. **E. ageratoides**, L. (WHITE SNAKE-ROOT.) Smooth, branching; leaves broadly ovate, pointed, coarsely and sharply toothed, long-petioled, thin; corymbs compound. — Rich woods and copses, N. England to Wisconsin, common northward. — Stem 2° - 3° high: leaves 4' - 5' long.

13. **E. aromàticum**, L. Smooth or slightly downy; stems nearly simple; leaves on short petioles, ovate, rather obtusely toothed, not pointed, thickish. — Copses, Massachusetts to Penn. and southward, near the coast. — Resembles the last; but is lower and more slender, with fewer, but usually larger heads, and different leaves.

7. MIKÀNIA, Willd. CLIMBING HEMP-WEED.

Heads 4-flowered. Involucre of 4 scales. Receptacle small. Flowers and achenia, &c., as in Eupatorium. — Climbing perennials, with opposite commonly heart-shaped and petioled leaves, and corymbose-panicled flesh-colored flowers. (Named in honor of Prof. Mikan, of Prague.)

1. **M. scàndens**, L. Nearly smooth, twining; leaves somewhat triangular-heart-shaped or halbert-form, pointed, toothed at the base. — Copses along streams, climbing over bushes. July - Sept.

8. CONOCLÍNIUM, DC. MIST-FLOWER.

Heads many-flowered. Involucre bell-shaped, the nearly equal linear-awl-shaped scales somewhat imbricated. Receptacle conical! Otherwise as in Eupatorium. — Perennial erect herbs, with

opposite petioled leaves, and violet-purple or bluish flowers in crowded terminal corymbs. (Name from *κῶνος*, a cone, and *κλίνη*, a bed, referring to the conical receptacle.)

1. **C. cœlestinum**, DC. Somewhat hairy; leaves triangular-ovate and slightly heart-shaped, coarsely and bluntly toothed, tapering to the apex. — Copses, Penn. and Ohio. Sept. — Plant 1° - 2° high, in tufts, with handsome bluish-purple blossoms.

Subtribe 2. TUSSILAGÍNEÆ. — Flowers of the head dissimilar, or diœcious; the pistillate often ligulate.

9. NARDÓSMIA, Cass. SWEET COLTSFOOT.

Heads many-flowered, somewhat diœcious: in the sterile plant with a single row of ligulate pistillate ray-flowers, and many tubular ones in the disk; in the fertile plant with many rows of minutely ligulate ray-flowers, and a few tubular perfect ones in the centre. Scales of the involucre in one row. Receptacle flat. Achenia terete. Pappus of soft capillary bristles, longer and copious in the fertile flowers. — Perennial woolly herbs, with the leaves all from the rootstock, the scape with sheathing scaly bracts, and the heads of purplish or whitish fragrant flowers in a corymb. (Name from *νάρδος*, *spikenard*, and *ὄσμή*, *odor*.)

1. **N. palmata**, Hook. Leaves rounded, somewhat kidney-form, white-woolly beneath, palmately and deeply 5-7-lobed, the lobes toothed and cut. (*Tussilago palmata*, Ait. *T. frigida*, Bigel.) — Swamps, Maine to Michigan northward; rare. May. — Full-grown leaves 6' - 10' broad.

10. TUSSILÀGO, Tourn. COLTSFOOT.

Head many-flowered; the ray-flowers narrowly ligulate, pistillate, fertile, in many rows; the tubular disk-flowers few, staminate. Scales of the involucre nearly in a single row. Receptacle flat. Fertile achenia cylindrical-oblong. Pappus capillary, copious in the fertile flowers. — A low perennial, with horizontal creeping rootstocks, sending up scaly simple scapes in early spring, bearing a single head, and producing rounded heart-shaped leaves later in the season. Flowers yellow. (Name from *tussis*, a cough, for which the plant is a reputed remedy.)

1. **T. Fáfara**, L. — Wet places, naturalized in cultivated

grounds. April.—Plant low, woolly: the full-grown leaves 4'–5' broad, woolly underneath, somewhat angled or toothed.

11. ADENOCAULON, Hook. ADENOCAULON.

Heads 5–10-flowered; the flowers all with tubular similar corollas; the 5 marginal pistillate, fertile; the others staminate. Scales of the involucre equal, in a single row. Achenia obovoid or club-shaped, beset with stalked glands above. Pappus none.—Slender perennials, with the alternate thin and petioled leaves smooth and green above, white woolly beneath, and few small (white?) heads in a loose panicle, beset with glands, whence the name, from ἀδήν, a gland, and καυλός, a stem.

1. **A. bicolor**, Hook. Leaves triangular, rather heart-shaped, with angular-toothed margins; petioles margined.—Moist woods, outlet of L. Superior, *Dr. Pitcher*. June.

Tribe III. ASTEROIDEÆ. THE ASTER TRIBE.

Branches of the style in the perfect flowers flat or flattish, smooth up to the point where the conspicuous stigmatic lines terminate, and prolonged above this into a flattened appendage, which is uniformly hairy or pubescent outside. Leaves almost always alternate.

Subtribe 1. ASTERINEÆ.—Heads with the flowers all alike and perfect, or with ligulate rays. Receptacle not chaffy. Anthers without tails at the base. Leaves alternate. (Genera No. 12–17, with the rays never yellow: genera No. 18–20, with the rays yellow or none.)

12. GALATÉLLA, Cass. GALATELLA.

Heads many-flowered, the rays few, sterile. Involucre shorter than the flowers, the scales closely imbricated in 3 or 4 rows, without herbaceous tips. Receptacle alveolate. Achenia oblong, silky-hairy. Pappus of copious capillary bristles.—Perennials, with straight stems, and narrow 1–3-nerved rather rigid entire leaves, often dotted. Flowers with purple or pale rays and a yellow disk. (Name a diminutive from that of the nymph *Galatea*.)

1. **G. hyssopifolia**, Nees. Branches corymbose, crowded; leaves lanceolate-linear, acute, dotted, 3-nerved; rays 5–10, white

tinged with purple. — Sandy fields, New Jersey, *Pursh.* — Not recently found, and perhaps not really a native of this country.

13. SERICOCÁRPUS, Nees. WHITE-TOPPED ASTER.

Heads 12 – 15-flowered; the rays about 5, perfect (white). Involucre somewhat cylindrical or club-shaped, closely imbricated in several rows, cartilaginous and whitish, with short and abrupt green tips. Receptacle alveolate-toothed. Achenia short, inversely pyramidal, very silky. Pappus simple, of capillary bristles. — Perennial tufted herbs, with sessile somewhat 3-nerved leaves, and small heads in little clusters disposed in a flat corymb. Disk-flowers pale yellow. (Name from *σηρικός*, *silky*, and *καρπός*, *fruit*.)

1. **S. solidagineus**, Nees. Smooth, slender; *leaves linear, rigid*, obtuse, entire, with rough margins, tapering to the base; *heads very small, in close clusters, few-flowered*; rays slender; *pappus white*. (*Aster solidagineus*, *Michx.*) — Copses, New England to Penn. near the coast. July.

2. **S. conyzoides**, Nees. Somewhat pubescent; *leaves oblong-lanceolate or the lower spatulate, mostly serrate* towards the apex, ciliate, *veiny*; heads rather loosely corymbed; involucre top-shaped; rays short; *pappus rusty-color*. (*Aster conyzoides*, *Willd.*) — Dry copses, common. July. — Plant 1^o – 2^o high.

14. ÁSTER, L. STARWORT. ASTER.

Heads many-flowered; the ray-flowers in a single series, fertile. Scales of the involucre more or less imbricated, usually with herbaceous or leaf-like tips. Receptacle flat, alveolate. Achenia generally more or less flattened. Pappus simple, of capillary bristles. — Perennial herbs (or annual in § 6), with corymbed, paniced, or racemose heads. Rays white, purple, or blue: the disk yellow, often changing to purple. (Name *ἀστήρ*, *a star*, from the appearance of the radiate heads of flowers.)

§ 1. ΒΙΔΤΙΑ, DC. — *Involucre obovoid-bell-shaped; the scales regularly imbricated in several rows, appressed, nearly destitute of herbaceous tips: rays 6 – 15 (white or nearly so): achenia slender: lower leaves large, heart-shaped, petioled, coarsely serrate: heads in open corymbs.*

1. **A. corymbosus**, Ait. (CORYMBED ASTER.) *Stem slender, somewhat zigzag; leaves thin, smoothish, coarsely and unequally serrate with sharp spreading teeth, sharp-pointed, ovate or ovate-lanceolate, all but the uppermost heart-shaped at the base and on slender*

naked petioles; rays 6-9.—Copses, common. July-Aug.—Plant 1°-2° high, with smaller heads, looser corymbs, rounder and less rigid exterior involucreal scales, and thinner (not rough, but sometimes pubescent) leaves, than the next.

2. **A. macrophýllus**, L. (LARGE-LEAVED ASTER.) Stem stout; leaves thickish, rough, closely serrate, somewhat pointed; the lower heart-shaped (4'-10' long and 3'-6' wide), long-petioled; the upper ovate or oblong, sessile or on margined petioles; heads in ample rigid corymbs; rays 12-25 (white or bluish).—Copses, common. Aug.-Sept.—Stem 2°-3° high, rigid; the branches rough-downy above. Involucre $\frac{1}{2}$ ' broad; the outer scales rigid, oblong or ovate-oblong, the innermost much larger and thinner.

§ 2. **CALLIÁSTRUM**, Torr. & Gr.—Scales of the involucre imbricated in several rows, coriaceous, with herbaceous spreading tips: rays 12-30, violet: achenia narrow (smoothish): pappus of rigid bristles of unequal thickness: stem-leaves all sessile; lower ones not heart-shaped: heads few, large and showy. (Allied to § 1, and to *Sericocarpus*.)

3. **A. rádula**, Ait. (ROUGH-LEAVED ASTER.) Stem corymbose at the summit, smooth; leaves oblong-lanceolate, pointed, sharply serrate in the middle, very rough both sides and rugose-veined, closely sessile; scales of the bell-shaped involucre oblong, appressed, with very short and slightly spreading herbaceous tips; achenia smooth, linear-oblong.—Bogs and low grounds, Maine to Penn., rare. Aug.—Stems 1°-3° high, many-leaved: the leaves 2'-3' long, nearly equal throughout. Rays light violet-purple. Involucre nearly smooth, except the ciliate margins.

4. **A. gràcilis**, Nutt. (LOW SHOWY ASTER.) Stems several by creeping suckers and offsets from the same root, low, slightly pubescent; leaves roughish, obscurely toothed, spatulate or narrowly oblong, contracted at the base, slightly clasping; heads (small) corymboid; involucre inversely conical, the whitish and coriaceous scales with short and blunt herbaceous tips, the outer successively shorter; achenia oblong-wedge-form, minutely hairy.—Sandy pine barrens, N. Jersey. Sept.—Scarcely a foot high, smaller in all its parts than the next, with narrow involucre very like those of *Sericocarpus conyzoides*. Rays about 12, bright violet.

5. **A. spectábilis**, Ait. (SHOWY ASTER.) Stems minutely rough and glandular-pubescent at the summit; leaves oblong-lanceolate, roughish, obscurely toothed, tapering to the base; scales of the short and nearly bell-shaped involucre almost equal, linear-oblong, with conspicuous spatulate glandular-downy tips; achenia slightly pubescent.—Sandy soil, Massachusetts to New Jersey, near the coast. Sept.-Nov.—Plant 1°-2° high, perhaps the handsomest of the genus, though the heads are few. The rays, about 20, are narrowly lanceolate, nearly 1' long, very deep violet-blue.

§ 3. **ASTER** proper. — *Scales of the involucre imbricated in various degrees, with herbaceous or leaf-like summits, or the outer ones entirely foliaceous: rays numerous: pappus soft and nearly uniform: achenia flattened.* (All flowering at the close of summer or in autumn.)

* *Leaves silvery-silky both sides, all sessile and entire, mucronulate: involucre imbricated in 3 to several rows: rays showy, purple-violet.*

6. **A. sericeus**, Vent. (SILVERY ASTER.) Stems slender, branched; leaves lanceolate or oblong; heads mostly solitary terminating the short silvery branchlets; scales of the subglobose involucre similar to the leaves, spreading, except the short coriaceous base, silvery; achenia smooth, many-ribbed. — Prairies and banks, Wisconsin and southward. — An elegant silvery species; the large heads with 20–30 rays $\frac{1}{2}$ ' or more in length.

7. **A. cóncolor**, L. (SILKY ASTER.) Stems wand-like, nearly simple; leaves crowded, oblong or lanceolate, appressed, the upper reduced to little bracts; heads in a simple or compound wand-like raceme; scales of the obovoid involucre closely imbricated in several rows, appressed, rather rigid, silky, lanceolate; achenia silky. Dry sandy soil, New Jersey and southward. — A handsome plant, 1°–3° high, with the short leaves 1' or less in length, grayish-silky and of the same hue both sides. Heads middle-sized, showy, bright violet-purple.

* * *Lower leaves not heart-shaped; the upper all sessile and more or less clasping by a heart-shaped or auricled base: heads showy: scales of the inversely conical or bell-shaped involucre regularly imbricated in several rows, the outer successively shorter, appressed, coriaceous, with short herbaceous tips: rays large, deep purple or blue.*

8. **A. patens**, Ait. (SPREADING ASTER.) Rough-pubescent; stem loosely paniced above, the heads mostly solitary, terminating the slender branchlets; leaves oblong-lanceolate or ovate-oblong, often contracted below the middle, all clasping by a deep auricled-heart-shaped base, rough, especially above and on the margins, entire; scales of the minutely roughish involucre with spreading pointed tips; achenia silky. — Var. **PHLOGIFOLIUS** is a form which the plant assumes in shady moist places, with larger and elongated scarcely rough thin leaves, downy underneath, sometimes a little toothed above, mostly much contracted below the middle. — Dry copses, common. — Stem 1°–3° high, with very spreading bushy branches, and large heads, with showy deep blue-purple rays.

9. **A. lævis**, L. (SMOOTH SKY-BLUE ASTER.) Very smooth throughout, glaucous; heads in a close panicle; leaves thickish, lanceolate or ovate-lanceolate, chiefly entire, the upper more or less clasping by an auricled or heart-shaped base; scales of the involucre with abrupt appressed green points; achenia smooth. — Rich woodlands and banks, common. — A handsome species, 2°–3° high, well

marked by its great smoothness, pale glaucous foliage, its copious rather large heads with triangular green tips to the otherwise white involucre, and the showy bright sky-blue rays.

* * * *Lower leaves all heart-shaped and petioled, the upper sessile or petioled: involucre imbricated much as in the last division, but the heads smaller, very numerous, racemose or paniced.*

+ *Leaves entire or slightly serrate: heads middle-sized: rays bright-blue.*

10. **A. azùreus**, Lindl. (ROUGH SKY-BLUE ASTER.) Stem rather rough, erect, racemose-compound at the summit, the branches slender and rigid; *leaves rough; the lower ovate-lanceolate or oblong, heart-shaped, on long often hairy petioles; the others lanceolate or linear, sessile, on the branches awl-shaped; involucre inversely conical.* — Copses and prairies, Ohio to Wisconsin. — A handsome species; the involucre much as in No. 9, but slightly pubescent; the rays bright blue.

11. **A. Shórtii**, Boott. (SHORT'S ASTER.) Stem slender, spreading, nearly smooth, bearing very numerous heads in racemose panicles; *leaves smooth above, minutely pubescent underneath, lanceolate or ovate-lanceolate, elongated, tapering gradually to a sharp point, all but the uppermost more or less heart-shaped at the base and on naked petioles; involucre bell-shaped.* — Cliffs and banks, from Ohio southward and westward. — A beautiful species, 2°–4° high; the leaves 3'–5' long.

12. **A. undulàtus**, L. (VARIABLE ASTER.) Pale or somewhat hoary with close pubescence; stem spreading, bearing numerous heads in racemose panicles; *leaves ovate or ovate-lanceolate, with wavy or slightly toothed margins, roughish above, downy underneath, the lowest heart-shaped on margined petioles, the others abruptly contracted into short broadly winged petioles which are dilated and clasping at the base, or directly sessile by a heart-shaped base; involucre obovoid. (A. diversifolius, Michx.)* — Dry copses, common.

+ + *Leaves conspicuously serrate: heads small: rays pale.*

13. **A. cordifolius**, L. (HEART-LEAVED ASTER.) Stem much branched above, *the spreading or diverging branches bearing very numerous paniced heads; lower leaves all heart-shaped, on slender and mostly naked ciliate petioles; scales of the inversely conical involucre all appressed and tipped with short green points, obtuse or acutish.* — Woodlands, very common. Varies with the stem and leaves either smooth, roughish, or sometimes hairy underneath. Heads in great profusion, but quite small. Rays pale blue.

14. **A. sagittifolius**, Willd. (ARROW-LEAVED ASTER.) Stem rigid, erect, with *ascending branches bearing numerous racemose heads; leaves ovate-lanceolate, pointed; the lower heart-shaped at the base, on margined petioles; the upper lanceolate or linear, pointed at both ends; scales of the oblong involucre linear, tapering into awl-shaped*

slender and loose tips. — Copses, &c., New York and Penn. to Wisconsin. — Usually more or less hairy; the heads rather larger than in the last, almost sessile, with bluish or nearly white rays.

* * * * *Leaves none of them heart-shaped; those of the stem sessile, narrow, rigid, entire: involucre imbricated in several rows: the coriaceous scales appressed and whitish at the base, with abrupt and conspicuous spreading herbaceous tips: heads small and very numerous, paniculate-racemose: rays white.*

15. **A. ericoides**, L. (HEATH-LIKE ASTER.) *Smooth or sparingly hairy, low; the simple branchlets or peduncles racemose along the upper side of the wand-like spreading branches; lowest leaves oblong-spatulate, sometimes toothed; the others linear-lanceolate or linear-awl-shaped, acute at both ends; scales of the involucre broadest at the base, with acute or awl-shaped green tips.* — Var. *VILLÒSUS* is a hairy form, often with broader leaves; chiefly in the Western States. — Dry open places, New York to Wisconsin. — Stem about 1° high.

16. **A. multiflorus**, Ait. (MANY-FLOWERED ASTER.) *Pale or hoary with minute close pubescence; the heads much crowded on the spreading racemose branches; leaves crowded, linear, spreading, with rough or ciliate margins, the upper somewhat dilated and partly clasping at the base; scales of the involucre with spatulate spreading green tips broader than the lower portion, the outer obtuse.* — Dry gravelly or sandy soil, common. — Plant 1° or so high, much branched and bushy.

* * * * * *Leaves none of them heart-shaped; those of the stem tapering at the base, sessile; involucre imbricated; the scales of unequal length, with short and narrow appressed or rather loose greenish tips: heads small or middle-sized: rays white or pale bluish-purple.*

→ *Heads small.*

17. **A. dumosus**, L. (BUSHY ASTER.) *Smooth or nearly so, racemosely compound, the scattered heads mostly solitary at the end of the spreading branchlets; leaves linear or the upper oblong, crowded, entire or slightly serrate, with rough margins; scales of the closely imbricated involucre linear-spatulate, obtuse, in 4-6 rows.* — Thickets in dry or moist soil, common. — A variable species, 1°-3° high, loosely branched, with small leaves, especially the upper, and an inversely conical or bell-shaped involucre, with more abrupt green tips than any of the succeeding. Rays pale purple or blue, larger than in the next. Runs into several peculiar forms.

18. **A. Tradescánti**, L. (NARROW-LEAVED ASTER.) *Smooth or smoothish; the numerous heads closely racemed along the erect-spreading or diverging branches; mostly one-sided; leaves lanceolate-linear, elongated, the larger ones remotely serrate in the middle with fine sharp teeth; scales of the involucre narrowly linear, acute or acutish, imbricated in 3 or 4 rows.* — Var. *FRÁGILIS*; leaves entire or

nearly so, except the lowest; heads more scattered. — Moist banks, &c., very common. — Stems 2°–4° high, bushy: heads very numerous, smaller than in the last. Rays white or nearly so.

19. **A. miser**, L., Ait. (INCONSPICUOUS ASTER.) *More or less hairy, much branched; the branches usually diverging, bearing racemose often scattered heads; leaves lanceolate or oblong-lanceolate, tapering or pointed at each end, sharply serrate in the middle; scales of the involucre linear, acute or rather obtuse, imbricated in 3 or 4 rows.* — Thickets, fields, &c., very common, and extensively variable. — Leaves larger than in either of the preceding; the involucre intermediate between No. 17 and 18, as to the form of the scales. Rays mostly short, pale bluish-purple or white.

++ Heads middle-sized.

20. **A. simplex**, Willd. (PALE WILLOW-LEAVED ASTER.) Smooth or nearly so, tall, much branched; the *branches and scattered heads somewhat corymbose at the summit; leaves lanceolate, pointed, the lower serrate; scales of the involucre linear-awl-shaped, loosely and sparingly imbricated.* — Shady moist banks, common. — Stem 3°–6° high. Lower leaves large. Rays pale. Approaches No. 19 on one side and the two following on the other.

21. **A. tenuifolius**, L. (TAPER-POINTED ASTER.) Nearly smooth; stem much branched, the heads somewhat panicled or racemed; *leaves narrowly lanceolate, tapering into a long slender point; the lower somewhat serrate in the middle; scales of the hemispherical involucre linear-awl-shaped, very slender-pointed, numerous, closely imbricated.* — Low grounds, New York to Ohio. — Stems 2°–5° high: larger leaves 3'–6' long, rather firm, with rough margins. Rays short and narrow, pale purple or whitish.

22. **A. carneus**, Nees. (VARIABLE ASTER.) Smooth, or the branches rough or pubescent; *leaves lanceolate, somewhat pointed, or the upper short and partly clasping; heads racemose along the ascending leafy branches; scales of the obovate involucre lanceolate, abruptly acute, closely imbricated.* — Moist soil, Massachusetts to Wisconsin. — Varies exceedingly, the *A. Greenei*, Torr. & Gr., being probably one of its forms. Leaves firm in texture, smooth, or rough above. Rays rather large, bluish, purplish, or almost white.

* * * * * *Stem-leaves sessile, the upper more or less clasping and often somewhat auricled at the base: scales of the hemispherical involucre loosely or slightly imbricated, somewhat equal, with loose herbaceous tips, or the outer often entirely herbaceous: heads middle-sized or large: rays blue or purple.*

23. **A. laxifolius**, Nees. (NARROW-LEAVED ASTER.) *Stem slender, rough, bushy-branched; leaves narrowly lanceolate-linear, elongated, taper-pointed, entire, with rough margins; heads corymbose, loose; scales of the involucre linear, loose; rays large, apparently*

light blue. — Var. *LÆTIFLORUS* has very slender branches and leaves, and the scales of the involucre unequal and more appressed. — Moist shady places, Ohio to Wisconsin and northward. Heads about as large as in *A. puniceus*, in some forms appearing more like *A. carneus*. Leaves 4'–7' long, $\frac{1}{4}$ ' to $\frac{1}{2}$ ' wide.

24. **A. Novi-Bélgii**, L. (PALE WILLOW-LEAVED ASTER.) *Nearly smooth; stem stout; leaves oblong-lanceolate, pale, or somewhat glaucous, serrate in the middle, acute, tapering to each end; scales of the involucre rather closely imbricated in about 3 series, with broadish acute herbaceous tips; rays pale blue or purplish.* — Low grounds, not well known in a wild state. Heads smaller and much less showy than in the next.

25. **A. longifolius**, Lam. (WILLOW-LEAVED BLUE ASTER.) *Smooth or nearly so; stem branched, corymbose-panicled at the summit; leaves lanceolate or linear, or the lower ovate-lanceolate, entire or sparingly serrate in the middle, taper-pointed, shining above; scales of the involucre imbricated in 3–5 rows, linear, with acute or awl-shaped spreading or recurved green tips; rays large and numerous, bright purplish-blue.* — Moist places, along streams, Maine to Penn., near the coast, common. — Plant 1°–5° high, with large and showy heads; very variable in the foliage, involucre, &c.; its multiform varieties including *A. laxus*, Willd. (a form with more leafy involucre), *A. præaltus*, Poir., and *A. elodes*, Torr. & Gr.

26. **A. puniceus**, L. (ROUGH-STEMMED ASTER.) *Stem tall and stout, rough-hairy all over or in lines, panicled above; leaves oblong-lanceolate, clasping by an auricled base, sparingly serrate in the middle with appressed teeth, rough above, nearly smooth underneath, pointed; scales of the involucre narrowly linear, acute, loose, equal, in about 2 rows; rays long and showy (lilac-blue, paler in shade).* — Low thickets and swamps, common. — Stem 3°–6° high, in open grounds usually purple, and very rough with rigid bristly hairs.

27. **A. prenanthoides**, Muhl. (TOOTHED-LEAVED ASTER.) *Stem low, corymbose-panicled, hairy above in lines; leaves rough above, very smooth underneath, ovate-lanceolate, sharply cut-toothed in the middle, conspicuously taper-pointed, and tapering below in a long contracted entire portion, which is abruptly dilated into an auricled-heart-shaped clasping base; scales of the involucre narrowly linear, with recurved-spreading tips; rays light blue.* — Moist copses. W. New York and Penn. to Ohio. — Stem 1°–3° high, usually much lower than the preceding, to which it is allied, though very distinct.

28. **A. amethystinus**, Nutt. (AMETHYSTINE ASTER.) *Grayish-hoary; stem racemose-panicled, leafy; leaves linear-lanceolate, entire, rough, acute, partly clasping by an auricled base; scales of the involucre nearly equal, linear, acute, imbricated, with spreading foli-*

aceous tips; rays violet-purple; achenia silky. — Near Boston and Salem, *Nuttall, Mr. Little*. — Scarcely known: allied to *A. oblongifolius*, and to the next; but the heads much smaller.

29. **A. Novæ-Angliæ**, L. (NEW ENGLAND ASTER.) Stem stout, hairy, corymbed at the summit; leaves very numerous, lanceolate, entire, acute, auriculate-clasping, clothed with minute roughish pubescence; scales of the involucre linear-awl-shaped, loose, equal, nearly in a single row, glandular-viscid, as well as the branchlets; rays violet-purple, sometimes rose-purple, very numerous; achenia hairy. — Moist grounds, common. — Stem 3° - 8° high; the showy heads crowded in close corymbs.

§ 4. ORITRÒPHIUM, Kunth. — Scales of the involucre narrow, nearly equal and almost in a single row, more or less herbaceous: pappus of soft and uniform capillary bristles: mostly low perennials, bearing solitary or few heads. (Chiefly arctic or alpine.)

30. **A. graminifolius**, Pursh. (GRASSY-LEAVED ASTER.) Slightly pubescent, slender (6' - 12' high); leaves very numerous, narrowly linear; branches prolonged into slender naked peduncles, bearing solitary small heads; rays rose-purple or whitish. — New Hampshire, about the White Mountains, *Mr. Eddy*. (*Herb. Tucker-man*.) A northern plant.

§ 5. ORTHÓMERIS, Torr. & Gr. — Scales of the involucre regularly imbricated, unequal, often carinate, with membranaceous margins, entirely destitute of herbaceous tips: pappus of soft and unequal capillary bristles.

31. **A. acuminatus**, Michx. (POINTED-LEAVED ASTER.) Somewhat hairy; stem low, simple, zigzag, paniced-corymbose at the summit; peduncles slender; leaves oblong-lanceolate, conspicuously pointed, coarsely toothed above, wedge-form and entire at the base; scales of the involucre few and loosely imbricated, linear-lanceolate, pointed, thin; rays 12 - 18, white, often tinged with purple. — Cool rich woods, N. England to Wisconsin, principally northward and on mountains. — About 1° high, with thin leaves 3' - 5' long, and few or several heads.

32. **A. nemoralis**, Ait. (GALATELLA-ASTER.) Minutely roughish-pubescent; stem slender, simple or corymbose at the summit, very leafy; leaves small (1' - 1½' long), rather rigid, lanceolate, nearly entire, with revolute margins; scales of the inversely conical involucre narrowly linear-lanceolate, the outer passing into awl-shaped bracts; rays lilac-purple, elongated. — Bogs, E. Massachusetts to New Jersey near the coast. — A handsome species, 1° - 2° high, with small pale leaves resinous-dotted beneath. Heads 1 or several, terminating peduncle-like simple branches.

33. **A. ptarmicoides**, Torr. & Gr. (SNEEZEWORD-ASTER.)

Low, smooth or roughish ; stems many from the same firm rootstock, simple ; *leaves linear-lanceolate, acute, rigid, entire*, with rough margins, tapering to the base, somewhat 3-nerved ; heads small, in a flat crowded corymb ; scales of the involucre closely imbricated in 3 or 4 rows, oblong, obtuse, the inner broadly margined ; rays 12-18, white, short. — Dry rocky banks, W. Vermont to Wisconsin northward. — A well-marked and handsome plant, 6'-12' high, tufted.

§ 6. OXYTRIPOLIUM, DC. — *Scales of the involucre imbricated, without herbaceous tips, usually very acute, the outer passing into scale-like bracts : pappus soft and capillary : achenia striate.* (Natives of salt marshes, smooth, with narrow and mostly fleshy leaves.)

34. **A. flexuosus**, Nutt. (PERENNIAL SALT-MARSH ASTER.) Stem zigzag, rigid, forked ; the *branches bearing large solitary heads ; leaves linear, thick and fleshy, pointed, entire ; scales of the bell-shaped involucre imbricated in many rows, ovate-lanceolate with awl-shaped points ; rays numerous, large, pale purple.* — Salt marshes, Maine to Penn.

35. **A. linifolius**, L. (ANNUAL SALT-MARSH ASTER.) Stem much branched, the *branches rather erect, bearing numerous racemose or paniced small heads ; leaves linear-lanceolate, pointed, entire, flat, on the branches awl-shaped ; scales of the oblong involucre linear-awl-shaped, in few rows ; rays somewhat in two rows, short, not projecting beyond the disk, more numerous than the disk-flowers, purplish.* (*A. subulatus, Michx.*) — Salt marshes, Maine to Penn. and southward. — Plant 1° - 2° high.

15. ERIGERON, L. FLEABANE.

Heads many-flowered, mostly hemispherical ; the narrow rays very numerous, pistillate. Scales of the involucre narrow, nearly equal and almost in a single row. Receptacle flat, naked. Achenia flattened, usually pubescent and 2-nerved. Pappus a single row of capillary bristles, with minuter ones intermixed, or with a distinct short outer pappus of little bristles or chaffy scales. — Herbs, with entire or toothed and generally sessile leaves, and solitary or corymbed flowers. Ray white or purple. (Name, from ἔρρ, *spring*, and γέρων, *an old man*, suggested by the hoary appearance of some of the vernal species.)

§ 1. CENOTUS, Nutt. — *Rays inconspicuous, in several rows, scarcely longer than the pappus : disk-corollas 4-toothed : pappus simple : annuals and biennials : heads very small, cylindrical.*

1. **E. Canadense**, L. (HORSE-WEED. BUTTER-WEED.) Bristly-hairy ; stem erect, wand-like ; leaves linear, mostly entire ;

those from the root cut-lobed; heads very numerous, panicled. — Waste places, a common weed everywhere. July — Oct. — Plant 5' — 5° high. Ligules much shorter than their tube.

§ 2. *EUERIGERON*, Torr. & Gr. — *Rays crowded and conspicuous, in one, two, or more rows: pappus simple. (Erect perennials: heads somewhat corymbed.)*

2. **E. bellidifolium**, Muhl. (ROBIN'S PLANTAIN.) Hairy, producing offsets from the base; stem simple, rather naked above, bearing few (1–9) large heads, on slender peduncles, root-leaves obovate and spatulate, sparingly toothed; those of the stem distant, lanceolate-oblong, partly clasping, entire; rays (about 50) rather broadly linear, light bluish-purple. — Copses and moist banks, common. May.

3. **E. Philadelphicum**, L. (ROSE-PURPLE FLEABANE.) Hairy; stem leafy, loosely corymbed at the summit, bearing several small heads; leaves thin, with a broad midrib, oblong; the upper smoothish, clasping by a heart-shaped base, mostly entire; the lowest spatulate, toothed; rays innumerable and very narrow, rose-purple or flesh-color. (*E. purpureum*, Ait.) — Copses and fields, common. June — Aug.

§ 3. *PHALACROLOMA*, Cass. — *Rays numerous, but nearly in a single row, conspicuous: pappus plainly double, the outer a crown of minute chaffy-bristle-form scales; the inner of scanty capillary bristles which are deciduous, or entirely wanting in the ray: annuals and biennials.*

4. **E. annuum**, Pers. (DAISY FLEABANE.) Stem tall, branched, beset with spreading hairs; leaves coarsely and sharply toothed; the lowest ovate, tapering into a margined petiole; the upper ovate-lanceolate, acute and entire at both ends; rays white, tinged with purple, not twice the length of the bristly involucre. (*E. heterophyllum*, Muhl. *E. strigosum*, Bigel.) — Fields and waste places, a very common weed. June — Aug. — Stem 3°–5° high, stout, bearing numerous corymbed heads, not showy.

5. **E. strigosum**, Muhl. (NARROW-LEAVED DAISY FLEABANE.) Stem panicled-corymbose at the summit, roughish like the leaves with minute appressed hairs, or almost smooth; leaves entire or nearly so, the upper lanceolate, scattered, the lowest oblong or spatulate, tapering into a slender petiole; rays white, twice the length of the minutely hairy involucre. (*E. integrifolium*, Bigel.) — Fields, &c., common. June — Aug. — Stem smaller and more simple than the last, with smaller heads but longer rays.

16. DIPLOPAPPUS, Cass. DOUBLE-BRISTLED ASTER.

Heads many-flowered, the rays 8–12, pistillate. Scales of the involucre imbricated, appressed, lanceolate or awl-shaped,

1-nerved or keeled, destitute of herbaceous tips. Receptacle flat, alveolate. Achenia flattish. Pappus double; the outer of very short and small stiff bristles, the inner of capillary bristles as long as the disk-corolla. — Perennials with corymbose or simple heads. (Name composed of διπλός, *double*, and πάππος, *pappus*, the character which distinguishes the genus from Aster.)

§ 1. **ΙΑΝΤΗ**, Torr. & Gr. — *Rays violet, showy: involucre much imbricated: achenia silky: bristles of the inner pappus all alike.*

1. **D. linariifolius**, Hook. (VIOLET DIPLOPAPPUS.) Stems low (8'–20' high), several from the same woody root, very leafy; leaves rigid, spreading, linear, strongly 1-nerved, smooth, with very rough margins; heads terminating the simple somewhat hoary branches. — Dry soil, common. Sept. — Heads large for the size of the plant, with long showy rays.

§ 2. **ΤΡΙΠΛΟΠΑΨΟΣ**, Torr. & Gr. — *Rays white: involucre shorter than the disk, imbricated in about 3 rows: achenia smoothish: bristles of the inner pappus unequal, some of them thickened at the tip: leaves large, scattered, membranaceous, veiny, entire: heads in compound flat corymbs.*

2. **D. umbellatus**, Torr. & Gr. (LARGE DIPLOPAPPUS.) Smooth, leafy to the top, *leaves lanceolate, elongated, taper-pointed* and tapering at the base; heads very numerous; scales of the involucre rather closely imbricated, obtusish. — Moist thickets, common, especially northward. Aug. — Stem 2°–6° high, bushy at the top. Leaves 3'–6' long.

3. **D. amygdalinus**, Torr. & Gr. (ALMOND-LEAVED DIPLOPAPPUS.) Smooth or roughish above, leafy; *leaves ovate-lanceolate, acute*, abruptly narrowed at the base; heads numerous, scales of the involucre loosely imbricated, obtuse. — Low grounds, New Jersey and southward. Aug. — Near the last, usually lower, rougher, and with broader and shorter leaves.

4. **D. cornifolius**, Darl. (CORNEL-LEAVED DIPLOPAPPUS.) *Stem low, pubescent and loosely paniced at the summit, bearing few heads on divergent peduncles; leaves elliptical or ovate-lanceolate, conspicuously pointed at both ends, ciliate, hairy on the veins underneath.* — Copses, Massachusetts to Penn. and southward. July–Sept. — Stem 1°–2° high.

17. **BOLTÒNIA**, L'Her. **BOLTONIA.**

Heads many-flowered, the rays numerous, pistillate. Scales of the hemispherical involucre imbricated somewhat in 2 rows, appressed, with narrow membranaceous margins. Receptacle con-

ical or hemispherical, naked. Achenia flat, obovate or inversely heart-shaped, margined with a callous wing, or in the ray 3-winged, crowned with a pappus of several minute bristles and frequently with 2-4 longer awns. — Perennial and bushy-branched smooth herbs, pale green, with the aspect of Aster: the thickish leaves often turned edgewise, chiefly entire. Heads loosely corymbose or paniced, rather small. Rays white or purplish. (Dedicated to *I. Bolton*, an English botanist of the last century.)

1. **B. asteroides**, L'Her. Leaves lanceolate; achenia broadly oval; pappus of few minute bristles and no awns. — Moist places along streams, Pennsylvania (*Bartram*) and southward. — Plant 3° - 6° high.

2. **B. glastifolia**, L'Her. Leaves lanceolate; achenia obovate, broadly winged; pappus of several short bristles and especially in the disk, and 2 or 3 more or less prolonged awns. — Rich moist soil, Pennsylvania, Ohio, and southward. Sept. — Resembles the last, except the pappus, and is much more common.

18. SOLIDAGO, L. GOLDEN-ROD.

Heads few-many-flowered; the rays 1 to 16, pistillate. Scales of the oblong involucre appressed, destitute of herbaceous tips (except No. 1). Receptacle small, alveolate. Achenia many-ribbed, nearly terete. Pappus simple, of equal capillary bristles. — Perennial herbs, with mostly wand-like stems and nearly sessile stem-leaves, never heart-shaped. Heads small, racemed or clustered: flowers both of the disk and ray (except No. 2) yellow. (Name from *solido*, to join, or make whole, in allusion to its reputed vulnerary qualities.) Flowering in Aug. and Sept.

§ 1. **CHRYSÁSTRUM**, Torr. & Gr. — Scales of the much imbricated rigid involucre with abruptly spreading herbaceous tips: heads in clusters or glomerate racemes disposed in a dense somewhat leafy and interrupted wand-like compound spike.

1. **S. squarròsa**, Muhl. (LARGE-SPIKED GOLDEN-ROD.) Stem stout (2° - 5° high), hairy above; leaves large, oblong, or the lower spatulate-oval and tapering into a margined petiole, serrate, veiny; disk-flowers 16-24, the rays 12-16. — Rocky wooded hills, Maine and W. Vermont to Penn.

§ 2. **VIRGAUREA**, Tourin. — Scales of the involucre destitute of herbaceous tips: rays mostly fewer than the disk-flowers: heads all more or less pedicelled.

* *Heads in close axillary clusters or short clustered racemes: leaves feather-veined. (Rays 3-6.)*

2. **S. bicolor**, L. (WHITE-RAYED GOLDEN-ROD.) *Hoary or grayish with soft hairs; stem mostly simple; leaves oblong or elliptical lanceolate, acute at both ends, or the lower oval and tapering into a petiole, slightly serrate; clusters or short racemes from the axils of the upper leaves, forming an interrupted spike or crowded panicle; rays small, cream-color or nearly white.* — Var. *CÓNCOLOR* has the rays yellow. — Dry copses and banks, common, the var. in Pennsylvania and westward.

3. **S. latifolia**, L. (BROAD-LEAVED GOLDEN-ROD.) *Smooth or nearly so, stem angled, zigzag, simple or paniculate-branched; leaves broadly ovate or oval, very strongly and sharply serrate, conspicuously pointed at both ends; heads in very short axillary sessile clusters, or somewhat prolonged at the end of the branches.* — Moist shaded banks, in rich soil, common, especially northward. — Stem 1° - 3° high, slender. Leaves thin, 3' - 6' long.

4. **S. cæsia**, L. (BLUE-STEMMED GOLDEN-ROD.) *Smooth; stem terete, mostly glaucous, at length much branched and diffuse; leaves lanceolate or oblong-lanceolate, serrate, pointed, sessile; heads in very short axillary clusters, or somewhat racemose paniced on the branches.* — Moist rich woodlands, common. Heads rather smaller than in No. 3.

* * *Racemes terminal, erect, either somewhat simple and wand-like, or compound and paniced, not one-sided: leaves feather-veined. (Not maritime.)*

+ *Heads small: leaves nearly entire, except the lower.*

5. **S. virgata**, Michx. (WAND-STEMMED GOLDEN-ROD.) *Very smooth throughout; stem very strict and simple, slender, beset with small and entire appressed lanceolate-oblong leaves, which are gradually reduced upwards to mere bracts; the lowest oblong-spatulate, all thickish and smooth; heads crowded in a very narrow compound spicate raceme; rays 5-7.* — Damp pine barrens, New Jersey and southward, 2° - 4° high.

6. **S. pubérula**, Nutt. (MANY-FLOWERED GOLDEN-ROD.) *Stem and panicle very minutely hoary; stem-leaves lanceolate, acute, tapering to the base; the lower wedge-lanceolate and sparingly toothed; heads very numerous, crowded in compact erect-spreading short racemes, forming a prolonged and dense narrow or pyramidal panicle; scales of the involucre linear-awl-shaped, appressed; rays about 10.* — Sandy soil, Maine to N. Jersey and southward near the coast. — Plant 1° - 3° high, simple or branched; the leaves 2' - 3' long, green and nearly smooth.

7. **S. stricta**, Ait. (WILLOW-LEAVED GOLDEN-ROD.) *Very smooth throughout; stem simple, strict; leaves lanceolate, pointed, the*

lower tapering gradually into winged petioles, partly sheathing at the base, minutely serrate above with appressed teeth; *racemes much crowded and appressed in a dense wand-like panicle*; scales of the involucre linear-oblong, obtuse; rays 5-6, small. — Peat-bogs, Maine to W. New York and northward. — Stem 2°-3° high: the root-leaves 6'-10' long. It flowers earlier than its allies, beginning in July.

++ Heads rather large, at least for the size of the plant.

8. **S. speciosa**, Nutt. (SHOWY GOLDEN-ROD.) Stem stout (3°-5° high), smooth; *leaves thickish, smooth* with rough margins, *oval or ovate*, slightly serrate, the uppermost oblong-lanceolate, the lower contracted into a margined petiole; *heads somewhat crowded in numerous erect racemes, forming an ample pyramidal or thyrsiform panicle*; peduncles and pedicels rough-hairy; scales of the cylindrical involucre oblong, obtuse; rays about 5, large. — Var. *ANGUSTATA* is a dwarf form, with the racemes short and clustered, forming a dense somewhat interrupted or compound spike. — Copses, Massachusetts to N. Jersey and Ohio. — A very handsome species; the lower leaves 4'-6' long and 2'-4' wide in the larger forms.

9. **S. humilis**, Pursh. (LOW GOLDEN-ROD.) Smooth, sometimes a little glutinous; *stem low* (6'-20' high); *leaves thickish, oblanceolate or the radical oblong-spatulate, crenate-serrate* towards the apex; the upper lanceolate, acute at both ends; *heads clustered in a wand-like or thyrsiform glomerate raceme or panicle*; scales of the involucre oblong, mostly obtuse; rays 6-8, short. — Rocky or gravelly banks, base of the White Mountains, N. Hampshire, W. Vermont, islands in L. Huron, and northward. — Leaves rigid. Heads numerous, smaller than in the next, which it perhaps too nearly approaches.

10. **S. Virga-aurea**, L., var. *ALPINA*, Bigel. (LOW MOUNTAIN GOLDEN-ROD.) *Nearly smooth, dwarf* (2'-8' high), *bearing 1 to 5 or 8 heads*; *leaves thickish, oblong-spatulate or oblanceolate, sparingly crenate-serrate*, the lower tapering into a winged petiole; *scales of the involucre lanceolate, acute*; rays about 8, short. — Alpine summits of the White Mountains, N. Hampshire, Mt. Katahdin, Maine (*Prof. Bailey, Mr. E. Hale*), and Mt. Marcy, New York. L. Superior.

11. **S. thyrsoides**, E. Meyer. (LARGE MOUNTAIN GOLDEN-ROD.) Stem smooth, or downy above, simple; *leaves ovate, irregularly and sharply serrate, pointed, veiny, large and thin*, all except the uppermost abruptly contracted into long margined petioles; heads in small clusters in the axils of the upper leaves, and crowded in an oblong or wand-like raceme or contracted panicle; *scales of the involucre membranaceous, lanceolate, taper-pointed, long*; rays 8-10. (*S. Virga-aurea, Pursh, Bigel. S. leiocarpa, DC.*) — Wooded sides of the White Mountains, N. Hampshire, Green Mountains, Vermont, and Catskill Mountains, New York. — Stem 1°-3° high. Heads large.

* * * *Heads in a compound corymb terminating the simple stem, showy: leaves thickish, mostly feather-veined from a strong midrib.*

12. **S. rigida**, L. (RIGID GOLDEN-ROD.) *Rough and somewhat hoary with a minute pubescence; stem stout (3° - 5° high), very leafy; the short compact clusters densely corymbed at the summit; leaves oval or oblong, or the upper ovate-oblong and closely sessile by a broad base, slightly serrate, the uppermost entire, veiny, thick and rigid; heads about 34-flowered, the rays 7 - 10. — Dry soil, Connecticut to Michigan. Heads large.*

13. **S. Ohioënsis**, Riddell. (OHIO GOLDEN-ROD.) *Very smooth throughout; stem wand-like, slender, leafy; stem-leaves oblong-lanceolate, entire, flat, closely sessile, the lower and the radical elongated, slightly serrate towards the apex, somewhat veiny, tapering into long margined petioles; heads numerous in a flat-topped compound corymb, on smooth pedicels, 16 - 20-flowered, the rays 6 or 7. — Moist meadows or prairies, W. New York to Ohio and Indiana. — Plant 2° - 3° high; the root-leaves 1° long; the upper reduced to 1' - 2', with rough margins, like the rest. Heads smaller than in any other of this section, scarcely one third the size of those of No. 12.*

14. **S. Riddëllii**, Frank. (RIDDELL'S GOLDEN-ROD.) *Smooth and stout, very leafy; the branches of the dense corymb and pedicels rough-pubescent; leaves linear-lanceolate, elongated, entire, acute, partly clasping or sheathing, conduplicate and mostly recurved, the lowest elongated-lanceolate and tapering into a long keeled petiole, obscurely 3-nerved; heads very numerous in close clusters, aggregated in a spreading flat-topped compound corymb, 20 - 24-flowered, the rays 7 - 9. — Wet grassy prairies, Ohio to Wisconsin. — Stem 2° - 3° high. Heads larger than in the last, 2'' - 3'' long. Stem-leaves 4' - 6' long, grass-like, upright and partly sheathing at the base, then gradually recurved-spreading.*

15. **S. Houghtonii**, Torr. & Gray, ined. (HOUGHTON'S GOLDEN-ROD.) *Smooth; stem rather low and slender; leaves scattered, linear-lanceolate, acutish, flat, entire, tapering into a narrowed slightly clasping base or the lower into margined petioles; heads several, crowded in a small nearly simple corymb, 20 - 30-flowered; the rays 9 or 10. — North shore of L. Michigan; collected in the Michigan State Survey. Aug. — Stem 1° - 1½° high. Leaves smooth, but not shining, rough margined, 3' - 5' long, 1-nerved, or the lower very obscurely 3-nerved above. Corymb minutely pubescent. Heads large, nearly ½' long, not very numerous. Scales of the involucre obtuse, minutely ciliate.*

* * * * *Heads in one-sided more or less spreading or recurved racemes: leaves veiny, not 3-ribbed.*

← *Leaves thickish or fleshy, very smooth and entire, elongated, obscurely veiny: heads rather large: natives of salt marshes.*

16. **S. sempérvirens**, L. (SEA-SIDE GOLDEN-ROD.) Smooth and stout; leaves fleshy, lanceolate, slightly clasping, or the lower lanceolate-oblong, obscurely triple-nerved; racemes short, in an open or contracted panicle. — Varies, in less brackish swamps, with thinner and elongated linear-lanceolate leaves, tapering to each end, with more erect racemes in a narrower panicle. — Salt marshes, or rocks on the shore, Maine to Penn. and southward. — Stem stout, 1° - 8° high. Heads showy: the golden rays 8 - 10.

← ← *Leaves usually ample, serrate, loosely feather-veined, or rarely slightly triple-nerved: heads middle-sized.*

17. **S. ellíptica**, Ait. (ELLIPTIC-LEAVED GOLDEN-ROD.) Smooth; stem stout; *very leafy; leaves elliptical or oblong-lanceolate, acute, closely sessile, slightly serrate, strongly veined, thick, smooth both sides, shining above; heads in dense spreading racemes which are crowded in a close pyramidal panicle; peduncles and achenia strigose-pubescent.* — Swamps (fresh or brackish), New Jersey, *Carey*. Rhode Island, *Olney*. Sept. - Oct. — Stem 1° - 2° high: leaves 2' - 3' long. Heads showy, 3" long, the rays 8 - 12.

18. **S. neglécta**, Torr. & Gray. (SMOOTH GOLDEN-ROD.) Smooth; stem stout; *leaves thickish, smooth both sides, opaque; the upper oblong-lanceolate, mostly acute and nearly entire; the lower ovate-lanceolate or oblong, sharply serrate, tapering into a petiole; racemes short and dense, at length spreading, disposed in an elongated or pyramidal close panicle; peduncles and achenia nearly glabrous.* — Swamps, Maine to Penn. and Wisconsin. — Stem 2° - 3° high; the lower leaves 5' - 7' long. Heads rather large, crowded; the racemes at first erect and scarcely one-sided.

19. **S. pátula**, Muhl. (SHAGREEN-LEAVED GOLDEN-ROD.) Stem strongly angled, smooth; *leaves (large) ovate, acute, serrate, pale, very smooth and veiny underneath, but the upper surface very rough; racemes rather short and numerous, on the spreading branches.* — Swamps, common. — Stem 3° - 5° high; the lead-colored leaves often 6' - 8' long, the upper surface remarkably rough, like shagreen.

20. **S. argûta**, Ait. (SHARP-TOOTHED GOLDEN-ROD.) Smooth throughout; *radical and lower stem-leaves elliptical or lanceolate-oval, sharply serrate with spreading teeth, pointed, tapering into winged and ciliate petioles; the others lanceolate or oblong, slightly triple-nerved, tapering to each end, the uppermost entire; racemes dense, naked, at length elongated and recurved, forming a crowded and flat corymb-like panicle; rays 8 - 12, small.* — Var. 1. *JÚNCEA* has all the leaves narrower and less serrate, or all the upper entire. — Var. 2. *SCABRÉLLA* is somewhat roughish-pubescent (Wisconsin, &c.). — Copses and banks, common, especially the 1st variety. — Well distinguished by its long or drooping racemes, and the closely appressed rigid scales of the involucre, small rays, &c.

21. **S. Muhlenbergii**, Torr. & Gr. (MUHLENBERG'S TOOTHED GOLDEN-ROD.) *Smooth; stem angled; leaves (large and thin) ovate, and the upper elliptical-lanceolate, very sharply and strongly serrate, pointed at both ends, the lowest on margined petioles; racemes pubescent, spreading, disposed in an elongated open panicle; rays 6-7, large.* — Copses and moist woods, Massachusetts to Penn. — More slender and simple than the last, with much shorter racemes, looser and more slender thin involucre scales, &c.

22. **S. linoïdes**, Solander. (SLENDER GOLDEN-ROD.) *Smooth; stem slender, simple; leaves lanceolate, serrate with small appressed teeth, narrowed at the base, the lower tapering into margined ciliate petioles, the uppermost oblong; racemes short, crowded in one or 3-4 small one-sided panicles; heads small and few-flowered; rays 1-3.* — Bogs, near Boston and Providence, to the pine barrens of N. Jersey. — Stem 12' - 20' high, with a panicle only 3' - 4' long; sometimes larger and nearly approaching No. 18.

+ + + *Leaves small, serrate, copiously feather-veined, the veinlets conspicuously reticulated: heads small.*

23. **S. altissima**, L. (ROUGH-HAIRY GOLDEN-ROD.) *Rough-hairy, especially the stem; leaves ovate-lanceolate, elliptical, or oblong, acute or pointed, coarsely serrate, often thickish and very rugose; racemes paniced, spreading; scales of the involucre linear; rays 6-9; the disk-flowers 4-7.* — Borders of fields and copses, very common, presenting a great variety of forms: 2° - 7° high.

24. **S. ulmifolia**, Muhl. (SMOOTH-STALKED GOLDEN-ROD.) *Stem smooth, the branches hairy; leaves thin, elliptical-ovate or oblong-lanceolate, pointed, tapering to the base, coarsely serrate, loosely veined, beset with soft hairs beneath; racemes paniced, recurved-spreading; scales of the involucre lanceolate-oblong; rays about 4.* — Low copses, common, especially southward. — Distinguished from the last by its smooth stem and thin larger leaves.

+ + + + *Leaves entire or nearly so, thickish, the veins obscure.*

25. **S. pilosa**, Walt. (HAIRY-STALKED GOLDEN-ROD.) *Stem stout, upright (3° - 7° high), clothed with spreading hairs, often paniced at the summit; leaves oblong-lanceolate, roughish, hairy beneath, at least on the midrib, serrulate, the upper ovate-lanceolate or oblong and entire, closely sessile; racemes many, recurved, crowded in a dense pyramidal panicle; rays 7-10, very short.* — Low grounds, pine barrens of New Jersey and southward.

26. **S. odora**, Ait. (FRAGRANT-LEAVED GOLDEN-ROD.) *Smooth or nearly so throughout; stem slender (2° - 3° high), often reclined; leaves linear-lanceolate, entire, shining, very smooth, pellucid-dotted; racemes spreading, in a small one-sided panicle; rays 3-4, rather large.* — Border of thickets in dry or sandy soil, Vermont and Maine

to Penn. chiefly eastward.—The crushed leaves yield a pleasant anisate odor.

+++ + *Leaves grayish or hoary, thickish, feather-veined and slightly triple-nerved: heads middle-sized.*

27. **S. nemoralis**, Ait. (GRAY GOLDEN-ROD.) *Clothed with a minute and close grayish-hoary pubescence; stem simple or corymbed at the summit; leaves oblanceolate or spatulate-oblong, the lower somewhat crenate-toothed and tapering into a petiole; racemes numerous, dense, at length recurved, forming a crowded compound raceme or panicle which is usually turned to one side; scales of the involucre linear-oblong, appressed; rays 6–9.—Dry sterile fields, very common.—Plant 8'–20' high, with the panicle usually large in proportion.*

* * * * *Heads in one-sided spreading or recurved racemes, forming an ample panicle: heads small: scales of the involucre thin and narrow: leaves 3-ribbed.*

28. **S. Canadensis**, L. (COMMON 3-RIBBED GOLDEN-ROD.) *Stem tall and stout (3°–6° high), rough-hairy; leaves lanceolate, pointed, sharply serrate (sometimes almost entire), more or less pubescent beneath and rough above; heads small; rays very short.—Borders of thickets and fields, very common.—Varies greatly in the roughness and hairiness of the stem and leaves, the latter oblong-lanceolate or elongated linear-lanceolate; in var. PRÒCERA, whitish woolly underneath, and in var. SCÀBRA also very rough above, often entire, and rugose-veined.*

29. **S. serótina**, Ait. (LATE 3-RIBBED GOLDEN-ROD.) *Stem very smooth, tall and stout (4°–8° high), often glaucous; leaves lanceolate, pointed, serrate, roughish above, smooth except the veins underneath which are more or less hairy; rays short.—Thickets and low grounds, common. Intermediate in character, and in the size of the heads and rays, between the last and the next.*

30. **S. gigantea**, Ait. (SMOOTH 3-RIBBED GOLDEN-ROD.) *Stem stout (3°–7° high), smooth, often glaucous; leaves quite smooth both sides, lanceolate, taper-pointed, very sharply serrate, except the narrowed base, rough-ciliate; the ample panicle pubescent; rays rather long.—Copses and fence-rows, common; presenting many varieties, with decidedly larger heads and rays than in the two preceding.*

§ 4. **EUTHAMIA**, Nutt.—*Corymbosely much branched: heads small, sessile in little clusters which are crowded in flat-topped corymbs: the closely appressed scales of the involucre somewhat glutinous: receptacle fimbriate: rays 15–20, short, more numerous than the disk-flowers: leaves narrow, entire, sessile, crowded.*

31. **S. lanceolata**, L. (BUSHY GOLDEN-ROD.) *Leaves lanceolate-linear, 3–5-nerved, the nerves, margins, and angles of the*

branches minutely rough-pubescent; heads obovoid-cylindrical, in dense corymbed clusters; rays 15-20. — Copses and river-banks, common. — Stem 2°-4° high: leaves 3'-5' long.

32. **S. tenuifolia**, Pursh. (SLENDER BUSHY GOLDEN-ROD.) Smooth; leaves very narrowly linear, mostly 1-nerved, dotted; heads obovoid-club-shaped, in numerous clusters of 2 or 3, disposed in a loose corymb; rays 6-12. — Sandy fields, Massachusetts to New Jersey and southward, near the coast. — More slender, with smaller and less clustered heads than the last.

19. **BIGELÓVIA**, DC. RAYLESS GOLDEN-ROD.

Heads 3-4-flowered, the flowers all perfect and tubular: rays none. Involucre club-shaped, yellowish, the rigid somewhat glutinous scales linear, closely imbricated and appressed. Receptacle narrow, with an awl-shaped prolongation in the centre. Achenia somewhat obconical, hairy. Pappus a single row of capillary bristles. — A perennial smooth herb, simple or branched from the base, naked above, corymbose at the summit, with small heads in a flat-topped corymb. Flowers yellow. Leaves scattered, oblanceolate or linear, 1-3-nerved. (Dedicated by De Candolle to *Dr. Bigelow*, author of the *Florula Bostoniensis*, and the *American Medical Botany*.)

1. **B. nudata**, DC. — Swamps, pine barrens, New Jersey and southward. Sept. — Stem 1° high, slender.

20. **CHRYSÓPSIS**, Nutt. GOLDEN ASTER.

Heads many-flowered; the rays numerous, pistillate. Scales of the involucre linear, imbricated, without herbaceous tips. Receptacle flat. Achenia obovate or linear-oblong, flattened, hairy. Pappus of all the flowers double, the outer a set of very short and somewhat chaffy bristles, the inner of elongated capillary bristles. — Chiefly perennial herbs, woolly or hairy, with rather large often corymbose heads, terminating the branches. Disk and ray-flowers yellow. (Name from χρυσός, *gold*, and ὄψις, *aspect*, in allusion to the golden blossoms.)

1. **C. Mariàna**, Nutt. Clothed with long and weak somewhat deciduous silky hairs; stem rather stout, leafy; leaves oblong or elliptical, veiny, nearly entire, the upper closely sessile, the lower tapering at the base into a petiole; heads (large) corymbed; achenia compressed. — Dry sandy soil, Long Island to New Jersey and southward. Aug. — Plant 1°-2° high.

2. **C. falcàta**, Ell. *Stems low, very woolly; leaves crowded, linear, rigid, about 3-nerved, entire, spreading, somewhat recurved or scythe-shaped, hairy, or smooth when old, sessile; heads (small) corymbed; achenia oblong-linear.* — Dry sandy soil, pine barrens of New Jersey and Long Island, to Rhode Island. Aug. — Stems stout, 5' - 10' high.

3. **C. graminifolia**, Nutt. *Silvery-silky with long close-pressed hairs; stem slender, naked above, the few (showy) heads loosely corymbed; leaves lanceolate or linear, elongated, grass-like, nerved, shining, entire; achenia linear.* — Dry sandy soil, Delaware and southward, — to be sought in S. New Jersey.

Subtribe 2. BACCHARÍDEÆ. — Heads not radiate; the flowers all tubular, diœcious or monœcious; the corolla of the pistillate flowers very slender and thread-like, truncate, of the staminate 5-toothed. Anthers without tails at the base. Receptacle naked. Leaves alternate.

21. BÁCCHARIS, L. GROUNDSEL-TREE.

Heads many-flowered, diœcious, viz. the pistillate and staminate flowers in separate heads borne by different plants. Involucre imbricated. Achenia ribbed. Pappus of slender capillary bristles, in the sterile plant scanty and tortuous; in the fertile plant very long and copious. — Shrubs, commonly smooth and resinous or glutinous. Flowers whitish. (Name of a shrub anciently dedicated to *Bacchus*.)

1. **B. halimifolia**, L. (SEA GROUNDSEL-TREE.) Smooth and somewhat scurfy; branches angled; leaves obovate and wedge-form, coarsely toothed above, or the upper entire; heads scattered or in leafy panicles. — Sea-beach, Connecticut to New Jersey, and southward. Sept. - Oct. — Shrub 6° - 12° high; the fertile plant conspicuous in autumn by its very long and white pappus.

Subtribe 3. TARCHONÁNTHEÆ. — Heads and flowers nearly as in subtribe 2, but chiefly monœcious. Anthers produced into tails at the base. Receptacle naked or chaffy. Leaves alternate.

22. PLUCHÈA, Cass. MARSH FLEABANE.

Heads many-flowered; the flowers all tubular; the central perfect but sterile, few, with a 5-cleft corolla; the others with a

thread-shaped truncate corolla, pistillate and fertile. Involucre imbricated. Achenia grooved. Pappus capillary, in a single row. — Herbs, somewhat glandular, emitting a strong and disagreeable or camphoric odor, the heads in close compound corymbs. Flowers purplish. (Dedicated to an obscure French botanist, *N. Pluche.*)

1. **P. camphorata**, DC. (SALT-MARSH FLEABANE.) *Minutely viscid, pale; leaves scarcely petioled, oblong-ovate or lanceolate, thickish, obscurely veiny, serrate; corymb flat; involucre viscid-downy.* ① (*Conyza camphorata, Bigel. C. Marylandica, Pursh.*) — Salt marshes, Massachusetts to New Jersey and southward. Aug. — Plant 10' - 20' high.

2. **P. foetida**, DC. (WESTERN MARSH FLEABANE.) *Almost smooth; leaves distinctly petioled, veiny, oval-lanceolate, pointed at both ends, serrate; corymbs paniced; involucre smooth.* ‡ — Riverbanks, Ohio and southward. Aug. — Stem stout, 2° - 4° high.

Subtribe 4. INULÉÆ. — Heads radiate, with the flowers as in subtribe Asterineæ: but the anthers with tails at the base. Receptacle naked. Leaves alternate.

23. ÍNULA, L. ELEECAMPANE.

Heads many-flowered; the rays in a single row, pistillate; the disk-flowers perfect. Involucre imbricated. Pappus of capillary bristles. — Heads solitary or corymbose, large; the ray and disk yellow. (The ancient Latin name.)

1. **I. Helènum**, L. (COMMON ELEECAMPANE.) Stout; leaves large, woolly underneath; those from the thick perennial root ovate, petioled, the others partly clasping; outer scales of the involucre leaf-like; rays very many, narrow; achenia prismatic, 4-sided. — Road-sides, introduced. Aug. — Heads very large. Root mucilaginous.

Subtribe 5. ECLÍPTEÆ. — Heads radiate, &c., as in the last; but the anthers without tails, and the receptacle chaffy. Pappus not capillary. Leaves opposite.

24. ECLÍPTA, L. ECLÍPTA.

Heads many-flowered; the rays short, in a single row, the disk-flowers perfect, 4-toothed. Scales of the involucre 10 - 12, in 2 rows, leaf-like, ovate-lanceolate. Receptacle flat, furnished

with almost bristle-form chaff. Achenia short, 3-4-sided or in the disk 2-sided, roughened on the sides, hairy at the summit; the pappus none or an obscure denticulate crown. — Annual or biennial rough herbs, with slender stems and opposite lanceolate or oblong leaves. Heads solitary, small. Flowers whitish: anthers brown. (Name from *ἐκλείπω*, to be deficient, alluding to the absence of pappus.)

1. **E. procumbens**, Michx. Rough with close appressed hairs; stems procumbent, creeping, or ascending; leaves oblong-lanceolate, acute at each end, sessile, slightly serrate; peduncles axillary or terminal, many times longer than the head. — Var. **BRACHYPODA** has the peduncles not more than twice the length of the heads. — Wet river-banks, W. Penn. and Ohio, southward. June - Oct.

Tribe IV. SENECONIÐEÆ. THE GROUNDSEL TRIBE.

Branches of the style linear, hairy or pencil-tufted at the apex where the stigmatic lines terminate abruptly, either truncate or produced beyond into a cone or more or less elongated hairy appendage. Leaves opposite or alternate.

Subtribe 1. MELAMPODINEÆ. — Flowers all either staminate or pistillate (not perfect), the two kinds either in the same head, when the fertile are in the border, or in separate heads. Receptacle mostly chaffy. Anthers without tails at the base. Pappus mostly none, never of bristles.

25. POLYMNIA, L. POLYMNIA.

Heads many-flowered; the rays several, pistillate and fertile, those of the disk perfect, but sterile. Scales of the involucre in 2 rows; the outer about 5, leaf-like, large and spreading, the inner small and membranaceous, partly embracing the thickened round-obovoid achenia. Receptacle flat, the chaff membranaceous. Pappus none. — Tall branching perennial herbs, viscid-hairy, exhaling a heavy odor. Leaves large and thin, opposite, or the uppermost alternate, large, lobed, and with dilated appendages like stipules at the base. Heads in paniced corymbs. Flowers light yellow. (Dedicated to one of the Muses, for no imaginable reason, as the plants are coarse and inelegant.)

1. **P. Canadensis**, L. (SMALL-FLOWERED POLYMNIA.) *Clammy-hairy*; lower leaves deeply pinnatifid, the uppermost triangular-

ovate, 3-5-lobed or angled, petioled; *rays few, obovate or wedge-form, shorter than the involucre*, whitish-yellow. — Moist shaded ravines, W. New York to Wisconsin. July.

2. **P. Uvedàlia**, L. (LARGE POLYMNIA. LEAF-CUP.) *Roughish hairy, stout (4°-10° high)*; leaves broadly ovate, angled and toothed, nearly sessile; the lower palmately lobed, abruptly narrowed into a winged petiole; outer involucre scales very large; *rays 10-15, linear-oblong, much longer than the inner scales of the involucre*, yellow. — Rich soil, W. New York and Penn., southward. Aug.

26. SÍLPHIUM, L. ROSIN-PLANT.

Heads many-flowered; the rays numerous, pistillate and fertile, their broad flat ovaries imbricated in 2 or 3 rows; the disk-flowers perfect, but sterile. Scales of the broad and flattish involucre imbricated in several rows, broad and with loose leaf-like summits, except the innermost, which are small and resemble the linear chaff of the flat receptacle. Achenia broad and flattened (parallel with the scales of the involucre), surrounded by a wing which is notched at the top, destitute of pappus, or with 2 teeth confluent with the winged margin: achenia of the disk sterile and stalk-like. — Coarse and tall rough perennial herbs, with a copious resinous juice, and large corymbose-panicked yellow-flowered heads. (Σιλφίον, the ancient name of a plant which produced some gum-resin (assafœtida?), was transferred by Linnæus to this American genus.)

* *Stem terete, naked above, alternate-leaved near the base.*

1. **S. laciniàtum**, L. (ROSIN-WEED.) *Very rough-bristly throughout*; stem stout; *leaves pinnately parted*, petioled but dilated and clasping at the base; *their divisions lanceolate or linear, acute, cut-lobed or pinnatifid*, rarely entire; heads few (large), somewhat racemed; *scales of the involucre ovate, tapering into long and spreading rigid points*; achenia broadly winged and deeply notched. — Prairies, Michigan and Wisconsin, thence southward. July. — Root very thick. Stem 3°-5° high; heads 1'-2' broad. Lower leaves 12'-30' long, ovate in outline, said to present their faces uniformly north and south (which is not the case), and hence called *Compass-plant*.

2. **S. terebinthinàceum**, L. (PRAIRIE BURDOCK.) *Stem smooth*, tall, panicked at the summit and bearing many (small) heads, leafless except next the base; *leaves ovate and ovate-oblong, somewhat heart-shaped, serrate-toothed*, rough, especially beneath; *scales of the involucre roundish, obtuse, smooth*; achenia narrowly winged,

slightly notched and 2-toothed. — Var. *PINNATÍFIDUM* has the leaves deeply cut or pinnatifid, but varies into the ordinary form. — Prairies and oak-openings, Ohio and Michigan, thence southward. July–Sept. — Stem slender, 4°–10° high; the thick root-leaves 1°–2° long, and on long petioles.

* * *Stem terete or slightly 4-angled, leafy: leaves undivided.*

3. **S. trifoliatum**, L. (WHORLED ROSIN-PLANT.) Stem tall and rather slender (4°–6° high), smooth, often glaucous, branched above, stem-leaves lanceolate, pointed, entire or scarcely serrate, rough, short-petioled, in whorls of 3 or 4, the uppermost opposite; heads loosely paniced; involucre smooth; achenia rather broadly winged and sharply 2-toothed at the top. — Dry plains and banks, W. New York and Penn. to Wisconsin and southward. Aug.

4. **S. integrifolium**, Michx. (ENTIRE-LEAVED ROSIN-PLANT.) Stem rather stout (2°–4° high), rigid, 4-angular and grooved, rough, nearly simple; leaves all opposite, rigid, lanceolate-ovate, entire, tapering to a sharp point from a roundish heart-shaped and partly clasping base, rough-pubescent or nearly smooth; heads in a close forking corymb, short-peduncled; scales of the involucre rough and rigid, the outer acute, achenia broadly winged and deeply notched. — Var. *LÆVE* has the stem and leaves smooth or nearly so. — Prairies, Michigan, Wisconsin, and southward. Aug. — Leaves thick, 3'–5' long.

* * * *Stem square: leaves opposite, connate.*

5. **S. perfoliatum**, L. (CUP-PLANT.) Stem stout, often branched above; leaves ovate, coarsely toothed, the upper united by their bases and forming a cup-shaped disk, the lower abruptly narrowed into winged petioles which are connate by their bases; heads corymbose; achenia winged and variously notched. — Rich soil along streams, Michigan, Ohio, and southward. July. — Stem 4°–6° high: leaves thin, 6'–14' long.

27. **IVA**, L. MARSH ELDER. HIGHWATER-SHRUB.

Heads several-flowered, not radiate; the fertile and sterile flowers in the same heads, the former few (1–5) and marginal, with a small tubular corolla; the latter with a funnel-form 5-toothed corolla. Scales of the involucre few, generally in one row, roundish. Receptacle small, with narrow chaff among the flowers. Achenia obovoid or lenticular. Pappus none. — Herbaceous or shrubby maritime or saline plants, with thickish leaves, the lower opposite, and small greenish-white heads on short recurved peduncles in the axils of the leaves or of bracts. (Derivation unknown.)

1. **I. frutescens**, L. Shrubby at the base, branching, nearly smooth; leaves oval or lanceolate, coarsely and sharply toothed, the

upper reduced to linear bracts, in the axils of which the heads are disposed, forming leafy paniced racemes; fertile flowers and scales of the involucre 5. — Sea-coast, Massachusetts to N. Jersey and southward. Aug. — A coarse plant, 3° - 8° high.

28. AMBRÒSIA, Tourn. RAG-WEED.

Sterile and fertile flowers occupying different heads on the same plant; the fertile 1 - 3 together and sessile in the axil of leaves or bracts at the base of the racemes or spikes of sterile heads. Sterile involucre flattish or top-shaped, composed of 7 - 12 scales united into a cup, containing 5 - 20 funnel-form staminate flowers. Fertile involucre oblong or top-shaped, closed, pointed, and usually with 4 - 8 tubercles or horns near the top in one row, inclosing a single flower which is composed of a pistil only; branches of the style elongated. Achenia ovoid: pappus none. — Chiefly annual coarse weeds, with opposite or alternate lobed or dissected leaves, and inconspicuous greenish or whitish flowers. (*Ἀμβροσία*; *the food of the gods*, an ill-chosen name for these worthless and coarse weeds.)

1. *A. trifida*, L. (GREAT RAG-WEED.) *Stem tall and stout, square, rough-hairy, as well as the large opposite deeply 3-lobed leaves; racemes paniced; fruit (fertile involucre) 6-ribbed, the ribs terminating in as many crested tubercles.* — Var. *INTEGRIFÒLIA* has all the *leaves*, or the upper ones, *undivided, ovate or oval, pointed.* — Low moist banks of streams, common, especially westward. — A coarse unsightly plant, 4° - 12° high. Leaves 4' - 7' broad, the lobes oval-lanceolate, serrate.

2. *A. artemisiæfòlia*, L. (ROMAN WORMWOOD.) *Stem slender, much branched (1° - 3° high), hairy or roughish-pubescent; leaves opposite and the upper alternate, twice-pinnatifid, smoothish above, paler or hoary beneath; racemes or spikes loosely paniced; fruit obovoid or globular, pointed, armed with about 6 short acute teeth or spines.* — Waste places everywhere. July - Sept. — An extremely variable weed, with finely cut leaves, embracing several nominal species.

29. XÁNTHIUM, Tourn. COCKLE-BURR. CLOT-BURR.

Sterile and fertile flowers occupying different heads on the same plant; the latter clustered below, the former in short spikes or racemes above. Sterile involucre and flowers as in Ambrosia, but the scales separate. Fertile involucre closed, coriaceous, ovoid or

oblong, clothed with hooked prickles so as to form a rough burr, 2-celled, 2-flowered; the flowers consisting of a pistil with a slender thread-form corolla. Achenia oblong, flat; destitute of pappus. — Coarse and low annuals, with branching stout stems, and alternate toothed or lobed petioled leaves. (Name from ξάυθος, *yellow*, in allusion to the color the plants are said to yield.)

* *Leaves heart-shaped, rounded, not spiny at their base; fruit (involucre) terminated by 2 stout beaks.*

1. **X. strumarium**, L. (COMMON COCKLE-BURR.) *Fruiting involucre oval, rather pubescent, the beaks straight; leaves 3-5-lobed and cut-toothed; lobes acute.* — Var. **CANADENSE** has mostly larger involucre than the introduced plant, more rough and prickly; the stem spotted. — Waste places. July-Sept. — The var. is native in the West. A vile weed.

2. **X. echinatum**, Murray. (SEA COCKLE-BURR.) *Fruiting involucre oval, very thickly beset with rigid slender prickles which are strongly bristly, as well as the incurved beaks; stem and stalks rough, spotted; leaves obscurely lobed or toothed.* — Salt marshes, Massachusetts to N. Jersey and southward. Aug.-Oct. — Ripe involucre 1½ long, thick and turgid.

* * *Leaves narrowed into the petiole, furnished with 3 slender yellow spines at the base, fruit tipped with a single inconspicuous beak.*

3. **X. spinosum**, L. (THORNY CLOT-BURR.) *Leaves ovate-lanceolate, pointed, wedge-shaped at the base, entire, or slightly 3-lobed, hoary underneath; stem much branched.* — Waste places, introduced and naturalized along the seaboard. Sept. - Nov.

Subtribe 2. HELIANTHÆ. — Heads radiate, or rarely discoid; the disk-flowers always perfect and fertile. Receptacle chaffy. Anthers blackish, not tailed at the base. Pappus none or crown-like, or of one or two chaffy awns, never capillary or of uniform chaffy scales. Leaves chiefly opposite. (Genera 30-35 and 38 have the achenia flattened laterally if at all: genera 36 and 37 have them flattened parallel with the scales of the involucre.)

30. HELIÓPSIS, Pers. OX-EYE.

Heads many-flowered; the rays 10 or more, fertile. Scales of the involucre in 2 or 3 rows; the outer leaf-like and somewhat spreading, the inner shorter than the disk. Receptacle conical: chaff linear. Achenia smooth, 4-angular. Pappus none, or a mere border. — Perennial herbs, like Helianthus. Heads showy,

peduncled, terminating the stem or branches. Leaves opposite, petioled, triple-ribbed, serrate. Flowers light yellow. (Name composed of ἥλιος, *the sun*, and ὄψις, *appearance*, from its resemblance to the Sunflower.)

1. **H. lævis**, Pers. Nearly smooth; leaves ovate-lanceolate or oblong-ovate. — Var. *SCΛΒΡΑ* has roughish foliage and the involucre somewhat hoary. — Banks and copses, common. Aug. Stem 1° - 4° high.

31. ECHINÀCEA, Mœnch. PURPLE CONE-FLOWER.

Heads many-flowered; the rays very long, drooping, pistillate but sterile. Scales of the involucre imbricated, lanceolate, spreading. Receptacle conical; the lanceolate chaff tipped with a cartilaginous point, longer than the disk-flowers. Achenia thick and short, 4-sided. Pappus a small crown-form toothed border. — Perennial herbs, with the stout and nearly simple stems naked above and terminated by a single large head; the leaves chiefly alternate, 3 - 5-nerved. Rays rose-purple, rather persistent; disk purplish. (Name formed from ἔχινος, *the Hedge-hog* or *Sea-urchin*, in allusion to the spiny chaff of the roundish disk.)

1. **E. purpûrea**, Mœnch. Leaves rough, often serrate; the lowest ovate, 5-nerved, veiny, long-petioled; the others ovate-lanceolate; involucre imbricated in 3 - 5 rows; stem smooth, or in one variety (*E. serótina*, DC.) rough bristly, as well as the leaves. — Prairies and banks, Ohio and westward. July. — Rays 15 - 20, dull purple, 1' - 2' long. Root thick, black, very pungent to the taste, used in popular medicine under the name of *Black Sampson*.

32. RUBBÉCKIA, L. CONE-FLOWER.

Heads many-flowered, the rays neutral. Scales of the involucre leaf-like in about 2 rows, spreading. Receptacle conical or columnar; the short chaff concave, not rigid. Achenia 4-angular, smooth, not margined, flat at the top, with no pappus, or a minute crown-like border. — Chiefly perennial herbs, with alternate leaves, and showy heads terminating the stem or branches; the rays generally long and drooping, yellow. (Named in honor of the *Professors Rudbeck*, father and son, predecessors of Linnæus at Upsal.)

* *Disk oblong-conical, and columnar in fruit, greenish-yellow: leaves all more or less divided and cut.*

1. **R. laciniata**, L. (TALL CONE-FLOWER.) Stem smooth, branching (3° - 7° high); leaves smooth or roughish, the lowest pinnate, with 5 - 7 cut or 3-lobed leaflets; upper leaves irregularly 3 - 5-parted; the lobes ovate-lanceolate, pointed, or the uppermost undivided; chaff truncate and downy at the tip; rays linear, long and drooping. — Low thickets, common. July - Sept.

* * *Disk broadly conical, dark purple or brown.*

2. **R. triloba**, L. Hairy, much branched, the branches slender and spreading; *upper leaves ovate-lanceolate*, sparingly toothed, *the lower 3-lobed*, tapering at the base, *coarsely serrate* (those from the root various); rays 8, *oval or oblong*; chaff of the black-purple disk smooth, *awned*. ② — Dry soil, Ohio and southward. Aug. — Plant 2° - 5° high; the heads small, but numerous and showy.

3. **R. speciosa**, Wender. Roughish-hairy, branched; the branches upright, elongated and naked above, terminated by single large heads; *leaves lanceolate or ovate-lanceolate, pointed at both ends, petioled, 3 - 5-nerved, coarsely and unequally toothed or incised*; involucre much shorter than the numerous elongated rays; chaff of the dark purple disk acutish, smooth. — Dry soil, W. Penn. to Ohio. Plant 1° - 2° high; the rays 1' - 1½' long.

4. **R. fulgida**, Ait. Hairy, branching, the upright branches naked at the summit and bearing single heads; *leaves spatulate-oblong or lanceolate, partly clasping, triple-nerved, the upper entire, mostly obtuse*; rays about 12, equalling or exceeding the involucre; chaff of the dark purple disk nearly smooth and blunt. — Dry soil, Penn. and southward. — Variable, 1° - 3° high: the rays orange-yellow.

5. **R. hirta**, L. Very rough and bristly-hairy throughout; stems simple or branched near the base, naked above, bearing single large heads; *leaves nearly entire; the upper oblong or lanceolate, sessile*; the lower spatulate, triple-nerved, petioled; rays (about 14) more or less exceeding the involucre; *chaff of the dull brown disk hairy at the tip, acutish*. — Dry soil, W. New York to Wisconsin and southward. Aug. — Stem stout, 1° - 2° high; the heads large, but coarser and less showy than the preceding, variable as to the size of the rays.

33. LÉPACHYS, Raf. (OBELISCARIA, DC.)

Heads many-flowered; the rays few, neutral. Scales of the involucre few and small, spreading. Receptacle oblong or columnar: the chaff truncate, thickened, and bearded at the tip, partly embracing the flattened and margined achenia. Pappus none, or 2 teeth. — Perennial herbs, with alternate pinnate leaves; the grooved stems or branches naked above, and terminated by single showy heads. Rays yellow or particolored, large and drooping;

the disk grayish. (Name from *λεπίς*, a scale, and *παχύς*, thick, referring to the thickened tips of the chaff.)

1. **L. pinnàta**, Torr. & Gr. Hoary with minute appressed hairs, tall, branching; leaflets 3-7, lanceolate, acute at both ends, toothed or entire; disk oblong, much shorter than the large and drooping light-yellow rays. — Dry soil, Chatauque County, New York, *Dr. Sartwell*, to Wisconsin and southward. July. — Plant 4° high. Rays 2' or more long: the disk exhaling an anisate odor when bruised. Achenia slightly margined on the inner edge, and obscurely 2-toothed at the top.

34. HELIÁNTHUS, L. SUNFLOWER.

Heads many-flowered; the rays several or many, neutral. Involucre imbricated. Receptacle flattish or convex; the persistent chaff embracing the 4-sided and laterally compressed achenia, which are neither winged nor margined. Pappus very deciduous, of 2 thin chaffy-awned scales on the principal angles of the achenium, and often 2 or more little intermediate scales. — Coarse and stout herbs, often exuding a resin, with solitary or corymbed heads, and yellow rays. Flowering toward autumn. (Name from *ἥλιος*, the sun, and *ἄνθος*, a flower.)

* *Perennial: disk convex, dark purple: leaves opposite, or the upper alternate.*

1. **H. angustifolius**, L. (NARROW-LEAVED SUNFLOWER.) *Stem tall and slender; leaves long and linear, sessile, entire, with revolute margins, 1-nerved, pale beneath; heads (small) loosely corymbed, long-peduncled; scales of the involucre irregularly imbricated, leafy-tipped, narrowly lanceolate, spreading in fruit. — Low pine barrens, New Jersey and southward.*

2. **H. rigidus**, Desf. (THICK-LEAVED SUNFLOWER.) *Stem stout, simple or sparingly branched, rough; leaves very thick and rigid, rough both sides, oblong-lanceolate, pointed at both ends, slightly serrate; the lowest oval; scales of the involucre regularly imbricated, appressed, ovate or ovate-lanceolate, obtuse, destitute of leaf-like tips; pappus of 2 large and often several small scales. — Prairies, Michigan and westward. — Stem 1° - 3° high: heads large.*

* * *Perennial: disk convex, yellow: scales of the involucre regularly imbricated and appressed, with somewhat spreading and acute, but not foliaceous tips: leaves chiefly opposite.*

3. **H. lætiflorus**, Pers. (BRIGHT SUNFLOWER.) *Stout and rough, branching above; leaves oval-lanceolate, very rough both sides, narrowed into short petioles, serrate, taper-pointed, the uppermost al-*

ternate and nearly entire; heads single or corymbed, on naked peduncles; scales of the involucre ovate-lanceolate, pointed, ciliate. — Dry open places, Ohio and westward. — Stem 3°–4° high. Leaves thick, as in No. 2. Rays showy, 1'–2' long.

4. **H. occidentàlis**, Riddell. (WESTERN LOW SUNFLOWER.) Somewhat hairy; stem *slender, simple, naked above*, bearing 1–5 small heads on long peduncles; *lowest leaves oval or lanceolate-ovate, 3-nerved, obscurely serrate, roughish-pubescent beneath, abruptly contracted into long hairy petioles; the upper small and remote* (all opposite), entire; scales of the involucre oval-lanceolate, pointed, ciliate. — Dry barrens, Ohio and Michigan westward. — Plant 1°–3° high, producing runners from the base.

5. **H. cinereus**, var. **SULLIVANTII**, Torr. & Gr. (HOARY SUNFLOWER.) *Gray, with a close roughish pubescence; stem branching above, hairy; leaves ovate-oblong, sessile by a narrowed base, acute, obscurely serrate; the upper small and remote; peduncles slender; scales of the involucre lanceolate, hoary.* — Darby Plains, Ohio, *Sullivant*. Stem 2°–3° high, bearing few heads as large as in the next: intermediate between it and the last.

6. **H. mollis**, Lam. (DOWNY SUNFLOWER.) Stem clothed with soft white hairs, *simple, leafy; leaves ovate, with a somewhat heart-shaped and clasping base, pointed, nearly entire, hoary above, very soft white-woolly and reticulated underneath; scales of the involucre lanceolate, downy.* — Barrens and prairies, Ohio and westward.
* * * *Perennial: heads small: scales of the involucre few, shorter than the yellow disk, irregularly imbricated, appressed, the outer with spreading foliaceous pointed tips: rays 5–8.*

7. **H. microcéphalus**, Torr. & Gr. (SMALL-FLOWERED SUNFLOWER.) Stem smooth, with numerous slender branches above; leaves opposite, or the uppermost alternate, thin, ovate-lanceolate, taper-pointed, somewhat serrate, veiny, petioled, rough above, downy or hairy underneath; peduncles slender, rough; scales of the involucre ovate and ovate-lanceolate, ciliate. — Thickets, W. Penn. and westward. — Stem 3°–8° high: heads $\frac{1}{3}$ ' broad, the rays nearly 1' long.

* * * * *Perennial: heads middle-sized or large: scales of the involucre irregularly imbricated, loose, with spreading foliaceous summits, as long as the yellow disk or longer.*

+ *Leaves chiefly alternate or scattered, feather-veined.*

8. **H. giganteus**, L. (TALL SUNFLOWER.) *Stem hairy or rough, branched above; leaves lanceolate, pointed, serrate, very rough above, rough-hairy beneath, narrowed and ciliate at the base, but nearly sessile; scales of the involucre long, linear-lanceolate, pointed, hairy, or strongly ciliate.* — Var. **AMBIGUUS** has most of the leaves opposite and closely sessile by an obtuse base, and approaches No. 10.

— Thickets and swamps, common. — Stem 3° - 10° high. Heads numerous: the pale yellow rays 15 - 20.

9. **H. grosse-serratus**, Martens. (STALK-LEAVED TALL SUNFLOWER.) Stem smooth and glaucous, at least below; leaves elongated-lanceolate or ovate-lanceolate, taper-pointed, serrate, rough above, rounded or acute at the base, petioled, rough above, hoary and downy beneath; scales of the involucre lance-awl-shaped, slightly ciliate. — Dry plains, Ohio and southwestward. — Some forms nearly approach the last.

++ Leaves chiefly opposite, 3-nerved or triple-nerved.

† 10. **H. divaricatus**, L. (CROSS-LEAVED SUNFLOWER.) Stem simple or forked and corymbed at the top, smooth; leaves all opposite and divaricate, ovate-lanceolate, 3-nerved from the rounded or truncate sessile base, tapering gradually to a sharp point, serrate, thickish, rough; scales of the involucre lanceolate from a broad base, pointed, equalling the disk; rays 8 - 12. — Thickets and barrens, common. — Stem 1° - 4° high: leaves 3' - 6' long: heads small.

11. **H. hirsutus**, Raf. (ROUGH-HAIRY SUNFLOWER.) Stem simple or forked above, bristly-hairy; leaves more or less petioled, ovate-lanceolate, gradually pointed, slightly serrate, rounded or obtuse at the base, very rough above and rough-hairy underneath; scales of the involucre ovate-lanceolate, pointed, equalling the disk; rays about 12. — Dry plains, &c., Ohio and westward. — Plant stout, 1° or more high, allied to the last.

12. **H. tracheliifolius**, Willd. (THROATWORT SUNFLOWER.) Stem loosely branched, tall, hairy; leaves thin, ovate-lanceolate, or oblong-lanceolate, taper-pointed, sharply serrate, smoothish or roughish-pubescent both sides, contracted into short petioles; scales of the involucre lanceolate-linear, elongated and very taper-pointed, loose, exceeding the disk; rays 12 - 15. — Copses, Penn.? and Ohio.

13. **H. decapetalus**, L. (CUT-TOOTHED SUNFLOWER.) Stem tall and branching, smooth below; leaves thin and green both sides, smooth or roughish, ovate, coarsely serrate, pointed, abruptly contracted into margined petioles; scales of the involucre lanceolate-linear, elongated, loosely spreading, the outer longer than the disk; rays about 10. — Var. FRONDOSUS has the outer involucre scales foliaceous or changing to leaves. — Copses and low banks of streams, common.

14. **H. strumosus**, L. (PALE-LEAVED SUNFLOWER.) Stem rather simple and tall, smooth below; leaves ovate-lanceolate, tapering gradually to a point, serrate with small appressed teeth, abruptly contracted into short margined petioles, rough above, whitish and naked or minutely downy underneath; scales of the involucre broadly lanceolate with spreading tips, equalling the disk; rays mostly 10. — Var. MOLLIS has the leaves softly downy underneath. — River-banks and low copses, common.

15. **H. doronicoides**, Lam. (LARGE-LEAVED SUNFLOWER.) Stem tall and stout, branching, *rough-hairy above; leaves ovate or oblong-lanceolate, pointed, serrate, strongly triple-nerved*, rough above, *downy underneath*, the lower often heart-shaped and on margined petioles; scales of the involucre linear-lanceolate, pointed, scarcely exceeding the disk; rays 12-15. — River-bottoms, Ohio and southwestward. — A coarse species, 5°-8° high, with ample thickish leaves (the lower often 1° long), and showy heads.

+++ *Leaves chiefly alternate, triple-nerved: introduced.*

16. **H. tuberôsus**, L. (JERUSALEM ARTICHOKE.) Tuber-bearing; stem stout and tall, branched, rough; leaves petioled, rough, ovate, pointed, serrate, the lower heart-shaped; scales of the involucre linear-lanceolate; rays 12-20. — Naturalized in fence-rows and around gardens.

H. ANNUUS, L., the COMMON SUNFLOWER, which grows spontaneously around dwellings, belongs to the annual section of the genus, with large flat heads and a brownish disk.

35. **ACTINÓMERIS**, Nutt. ACTINOMERIS.

Heads many-flowered, the rays few or several, neutral rarely none. Involucre foliaceous, nearly equal, in 1 to 3 rows. Receptacle convex or conical, chaffy, the chaff embracing the outer margin of the flat (laterally compressed) and winged achenia. Pappus of 2 smooth persistent awns. — Tall and branching perennial herbs, with serrate feather-veined leaves, tapering to the base and mostly decurrent on the stem. Heads corymbed: flowers chiefly yellow. (Name from *ἀκτίς*, a ray, and *μέρις*, a part; alluding to the fewness or irregularity of the rays.)

1. **A. squarrôsa**, Nutt. (TALL ACTINOMERIS.) *Stem somewhat hairy and winged above; leaves alternate or the lower opposite, oblong or ovate-lanceolate, pointed at both ends; heads in an open corymbed panicle; scales of the involucre in 2 rows, the outer linear-spatulate, reflexed; rays 4-10, irregular; achenia broadly winged; receptacle globular.* — Rich soil, W. New York (*Sartwell*) to Michigan and southward. Sept. — Plant 4°-8° high.

2. **A. helianthoides**, Nutt. (HOARY ACTINOMERIS.) *Stem hairy, widely winged by the ovate-lanceolate sessile alternate leaves, which are rough above and whitened with close hairs beneath; heads few; scales of the involucre not spreading; rays 8-15, regular, narrow; achenia oval, slightly winged, tipped with 2 fragile bristly awns; shorter than the chaff; receptacle conical.* — Prairies and copses, Ohio and southward. July. — Stem 1°-3° high, often simple, leafy.

36. COREÓPSIS, L. TICKSEED.

Heads many-flowered; the rays mostly 8, neutral, rarely wanting. Involucre double; each of about 8 scales, the outer rather foliaceous and somewhat spreading; the inner broader and appressed, nearly membranaceous. Receptacle flat, with membranaceous chaff deciduous with the fruit. Achenia flat (compressed parallel with the scales of the involucre), often winged, not beaked or narrowed at the top, 2-toothed, 2-awned, or sometimes naked at the summit, the awns never barbed downwardly. — Herbs, generally with opposite leaves, and yellow or party-colored, rarely purple, rays. (Name from *κόρις*, a bug, and *ὄψις*, resemblance; from the form of the fruit.)

§ 1. *Corolla of the ray and disk yellow: branches of the style tipped with a pointed or acute appendage.*

* *Achenia wingless, wedge-oblong, flat, 2-awned or 2-toothed: scales of the outer involucre leafy, reflexed: leaves opposite, petioled, generally pinnately or ternately compound, the leaflets serrate: biennials?* (Plants with the aspect of *Bidens*, but the awns barbed upwardly.)

+ *Rays wanting.*

1. **C. discoidea**, Torr. & Gr. (RAYLESS TICKSEED.) Smooth, diffusely branched; *leaves ternately divided; leaflets ovate-lanceolate, pointed, coarsely serrate; heads paniculate-corymbed; outer involucre of 3-5 foliaceous bracts usually much longer than the heads; achenia hairy; the awns or teeth as long as the corolla, barbed upwardly.* — Wet places, Ohio and southward. July - Sept. — Plant 1^o - 2^o high.

2. **C. bidentoides**, Nutt. *Dwarf, diffusely branched, smoothish; leaves lanceolate-linear, cut-toothed, tapering into a petiole; awns slender, upwardly barbed, much longer than the corolla or the bristly young achenium.* — Near Philadelphia, Nuttall. — A very obscure and doubtful plant.

+ + *Rays conspicuous.*

3. **C. trichosperma**, Michx. (TICKSEED SUNFLOWER.) Smooth, branched; leaves short-petioled, 5-7-divided; leaflets lanceolate or linear, cut-toothed, or the upper leaves only 3-5-cleft and almost sessile; heads panicled-corymbose; *achenia narrowly wedge-oblong, bristly ciliate above, crowned with 2 triangular or aocl-shaped stout teeth.* — Swamps, Massachusetts to N. Jersey near the coast, and southward. Sept. — Rays large, golden-yellow, showy.

4. **C. aristosa**, Michx. (WESTERN TICKSEED.) Somewhat pubescent; leaves 1-2-pinnately 5-7-divided, petioled; leaflets lanceolate, cut-toothed or pinnatifid; heads panicled-corymbose; outer

involucre of 10-12 leafy bracts; *achenia oblong-obovate*, obscurely wing-margined, bristly-ciliate, with 2 (or 4) long and slender diverging awns (in one variety awnless). — Swamps, Michigan and Ohio south-westward. Aug.

* * *Achenia elliptical, narrowly winged, the narrowly notched summit of the wing minutely lacerate-toothed: scales of the outer involucre foliaceous, much smaller than the inner; all united at the base: rays obtuse, entire: leaves opposite, petioled, 3-5-divided: perennial.*

5. **C. tripteris**, L. (TALL COREOPSIS.) Smooth; stem simple (4°-9° high), corymbed at the top; leaflets lanceolate, acute, entire. (*Chrysostemma*, L.) — Rich soil, Michigan and Ohio, southward. Aug. — Heads exhaling the odor of anise when bruised: disk-corollas turning brownish.

* * * *Achenia oblong, narrowly winged, minutely or obscurely 2-toothed at the summit: scales of the outer involucre narrow, about the length of the inner, all united at the base: rays mostly entire: leaves opposite, sessile, 3-divided: perennial.*

6. **C. verticillata**, L. (WHORLED SLENDER-LEAVED COREOPSIS.) Smooth, low and slender; leaves closely sessile and 3-divided, so as to appear like whorls of six; the divisions 1-2-pinnately parted, very narrowly linear; *achenia wedge-obovate*. — Damp soil, Michigan along the Great Lakes, and southward, rare: often cultivated. August.

7. **C. palmata**, Nutt. (THREE-CLEFT COREOPSIS.) Nearly smooth, simple (1°-2° high); leaves sessile, with a broadly wedge-shaped outline deeply 3-cleft, rigid; the lobes broadly linear, entire, or the middle one 3-lobed; *achenia narrowly oblong*. — Prairies, Michigan and Wisconsin. July.

* * * * *Achenia nearly orbicular, broadly winged, incurved, furnished with a callous tubercle on the inside at the top and bottom, crowned with 2 small chaff-like denticulate teeth: exterior involucre about the length of the inner: rays coarsely 3-5-toothed: leaves opposite or the uppermost alternate: heads on long naked peduncles.*

8. **C. lanceolata**, L. (LANCE-LEAVED COREOPSIS.) Smooth or hairy; stems short, tufted or branched at the base; leaves entire, lanceolate, sessile; the lower oblanceolate or oblong-spatulate, tapering into hairy petioles; scales of the outer involucre ovate-lanceolate. — Lakes Huron and Superior: common in the Southern States: frequent in cultivation. June - Aug.

§ 2. *Branches of the style truncate: rays rose-color: disk yellow.*

9. **C. rosea**, Nutt. (ROSE-FLOWERED COREOPSIS.) Stem branching, low, leafy, smooth; leaves opposite, linear, entire; heads somewhat corymbed, on short peduncles; outer involucre very short; rays 3-toothed; *achenia oblong, wingless; pappus an obscure crown-like border.* ¶ — Sandy and grassy swamps, Plymouth, Massachu-

setts, to New Jersey, rare. Aug. — Plant 8' - 18' high, with small heads.

C. *TINCTÒRIA*, Nutt., a native of the Southwestern States, with yellow rays brown-purple towards the base, is everywhere common in gardens.

C. *AURICULÀTA*, L., is to be sought in Western Pennsylvania.

37. *BIDENS*, L. BURR MARIGOLD.

Heads many-flowered; the rays 3 - 8, neutral, frequently inconspicuous or entirely wanting. Involucre double, the outer commonly large and foliaceous. Receptacle flattish, the chaff deciduous with the fruit. Achenia flattened parallel with the scales of the involucre, or slender and 4-sided, crowned with 2 or more rigid and persistent awns which are downwardly barbed. — Annual or perennial herbs, with opposite various leaves, and mostly yellow flowers. (Name the Latin *bidens*, from the two teeth or awns of the fruit.)

* *Achenia flat, not tapering at the summit. (All annuals?)*

1. **B. frondosa**, L. (COMMON BEGGAR-TICKS.) Smooth or rather hairy, tall (2° - 6° high) and branching; *leaves 3 - 5-divided*; the *leaflets lanceolate, pointed, coarsely toothed, mostly stalked*; outer leafy involucre much longer than the head, ciliate below; *rays none*; *achenia wedge-obovate, 2-awned, the margins ciliate with upward bristles*, except near the summit. — Moist waste places, a common coarse weed, very troublesome; the achenia, as in the other species, adhering by their retrorsely barbed awns to the dress, and to the fleece of animals. July - Sept.

2. **B. connata**, Muhl. (SWAMP BEGGAR-TICKS.) Smooth (1° - 2° high); *leaves lanceolate* or oblong-lanceolate, pointed, sharply serrate, tapering into margined petioles which are slightly united at the base; *the lower often 3-divided*; *the lateral divisions united at the base and decurrent on the petiole*; scales of the outer involucre longer than the head, mostly obtuse, scarcely ciliate; *rays none*; *achenia narrowly wedge-form, 3- (2-4-) awned*, and with downwardly barbed margins. (*B. tripartita*, Bigel.) — Wet grounds, common, especially from New York westward.

3. **B. cernua**, L. (NODDING BURR-MARIGOLD.) Nearly smooth, low; *leaves all undivided, lanceolate, unequally serrate, scarcely connate*; *heads nodding, with or without (light yellow) rays*; outer involucre longer than the head; achenia wedge-obovate, 4-awned, the margins downwardly barbed. — Swamps and ditches, Massachusetts to Michigan northward. — Rays, when present, smaller than in the next, the leaves irregularly toothed, and the outer involucre more leaf-like.

4. **B. chrysanthemoides**, Michx. (LARGE-FLOWERED BURR-MARIGOLD.) Smooth, erect or reclining at the base (6' - 30' high); *leaves lanceolate*, tapering at both ends, more or less connate, *regularly serrate*; *heads erect or nodding, conspicuously radiate*; outer involucre mostly shorter than the golden-yellow rays; achenia wedge-shaped, with almost prickly downwardly barbed margins; awns 2, 3, or 4.—Swamps, common, especially southward.—Rays showy, about 1' long.

* * *Achenia linear-4-sided, slender, tapering at the summit.*

5. **B. Bäckii**, Torr. (WATER MARIGOLD.) *Aquatic*, smooth; stems long and slender, nearly simple, bearing crowded *immersed leaves many times dissected into fine capillary divisions*; the few emerging leaves at the summit lanceolate, slightly connate, cut-toothed; heads single, short-peduncled; *outer involucre of oval or oblong scales shorter than the interior and several times shorter than the showy (golden-yellow) rays*; achenia linear, thickish, smooth; the 4-6 short awns barbed only towards the apex. ♀ — Ponds and slow deep streams, W. New York to Massachusetts.

6. **B. bipinnata**, L. (SPANISH NEEDLES.) Smooth, branched (1°-4° high); *leaves 1-3-pinnately parted, petioled; leaflets ovate-lanceolate*, mostly wedge-shaped at the base; heads on slender peduncles; *outer involucre of linear scales as long as the inner, and nearly as long as the short pale yellow rays*; achenia long and slender, 4-grooved and angled, nearly smooth, 3-4-awned. ♂ — Dry soil, Connecticut to Pennsylvania and westward.—Heads small.

38. VERBESINA, L. CROWNBEARD.

Heads several - many-flowered; the rays pistillate, few (rarely none). Scales of the erect involucre few, imbricated in 2 or more rows. Receptacle rather convex, the chaff concave. Achenia flat (compressed laterally), winged or wingless, 2-awned.—Perennial herbs; the toothed or lobed leaves decurrent on the stem. ("Name altered from Verbena.")

1. **V. Siegesbäckia**, Michx. Stem tall, 4-winged; *leaves opposite, ovate, triple-nerved, serrate, pointed at both ends, smooth or pubescent underneath (large and thin)*; heads in compound corymbs; *flowers yellow*; rays 1-5, lanceolate; achenia wingless.—Rich soil, W. Penn. and southward.

2. **V. Virginica**, L. Stem narrowly or interruptedly winged, *downy pubescent above, like the lower surface of the ovate-lanceolate feather-veined alternate leaves*; heads in compound corymbs; *flowers white*; rays 3-4, oval; achenia narrowly winged.—Dry soil, W. Pennsylvania? and southward.

Subtribe 3. HELENIÆ. — Pappus composed of several distinct chaffy scales.

39. HELENIUM, L. FALSE SUNFLOWER.

Heads many-flowered; the spreading wedge-shaped rays several, 3–5-cleft at the summit, fertile. Involucre small, reflexed, the scales linear or awl-shaped. Receptacle globose or oblong, naked. Achenia top-shaped, ribbed. Pappus of 5–8 thin and 1-nerved chaffy scales, the nerve extended into a bristle or point. — Erect branching herbs, with alternate leaves decurrent on the angled stem and branches, which are terminated by single or corymbed (yellow) heads; often sprinkled with bitter and aromatic resinous globules. (Named after *Helen*, the wife of Menelaus.)

1. **H. autumnale**, L. (SNEEZE-WEED.) Nearly smooth; leaves lanceolate, toothed; rays longer than the globular disk. ♃ — Alluvial river-banks, common from New York westward and southward. Sept. — Plant 1°–3° high, bitter: the corymbed heads showy.

Subtribe 4. ANTHEMIDÆ. — Pappus none, or a very short crown. Heads radiate or discoid, not diœcious, the central sometimes infertile. Anthers without tails at the base. Leaves alternate. (Gen. 40–43 are radiate: 44 and 45, discoid.)

40. MARÛTA, Cass. MAY-WEED.

Heads many-flowered, the rays neutral. Involucre somewhat imbricated, shorter than the disk. Receptacle conical, more or less chaffy. Achenia obovoid, ribbed, smooth. Pappus none. — Annual acrid herbs, with a strong odor, finely thrice-pinnately divided leaves and single heads terminating the branches. Rays white, turned down, the disk yellow. (Derivation unknown.)

1. **M. Cótula**, DC. (COMMON MAY-WEED.) Scales of the involucre with whitish margins; receptacle chaffy only among the upper flowers. — Road-sides, a very common naturalized weed.

41. ANTHEMIS, L. CHAMOMILE.

Heads and flowers as in Maruta, but the rays fertile. Achenia terete, striate or smooth. Pappus none or a minute crown. — Herbs with aromatic or strong odor, 1–2-pinnately divided leaves, the branches terminated by single heads. Rays white, the disk

yellow. (*Ἄνθεμις*, the ancient name, given in allusion to the profusion of the flowers.)

1. **A. arvensis**, L. (CORN CHAMOMILE.) Pubescent; leaflets or divisions linear-lanceolate, toothed, very acute; branchlets leafless at the summit; scales of the involucre obtuse; chaff lanceolate, pointed, membranaceous; achenia crowned with a very short somewhat toothed margin. ①—Fields, N. England and New York, introduced, sparingly naturalized.—Resembles the May-weed, but has larger heads, and is not fetid.

A. nobilis, L., the officinal CHAMOMILE, is said to be somewhat naturalized in Delaware.

42. ACHILLÆA, L. YARROW.

Heads many-flowered; the rays few, fertile. Involucre imbricated. Receptacle chaffy, flattish. Achenia oblong, flattened, margined. Pappus none.—Perennial herbs, with small corymbose heads. (So named because its virtues are said to have been discovered by *Achilles*.)

1. **A. Millefolium**, L. (COMMON YARROW OR MILFOIL.) Stems mostly simple; *leaves twice-pinnately parted*; the divisions linear, 3-5-cleft, crowded; corymb compound, flat-topped; *involucre oblong*; *rays 4-5, short, white (or rose-color)*; receptacle small.—Fields and hills, common. Aug.—Smooth or often woolly.

2. **A. Ptarmica**, L. (SNEEZEWORD.) *Leaves simple, lanceolate-linear*, sharply serrate with appressed teeth; corymb loose; *rays 8-12, much longer than the bell-shaped involucre*; receptacle broad; flowers white.—Naturalized in some places, as in Danvers, Massachusetts. Aug.

43. LEUCANTHEMUM, Tourn. OX-EYE DAISY.

Heads many-flowered; the rays numerous, fertile. Scales of the broad and flat involucre imbricated, with scarious margins. Receptacle flattish. Disk-corollas with a flattened tube. Achenia of the disk and ray similar, striate, destitute of pappus.—Perennial herbs, with toothed or pinnatifid leaves, and large single heads terminating the stem or branches. Rays white; disk yellow. (Name composed of *λευκός*, *white*, and *ἄνθεμον*, *a flower*, from the white rays.)

1. **L. vulgare**, Lam. (OX-EYE OR WHITE DAISY. WHITE-WEED.) Stem erect, nearly simple, naked above; root-leaves spatulate, petioled, the others partly clasping, all cut or pinnatifid-toothed;

scales of the involucre with rusty brown margins. (*Chrysanthemum Leucanthemum*, L.) — Naturalized in fields and meadows too extensively. A pernicious weed, with large and showy heads.

44. TANACÉTUM, L. TANSY.

Heads many-flowered, nearly discoid, all fertile; the marginal flowers chiefly pistillate and 3-5-toothed, forming a kind of ray. Scales of the involucre imbricated, dry. Receptacle convex, naked. Achenia angled or ribbed, with a large flat top. Pappus a short crown. — Bitter and acrid strong-scented herbs, with 1-2-pinnately dissected leaves and rather large corymbed heads. Flowers yellow. (Name said to be a corruption of *ἀθανασία*, *undying*, from its durable flowers.)

1. **T. vulgàre**, L. (COMMON TANSY.) Stem erect, smooth; leaves twice-pinnately parted, the leaflets and the margined petiole cut-toothed; corymb dense; rays terete; pappus 5-lobed. — Var. *crispum* has the leaves more cut and crisped. ♃ — Cultivated and naturalized. Aug.

2. **T. Huronense**, Nutt. Hairy or woolly when young, stout (1°-3° high); leaves 2-3-pinnately dissected, the lobes oblong; heads large and usually few, on stout peduncles; rays flattened, 3-5-cleft; pappus toothed. ♃ — Shore of L. Huron, and northward. — Disk very convex in fruit, the rays slightly exserted.

45. ARTEMÍSIA, L. WORMWOOD.

Heads discoid, few-many-flowered; the flowers all tubular, the marginal ones pistillate, or sometimes all similar and perfect. Scales of the involucre imbricated, with dry and scarious margins. Receptacle small and flattish, naked. Achenia obovoid, with a small summit and no pappus. — Herbs or shrubby plants, bitter and aromatic, with small heads in paniced spikes or racemes. Corolla yellow or purplish. (Dedicated to the goddess *Artemis*.)

§ 1. **DRACÚNCULUS**, Besser. — *Receptacle smooth: marginal flowers pistillate and fertile, those of the disk sterile.*

1. **A. Canadensis**, Michx. (CANADA WORMWOOD.) Smooth or hoary with silky down; lower leaves twice-pinnately divided, the upper 3-7-divided; the *divisions linear, rather rigid; heads rather large in paniced racemes.* ♃ — Shore of the Great Lakes from L. Ontario to L. Superior. — Plant 1°-2° high.

2. **A. caudàta**, Michx. (SLENDER-LEAVED WORMWOOD.) Smooth; upper leaves pinnately, the lower 2-3-pinnately divided;

the *divisions thread-form*, spreading; *heads small*, the *racemes in a wand-like elongated panicle*. — Sandy soil, coast of New Hampshire to New Jersey; and again in the Western States. ② — Plant 2°-5° high.

§ 2. **ABRÓTANUM**, Tourn. — *Receptacle smooth: flowers all fertile, the marginal ones pistillate.*

3. **A. Ludoviciàna**, Nutt. (WESTERN MUGWORT.) *Whiten-ed-woolly* throughout, branched; *leaves lanceolate*, the lower mostly cut-toothed or sparingly pinnatifid, *the upper entire*, the upper surface often becoming naked and smooth with age; *heads ovoid*, mostly sessile, disposed in *narrow leafy panicles*. ¶ — Dry banks, Lakes Huron and Michigan and westward, especially the var. **GNAPHALÒDES**, which has the elongated nearly entire leaves very woolly both sides.

4. **A. vulgàris**, L. (COMMON MUGWORT.) Branches and lower surface of the leaves *whitish-woolly*; *stem-leaves pinnatifid*, with the *lobes variously cut or entire, linear-lanceolate*; *heads ovoid, in open leafy panicles*. ¶ — Waste places, introduced from Europe into the Eastern States.

5. **A. biennis**, Willd. (BIENNIAL WORMWOOD.) *Smooth*, simple; *lower leaves 2-pinnately parted, the upper pinnatifid*; lobes linear, acute, in the lower leaves cut-toothed; *heads in short axillary spikes* which are crowded in a narrow and clustered leafy panicle. ② — River-banks, Ohio and westward, indigenous.

§ 3. **ABSÍNTHIUM**, Tourn. — *Receptacle hairy: flowers all fertile, the marginal ones pistillate.*

6. **A. Absínthium**, L. (COMMON WORMWOOD.) Rather shrubby, silky-hoary; leaves 2-3-pinnately parted; the lobes lanceolate, obtuse, often cut; *heads in paniced racemes, nodding*. — Road-sides, sparingly naturalized, escaped from gardens.

A. ABRÓTANUM, L. (SOUTHERN-WOOD), is found in gardens.

PYRÈTHRUM PARTHÈNIUM, L. (FEVERFEW), has escaped from gardens in some places.

Subtribe 5. **GNAPHALÍNEÆ**. — Pappus of capillary or stiff bristles. Anthers with tails at the base. Heads all discoid, the fertile flowers with thread-shaped corollas. — Floccose-woolly herbs; the leaves alternate.

46. **GNAPHÀLIUM**, L. CUDWEED.

Heads many-flowered; the flowers all tubular; the outer pistillate and very slender, the central perfect. Scales of the involucre dry and scarious, white or colored, imbricated in several rows. Receptacle flat, naked. Pappus a single row of capillary rough

bristles. — Woolly herbs, with sessile or decurrent leaves and clustered or corymbed heads. (Name from γνάφαλον, a lock of wool, in allusion to the floccose down of the leaves.)

* *Achenia* nearly terete : pistillate flowers in several series.

1. **G. decurrens**, Ives. (WING-MARGINED EVERLASTING.) Stem stout, erect, branched at the top, clammy-pubescent, white-woolly on the branches, bearing numerous heads in dense corymbed clusters; leaves linear-lanceolate, partly clasping, decurrent; scales of the (yellowish-white) involucre oval, acutish. ♀ — Hill-sides, Maine and Vermont to New Jersey. Aug., Sept. — Plant 2° high.

2. **G. polycéphalum**, Michx. (COMMON EVERLASTING.) Stem erect, woolly; leaves lanceolate, tapering at the base, with undulate margins, not decurrent, smoothish above; heads clustered at the summit of the paniced-corymbose branches, ovate-conical before expansion, then obovate; scales of the (whitish) involucre ovate and oblong, rather obtuse; perfect flowers few. ① — Old fields and woods, common southward. — Plant fragrant, 1° - 2° high.

3. **G. uliginòsum**, L. (LOW CUDWEED.) Low, diffusely branched, woolly all over; leaves lanceolate or linear, not decurrent; heads (small) in terminal sessile capitate clusters subtended by leaves; scales of the involucre oblong. ① — Low grounds and ditches by the road-side, everywhere. — Plant 3' - 6' high.

4. **G. purpureum**, L. (PURPLISH CUDWEED.) Stem simple, or branched from the base, ascending, woolly; leaves oblong-spatulate, mostly obtuse, not decurrent, green above, very white with close wool underneath; heads in sessile clusters in the axils of the upper leaves, and spiked at the wand-like summit of the stem; scales of the involucre lance-oblong, tawny-white, the inner often marked with purple. — Sandy or gravelly soil, coast of Maine to Pennsylvania and southward.

* * *Achenia* flattish : pistillate flowers in a single marginal row.

5. **G. supinum**, Villars. (MOUNTAIN DWARF CUDWEED.) Dwarf and tufted; leaves linear, woolly; heads solitary or few and spiked on the slender simple flowering stems; scales of the involucre brown, lanceolate, acute. — Alpine region of Mt. Washington, N. Hampshire, Nuttall, Oakes.

47. ANTENNÀRIA, Gærtn. EVERLASTING.

Heads many-flowered, diœcious or nearly so; the pistillate flowers very slender. Scales of the involucre dry and scarious, white or colored, imbricated. Receptacle convex or flat, not chaffy. Pappus a single row of bristles, which in the fertile flowers are capillary, and in the sterile thickened and club-shaped or

barbellate at the summit. — Perennial white-woolly herbs, with entire leaves and corymbed (rarely single) heads. Corolla yellowish. (So named from the resemblance of the sterile pappus to the *antennæ* of many insects.)

1. **A. margaritacea**, R. Brown. (PEARLY EVERLASTING.) Stem erect (1°–2° high), corymbose at the summit, with many heads, leafy; leaves linear-lanceolate, taper-pointed, sessile; fertile heads often with a few imperfect staminate flowers in the centre; scales of the pearly white involucre obtuse or rounded. — Dry hills and woods, common. Aug. (*Gnaphalium*, L., &c.)

2. **A. plantaginifolia**, Hook. (PLANTAIN-LEAVED EVERLASTING.) Low, spreading by offsets and runners; leaves silky-woolly when young, at length green above and hoary beneath; those of the simple and scape-like flowering stems small, lanceolate, appressed; the radical obovate or oval-spatulate, petioled, ample, 3-nerved; heads in a small crowded corymb; scales of the (mostly white) involucre obtuse in the sterile, and acutish and narrower in the fertile plant. — Var. **MONOCÉPHALA** has a single larger head. (Philadelphia, Mr. Lea.) — Sterile knolls and wooded banks, common. April, May.

48. **FILÀGO**, Tourn. COTTON-ROSE.

Heads many-flowered; the central flowers perfect, but often infertile; the others pistillate, very slender and thread-form. Scales of the involucre few and woolly. Receptacle elongated or top-shaped, naked at the summit, but chaffy at the margins or toward the base; the chaff resembling the proper involucre scales, each covering a single pistillate flower. — Pappus of the central flowers capillary, of the outer ones chiefly none. — Annual and low branching woolly herbs, with entire leaves and small heads in capitate clusters. (Name from *filum*, a thread, in allusion to the cottony hairs that cover these plants.)

1. **F. Germánica**, L. (HERBA IMPIA.) Stem erect, short, clothed with lanceolate and upright crowded leaves, producing a capitate cluster of woolly heads, from which rise one or more branches, each terminated by a similar head, and continued in the same manner: — hence the common name applied to it by the old botanists, as if the offspring were undutifully exalting themselves above the parent. — Dry fields, introduced from Europe. July–Oct.

Subtribe 6. **SENECIÒNEÆ**. — Pappus soft and capillary. Anthers without tails at the base. Receptacle naked. Heads radiate or discoid. Leaves alternate (except in No. 52).

49. ERECHTHITES, Raf. FIREWEED.

Heads many-flowered, discoid, the flowers all tubular and fertile; the marginal pistillate with a slender corolla. Scales of the cylindrical involucre in a single row, linear, acute, with a few small bractlets at the base. Achenia oblong, tapering at the end. Pappus copious, of very fine and white soft hairs. — Erect and coarse annuals, with alternate simple leaves and paniculate-corymbed heads. Flowers whitish. (The ancient name of some species of Groundsel, probably called after *Erechtheus*.)

1. **E. hieracifolia**, Raf. (FIREWEED.) Often hairy; stem grooved; leaves lanceolate or oblong, acute, cut-toothed, sessile; the upper often with an auricled clasping base. (*Senecio hieracifolius*, L.) — Moist woods, and especially in recent clearings, where the ground has been burned over. July – Sept. — Plant 1° – 5° high, with somewhat the aspect of a Sow-thistle.

50. CACALIA, L. INDIAN PLANTAIN.

Heads 5 – many-flowered, discoid; the flowers all tubular and perfect. Scales of the involucre in a single row, with a few bractlets at the base. Corolla deeply 5-cleft. Achenia oblong, smooth. Pappus of numerous capillary bristles. — Smooth and tall perennial herbs, with alternate often petioled leaves, and rather large heads in flat corymbs. Flowers white or whitish. (An ancient name, of uncertain meaning.)

* *Involucre 25–30-flowered: receptacle flat.*

1. **C. suavèolens**, L. (SWEET-SCENTED CACALIA.) Stem grooved; leaves triangular-lanceolate, halbert-shaped, pointed, serrate, those of the stem on winged petioles; bractlets of the involucre several, slender, spreading. — Rich woods, from W. New York and Connecticut southward and westward. Sept.

* * *Involucre 5-leaved and 5-flowered: receptacle bearing a more or less evident scale-like pointed appendage in the centre.*

2. **C. renifórmis**, Muhl. (GREAT INDIAN PLANTAIN.) Stem (4° – 9° high) grooved and angled; leaves green both sides, dilated fan-shaped, or the lowest kidney-form, repand-toothed and angled, palmately veined, petioled; the teeth pointed; corymbs large. — Rich damp woods, Penn. to Indiana and southward. Aug. — Root-leaves often 2° broad.

3. **C. atriplicifolia**, L. (PALE INDIAN PLANTAIN.) Stem terete, and with the palmately veined and angulate-lobed leaves glaucous; lower leaves triangular-kidney-form or slightly heart-shaped;

the upper rhomboid or wedge-form, *toothed*. — Rich copses, from W. New York and New Jersey southward and westward. Aug.

4. **C. tuberosa**, Nutt. (TUBEROUS INDIAN PLANTAIN.) Stem angled and grooved, from a tuberous root; *leaves green both sides*, thickish, strongly 5-7-nerved; the lower *lanceolate-ovate or oval*, rather blunt, nearly entire, tapering into long petioles; the upper on short margined petioles, sometimes toothed at the apex. — Wet prairies, &c., Ohio to Wisconsin. June.

51. SENÈCIO, L. GROUNDSEL.

Heads many-flowered, discoid, with the flowers all perfect and tubular, or mostly radiate, the rays pistillate. Scales of the involucre in a single row, or with a few bractlets at the base. Receptacle flat. Pappus of numerous very soft and slender capillary bristles. — Herbs, or in the tropics shrubs (probably the largest phænogamous genus in the world), with alternate leaves and solitary or corymbed heads. Flowers chiefly yellow. (Name from *senex*, an old man, alluding to the hoary hairs which cover many species, or to the white hairs of the pappus.)

* *Rays none: annual.*

1. **S. vulgàris**, L. (COMMON EUROPEAN GROUNDSEL.) Nearly smooth, or at first woolly; leaves pinnatifid and toothed, clasping, the lowest petioled; heads loosely corymbed, nodding. — Waste grounds, E. New England and New York: introduced. — A homely weed, 6' - 12' high.

* * *Rays present: perennial: heads corymbed.*

2. **S. àureus**, L. (GOLDEN RAGWORT. SQUAW-WEED.) *Smooth, or floccose-woolly when young; root-leaves simple and rounded*, the larger mostly heart-shaped, crenate-toothed, *long-petioled*; the lower *stem-leaves lyre-shaped*, upper ones lanceolate, cut-pinnatifid, sessile or partly clasping; corymb umbel-like; rays 8 - 12. — Varies greatly, the leading forms being, — Var. 1. **OBOVÀTUS**, with the root-leaves round-obovate (growing in drier places). — Var. 2. **BALSÀMITÆ**, with the root-leaves oblong, spatulate, or lanceolate, sometimes cut-toothed, tapering into the petiole. Rocky places. — Var. 3. **LANCEOLÀTUS**, *Oakes*, with the leaves all lanceolate-oblong, thin, sharply and unequally toothed, either wedge-shaped or somewhat heart-shaped at the base, the upper merely pinnatifid-cut towards the base. (Cedar swamps, Vermont, *Robbins*.) — Common everywhere; the primary form in swamps. May, June. — Plant 10' - 30' high.

3. **S. tomentòsus**, Michx. (WOOLLY RAGWORT.) *Clothed with scarcely deciduous hoary wool; root-leaves oblong, obtuse, crenate-*

toothed, on slender petioles; the upper sessile; corymb flat-topped; rays 12-15. — Mountains of Pennsylvania (*Pursh*), and southward. May. — Plant 1°-2° high, nearly leafless above.

52. *ARNICA*, L. *ARNICA*.

Heads many-flowered, radiate, the rays pistillate. Scales of the bell-shaped involucre lanceolate, equal, somewhat in 2 rows. Receptacle flat, fimbriate. Achenia spindle-shaped. Pappus a single row of rather rigid and strongly roughened-denticulate bristles. — Perennial herbs, chiefly of the mountains and cold northern regions, with simple stems, bearing single or corymbed large heads and opposite leaves. Flowers yellow. (Name thought to be a corruption of *Ptarmica*.)

1. *A. mollis*, Hook. Soft-hairy; stem leafy, bearing 1 to 5 heads; leaves thin, veiny, smoothish when old, toothed; the upper ovate-lanceolate, closely sessile; the lower narrower, tapering into a margined petiole; scales of the involucre pointed; pappus almost plumose. — Alpine rivulets, &c., White Mountains of N. Hampshire and mountains of N. New York. July.

Tribe V. CYNÀREÆ. THE ARTICHOKE OR THISTLE TRIBE.

Style in the perfect flowers often thickened near the summit; the branches distinct or concreted, minutely pubescent externally; the stigmatic lines reaching their apex and there confluent. (Heads discoid, mostly large.)

53. *CENTAURÈA*, L. *STAR-THISTLE*.

Heads many-flowered; the flowers all tubular, the marginal mostly falsely radiate and larger, sterile. Receptacle bristly. Involucre imbricated, the scales margined or appendaged. Achenia compressed. Pappus wanting, or of a few bristles. — Herbs with alternate leaves and single heads. (Named from the *Centaur*, Chiron.)

1. *C. Cyanus*, L. (*BLUE-BOTTLE*.) Scales of the globular involucre fringe-margined; rays longer than the disk; pappus very short; stem erect, branching; leaves linear, entire, or toothed at the base. ① — Road-sides, escaped from gardens. July. — Flowers blue, varying to purplish or white.

2. *C. nigra*, L. (*KNAPWEED*.) Scales of the globular involucre appendaged, and with a stiff black fringe; rays wanting; pap-

pus very short; stem branched; leaves lanceolate, or the lower lyrate-angled, rough. ♀ — Naturalized in E. New England. Aug. — Flowers purple.

C. AMERICANA, Nutt., a very showy species of the Southwestern States, is commonly cultivated in gardens.

54. CNICUS, Vaill. BLESSED THISTLE.

Heads many-flowered; the ray-flowers tubular and sterile, shorter than the rest, which are all tubular and perfect. Scales of the ovoid involucre coriaceous, appressed, produced into a long and rigid pinnately spinose appendage. Receptacle clothed with capillary bristles. Achenia short, strongly striate, crowned with 10 short and horny teeth, and bearing a pappus of 10 elongated rigid bristles, and 10 short bristles alternate with the last in an inner row. — An annual somewhat woolly herb, with clasping scarcely pinnatifid-cut leaves and large bracted heads. Flowers yellow. (Name from κνίζω, to prick.)

1. **C. benedictus**, L. — Road-sides, scarcely naturalized.

55. CIRSIIUM, Tourn. PLUMED THISTLE.

Heads many-flowered; the flowers all tubular, perfect and similar, or rarely imperfectly dioecious. Scales of the ovoid or spherical involucre imbricated in many rows, tipped with a point or prickle. Receptacle clothed with soft bristles or hairs. Achenia oblong, flattish, not ribbed. Pappus of numerous bristles united into a ring at the base, plumose to the middle. — Herbs, with sessile alternate leaves, often pinnatifid, and the margins and teeth prickly. Heads large terminating the stem or branches. Flowers purple or cream-color. (Name from κύρσιος, a swelled vein, for which the Thistle was a reputed remedy.)

* Scales of the involucre all tipped with spreading prickles.

1. **C. lanceolatum**, Scop. (COMMON THISTLE.) Leaves decurrent on the stem, forming prickly lobed wings, pinnatifid, rough and bristly above, woolly with deciduous webby hairs beneath, prickly; flowers purple. ② — Pastures and road-sides, everywhere, introduced. July — Sept.

* * Inner, or nearly all the scales of the involucre unarmed, appressed: filaments hairy.

→ Leaves white-woolly beneath and sometimes also above: outer scales of the involucre successively shorter, tipped with short prickles.

2. **C. Pitcheri**, Torr. & Gr. (PITCHER'S THISTLE.) *White-woolly throughout, low; stem stout, very leafy; leaves all pinnately parted into rigid narrowly linear and elongated divisions, with revolute margins; flowers cream-color.* ♀ — Sandy shores of L. Huron and Michigan.

3. **C. undulatum**, Spreng. (WOOLLY THISTLE) *White-woolly throughout, low and stout, leafy; leaves lanceolate-oblong, partly clasping, undulate-pinnatifid, with prickly lobes; flowers reddish-purple.* ② — Islands of L. Huron and Michigan, thence westward. July.

4. **C. discolor**, Spreng. (TWO-COLORED THISTLE.) Stem grooved, hairy, branched, leafy; *leaves all deeply pinnatifid, sparingly hairy and green above, whitened with close wool beneath, the diverging lobes 2-3-cleft, linear-lanceolate, prickly-pointed; flowers pale purple.* ② — Meadows and copses, not uncommon. Aug. — Plant 3°-6° high: heads 1' or more in width.

5. **C. altissimum**, Spreng. (TALL THISTLE.) Stem downy, branching, *leafy to the heads; leaves roughish-hairy above, whitened with close wool beneath, oblong-lanceolate, sinuate-toothed, undulate-pinnatifid, or undivided, the lobes or teeth prickly, those from the base pinnatifid; lobes short, oblong or triangular; flowers chiefly purple.* ♀? — Fields and copses, Penn. to Ohio, &c. Aug. — Plant 3°-10° high: leaves variable: the heads much as in the last.

6. **C. Virginiænum**, Michx. (SMALL THISTLE.) Stem woolly, slender, simple or sparingly branched, the *branches or long peduncles naked; leaves lanceolate, green above, whitened with close wool beneath, ciliate with prickly bristles, entire or sparingly sinuate-lobed, sometimes the lower deeply sinuate-pinnatifid; outer scales of the involucre scarcely prickly; flowers purple.* — Woods and plains, Ohio and southward. July. — Plant 1°-3° high; the heads seldom more than half as large as in the last.

→ → *Leaves green both sides, or with loose webby hairs underneath: scales of the involucre scarcely prickly-pointed.*

7. **C. mucronatum**, Michx. (SWAMP THISTLE.) *Stem tall, angled, smoothish, paniced at the summit, the branches sparingly leafy and bearing single or few naked heads; leaves somewhat hairy above, whitened with loose webby hairs beneath when young, deeply pinnatifid, the divisions lanceolate, acute, cut-lobed, prickly-pointed; scales of the webby and glutinous involucre closely appressed, pointless or barely mucronate; flowers purple.* ♀ — Swamps and low copses, common. Aug. — Plant 3°-8° high: heads rather large.

8. **C. pumilum**, Spreng. (PASTURE THISTLE.) *Stem low and stout, hairy, bearing 1-3 very large heads which are somewhat leafy-bracted at the base; leaves lanceolate-oblong, partly clasping, green,*

somewhat hairy, pinnatifid, with short and cut very prickly-margined lobes; outer scales of the involucre prickly-pointed, the inner very slender; flowers purple or rarely white. ② — Low or dry fields, Maine to Penn., near the coast. July. — Stem 1° - 3° high: heads 1½' broad; the fragrant flowers 2' long.

9. **C. horridulum**, Michx. (GREAT YELLOW THISTLE.) *Stem stout, webby-haired when young; leaves partly clasping, green, soon smooth, lanceolate, pinnatifid, the short toothed and cut lobes very spiny with yellowish prickles; heads large, surrounded at the base by an involucre whorl of leaf-like and very prickly bracts, which equal or exceed the narrow and unarmed scales of the involucre; flowers pale yellow, often turning purple in fading.* — Sandy fields, &c., Massachusetts to Penn. and southward, near the coast. June - Aug. — Plant 1° - 4° high: the heads nearly as large as in the last.

* * * *Outer scales of the appressed involucre barely prickly-pointed: filaments nearly smooth: heads imperfectly diœcious.*

10. **C. arvense**, Scop. (CANADA THISTLE.) *Low, branched; roots extensively creeping; leaves oblong or lanceolate, smooth, or slightly woolly beneath, sinuate-pinnatifid, prickly-margined; heads small and numerous; flowers rose-purple* ¶ — Cultivated fields and pastures, naturalized: a most troublesome weed, which it is extremely difficult to eradicate. July, Aug.

56. ONOPÓRDON, Vaill. COTTON THISTLE.

Heads and flowers nearly as in *Cirsium*. Scales of the involucre coriaceous, tipped with a lanceolate prickly appendage. Receptacle deeply alveolate. Achenia 4-angled, wrinkled transversely. Bristles of the pappus numerous, slender, not plumose, united at the base into a horny ring. — Coarse branching herbs, with the stems winged by the decurrent base of the lobed and toothed somewhat prickly leaves. Heads large: flowers purple.

1. **O. acanthium**, L. *Stem and leaves woolly; scales of the involucre linear-awl-shaped.* ② — Road-sides, naturalized in New England. July. — A tall cottony plant.

57. LÁPPA, Tourn. BURDOCK.

Heads many-flowered, the flowers all perfect and similar. Involucre globose; the imbricated scales coriaceous and appressed at the base, produced into an abrupt and spreading awl-shaped appendage, with a rigid hooked point. Receptacle bristly. Achenia oblong, flattened, wrinkled transversely. Pappus short, of numerous rough bristles, not united at the base, deciduous. — Coarse bi-

ennial weeds, with large unarmed heart-shaped and petioled leaves, with undulate margins, and the lower surface somewhat woolly. Heads small, solitary or clustered: flowers purple, rarely white. (Name from λαβεῖν, *to lay hold*, the involucre forming a hooked burr which holds tenaciously to the dress or fleece of animals.)

1. **L. mājor**, Gært. (COMMON BURDOCK.) Upper leaves ovate, the lower very large, heart-shaped; involucre smoothish. (*Árctium Lappa, L.*) — Waste places and around dwellings, introduced. July.

L. BARDÀNA, a species or variety with pinnatifid leaves, has been observed near Boston by Mr. Tuckerman, and in Pennsylvania by Dr. Darlington.

Suborder II. LIGULIFLORÆ.

Tribe VI. CICHORACEÆ. THE SUCCORY TRIBE.

Flowers all perfect and ligulate. Branches of the style slender, obtuse, uniformly hairy, the stigmatic lines terminating near the middle. — Plants with a milky juice! Leaves alternate. (See *Synopsis*, p. 189.)

58. LAMPSÀNA, Tourn. NIPPLE-WORT.

Heads 8-12-flowered. Scales of the cylindrical involucre 8, erect, in one row. Receptacle naked. Achenia oblong. Pappus none. — Slender branching herbs, with angled or toothed leaves, and loosely paniced small heads: flowers yellow. (Name from λαπάζω, *to purge*.)

1. **L. commūnis**, L. Annual, nearly smooth; lower leaves ovate, sometimes lyre-shaped. — Road-sides, sparingly introduced near Boston, scarcely naturalized.

59. CICHORIUM, Tourn. SUCCORY.

Heads many-flowered. Involucre double, the outer of 5 short spreading scales, the inner of 8-10 scales. Achenia striate. Pappus of numerous very small chaffy scales, forming a short crown. — Branching perennials, with the root-leaves toothed or pinnatifid; the sessile heads axillary and terminal. Flowers bright blue, showy. (Altered from the Arabian name of the plant.)

1. **C. Intÿbus**, L. (COMMON SUCCORY or CICHORY.) Stem-

leaves small, oblong or lanceolate, partly clasping, toothed or entire, those of the branches inconspicuous; heads 2 or 3 together. — Roadsides and fields, naturalized in the Atlantic States. Aug. — Oct.

60. KRÍGIA, Schreber. DWARF DANDELION.

Heads 15–20-flowered. Scales of the involucre several, in about 2 rows. Achenia top-shaped, many-striate or angled. Pappus double; the outer of 5 broad and rounded chaffy scales; the inner of as many alternate slender bristles. — Small annuals or biennials, branched from the base; the leaves chiefly radical, lyrate, or toothed, the small heads terminating the naked scapes or branches. Flowers yellow. (Named after *D. Krieg*, an early German botanical collector in this country.)

1. **K. Virgínica**, Willd. Stems or scapes several, and forking during the season; earlier leaves roundish, entire, the others narrower and often pinnatifid. — Var. *ΔΙΧÓΤΟΜΑ* is a more branching and leafy form. — Dry sandy soil, N. England to Penn. and southward, near the coast. — Plant 1'–10' high, the heads minute.

61. CÝNTHIA, Don. CYNTHIA.

Heads many-flowered. Scales of the involucre several, somewhat in 2 rows. Achenia short, striate. Pappus double; the outer of numerous very small chaffy bristles; the inner of numerous capillary elongated bristles. — Low perennial herbs, nearly smooth and glaucous, with scattered or radical undivided or pinnatifid leaves; the scapes or naked peduncles (often bristly at the apex) bearing rather showy single heads. Flowers yellow. (Probably named after *Mount Cynthus*.)

1. **C. Virgínica**, Don. Stem-leaves 1–2, oblong or lanceolate-spatulate, clasping, mostly entire; the radicle on short winged petioles, often toothed, rarely pinnatifid; peduncles 2–5. — Moist banks and copses, New York to Michigan. June. — Stem 1° high, or more.

62. LEÓNTODON, L., Juss. HAWKBIT.

Heads many-flowered. Involucre scarcely imbricated, but with several bractlets at the base. Achenia spindle-shaped, striate, all alike. Pappus persistent, composed of plumose bristles which are enlarged and flattened towards the base. — Low and stemless perennials, with toothed or pinnatifid root-leaves, the scapes bear-

ing one or more yellow heads. (Name from λέων, *a lion*, and ὀδούς, *a tooth*, in allusion to the toothed margins of the leaves.) — The following belongs to the subgenus OPORÍNIA, which has a tawny white pappus of a single row of equal bristles.

1. **L. autumnâle**, L. (AUTUMNAL FALSE DANDELION.) Leaves more or less pinnatifid; scape branched; peduncles several, thickened at the summit and furnished with small scaly bracts; involucre obovoid-oblong. (*Apárgia*, Willd.) — Meadows and road-sides, thoroughly naturalized in E. New England. Aug. — Oct.

63. HIERÁCIUM, TOURN. HAWKWEED.

Heads many-flowered. Involucre more or less imbricated. Achenia oblong or columnar, striate, not beaked. Pappus a single row of tawny fragile capillary bristles. — Perennial herbs, with entire or toothed leaves, and single or paniced heads of yellow flowers. (Name from *ίέραξ*, *a hawk*.)

* *Heads large and broad: achenia tapering towards the base.*

1. **H. Canadêse**, Michx. (CANADA HAWKWEED.) Stems simple, leafy, corymbed at the summit; leaves sessile, lanceolate or ovate-oblong, acute, remotely and very coarsely toothed, somewhat hairy, the uppermost slightly clasping; scales of the imbricated involucre awl-shaped. (*H. Kálmii*, Spreng., &c., not of Linn.) — Dry woods, Massachusetts to Michigan, chiefly northward. Aug. — Plant 1° — 2° high, stout; the leaves variable in breadth.

* * *Heads small: involucre cylindrical, scarcely imbricated: achenia columnar or spindle-shaped.*

2. **H. scàbrum**, Michx. (ROUGH HAWKWEED.) Stem rather stout (1° — 3° high) leafy, *rough-hairy*; the stiff flexuous panicle at first racemose, at length rather corymbose; the thickish peduncles and the hoary 40 — 50-flowered involucre *densely clothed with glandular bristles*; achenia columnar, *not tapering at the summit*; leaves obovate or oval, nearly entire, hairy. — Dry open woods, common, especially northward. Aug.

3. **H. longipìlum**, Torr. (LONG-BEARDED HAWKWEED.) Stem wand-like, simple, stout (2° — 3° high), *very leafy towards the base, naked above*, and bearing a small racemed panicle; the lower portion and both sides of the oblong-lanceolate or spatulate entire leaves *thickly clothed with very long and upright bristles*; peduncles with the 20 — 30-flowered involucre glandular-bristly; achenia spindle-shaped, *narrowed at the apex*. — Prairies and copses, Michigan and westward. Aug. — Heads intermediate between the last and the next. Bristles straight and even, as if combed, often 1' long!

4. **H. Gronòvii**, L. (HAIRY HAWKWEED.) Stem wand-like,

mostly simple, leafy and very hairy below, naked above and forming a long and narrow panicle; leaves oblong or obovate, nearly entire, hairy; the slender peduncles and the 20–30-flowered involucre sparingly glandular-bristly; *achenia spindle-shaped, with a very taper summit*. — Dry sterile soil, common, especially southward. Aug. — Varies from 1°–4° high; with small heads and almost beaked fruit, which well distinguishes the largest forms from No. 2, and the smallest naked-stemmed states from the next.

5. **H. venòsum**, L. (RATTLESNAKE-WEED.) Stem or *scape naked or with a single leaf, smooth and slender, forking above into a spreading loose corymb*; root-leaves obovate or oblong, nearly entire, scarcely petioled, thin and pale, purplish and glaucous underneath (often hairy along the midrib) marked with purple veins; peduncles very slender; involucre 20-flowered; *achenia linear, not tapering above*. — Var. *SUBCAULÉSCENS* has the stem more or less leafy next the base. — Dry soil, and pine woods, common. — Plant 1°–2° high; the rays large for the size of the head.

6. **H. paniculatum**, L. (PANICLED HAWKWEED.) Stem slender, leafy, diffusely branched, hairy below; leaves lanceolate, acute at both ends, slightly toothed, smooth; heads (very small) in a loose panicle on slender diverging peduncles, 12–20-flowered; *achenia short, not tapering at the summit*. — Copses, common. Aug.

64. NÁBALUS, Cass. RATTLESNAKE-ROOT.

Heads few – many-flowered. Involucre cylindrical, of 5 to 14 linear scales in a single row, and a few small bractlets at the base. Achenia linear-oblong, striate or grooved, not contracted at the apex. Pappus of copious straw-color or brownish roughish capillary bristles. — Perennial herbs, with upright leafy stems arising from spindle-shaped (extremely bitter) tubers, very variable leaves, and racemose-panicled mostly nodding heads. Flowers greenish-white or cream-color, often tinged with purple. (Name probably from *νάβλα*, a harp, in allusion to the lyrate leaves which these plants sometimes present.) Species of *Prenánthes*, L.

* *Involucre smooth or nearly so, 5–12-flowered.*

1. **N. álbis**, Hook. (WHITE LETTUCE. RATTLESNAKE-ROOT.) Smooth and glaucous, tall; stem *corymbose-panicled at the summit*; leaves angulate or triangular-halbert-form, sinuate-toothed, or 3–5-cleft; the uppermost oblong and undivided; involucre (purplish) of about 8 scales, 8–12-flowered; pappus deep cinnamon-color. — Var. *SERPENTÁRIA* is a form with deeply divided leaves, their margins often rough-ciliate. — Copses in rich soil, common, especially north-

ward. Aug. — Stouter and more corymbed than the next, with thickish leaves and often purplish branches. Heads $\frac{1}{2}$ ' long.

2. **N. altissimus**, Hook. (TALL WHITE LETTUCE.) Smooth; stem tall and slender (3° – 6° high); the heads in small axillary and terminal loose clusters forming a long and wand-like leafy panicle; leaves membranaceous, all petioled, ovate, heart-shaped or triangular, and merely toothed or cleft, with naked or winged petioles, or frequently 3–5-parted, with the divisions entire or again cleft; involucre slender (greenish), of 5 scales, 5–6-flowered; pappus dirty white, or pale straw-color. — Rich moist woods, common, especially northward. Aug. — Leaves excessively variable.

3. **N. Frasèri**, DC. (LION'S-FOOT. GALL-OF-THE-EARTH.) Nearly smooth; stem corymbose-panicled at the summit (1° – 4° high); leaves mostly deltoid, roughish; the lower variously 3–7-lobed, on margined petioles; the upper oblong-lanceolate, mostly undivided, nearly sessile; involucre (greenish or purplish, sometimes slightly bristly) of about 8 scales, 8–12-flowered; pappus dull straw-color. — Varies greatly in foliage: the var. *INTEGRIFOLIUS* has the thickish leaves all undivided and merely toothed. — Dry sandy or sterile soil, S. New England to Penn. and southward. Sept.

4. **N. nanus**, DC. (DWARF MOUNTAIN NABALUS.) Smooth; stem low and simple; the heads in axillary clusters forming a narrow racemed panicle; leaves triangular-halbert-shaped and variously lobed or cleft, on slender petioles; involucre (livid) 10–13-flowered, of about 8 proper scales and several very short bract-like ones, which are triangular-ovate and appressed; pappus dark straw-color. — Alpine summits of the White Mountains, New Hampshire, and Mount Marcy, New York. Aug. — Plant 5'–10' high; the leaves with all the variations of the foregoing species.

5. **N. Boóttii**, DC. (BOOTT'S ALPINE NABALUS.) Stem simple, dwarf, pubescent at the summit; the heads in an almost simple raceme; lowest leaves halbert-shaped or heart-shaped, the middle oblong, the upper lanceolate, nearly entire, tapering into a margined petiole; involucre (livid) 10–18-flowered, of 10–15 very obtuse proper scales, and several linear and loose exterior ones nearly half the length of the former; pappus straw-color. — Higher alpine summits of the White Mountains, New Hampshire, and Whiteface Mountain, New York. August.

6. **N. virgatus**, DC. (SLENDER RATTLESNAKE-ROOT.) Smooth, slightly glaucous; stem very simple, produced above into a naked long and slender spiked raceme, the heads clustered and mostly unilateral; leaves lanceolate, acute, closely sessile, the upper reduced to bracts, the lower toothed or pinnatifid; involucre (purplish) of about 8 scales, 8–12-flowered; pappus straw-color. — Sandy pine barrens of New Jersey. Sept. — Stem 2° – 4° high, the wand-like raceme often 1° – 2° long.

* * *Involucre 12-40-flowered, hairy, as well as the peduncles.*

7. **N. racemòsus**, Hook. (RACEMED NABALUS.) Stem wand-like, simple (2°-5° high), *smooth*, as well as the oval or oblong-lanceolate denticulate leaves; the lower tapering into winged petioles (rarely cut-pinnatifid), the upper partly clasping; *heads* in short clusters or racemes *crowded in a long and narrow interruptedly spiked panicle*; *involucre about 12-flowered*; pappus straw-color.— Plains, Ohio to Wisconsin. Also Hackensack marshes, New Jersey. Sept.— Flowers flesh-color.

8. **N. ásper**, Torr. & Gr. (ROUGH NABALUS.) Stem wand-like, simple (2°-4° high), *rough-pubescent*, as well as the oval-oblong or broadly lanceolate toothed leaves; *heads* in small clusters (mostly erect) *disposed in a long and narrow compound raceme*; *involucre 12-14-flowered*; pappus straw-color.— Dry prairies and barrens, Ohio and westward. Sept.— Flowers larger than No. 7, cream-color.

9. **N. crepidíneus**, DC. (LARGE NABALUS.) Somewhat smooth; stem tall and stout (5°-8° high), bearing numerous nodding *heads* in loose clusters on the *corymbose-panicked* branches; *leaves* large, *broadly triangular-ovate or halbert-form*, strongly toothed, contracted into winged petioles; *involucre 20-40-flowered*; pappus brown.— Border of copses in rich soil, Ohio to Wisconsin and southward. Sept.— Lower leaves often 1° long. Involucre blackish; flowers cream-color.

65. TRÓXIMON, Nutt. TROXIMON.

Head many-flowered. Scales of the bell-shaped involucre ovate or lanceolate, pointed, loosely imbricated in 2 or 3 rows. Achenia smooth, 10-ribbed, not beaked. Pappus longer than the achenium, white, of copious and unequal rather rigid capillary bristles, some of the larger gradually thickened towards the base.— Perennial herbs, with linear elongated tufted leaves and a simple naked scape from a thick rootstock. Head solitary, large: flowers yellow. (Name from *τρώξομαι*, *to eat*, first applied to a plant with an edible root.)

1. **T. cuspidatum**, Pursh. Leaves narrowly lanceolate, elongated, tapering to a sharp point, woolly on the margins; scales of the involucre scarious, lanceolate, sharp-pointed; larger bristles of the pappus flattened towards the base and almost scale-like.— Prairies, Wisconsin, Lapham. April, May.

66. TARÁXACUM, Haller. DANDELION.

Head many-flowered. Involucre double, the outer of short scales; the upper of long linear scales, erect in a single row.

Achenia oblong, ribbed, and roughened on the ribs, the apex prolonged into a very slender thread-like beak, bearing the pappus of copious soft and white capillary bristles. — Perennial herbs, producing a tuft of pinnatifid or runcinate radical leaves and slender naked hollow scapes, bearing a single large head of yellow flowers. (Name from *ραπάσσω*, to *disquiet* or *disorder*, probably in allusion to its medicinal properties.)

1. **T. Dens-leònis**, Desf. (COMMON DANDELION.) Smooth, or at first pubescent; leaves unequally and deeply runcinate; outer involucre reflexed. — Pastures and fields everywhere: probably indigenous in the North. April–Sept. — After blossoming the inner involucre closes for a time, the slender beak elongates and raises up the pappus while the fruit is forming, the whole involucre is then reflexed, exposing to the wind the naked fruits with the pappus displayed in an open globular head.

67. LACTUCA, Tourn. LETTUCE.

Heads several-flowered. Scales of the involucre imbricated in 2 or more sets of unequal lengths. Achenia flat (compressed parallel to the scales of the involucre), abruptly contracted into a long thread-form beak, bearing a copious and fugacious pappus of very soft and white capillary bristles. — Leafy-stemmed herbs, with paniced heads; the flowers of variable color. (The ancient name of the Lettuce, from *lac*, milk, in allusion to the milky juice.)

1. **L. elongata**, Muhl. (WILD LETTUCE.) Stem tall and stout; leaves partly clasping, pale beneath; the upper lanceolate and entire; the lower runcinate-pinnatifid; heads in a long and narrow naked panicle; achenia oval; flowers pale yellow, varying to purple. — Varies greatly; the leading form being smooth or nearly so, with long leaves: the var. *INTEGRIFOLIA* is mostly smooth with the leaves nearly all entire, and the flowers yellow or bluish (*L. integrifolia*, *Bigel.*): the var. *SANGUINEA* is smaller, mostly hairy, with the leaves chiefly runcinate, and the flowers very variously colored (*L. sanguinea*, *Bigel.*). — Rich damp soil, borders of copses, &c. July–Sept. — Stem 2°–9° high, hollow.

68. MULGÉDIUM, Cass. FALSE OR BLUE LETTUCE.

Heads many-flowered. Involucre, &c., as in *Lactuca*. Achenia laterally compressed, striate or ribbed, the summit contracted into a short and thick beak or neck of the same texture as the achenium, expanded at the apex into a ciliate disk, which bears a

copious rather deciduous pappus of soft capillary bristles. — Leafy-stemmed herbs, with the general aspect and foliage of *Lactuca*. Heads racemed or paniced; the flowers chiefly blue. (Name from *mulgeo*, to milk.)

* *Pappus bright white: flowers blue.*

1. **M. acuminatum**, DC. Smooth, paniced above (3°-6° high); *stem-leaves ovate* and ovate-lanceolate, *pointed, merely toothed*, sometimes hairy on the midrib beneath, contracted at the base into a winged petiole; the lowest often sinuate; heads loosely paniced. ② — Borders of thickets, New York to Ohio southward.

2. **M. Floridanum**, DC. Nearly smooth, paniced above (3°-6° high); *leaves all lyrate or runcinate*, the divisions sharply toothed; heads in a loose compound panice. ② — Varies with the upper leaves clasping by a heart-shaped base, &c. — Rich soil, from Ohio westward and southward. Aug.

** *Pappus tawny: corolla pale blue, or cream-color turning bluish.*

3. **M. leucophæum**, DC. Nearly smooth; stem tall (3°-12° high), very leafy; leaves irregularly pinnatifid, sometimes runcinate, coarsely toothed, the uppermost often undivided; heads in a large and dense compound panice. ② — Low grounds, common. Aug. — Lower leaves often 1° long.

69. SÓNCHUS, L. SOW-THISTLE.

Heads many-flowered, becoming tumid at the base. Involucre more or less imbricated. Achenia flattened laterally, ribbed or striate, not beaked. Pappus copious, of very white exceedingly soft and fine capillary bristles. — Leafy-stemmed weeds, chiefly smooth and glaucous, with corymbed or umbellate heads of yellow flowers. (The ancient Greek name.)

* *Annual: flowers pale yellow.*

1. **S. oleràceus**, L. (COMMON SOW-THISTLE.) Stem-leaves runcinate-pinnatifid, or rarely undivided, slightly toothed with soft spiny teeth, clasping by a heart-shaped base, the auricles acute; involucre downy when young; *achenia striate, wrinkled transversely*. — Waste places in manured soil and around dwellings, introduced.

2. **S. ásper**, Vill. (SPINY-LEAVED SOW-THISTLE.) Stem-leaves mostly undivided, undulate or slightly runcinate, conspicuously spiny-toothed, the auricles of the clasping base rounded; *achenia margined, 3-nerved on each side, smooth*. — Waste places like the last, usually a smaller and more rigid plant.

** *Perennial: flowers bright yellow.*

3. **S. arvénis**, L. (CORN SOW-THISTLE.) Leaves runci-

nate-pinnatifid, spiny-toothed, clasping by a heart-shaped base, the auricles obtuse; peduncles and involucre bristly; achenia transversely wrinkled on the ribs.—Introduced and sparingly naturalized in Essex county, Massachusetts, Staten Island, and New Jersey. Sept.—Heads large.

ORDER 57. LOBELIACEÆ. (LOBELIA FAMILY.)

Herbs, often with milky juice, with alternate leaves and scattered flowers, an irregular monopetalous 5-lobed corolla split down to the base on one side; the 5 stamens free from the corolla, and united into a tube both by their filaments and their anthers.—Calyx-tube adherent to the many-seeded pod. Style 1; stigma fringed. Seeds anatropous, with albumen.

1. LOBELIA, L. LOBELIA.

Calyx 5-cleft, with a short ovoid or hemispherical tube. Corolla with a straight tube, split down on the upper side; the limb somewhat 2-lipped; the upper lip of 2 rather erect lobes, the lower spreading and 3-cleft. Pod 2-celled, many-seeded, opening at the top.—Flowers axillary or chiefly in bracted racemes. Plants acrid and poisonous. (Dedicated to *Lobel*, a Flemish botanist of the close of the 16th century.)

* *Flowers deep red.*

1. **L. cardinalis**, L. (CARDINAL-FLOWER.) Tall, smoothish; leaves oblong-lanceolate, acute at both ends, slightly toothed; raceme elongated, rather 1-sided; the pedicels much shorter than the leaf-like bracts; calyx-lobes shorter than the corolla.—Low grounds, common. July–Oct.—Perennial by offsets, 2^o–3^o high, with large and very showy intensely red flowers,—rarely varying to rose-color! (Plymouth, *Mr. Gilbert*), and sometimes pure white!

* * *Flowers light blue, or variegated with white.*

+ *Stem leafy.*

2. **L. siphilitica**, L. (GREAT LOBELIA.) Tall, somewhat hairy and simple; leaves ovate or ovate-lanceolate, acute, slightly toothed; raceme or spike leafy, the pedicels not half the length of the floral leaves; lobes of the hairy calyx half the length of the corolla, the obtuse reflexed auricles shorter than the tube. †—Low grounds. Aug.—Flowers bright blue, nearly 1' long.

3. **L. pubérula**, Michx. (PALE-LEAVED LOBELIA.) Rather tall, simple, minutely downy-pubescent; leaves ovate or oblong, obtuse,

denticulate with glandular teeth; flowers in a 1-sided spike; the leafy bracts ovate, acute, serrate, as long as the flower, *lobes of the calyx scarcely shorter than the corolla, the auricles as long as the hairy tube.* † — Moist grounds, New Jersey to Ohio and southward. Aug. — Corolla bright blue, rather large.

4. **L. inflàta**, L. (INDIAN TOBACCO.) *Hairy*, low, panicled, branched above; *leaves ovate-lanceolate*, unequally toothed, the lower obtuse; racemes leafy; pedicels much shorter than the pointed bracts; lobes of the *smooth calyx as long as the* (small pale blue) *corolla; auricles none; pod inflated.* ② — Fields, &c., common. July-Sept. A virulent poison.

5. **L. spicàta**, Lam. (PALE SPIKED LOBELIA.) Somewhat pubescent; stem *slender and very simple; leaves* obtuse, slightly toothed, those from the root oblong, of the stem *oblong-lanceolate*; raceme spiked and wand-like, elongated; the *narrow linear bracts equal to the pedicels*; lobes of the smooth calyx awl-thread-form, nearly as long as the tube of the corolla; *appendages none.* † (L. Claytoniana, Michx. L. pallida, Muhl.) — Open woods or fields, Massachusetts to Penn. and Ohio. Aug. — Stem 1° - 3° high, the spike sometimes 1° long. Flowers pale blue, $\frac{1}{2}$ ' long.

6. **L. Nuttállii**, Rœm. & Sch. (SLENDER LOBELIA.) Stem *very slender*, minutely roughened, *mostly simple; root-leaves obovate*; those of the stem oblong-linear, somewhat denticulate, scattered, erect; flowers loosely scattered in a small wand-like raceme; the thread-form *pedicels longer than the minute bract, shorter than the flower*, with minute *bractlets near the base*; lobes of the calyx short, awl-shaped; appendages none. ② — Sandy swamps, Long Island and New Jersey, and southward. July-Sept. — Stem 1° - 2° high, more slender and simple than the next: the flowers similar.

7. **L. Kálmii**, L. (SMALL LOBELIA.) Stem *slender, branching, low, smooth; root-leaves oblong-spatulate*; those of the stem linear, rather obtuse, spreading; raceme loose, few-flowered; *pedicels shorter than the linear leaf-like bracts, longer than the flower*, with 2 minute *bractlets above the middle.* ② or † — Damp limestone rocks and banks, W. New England to Michigan along the Great Lakes. — Stem 4' - 10' high. Corolla $\frac{1}{2}$ ' long, bright light blue. Pod acute at the base. — Stem nearly leafless and scape-like: *root-leaves fleshy: lower lip of the corolla somewhat hairy.*

8. **L. Dortmánnia**, L. (WATER LOBELIA.) Smooth; stem simple, naked; *leaves* in a tuft at the root, *linear, terete and fleshy, hollow*; flowers few, scattered; *pedicels thrice the length of the ovate bracts.* † — In clear water, New England and New York. July. — Leaves growing under water, appearing like 2 tubes joined: the scape 6' - 10' long, bearing 3 or 4 small pale blue drooping blossoms. Apex of the pod free from the calyx.

9. **L. paludosa**, Nutt. (SWAMP LOBELIA.) Smooth; stem angled, nearly naked; root-leaves crowded, flat, rather fleshy, slightly crenate, linear-oblong, obtuse, the few on the stem linear; flowers in an elongated spiked raceme; bracts linear, half the length of the pedicels, and with the calyx-lobes toothed. ♀ — Peat-bogs, Delaware (Nuttall), and southward. — Scapes 2° long; flowers pale blue, small.

ORDER 58. CAMPANULÀCÆ. (CAMPANULA FAM.)

Herbs, with a milky juice, alternate leaves, and scattered flowers; the calyx adherent to the ovary; the regular 5-lobed corolla bell-shaped, valvate in the bud; the 5 stamens free from the corolla and usually distinct. — Style 1, beset with collecting hairs above: stigmas 2 or more. Pod 2-several-celled, many-seeded. Seed small, anatropous, with fleshy albumen. — Flowers generally blue and showy.

1. CAMPÁNULA, Tourn. BELL-FLOWER.

Calyx 5-cleft. Corolla generally bell-shaped, 5-lobed. Stamens 5, separate, the filaments broad and membranaceous at the base. Stigmas and cells of the pod mostly 3, the short pod opening laterally by as many valves. — Perennial herbs, with terminal or axillary flowers. (Name a diminutive of *campana*, a bell; from the shape of the corolla.)

* *Flowers few and paniced, or solitary, long-peduncled.*

1. **C. rotundifolia**, L. (HAREBELL.) Slender, branching; root-leaves round-heart-shaped, crenate, long-petioled; stem-leaves numerous, linear, narrow, entire, smooth; flowers nodding; calyx-lobes awl-shaped, not half the length of the broadly bell-shaped (bright blue) corolla. — Rocky banks, common northward. July–Oct. — The root-leaves of this delicate plant wither early, when the specific name appears wholly inappropriate. — There is a dwarf alpine variety on the White Mountains.

2. **C. aparinoides**, Pursh. (SLENDER BELL-FLOWER.) Stem simple and slender, weak (8'–20' high), somewhat 3-angled, rough backwards on the angles, as are the slightly toothed edges of the linear-lanceolate leaves; peduncles diverging, slender, 1-flowered; lobes of the calyx triangular, half the length of the bell-shaped (nearly white) corolla. (*C. erinoides*, Muhl.) — Bogs and wet meadows, among high grass, principally northward. July. — Plant with somewhat the habit of a *Galium*; the corolla barely $\frac{1}{2}$ ' long.

* * *Flowers in a prolonged leafy spike.*

3. **C. Americana**, L. (TALL BELL-FLOWER.) Stem tall and wand-like, nearly simple; leaves ovate-lanceolate, taper-pointed at both ends, serrate, sparingly hairy, thin; the lowest somewhat heart-shaped; flowers solitary or several in the axils of the upper leaves or bracts, forming a wand-like spike (often 2° long); lobes of the calyx awl-shaped, shorter than the almost wheel-shaped deeply 5-cleft (blue) corolla. — Moist alluvial soil, New York and Penn. to Wisconsin, common westward. July. — Stem 3° – 6° high, sometimes dwarf in dry soil. Flowers rather large.

2. **SPECULÀRIA**, Heist. VENUS'S LOOKING-GLASS.

Calyx 5- (rarely 3-4-) lobed. Corolla wheel-shaped, 5-lobed. Stamens 5, separate; the membranaceous hairy filaments shorter than the anthers. Stigmas 3. Pod prismatic or inversely conical, 3-celled, opening by 3 small lateral valves. — Low annuals, with sessile axillary flowers; the lower ones (in ♂ TRIODALLUS, Raf.) fruiting early in the bud, without expanding their imperfect corolla. (Name from *Speculum Veneris*, the early name of the common European species.)

1. **S. perfoliàta**, A. DC. (CLASPING SPECULARIA.) Somewhat hairy; leaves roundish or ovate, clasping by the heart-shaped base, toothed; flowers solitary or three together in the axils; the upper and later ones only with a conspicuous expanding (purple-blue) corolla; pod oblong-top-shaped, opening rather below the middle. — Dry hills or open fields, common. May – Aug.

ORDER 59. **ERICÀCEÆ**. (HEATH FAMILY.)

Shrubs, sometimes herbs, with the flowers regular or nearly so: the stamens as many or twice as many as the 4-5-lobed or 4-5-petalled corolla and inserted with it: anthers 2-celled, mostly appendaged or opening by terminal chinks or pores: style 1; and the ovary 4-10-celled. (Seeds anatropous, albuminous.) — Consists of four well-marked suborders, as follows.

Synopsis.

Suborder I. **VACCINIEÆ**. THE WHORTLEBERRY FAM.

Calyx-tube adherent to the ovary, which forms an edible berry or berry-like fruit, crowned with the calyx-teeth. — Shrubs or somewhat woody plants.

1. GAYLUSSACIA. Ovary 8-10 celled with a single ovule in each cell. Fruit a berried drupe with 8-10 small nutlets.
2. VACCINIUM. Berry 4-5-celled (or imperfectly 8-10-celled by false partitions), many-seeded. Anther-cells tapering upward into tubes.
3. CHIOGENES. Berry 4-celled, many seeded. Anther-cells not prolonged into tubes, but 2-pointed.

Suborder II. ERICINEÆ. THE PROPER HEATH FAMILY.

Calyx free from the ovary. Corolla monopetalous or rarely nearly or quite polypetalous. Seed-coat close and thin, rarely loose and cellular. — Shrubs or small trees.

Tribe 1. ARBUTEÆ. — Fruit a berry or drupe.

4. ARCTOSTAPHYLOS. Corolla urn-shaped. Drupe berry-like, with 5 seed-like nutlets.

Tribe 2. ANDROMEDEÆ. — Fruit a pod opening loculicidally.

* Calyx becoming berry-like in fruit, and inclosing the pod.

5. GAULTHERIA. Corolla cylindrical-urn-shaped, 5-toothed. Anthers 4-awned.

* * Calyx dry and unchanged in fruit.

6. EPIGÆA. Corolla salver-form; the border 5-parted. Anthers opening lengthwise, awnless.
7. ANDROMEDA. Corolla bell-shaped, ovoid, or somewhat urn-shaped, 4-5-toothed. Anthers opening by pores or chinks at the summit. Pod 5-celled, 5-valved.
8. CLETHRA. Corolla of 5 distinct petals. Pod 3-celled, 3-valved.

Tribe 3. RHODOREÆ. — Fruit a pod opening septicidally.

* Corolla ovoid or urn-shaped, barely 5-toothed.

9. PHYLLODOCE. Stamens 10. Pod 5-celled. Leaves Heath-like.
* * Corolla bell-shaped or funnel-form, 5-lobed or ringent.
10. RHODORA. Corolla irregular, 2-lipped; the upper lip 3-lobed, the lower 2-parted or of 2 petals. Stamens 10, unequal.
11. AZALEA. Corolla funnel-form, 5-lobed. Stamens 5, and with the style declined. Leaves deciduous.
12. RHODODENDRON. Corolla mostly bell-shaped. Stamens 10, and with the style commonly declined. Leaves evergreen.
13. KALMIA. Corolla between wheel-shaped and bell-shaped, 5-lobed, with 5 hollows which hold the anthers. Style straight. Leaves evergreen.

* * * Corolla 5-parted or of 5 separate petals, regular.

14. LOISELEURIA. Stamens 5, shorter than the deeply 5-cleft corolla: anthers opening lengthwise. Pod 2-3-celled.

15. **LEIOPHYLLUM**. Stamens 10, exserted: anthers opening lengthwise. Petals 5. Pod 2-3-celled.
16. **LEDUM**. Stamens 5-10: anthers opening by pores. Petals 5. Pod 5-celled.

Suborder III. PYROLEÆ. THE PYROLA FAMILY.

Calyx free from the ovary. Petals distinct, or very nearly so. Seeds with a very loose and translucent cellular covering much larger than the nucleus. — Nearly herbaceous; with evergreen foliage.

17. **PYROLA**. Flowers in a raceme. Petals converging or hardly spreading. Filaments awl-shaped: anthers scarcely 2-horned. Style long, mostly declined. Valves of the pod woolly on the edges.
18. **MONESSES**. Flower single. Petals widely spreading. Filaments not dilated in the middle: anthers conspicuously 2-horned. Style straight, exserted: stigmas 5, radiate. Valves of the pod smooth on the edges.
19. **CHIMAPHILA**. Flowers corymbed or umbelled. Petals widely spreading. Filaments dilated and hairy in the middle. Style very short and top-shaped, covered by a broad and orbicular 5-crenate stigma. Valves of the pod smooth on the edges.

Suborder IV. MONOTROPEÆ. THE INDIAN PIPE FAM.

Flowers nearly as in Suborders II, or III., but entirely destitute of green foliage, and with the aspect of Beech-drops. Seeds as in Suborder III.

20. **PTEROSPORA**. Corolla urn-shaped, 5-toothed, persistent. Stamens 10: anthers 2-awned on the back, 2-celled. Seeds with a stalked wing at the apex. Flowers racemed.
21. **HYPOPITYS**. Corolla of 4 or 5 distinct petals. Stamens 8 or 10: anthers kidney-shaped, 1-celled. Flowers racemed.
22. **MONOTROPA**. Corolla of 5 petals. Stamens 10: anthers 2-celled, awnless. Flower single.

Suborder I. VACCINIÆÆ. THE WHORTLEBERRY FAMILY.

1. **GAYLUSSÁCIA**, H. B. K. HUCKLEBERRY.

Corolla tubular, ovoid or bell-shaped; the border 5-cleft. Stamens 10: anthers awnless; the cells tapering upward into more or less of a tube, opening by a chink at the end. Fruit a berry-like drupe containing 10 seed-like nutlets. — Branching shrubs, with much the aspect of *Vaccinium*, commonly sprinkled with resinous dots; the flowers (white tinged with purple or red) in

lateral bracted racemes. (Named in honor of the distinguished chemist, *Gay-Lussac*.) For a critical notice of the N. Amer. species, see *Gray, Chloris Bor.-Am.*, t. 10, p. 49.

* *Leaves thick and evergreen, not resinous-dotted.*

1. **G. brachycera**, Gray. (BOX-LEAVED HUCKLEBERRY.) Low, very smooth; leaves oval, finely crenate-toothed; racemes short and nearly sessile; pedicels very short; corolla cylindrical-bell-shaped. (*Vaccinium brachycerum*, *Michx.* *V. buxifolium*, *Salisb.*) — Perry county, Penn., near Bloomfield, *Prof. Baird*. May. — Shrub 1° high: leaves in shape and aspect like those of the Box.

* * *Leaves deciduous, entire: whole plant more or less resinous-dotted.*

2. **G. dumosa**, Torr. & Gr. (DWARF HUCKLEBERRY.) *Somewhat hairy and glandular*, low (1° high from a creeping base), bushy; leaves obovate-oblong, mucronate, green both sides, rather thick and shining when old; racemes elongated; bracts leaf-like, oval, persistent, as long as the pedicels; ovary bristly or glandular; corolla bell-shaped; fruit black. — Var. *HIRTÉLLA* has the young branchlets, racemes, and often the leaves hairy. — Sandy low soil, Maine to New Jersey, near the coast, and southward. June. — Fruit insipid.

3. **G. frondosa**, Torr. & Gr. (BLUE TANGLE. DANGLE-BERRY.) *Smooth*; branches slender and divergent; leaves obovate-oblong, obtuse, pale, glaucous beneath; racemes slender, loose; bracts oblong or linear, rather deciduous, shorter than the slender drooping pedicels; corolla globular-bell-shaped; fruit dark blue with a white bloom. — Low copses, Maine to Penn. near the coast, and southward. May, June. — Shrub 3° - 6° high, with grayish bark. Fruit sweet, much prized in New Jersey, &c.

4. **G. resinosa**, Torr. & Gr. (BLACK HUCKLEBERRY.) Much branched, rigid, *slightly pubescent* when young; leaves oval, oblong-ovate, or oblong, thickly clothed and at first clammy, as well as the flowers, with shining resinous globules; racemes short, clustered, one-sided; pedicels about the length of the flowers; bracts and bractlets (reddish) small and deciduous; corolla ovoid-conical, or at length cylindrical with an open mouth; fruit black, without bloom. — Woodlands and swamps. May, June. — Shrub 1° - 3° high, bushy. Flowers reddish, tinged with green. Fruit pleasant; the common *Huckleberry* of the North. It is said sometimes to occur with white fruit.

2. VACCINIUM, L. BLUEBERRY. BILBERRY.

Corolla bell-shaped, urn-shaped, or cylindrical; the limb 4 - 5-cleft, revolute. Stamens 8 or 10: anthers sometimes 2-awned on the back; the cells separate and prolonged into a tube above, opening by a hole at the apex. Berry 4 - 5-celled, many-seeded,

or sometimes 8 – 10 celled by a false partition stretching from the back of each cell to the placenta. — Shrubs with solitary, clustered, or racemed flowers: the corolla white or reddish. (An ancient Latin name, of obscure derivation.)

§ 1. *Oxycoccus*, Tourn. — *Ovary 4-celled: corolla 4-parted, the elongated divisions revolute: anthers 8, awnless: filaments smooth: peduncles slender. (Berries red and acid; stems trailing, and the small leaves evergreen with revolute margins in the true Cranberries.)*

1. **V. Oxycoccus**, L. (SMALL CRANBERRY.) Stems very slender, creeping; *leaves ovate, acute, glaucous underneath; peduncles (2–4 together) terminal; filaments more than half the length of the anthers. (Oxycoccus vulgaris, Pursh.)* — Peat-bogs, N. England to Wisconsin northward. June. — Much rarer than the next, and smaller in all its parts. Berry globular, purple-scarlet, hardly $\frac{1}{2}$ ' broad, seldom sufficiently abundant to be collected for the market.

2. **V. macrocarpon**, Ait. (COMMON AMERICAN CRANBERRY.) Stems elongated, creeping, the flowering branches ascending; *leaves oblong, obtuse, glaucous underneath; peduncles lateral, from the base of the young shoots; filaments scarcely one third the length of the anthers. (O. macrocarpus, Pers.)* — Peat-bogs, common, especially northward. June. — Stems 2°–3° long; the leaves about $\frac{1}{2}$ ' long. Corolla rose-color. Berry fully $\frac{1}{2}$ ' broad, often oblong, light scarlet.

§ 2. *Vitis-Idæa*, Tourn. — *Ovary 4–5-celled: corolla bell-shaped or globular, 4–5-lobed: anthers 8–10, awnless: filaments hairy: flowers in short bracted racemes: leaves evergreen; berries red or purple.*

3. **V. Vitis-Idæa**, L. (COWBERRY.) Low; branches erect from tufted creeping stems; leaves obovate, with revolute margins, smooth and shining above, dotted with blackish bristly points underneath; flowers crowded in terminal and one-sided nodding racemes; corolla bell-shaped, 4-cleft. — Higher mountains of New England, also on the coast of Maine, and at Danvers, Massachusetts, *Oakes*. June. — Plant 6'–10' high, dark green; the berries dark red, acid and rather bitter, mealy, barely edible.

§ 3. *Batodéndron*. — *Ovary more or less completely 10-celled by false partitions: corolla spreading-campanulate, 5-lobed: anthers 2-awned on the back: filaments hairy: berries marckish and scarcely edible, ripening few seeds: flowers solitary on slender bractlets in the axils of the upper leaves, forming a sort of leafy racemes.*

4. **V. stamineum**, L. (DEERBERRY. SQUAW HUCKLEBERRY.) Diffusely branched (2°–3° high), somewhat pubescent; leaves ovate or oval, pale, whitish underneath, deciduous; tubes of the anthers much longer than the corolla, short-awned; berries globular or pear-

shaped, greenish. — Dry woods, Maine to Penn. and southward, chiefly eastward. May, June.

§ 4. *EUVACCINIUM*. — Ovary 4-5-celled, with no trace of false partitions: corolla urn-shaped or globular, 4-5-toothed: anthers 2-awned on the back: filaments smooth: flowers axillary, solitary, or 2-3 together: berries blue or black: northern-alpine plants, with deciduous leaves. (Bilberry.)

5. *V. cæspitosum*, Michx. (DWARF BILBERRY.) Dwarf, tufted; leaves obovate, narrowed at the base, membranaceous, smooth, somewhat shining, serrate; flowers solitary on short peduncles; corolla oblong, slightly urn-shaped: stamens 10. — Alpine region of the White Mountains, N. Hampshire, Robbins, Oakes. July. — Stems 3' - 5' high.

6. *V. uliginosum*, L. (LOW BOG BILBERRY.) Low and spreading, tufted; leaves entire, dull, obovate or oblong, obtuse, pale and slightly pubescent underneath; flowers single or 2-3 together from a scaly bud, almost sessile; corolla short, urn-shaped; stamens chiefly 8. — Alpine tops of the White Mountains, New Hampshire, Green Mountains, Vermont, and Essex Mountains, New York. June. — Stems 4' - 8' high: leaves scarcely $\frac{3}{4}$ ' long.

§ 5. *CYANOCOCCUS*. — Ovary more or less completely 10-celled by false partitions: corolla oblong-cylindrical or slightly urn-shaped, 5-toothed: anthers 10, awnless: filaments hairy: berries blue or black with a bloom (sweet): flowers in clusters or very short racemes from scaly buds separate from and somewhat preceding the leaves, appearing in April and May. (Leaves deciduous in the northern species or proper Blueberries.)

7. *V. Pennsylvanicum*, Lam. (LOW SHINING-LEAVED BLUEBERRY.) Dwarf (6' - 15' high), smooth; leaves ovate-lanceolate or oblong-lanceolate, distinctly serrulate with bristle-pointed teeth, smooth and shining both sides (or sometimes downy on the midrib underneath); corolla short, cylindrical-bell-shaped. (*V. tenellum*, Pursh, not of Ait. *V. virgatum*, Ait.) — Var. *ANGUSTIFOLIUM* is a high mountain or boreal form, 4' - 6' high, with narrower lanceolate leaves. (*V. angustifolium*, Ait.) — Dry hills and woods. — Branches green, angled, warted. Berries abundant, large and sweet, ripening early in July: the earliest blueberry or blue huckleberry in the market.

8. *V. Canadense*, Kalm. (DOWNY-LEAVED BLUEBERRY.) Low; leaves oblong-lanceolate, entire, downy both sides, as well as the crowded branchlets; corolla very short, nearly bell-shaped. — Swamps and moist mountain woods, Maine to Michigan, northward. — Shrub 8' - 20' high, with green twigs, and berries like the last but ripening later.

9. *V. vacillans*, Solander. (SMALL GLAUCOUS BLUEBERRY.) Low (1° - 2° high); branches angular; leaves oval or obovate, obtuse or

slightly pointed, *pale and dull, smooth both sides, glaucous beneath, serrulate-ciliate*; corolla broadly cylindrical-bell-shaped. (*V. virgatum*, *Bigel.*, not of *Ait.* *V. Pennsylvanicum*, *Torr. Fl.*) — Dry hills and open woods, common. — Branches yellowish-green. Leaves fringed with bristly or glandular hairs, which tip the more or less obvious serratures. Berries ripening a little later than those of No. 7, fully as large and sweet.

10. **V. pállidum**, *Ait.* (PALE SWAMP BLUEBERRY.) *Rather tall; leaves ovate or lanceolate-oval, acute or pointed, smooth both sides (sometimes downy on the midrib), pale or glaucous underneath, serrulate-ciliate*; corolla cylindrical-bell-shaped. — Margin of swamps and ponds (or on mountains), Vermont and Ohio and southward. — Plant 3°–8° high; the twigs with yellowish-green bark as in the last; the leaves even more strongly ciliate with bristly teeth, by which principally it is to be distinguished from the next.

11. **V. corymbòsum**, *L.* (COMMON SWAMP BLUEBERRY.) *Tall; leaves smooth both sides (when young somewhat downy on the veins) pale beneath, oval-obovate or oblong, mostly acute or acutish at both ends, the margins quite smooth and entire*; corolla cylindraceous. — Swamps and wet copses, common. — Plant 5°–10° high; the clusters of flowers somewhat corymbed on the naked branchlets, whence the name. Corolla $\frac{1}{2}$ '– $\frac{1}{2}$ ' long. Berries large, subacid, pleasant, deep blue, covered, like all the foregoing, with a glaucous bloom; ripening in Aug. and Sept.

12. **V. fuscàtum**, *Ait.* (BLACK BLUEBERRY.) *Tall; leaves downy beneath and also usually on the veins above, otherwise, like the flowers, as in No. 11; berry purplish-black, destitute of bloom.* — (*V. disomórphum*, *Bigel.*, not of *Michx.*) — Swamps, common. — Stem 5°–9° high. Leaves 2'–3' long when full-grown, at length thickish and somewhat shining above, but always soft-downy underneath. Berry crowned with very conspicuous calyx-teeth. — The plant appears to be perfectly constant in these characters.

3. **CHIÓGENES**, *Salisb.* CREEPING SNOWBERRY.

Corolla broadly bell-shaped, deeply 4-cleft. Stamens 8, included, inserted on the margin of the even epigynous disk: filaments very short and broad: anther-cells ovate-oblong, quite separate, not awned on the back, but minutely 2-awned at the apex, and opening by a large chink down to the middle. Berry white, globular, crowned with the 4-toothed calyx, rather dry, 4-celled, many-seeded. — A trailing and creeping evergreen, with very slender and scarcely woody stems, and small Thyme-like ovate and pointed leaves on short petioles, with revolute margins,

smooth above, the lower surface and the branches beset with rigid rusty bristles. Flowers very small, solitary in the axils, on short nodding peduncles, with 2 bractlets under the calyx. (Name from *χιών*, *snow*, and *γένος*, *offspring*, in allusion to the snow-white berries.)

1. **C. hispídula**, Torr. & Gr. (*Vaccinium hispidulum*, L. *Gaultheria serpyllifolia*, Pursh. *G. hispidula*, Muhl.) Peat-bogs and mossy mountain woods, in the shade of evergreens, common northward. May. — Whole plant with the aromatic flavor of the Boxberry, Wintergreen, or Birch. Leaves $\frac{1}{2}$ ' long. Berries $\frac{1}{4}$ ' broad, bright white, mature at the close of summer.

Suborder II. ERICÍNEÆ. THE PROPER HEATH FAMILY.

Tribe 1. ARBUTÉLÆ. THE ÁRBUTUS TRIBE.

4. ARCTOSTÁPHYLOS, Adans. BEARBERRY.

Corolla ovate and urn-shaped, with a short revolute 5-toothed limb. Stamens 10, included: anthers with 2 reflexed awns on the back near the apex, opening by terminal pores. Drupe berry-like, with 5 seed-like nutlets. — Shrubs with alternate leaves, and scaly-bracted nearly white flowers in terminal racemes or clusters. Fruit austere. (Name composed of *ἄρκτος*, *a bear*, and *σταφυλή*, *a grape or berry*, the Greek of the popular name.)

1. **A. Uva-úrsi**, Spreng. (COMMON BEARBERRY.) Trailing; leaves thick and evergreen, obovate, entire, smooth and shining; fruit red. (*Árbutus Uva-ursi*, L.) — Rocks and bare hills, common northward. May.

2. **A. alpína**, Spreng. (ALPINE BEARBERRY.) Dwarf, tufted and depressed; leaves deciduous, serrate, wrinkled with strong netted veins, obovate, ciliate when young; flowers appearing with the leaves; fruit black. — Alpine region of the White Mountains, New Hampshire.

Tribe 2. ANDROMEDELÆ. THE ANDROMEDA TRIBE.

5. GAULTHERIA, Kalm. AROMATIC WINTERGREEN.

Corolla cylindrical-ovoid or a little urn-shaped, 5-toothed. Stamens 10, included: anther-cells each 2-awned at the summit, opening by a terminal pore. Pod depressed, 5-lobed, 5-celled, 5-valved, many-seeded, inclosed when ripe by the calyx which thickens and

turns fleshy, so as to appear as a globular red berry! — Scarcely shrubby plants, with alternate evergreen leaves and axillary (nearly white) flowers: pedicels with 2 bractlets. (Dedicated by Kalm to “*Dr. Gaultier*,” of Quebec; *Linn. Amœn. Acad.* 3, p. 15; very likely the same person as the *M. Gautier* who contributed a paper on the Sugar Maple to the Memoirs of the French Academy; but it is too late to alter the original orthography of the genus.)

1. **G. procumbens**, L. (CREEPING WINTERGREEN.) Stems slender and extensively creeping on or below the surface; the flowering branches ascending, simple, leafy at the summit (3'–5' high); leaves obovate or oval, obscurely serrate, shining above; flowers few, mostly single in the axils, nodding. — Cool damp woods, mostly in the shade of evergreens. May–July. — The bright red berries (formed of the calyx) and the foliage have the well-known spicy-aromatic flavor of the Sweet Birch. In the interior of the country it is everywhere called *Wintergreen*, or sometimes *Tea-berry*. Eastward it is called *Chequer-berry* or *Partridge-berry* (names also applied to *Mitchella*, the latter especially so), and *Box-berry*.

6. EPIGÆA, L. GROUND LAUREL. TRAILING ARBUTUS.

Corolla salver-form, the tube as long as the ovate-lanceolate pointed and scale-like nearly distinct sepals. Stamens 10, with filiform filaments: anthers oblong, awnless, opening lengthwise. Pod depressed-globular, 5-lobed, 5-celled, many-seeded. — Prostrate or trailing scarcely shrubby plants, bristly with rusty hairs, with evergreen and reticulated rounded alternate leaves, and rose-colored flowers in small axillary clusters subtended by scaly bracts. (Name composed of *ἐπί*, upon, and *γη*, the earth, from the trailing growth.)

1. **E. repens**, L. (MAYFLOWER) Leaves roundish-oval and heart-shaped, on slender petioles; tube of the corolla hairy inside. — Sandy woods or sometimes in rocky soil, especially in the shade of pines, common in many places: flowers appearing in early spring, and exhaling a rich spicy fragrance.

7. ANDRÓMEDA, L. ANDROMEDA.

Corolla various in form, 5- (rarely 4-) toothed. Stamens 10, rarely 8, included: anthers awned or awnless, short, opening by terminal pores or slits. Pod 5-celled, many-seeded. — Shrubs,

with evergreen or deciduous alternate leaves and mostly racemed or clustered flowers. (Fancifully named by Linnæus in allusion to the fable of *Andromeda*.)

§ 1. *ANDRÓMEDA* proper. — *Calyx small, without bractlets: corolla globose-urn-shaped, much contracted and 5-toothed at the top: filaments bearded: anthers tipped with 2 ascending awns: pod globular-obovate: seeds smooth and shining: flowers on short naked peduncles crowded in a terminal umbel.*

1. **A. polifolia**, L. (ROSEMARY ANDROMEDA.) Low, very smooth; leaves evergreen, thick, lanceolate or linear, entire, with strongly revolute margins, green above, white beneath as well as the branchlets. — Cold peat-bogs, common northward. May. — Shrub 1° high; the leaves 1'–2' long, variable in breadth.

§ 2. *CASSIOPE*, Don. — *Calyx without bractlets: corolla open, bell-shaped, 4–5-cleft: filaments smooth: anthers bearing 2 recurved awns: pod globose, the 5 valves 2-cleft at the apex: seed-coat close: small arctic or alpine low and Heath-like evergreens, with crowded or imbricated small entire leaves, and solitary long-peduncled nodding flowers.*

2. **A. hypnoides**, L. (MOSS-LIKE ANDROMEDA.) Diffuse and tufted; leaves needle-shaped; peduncle terminal; corolla globular-bell-shaped. — Alpine summits of the White Mountains, New Hampshire, and Mount Marcy, New York. July. — Plant moss-like, in depressed tufts, 2'–3' high.

§ 3. *LYÓNIA*, Nutt. — *Calyx without bractlets: corolla globular, pubescent outside, the narrow mouth 5-toothed: filaments pubescent: anthers awnless: pod globular, the dorsal sutures bearing salient ribs which are generally separable when the pod opens: seed-coat loose: flowers (small) in paniced racemes or clusters.*

3. **A. ligustrina**, Muhl. (PRIVET ANDROMEDA.) Leaves deciduous, obovate-oblong, pointed, nearly entire; racemes crowded in a compound somewhat leafy or naked panicle on terminal branches of the preceding year. (*A. paniculata*, Ait.) — Swamps, common eastward. June. — Shrub 4°–10° high, minutely downy when young, sometimes rusty. Corolla scarcely 1" broad.

§ 4. *CASSÁNDRA*, Don. — *Calyx subtended by 2 bractlets: corolla cylindrical-oblong, the mouth slightly narrowed and 5-toothed: filaments smooth: anthers awnless but the cells with prolonged tubular points: pods depressed-globular, the epicarp 5-valved, separating from the cartilaginous inner portion, which splits into 5 at length 2-valved carpels: seed-coat close and shining: low shrubs, with evergreen rusty-dotted leaves, and flowers solitary in the axils, forming one-sided leafy racemes.*

4. **A. calyculata**, L. (RUSTY-LEAVED ANDROMEDA.) Leaves

elliptical or oblong-lanceolate, obtuse, flat, nearly entire; bractlets ovate. — Bogs, common, especially northward. April, May. — Shrub 1° - 3° high.

§ 5. *EUBOTRYS*, Nutt. — *Calyx with 2 bractlets: corolla cylindrical, slightly contracted at the summit, 5-toothed: filaments smooth: anthers tipped with 4 (rarely 2) erect awns: pod depressed-globular: branched shrubs, with veiny and thin deciduous serrulate leaves, and numerous flowers closely set in simple one-sided spiked racemes.*

5. **A. racemosa**, L. (RACEMED ANDROMEDA.) Nearly smooth; leaves oval-lanceolate or oblong, acute; racemes erect or spreading; sepals ovate-lanceolate; seeds angled, depressed, with a close coat. — Moist copses, Massachusetts to New Jersey near the coast, and southward. June. — Shrub 3° - 5° high: racemes 2' - 6' long; bracts awl-shaped.

6. *MARIA*, DC. — *Calyx without bractlets: corolla ovoid-bell-shaped: filaments with 2 short bristle-like reflexed appendages at the apex: anthers awnless: pod ovate-conical, 5-ribbed: seeds ascending, the coat rather loose: flowers in umbel-like clusters crowded on leafless branches, from buds developed in the axils of the deciduous leaves of the preceding year.*

6. **A. Mariàna**, L. (MARYLAND ANDROMEDA. STAGGER-BUSH.) Nearly smooth; leaves thickish, oval or oblong, entire, somewhat shining; flowers large ($\frac{1}{3}$ ' - $\frac{1}{2}$ ' long), nodding. — Sandy woods, Rhode Island to Penn. and southward, near the coast. June. — Shrub 2° - 4° high.

§ 7. *OXYDÉNDRUM*, DC. — *Calyx without bractlets: corolla oblong-ovoid, narrowed at the summit, 5-toothed: filaments thickened: anthers awnless, the cells long and pointed: pod pyramidal, 5-angled: seeds ascending from the base, linear, with a loose coat taper-pointed at both ends: leaves deciduous, large, sour: flowers in slender somewhat 1-sided racemes crowded in a large terminal panicle: bracts and bractlets minute, deciduous.*

7. **A. arborea**, L. (SORREL-TREE. SOUR-WOOD.) Leaves oblong-lanceolate, pointed, shining above; racemes and pods minutely hoary. — Rich woods, Penn. and Ohio, southward. July. — A tall shrub or tree with rough bark, 20° - 60° high. Leaves 5' - 6' long, turning bright scarlet early in autumn.

8. **CLÈTHRA**, L. SWEET PEPPERBUSH.

Corolla of 5 distinct obovate-oblong petals. Stamens 10, exerted: anthers inversely arrow-shaped, inverted and reflexed in the bud, opening by terminal pores or short slits. Style slender: stigmas 3. Pod 3-valved, 3-celled, many-seeded, inclosed in the calyx. — Shrubs, with alternate and serrate deciduous leaves, and

white flowers in single or paniced racemes. (*Κλήθρα*, the ancient Greek name of the Alder, which this genus somewhat resembles in foliage.)

1. **C. alnifolia**, L. (WHITE ALDER.) Leaves wedge-obovate, serrate, entire towards the base, smooth, green both sides; racemes upright, hoary; bracts as long as the pedicels; filaments smooth. — Wet copses, Maine to Penn. near the coast, and southward. — Shrub 4°–12° high, covered in July and August with handsome fragrant blossoms.

Tribe 3. RHODOREÆ. THE RHODORA TRIBE.

9. **PHYLLÓDOCE**, Salisb. PHYLLODOCE.

Corolla urn-shaped, 5-toothed. Stamens 10: anthers pointless, opening by terminal pores. Pod 5-celled, many-seeded. — Low alpine Heath-like evergreens, clothed with scattered linear obtuse leaves with rough margins. Flowers usually nodding on solitary or umbelled peduncles at the summit of the branches. (“A mythological name.”)

1. **P. taxifolia**, Salisb. Peduncles 2–6, clustered at the summit; corolla oblong-urn-shaped, purplish or rose-color, smooth; style included. (*Menziësia cærùlea*, *Smith.*) — Alpine summits of the White Mountains, New Hampshire. July. — Shrub 4'–6' high, tufted.

10. **RHODÒRA**, Duham. RHODORA.

Calyx minute, 5-toothed. Corolla irregular and 2-lipped; the upper lip 3-lobed or 3-cleft, the lower 2-parted or of 2 distinct spreading petals. Stamens 10, and with the slender style declined. Otherwise as in *Azalea*. (Name from *ῥόδον*, a *rose*, from the color of the showy flowers.)

1. **R. Canadensis**, L. — Damp woods and cold swamps, New England to Penn., chiefly northward or on mountains. May. — A handsome low shrub, with the oblong deciduous leaves whitish and downy underneath; the showy rose-purple flowers in clusters on short peduncles, rather earlier than the leaves.

11. **AZÀLEA**, L. FALSE HONEYSUCKLE.

Calyx 5-parted, often minute. Corolla funnel-form, 5-lobed, slightly irregular; the lobes spreading. Stamens 5, with long exerted filaments, usually declined, as well as the similar style: anthers short, opening by terminal pores, pointless. Pod 5-cell-

ed, 5-valved, many-seeded. Seeds scale-like. — Upright shrubs, with alternate and obovate or oblong deciduous leaves, which are entire, ciliate, and mucronate with a glandular point. Flowers large and showy, in umbelled clusters from large scaly-imbricated terminal buds. (Name from ἀζαλέος, *arid*, most inappropriate as applied to our species, which grow in swamps.)

* *Flowers appearing after the leaves.*

1. **A. arboréscens**, Pursh. (SMOOTH AZALEA.) *Branchlets smooth; leaves obovate, obtuse, very smooth both sides, shining above, glaucous beneath, the margins bristly-ciliate; calyx-lobes long and conspicuous; corolla slightly clammy; stamens and style very much exerted.* — Mountains of Penn. and southward. June. — Shrub 3°-10° high, with thickish leaves, and very fragrant rose-colored blossoms larger than in No. 3.

2. **A. viscosa**, L. (CLAMMY AZALEA OR WHITE HONEYSUCKLE.) *Branchlets bristly, as well as the margins and midrib of the oblong-obovate otherwise smooth leaves; calyx-lobes minute; corolla clammy with glandular hairs, the tube much longer than the lobes; stamens moderately, the style conspicuously, exerted.* — Var. GLAUCA has the leaves paler and often white-glaucous underneath, or above also, sometimes rough-hairy. — Swamps, Northern and Eastern States, near the coast, common. June, July. — Shrub 4°-10° high, with handsome fragrant flowers in large clusters, white, or tinged with rose-color.

* * *Flowers appearing before or with the leaves.*

3. **A. nudiflora**, L. (PURPLE AZALEA. PINKIE-FLOWER.) *Branchlets rather hairy; leaves obovate or oblong, downy underneath; calyx very short; tube of the corolla scarcely longer than the ample lobes, slightly glandular; stamens and style much exerted.* — Swamps, common, especially in the interior. April, May. — Shrub 2°-6° high, with very showy flowers varying from flesh-color to pink and purple. There are numberless varieties, some of them exhibiting 10 or more stamens.

4. **A. calendulæcea**, Michx. (FLAME-COLORED AZALEA.) *Branchlets and obovate or oblong leaves hairy; calyx-lobes oblong, conspicuous; tube of the corolla scarcely as long as the lobes, hairy, not clammy; stamens and style much exerted.* — Woods, mountains of Penn. and southward. May. — Shrub 3°-10° high, covered just when the leaves appear with a profusion of large and showy yellow or orange blossoms, usually turning to flame-color.

A. hispida, Pursh., from the mountains of New York and Penn., has not been identified, unless it be a variety of *A. viscosa*.

A. nitida, Pursh., is in the same condition: the cultivated plant resembles *A. viscosa*, but is very low and narrow-leaved.

12. RHODODÉNDRON, L. ROSE-BAY.

Calyx 5-parted, mostly small. Corolla bell-shaped or partly funnel-form, sometimes slightly irregular, 5-lobed. Stamens 10 (very rarely fewer), commonly declined: anthers, pods, &c., as in Azalea. — Shrubs or low trees with evergreen entire alternate leaves, and large showy flowers in compact terminal corymbs or clusters from large scaly-bracted buds. (*Ῥοδόδενδρον*, *rose-tree*, the ancient name.)

1. **R. máximum, L.** (GREAT LAUREL.) *Leaves elliptical-oblong or lanceolate-oblong, acute, narrowed towards the base, very smooth, with somewhat revolute margins; corolla bell-shaped.* — Damp deep woods, sparingly in New England and New York, but very common along shaded water-courses in the mountains of Penn. and southward. July. — Shrub or tree 6°–20° high. Leaves 4'–10' long, very thick. Corolla 1' broad, pale rose-color or nearly white, greenish in the throat on the upper side and spotted with yellow or reddish.

2. **R. Lappónicum, Wahl.** (LAPLAND ROSE-BAY.) *Dwarf, prostrate; leaves elliptical, obtuse, dotted both sides like the branches with rusty scales; umbels few-flowered; corolla open bell-shaped, dotted; stamens 5–10.* — Alpine summits of the White Mountains, New Hampshire, and Mount Marcy, New York. July. — Shrub 6' high, forming broad matted tufts; the leaves ½' long. Corolla violet-purple.

13. KÁLMIA, L. AMERICAN LAUREL.

Calyx 5-parted. Corolla between wheel-shaped and bell-shaped, 5-lobed, furnished with 10 depressions in which the 10 anthers are severally lodged until they begin to shed their pollen: filaments thread-form. Pod globose, 5-celled, many-seeded. — Evergreen mostly smooth shrubs, with alternate or opposite entire coriaceous leaves, and showy flowers in umbel-like corymbs. Pedicels bracted. Flower-buds naked. (Dedicated to *Peter Kalm*, a pupil of Linnæus who travelled in this country about the middle of the last century.)

1. **K. latifolia, L.** (CALICO-BUSH. MOUNTAIN LAUREL.) *Leaves mostly alternate, bright green both sides, ovate-lanceolate or elliptical, tapering to each end, petioled; corymbs terminal, many-flowered, clammy-pubescent.* — Rocky hills and damp soil, rather common from Maine to Ohio, as a shrub 4°–8° high, but in the mountains from Penn. southward forming dense thickets, and often

tree-like (10° - 20° high). June. — Flowers profuse, and very showy, light or deep rose-color, clammy. — Also called SPOONWOOD.

2. **K. angustifolia**, L. (SHEEP LAUREL. LAMBKILL.)
Leaves commonly opposite or in threes, pale or whitish underneath, light green above, narrowly oblong, obtuse, petioled; corymbs lateral (appearing later than the branches of the season), slightly glandular, many-flowered. — Hill-sides, common. June, July. — Shrub 2° - 3° high, upright: the flowers crimson, and two thirds smaller than in the last.

3. **K. glauca**, Ait. (PALE LAUREL.) *Branchlets 2-edged; leaves opposite, nearly sessile, oblong, white-glaucous underneath, with revolute margins; corymbs terminal, few-flowered, smooth; bracts large.* — Var. *ROSMARINIFOLIA* has linear strongly revolute leaves. — Cold peat-bogs and mountains, northward. July. — Straggling, about 1° high. Flowers larger than in No. 2, pale lilac.

14. LOISELEÛRIA, Desv. ALPINE AZALEA.

Calyx 5-parted, nearly as long as the rather bell-shaped and deeply 5-cleft regular corolla. Stamens 5, not declined, included: anthers opening lengthwise. Style short. Pod ovoid, 2 - 3-celled, many-seeded. — A dwarf and prostrate evergreen shrubby plant, much branched and tufted, smooth, with small and coriaceous opposite elliptical leaves, on short petioles, with revolute margins. Flowers small, white or rose-color, on very short solitary or clustered peduncles. (Dedicated to *Loiseleur-Deslongchamps*, a French botanist.)

1. **L. procumbens**, Desv. (*Azalea procumbens*, L.) — Alpine summits of the White Mountains, New Hampshire, on rocks. June.

15. LEIOPHYLLUM, Pers. SAND MYRTLE.

Calyx 5-parted. Corolla of 5 distinct obovate-oblong petals, spreading. Stamens 10, exerted: anthers opening lengthwise. Pod 2 - 3-celled, splitting from the apex downward, many-seeded. — A low much-branched evergreen, with the aspect and foliage of the preceding genus, but the crowded leaves often alternate, scarcely petioled. Flowers small, white, in terminal umbel-like clusters. (Name from *λεῖος*, *smooth*, and *φύλλον*, *foliage*, in allusion to the smooth and shining leaves.)

1. **L. buxifolium**, Ell. — Sandy pine barrens of New Jersey. May. — Shrub 6' - 10' high, with the oval or oblong leaves $\frac{1}{4}$ - $\frac{1}{2}$ ' long.

16. LÈDUM, L. LABRADOR TEA.

Calyx 5-toothed, very small. Corolla of 5 obovate and spreading distinct petals. Stamens 5–10 : anthers opening by terminal pores. Pod 5-celled, splitting from the base upwards, many-seeded. — Low evergreen shrubs, with the alternate entire leaves clothed with rusty wool underneath, the margins revolute : slightly fragrant when bruised. Flowers white, handsome, in terminal umbel-like clusters from large scaly-bracted buds. (*Λήδον*, the ancient Greek name of the *Cistus*, transferred by Linnæus to this genus.)

1. **L. latifolium**, Ait. Leaves elliptical or oblong ; stamens 5, sometimes 6 or 7 ; pod oblong. — Cold bogs and damp mountain woods. June. — Shrub 2°–5° high. — *L. PALÚSTRE, L.*, grows in British America, but I have never seen it in the United States. It is distinguished by its linear leaves, uniformly 10 stamens, and especially by its *oval pods*.

Suborder III. PYROLÈÆ. THE PYROLA FAMILY.

17. PÝROLA, L. FALSE WINTERGREEN.

Calyx 5-parted, persistent. Petals 5, concave and more or less converging, deciduous. Stamens 10 : filaments awl-shaped, naked : anthers turned outwards and inverted in the bud, soon erect, opening by 2 pores at the scarcely (if at all) 2-horned apex, more or less 4-celled. Style long and generally turned to one side : stigmas 5, either projecting or confluent with the ring which surrounds them. Pod depressed-globose, 5-valved from the base upwards (loculicidal), many-seeded ; the valves woolly on the edges. — Low and smooth perennial herbs, with running subterranean shoots, bearing a cluster of rounded and petioled evergreen root-leaves, and a simple raceme of nodding flowers, on an upright scaly-bracted scape. (Name a diminutive of *Pyrus*, the Pear-tree, from some fancied resemblance in the foliage, which is not obvious.)

* *Stamens ascending : style declining and curved, longer than the petals : stigmas exerted beyond the ring : leaves denticulate or entire.*

1. **P. rotundifolia, L.** (ROUND-LEAVED PYROLA.) *Leaves orbicular, thick, shining, usually shorter than the petiole ; raceme elongated, many-flowered ; calyx-lobes lanceolate, acutish, with somewhat*

spreading tips, *one half or one third the length of the roundish-obovate nearly spreading (chiefly white) petals; anther-cells not tapering at the apex.* — Damp or sandy woods, common. July. — Scape 6' - 12' high, many-bracted: flowers $\frac{3}{4}$ ' broad.

2. **P. asarifolia**, Michx. (ASARUM-LEAVED PYROLA.) *Leaves round-kidney-shaped or orbicular, thick, rather shining; commonly much shorter than the petiole; raceme loosely flowered; calyx-lobes triangular-ovate, pointed, about one third the length of the obovate somewhat converging (greenish-white or rose-colored) petals; anther-cells slightly pointed.* — Var. *ULIGINOSA* is more slender, with the calyx-lobes ovate, obtuse, acute, or pointed, from one fourth to one third the length of the petals, which with the anthers are *rose-red or purple.* (*P. uliginosa*, Torr.) — Moist cold woods, N. New England to Michigan northward; and the purple variety in peat-bogs, New York to Wisconsin; assuming several striking forms in higher northern regions. June, July. — Flowers mostly smaller than in the last.

3. **P. elliptica**, Nutt. (SHIN-LEAF.) *Leaves thin and dull, elliptical or obovate-oval, usually longer than the margined petiole; raceme many-flowered; calyx-lobes ovate, acute, not one-fourth the length of the obovate rather spreading (greenish-white) petals; anther-cells pointed at the apex.* — Rich woods, common. June. — Scape and flowers nearly as large as in No. 1.

4. **P. chlorantha**, Swartz. (SMALL PYROLA.) *Leaves small, roundish, thick, dull, shorter than the petiole; scape few-flowered, naked, calyx-lobes roundish-ovate, very short; the elliptical petals converging (greenish-white); anther-cells rather strikingly pointed; style strongly deflexed, slightly curved and scarcely exerted.* (*P. asarifolia*, Bigel., &c.) — Open woods, common, especially northward. June. — Leaves about 1' long. Scape 5' - 8' high, 3 - 8-flowered, the flowers large in proportion.

* * *Stamens and style straight: stigmas confluent with the peltate ring.*

5. **P. secunda**, L. (ONE-SIDED PYROLA.) *Leaves ovate, thin, longer than the petiole, finely serrate; raceme dense and spike-like, with the numerous small flowers all turned to one side; calyx-lobes ovate, very much shorter than the oblong erect petals; style long and exerted.* — Rich woods, common, especially northward. July. — Tuft of leaves somewhat raised on a stem: scape 3' - 6' high. Flowers greenish-white.

6. **P. minor**, L. (LESSER PYROLA.) *Leaves roundish, slightly crenulate, rather thin, mostly longer than the margined petiole; raceme spiked; calyx-lobes triangular-ovate, very much shorter than the globose corolla; style short and included.* — Woods, at the base of the White Mountains, New Hampshire, *Pickering* and *Oakes.* July. — Scape 5' - 10' high. Flowers small, white or rose-color.

18. MONÈSES, Salisb. ONE-FLOWERED PYROLA.

Petals 5, widely spreading, orbicular. Stamens 10: filaments awl-shaped, naked: anthers as in *Pyrola*, but conspicuously 2-horned at the apex, 2-celled. Style straight, rather short: the 5 stigmas long and radiating. Pod as in *Chimaphila*. — A small perennial, with the rounded and veiny serrate leaves clustered at the ascending apex of the creeping subterranean shoots; the 1-2-bracted scape bearing a single terminal flower. (Name *μόνος*, *single*, and *ἦσις*, *desire*, probably in allusion to the handsome solitary flower.)

1. **M. uniflora**. (*Pyrola uniflora*, L.) — Deep cold woods, chiefly northward. June. — Plant 2'-4' high, smooth; the corolla $\frac{1}{2}$ ' broad, white or slightly rose-color. — Nearer to *Chimaphila* than *Pyrola*.

19. CHIMÁPHILA, Pursh. PIPSISSEWA.

Petals 5, concave, spreading. Stamens 10: filaments enlarged and hairy in the middle: anthers as in *Pyrola*, but 2-celled, somewhat 2-horned at the apex. Style very short, inversely conical, nearly immersed in the depressed summit of the globular ovary: stigma broad and orbicular, the border obtusely 5-toothed. Pod, &c., as in *Pyrola*, but splitting from the apex downwards, the edges of the valves not woolly. — Low, nearly herbaceous plants, with running underground shoots, and evergreen thick and shining leaves somewhat whorled or scattered along the short ascending stems: the fragrant (white or purplish) flowers corymbed or umbelled on a terminal peduncle. (Name from *χείμα*, *winter*, and *φιλέω*, *to love*, in allusion to one of the popular names, viz. *Wintergreen*.)

1. **C. umbellata**, Nutt. (PRINCE'S PINE. PIPSISSEWA.) *Leaves wedge-lanceolate, acute at the base, sharply serrate, not spotted; peduncle 4-7-flowered.* — Dry woods, common. June. — Plant 4'-10' high, leafy, with handsome flowers: petals reddish-white: anthers violet.

2. **C. maculata**, Pursh. (SPOTTED WINTERGREEN.) *Leaves ovate-lanceolate, obtuse at the base, remotely toothed, the upper surface variegated with white; peduncles 1-5-flowered.* — Dry woods, not common except in the Middle States. June, July. — Smaller than the last, the blossoms less fragrant.

Suborder IV. MONOTRÒPEÆ. THE INDIAN PIPE FAM.

20. PTERÓSPORA, Nutt. PINE-DROPS.

Calyx 5-parted. Corolla ovate, urn-shaped, 5-toothed, persistent. Stamens 10 : anthers 2-celled, awned on the back, opening lengthwise. Style short : stigma 5-lobed. Pod globose, depressed, 5-lobed, 5-celled, loculicidal. Seeds very numerous, ovoid, tapering to each end, the apex expanded into a broad reticulated wing many times larger than the nucleus. — A stout and simple purplish-brown clammy-pubescent herb ; the wand-like stem furnished towards the base with scattered lanceolate scales in place of leaves, above bearing many nodding (white) flowers, like those of *Andromeda*, in a long bracted raceme. (Name from *πτερόν*, a *wing*, and *σπορά*, *seed*, alluding to the singular wing borne by the seeds.)

1. **P. Andromedèa**, Nutt. — Hard clay soil, parasitic on the roots apparently of pines, from Peekskill and Albany, New York, and N. Penn. northward and westward, rare. — Plant 8' - 24' high, 20 - 60-flowered, very singular in appearance.

21. HYPÓPITYS, Dill. PINE-SAP.

Calyx of 4 or 5 lanceolate bract-like sepals, deciduous. Corolla of 4 or 5 distinct erect fleshy petals, with a sac-like nectariferous depression at the base. Stamens 8 or 10 : anthers kidney-shaped, becoming one-celled, opening by a continuous line into 2 very unequal valves, of which the larger is recurved, but the narrower upright and then appearing like a continuation of the filament. Style columnar, hollow : stigma disk-like, with a bearded margin. Pod ovoid or globose, 8 - 10-grooved, 4 - 5-celled, loculicidal. Seeds as in *Pyrola*. — Fleshy brownish or purplish herbs, parasitic on the roots of trees, especially Beeches and Pines, with a musky odor, scales in place of leaves, and the flowers in a close bracted raceme, which is at first nodding, but in fruit erect. The terminal flower has 5 petals and 10 stamens ; the others 4 petals and 8 stamens. (Name composed of *ὑπό*, *under*, and *πίτυς*, a *Pine-tree*, from the place of growth.)

1. **H. lanuginòsa**, Nutt. (AMERICAN PINE-SAP. FALSE BEECH-DROPS.) More or less velvety or downy : filaments and style hairy ; pod almost globular. — Oak and pine woods, common, June -

Aug. — Plant 4' - 6' high in flower, or sometimes 12' in fruit, tawny or tan-color, often red towards the end of the season; occasionally there is a smoothish variety which is taken for *H. Europæa*.

22. MONÓTROPA, Gronov. INDIAN PIPE.

Calyx represented by 2 - 4-scale-like deciduous bracts, the lower rather distant from the corolla. Corolla of 5 distinct erect fleshy petals, which are narrowed below and have a small nectariferous pit at the base. Stamens 10: anthers short on the thickened apex of the hairy filament, 2-celled, opening by transverse chinks. Stigma 5-crenate, beardless. Pod (5-celled) and seeds as in the last. — A singular fleshy and scentless herb, white throughout, the low stems rising in a cluster from a matted mass of fibrous roots, with scales like the petals in place of leaves, bearing a solitary terminal flower, which is at first nodding, but becomes upright in fruit. (Name from *μόνος*, *one*, and *τροπός*, *a turn*; the solitary flower turned to one side.)

1. *M. uniflora*, L. — Deep rich woods, in soil composed of decayed wood and leaves. June - Aug. Stems 4' - 8' high.

ORDER 60. **AQUIFOLIACEÆ**. (HOLLY FAMILY.)

Trees or shrubs, with small axillary 4 - 6-merous flowers, a minute calyx free from the 4 - 6-celled ovary and the 4 - 6-seeded berry-like drupe, the stamens as many as the divisions of the almost or even quite 4 - 6-petalled corolla and attached to their very base. — Corolla imbricated in the bud. Anthers opening lengthwise. Stigmas 4 - 6 or united into one, nearly sessile. Seeds suspended and solitary in each cell, anatropous, with a minute embryo in fleshy albumen. Leaves in our genera alternate. Flowers white or greenish.

Synopsis.

1. *ILEX*. Stamens, rounded or obovate petals, and seeds 4, rarely 5.
2. *PRINOS*. Stamens, rounded petals, and seeds 6.
3. *NEMOPANTHES*. Stamens, narrow recurved petals, and seeds 5.

1. ILEX, L. HOLLY.

Parts of the flower throughout in fours, or rarely in fives. Petals or divisions of the corolla 4, rarely 5, oval or obovate, obtuse.

Drupe red: the nutlets striate or grooved. (The ancient Latin name of the Holly-oak, rather than of the Holly.)

§ 1. AQUIFOLIUM, Tourn. — *Leaves coriaceous, evergreen, spiny-toothed.*

1. **I. opàca**, Ait. (AMERICAN HOLLY.) Leaves oval, flat, the wavy margins armed with scattered spiny teeth; flowers in loose clusters along the base of the young branches and from the axils; calyx-teeth acute. — Moist woodlands, Maine to Penn. eastward, and more common farther south. June. — Tree 20°–40° high; the deep green foliage less glossy and the berries not so bright red as in the European Holly.

§ 2. PRINOIDES. — *Leaves membranaceous, deciduous.*

2. **I. montàna**, Torr. & Gr. Leaves oblong-ovate or oval-lanceolate, pointed, sharply serrate, smooth, closely approximated on the ends of the branches; fertile flowers on very short peduncles; calyx-teeth obtuse. — Damp woods, Catskill Mountains, New York, and along the Alleghanies southward from Penn. to Carolina. June. — Shrub or small tree, 8°–20° high, straggling. Leaves 3'–5' long, very thin. Sterile flowers, if any, unknown, the fertile perfect, on stalks shorter than the drupe. Nutlets strongly striate-ribbed on the back.

2. PRINOS, L. WINTERBERRY.

Parts of the flower throughout in sixes, polygamous (the fertile flowers rarely with their parts fours or fives). Drupe with 6 smooth nutlets. Otherwise as in Ilex. (The Greek name of the Holly.)

* *Leaves deciduous: fruit bright red.*

1. **P. verticillàtus**, L. (BLACK ALDER. WINTERBERRY.) *Leaves oval, obovate, or wedge-lanceolate, pointed, acute at the base, sharply serrate, downy on the veins beneath; flowers all on very short peduncles, the sterile in close clusters which are shorter than the petioles, the fertile somewhat clustered or solitary.* — Swamps, common. June. — Shrub 3°–10° high, very variable in foliage, often rugose-veiny: the bright scarlet fruit ripe in autumn, crowded so as to appear in whorls on the branches.

2. **P. lævigàtus**, Pursh. (SMOOTH WINTERBERRY.) *Leaves lanceolate, pointed at both ends, minutely serrate with appressed teeth, shining above, smooth, except the midrib beneath: sterile flowers 2–5 in a cluster, or single on slender peduncles (½' or more long); the fertile chiefly single and very short-peduncled.* — Swamps, and along cold streams, Maine to New Jersey and the mountains of Penn. June. — Shrub 4°–8° high; the thin leaves 1'–2' long.

* * *Leaves coriaceous, evergreen, shining above: fruit black.*

3. **P. glàber**, L. (INK-BERRY.) Leaves wedge-lanceolate or oblong, sparingly toothed towards the apex, smooth; peduncles of the sterile flowers 3-6-flowered at the summit, of the fertile 1-flowered. — Sandy woods, from Cape Ann to New Jersey along the coast, and southward. June. — A handsome bushy shrub, 2°-3° high, with handsome small evergreen leaves.

3. NEMOPÁNTHES, Raf. MOUNTAIN HOLLY.

Flowers polygamo-diœcious. Calyx a minute ring. Petals 5, oblong-linear, reflexed, distinct. Stamens 5. Drupe with 4-5 bony nutlets, light red. — A much branched shrub, with ash-gray bark, alternate and oblong deciduous leaves on short petioles, entire, or slightly toothed, smooth. Flowers solitary, on long and slender axillary peduncles. (Name said by the author of the genus to mean "flower with a filiform peduncle," therefore probably from *νήμα*, a thread, *ποὺς*, a foot, and *ἄνθος*, a flower.)

1. **N. Canadénsis**, DC. (*Ilex Canadensis*, Michx.) — Damp cold woods, New England to Penn. and Ohio, chiefly northward. May.

ORDER 61. EBENÀCEÆ. (EBONY FAMILY.)

Trees or shrubs, with alternate entire leaves, and polygamous regular flowers which have a calyx free from the ovary, the stamens 2-4 times as many as the lobes of the corolla, and the fruit a several-celled berry. Seeds anatropous, mostly single in each cell, large and flat, with a smooth coriaceous integument; the embryo shorter than the hard albumen.

1. DIÓSPYROS, L. PERSIMMON.

Calyx 4-6-lobed. Corolla 4-6-lobed. Stamens commonly 16 in the sterile flowers, and 8 in the fertile, in the latter imperfect. Berry large and globular, surrounded at the base by the permanent calyx, 4-8-celled, 4-8-seeded. — Flowers axillary, the fertile axillary and solitary, the sterile smaller and often clustered.

1. **D. Virginiàna**, L. (COMMON PERSIMMON.) Leaves ovate-oblong, smooth or nearly so; peduncles very short; calyx 4-

parted; corolla between bell-shaped and urn-shaped; styles 4, 2-lobed at the apex. — Woods and old fields, Rhode Island and New York to Ohio and southward. June. — The Persimmon is a small tree with thickish leaves, a greenish-yellow leathery corolla, and a plum-like fruit, 1' in diameter, which is exceedingly astringent when green, golden-yellow when ripe, and sweet and edible after exposure to frost.

ORDER 62. PLANTAGINACEÆ. (PLANTAIN FAM.)

Chiefly stemless herbs, with regular 4-merous spiked flowers, the stamens inserted on the tube of the dry and membranaceous veinless monopetalous corolla alternate with its lobes; — chiefly represented by the genus

1. PLANTÀGO, L. PLANTAIN. RIBGRASS.

Calyx of 4 imbricated persistent sepals, with dry membranaceous margins. Corolla tubular, withering on the pod, the border 4-parted. Stamens 4, generally with long and weak filaments, and fugacious anthers. Pod 2-celled, 2-several-seeded, opening all round by a transverse line so that the top falls off like a lid, and the loose partition (which bears the amphitropous albuminous seeds) falls away. — Leaves all from the root, ribbed. Flowers whitish, small, in a bracted spike raised on a naked scape. (The Latin name of the Plantain.)

* Pod 8-12-seeded: perennial.

1. **P. màjor**, L. (COMMON PLANTAIN.) Smooth or hairy; leaves oval or ovate, somewhat toothed, 5-7-nerved, abruptly narrowed into a channelled petiole; spike long, cylindrical, densely flowered; stamens and style long. — Rich moist soil, about footpaths near houses; doubtless brought from Europe. June-Sept. — Small forms are often found with the spikes only $\frac{1}{2}$ '-2' long, and the stalks and leaves small in proportion.

** Pod 2-4-seeded: perennial.

2. **P. cordàta**, Lam. (HEART-LEAVED PLANTAIN.) Smooth; leaves ovate and mostly heart-shaped, scarcely toothed, thickish, on long stout petioles; the 6-8 ribs or veins confluent below with the thick midrib; spike elongated, at length rather loose, or interrupted near the base, the rounded bracts, as well as the calyx and corolla-lobes, very obtuse; seeds mostly 4. — Rivulets, New York (rare), and Ohio to Wisconsin. April-June. — Leaves 3'-8' long. Scapes stout, 1°-2° high.

3. **P. lanceolàta**, Linn. (LANCE-LEAVED PLANTAIN. RIB-

wort.) Hairy or almost smooth; *leaves lanceolate*, 3-5-nerved, entire or nearly so, tapering to each end, on slender petioles, much shorter than the slender angled scapes; *spike ovoid or oblong-cylindrical* with age (rarely somewhat elongated), very dense, the scale-like bracts ovate, tapering to a slender point; seeds 2. — Dry fields among grass, common: brought from Europe. May - Aug. — Flower-stalks 1° - 2° high. Two of the sepals commonly united into one.

4. **P. maritima**, Linn. (SEASIDE PLANTAIN.) Smooth, or minutely pubescent; *leaves linear-awl-shaped*, rounded on the back, channelled inside, *very fleshy*, entire, sometimes sparingly toothed; scapes round; *spikes cylindrical*, dense, or the lower flowers scattered; bracts ovate, acutish; seeds 2. — Salt marshes along the coast. July.

* * * Pod 4-seeded: annual.

5. **P. pusilla**, Nutt. (PIGMY PLANTAIN.) Minutely pubescent, very small (1-4 inches high); *leaves narrowly linear or awl-shaped*, flat, tapering to the base, entire, shorter than the slender scapes; spike loosely flowered; bracts ovate, acute; stamens short; seeds 4. — Dry bare soil, New York to Penn., Illinois, &c. April - Aug. — Spikes ½' - 2' long.

* * * * Pod 2-seeded: annual or biennial.

6. **P. Virginica**, L. (VIRGINIA PLANTAIN.) Woolly with soft hoary hairs; *leaves oblong or spatulate-lanceolate*, 5-nerved, mostly obtuse and entire, narrowed into a short margined petiole, much shorter than the scapes; spike cylindrical, the flowers dense, or interrupted and scattered below; bracts nearly as long as the calyx; lobes of the *corolla in fruit involute and converging into a sort of beak*; seeds oval, concave on the inner face. — Sandy fields, Rhode Island to Penn. April - Sept. — Scapes 3' - 10' high. Anthers exerted in some specimens, included and small in others.

ORDER 63. PLUMBAGINACEÆ. (LEADWORT FAM.)

Maritime herbs, chiefly stemless, with regular 5-merous flowers, a plaited calyx, the 5 stamens opposite the separate petals or the lobes of the corolla, and the free ovary one-celled, with a solitary ovule hanging from a long cord which rises from the base of the cell. — The STATICEÆ or MARSH-ROSEMARY TRIBE alone is represented in our region by the genus

1. STÁTICE, Tourn. SEA-LAVENDER. MARSH-ROSEMARY.

Flowers scattered or loosely spiked on the branches of a compound corymb, one-sided, 2 - 3-bracted. Calyx funnel-form, dry

and membranaceous, persistent. Corolla of 5 nearly or quite distinct petals, with long claws, the 5 stamens attached to their bases. Styles 5, separate. Fruit membranous and indehiscent, 1-seeded, in the bottom of the calyx. Embryo straight in mealy albumen. — Sea-side perennials, with thick and stalked leaves. (*Στατική*, an ancient name given to this or a like astringent herb, on account of its astringency.)

1. **S. Limonium**, L. Leaves obovate-lanceolate or oblong, tipped with a bristly point, 1-ribbed; scape much branched, the flowers rather crowded along the upper side of the spreading or recurved branchlets. — Common in salt marshes on the coast. Aug. — Calyx pink, hairy along the angles; corolla pale blue. Root thick and woody, very astringent.

ARMÉRIA VULGARIS, the THRIFT of the gardens, is a native of Northern Canada as well as of Europe, but not of the United States proper.

ORDER 64. PRIMULACEÆ. (PRIMROSE FAMILY.)

Herbs usually low, with regular perfect flowers, the stamens as many as the lobes of the monopetalous (rarely polypetalous) corolla and inserted opposite them on the tube, and a 1-celled ovary with a central free placenta rising from the base, bearing several or many seeds. — Calyx free from the ovary, or in *Samolus* partly coherent. (Corolla none in *Glaux*.) Stamens 4–5, rarely 6–8. Style and stigma one. Pod 1-celled. Seeds with a small embryo in fleshy albumen, amphitropous and fixed by the middle, except in Tribe 4.

Synopsis.

Tribe 1. PRIMULEÆ. — Pod entirely free from the calyx, opening by valves.

* Stemless: leaves all in a cluster from the root.

1. PRIMULA. Corolla funnel-form or salver-shaped. Stamens included.

2. DODECATHEON. Corolla reflexed, 5-parted. Stamens exerted, united.

* * Stems leafy: corolla wheel-shaped (or none).

3. TRIENTALIS. Corolla 7-parted. Stem leafy at the summit.

4. LYSIMACHIA. Corolla 5-parted, without intermediate teeth.

5. NAUMBURGIA. Corolla of 5-6 petals, with intermediate teeth.

6. GLAUX. Corolla none: the calyx petal-like.

Tribe 2. ANAGALLIDÆ. — Pod free from the calyx, opening all round by a transverse line, the top falling off like a lid.

7. ANAGALLIS. Corolla longer than the calyx, 5-parted. Leaves opposite.

Tribe 3. SAMOLEÆ. — Pod half adherent to the calyx.

8. SAMOLUS. Corolla bell-shaped; 5 sterile filaments in the sinuses.

Tribe 4. HOTTONIÆ. — Pod opening by valves. Seeds fixed by the base, anatropous.

9. HOTTONIA. Corolla salver-shaped. Immersed leaves dissected.

Tribe I. PRIMULÆ. THE PRIMROSE TRIBE.

1. PRIMULA, L. PRIMROSE. COWSLIP.

Calyx tubular, angled, 5-cleft. Corolla salver-shaped, enlarging above the insertion of the stamens, the 5 lobes often notched or inversely heart-shaped. Stamens 5, included. Pod many-seeded, splitting at the top into 5 valves or 10 teeth. — Low perennial herbs, with a tuft of veiny leaves at the root, and simple scapes bearing the flowers in an umbel. (Name a diminutive of *primus*, from the flowering of the true Primrose in early spring.)

1. **P. farinosa**, L. (BIRD'S-EYE PRIMROSE.) Leaves elliptical or obovate-lanceolate, the lower surface with the 3-20-flowered involucre, &c., covered with a white mealiness: corolla lilac with a yellow eye. — Shores of Lake St. Clair, and the upper Great Lakes. June, July. — Scape 3' - 10' high.

2. **P. Mistassinica**, Michx. Leaves spatulate or wedge-oblong, not mealy; involucre 1-8-flowered; lobes of the flesh-colored corolla broadly and deeply obcordate, scarcely shorter than the tube. — Shores of the Upper Lakes. Also Crooked Lake, Surtwell, and Annsville, Oneida county, New York, Knieskern and Vasey. May. — A pretty species, 2' - 6' high.

P. VÉRIS and *P. VULGARIS* are the COWSLIP and PRIMROSE of Europe, from which our cultivated varieties are derived.

2. DODECÀTHEON, L. AMERICAN COWSLIP.

Calyx deeply 5-cleft; the divisions lanceolate, reflexed. Corolla with a very short tube, a thickened throat, and a 5-parted reflexed limb; the divisions long and narrow. Filaments short,

monadelphous at the base : anthers long and linear, approximate in a slender cone. — Perennial smooth herbs with fibrous roots, a cluster of oblong or spatulate leaves, from which proceeds a simple naked scape, involucrate at the summit, and bearing an ample umbel of showy flowers, usually nodding on slender peduncles. Corolla purple-rose-color, or sometimes white. (Name fancifully assumed from δώδεκα, *twelve*, and θεοί, *gods*.)

1. **D. Meàdia**, L. Leaves oblong, tapering into a margined petiole, toothed or entire; umbel many-flowered; anthers acute, many times longer than the very short tube of the filaments. — Rich soil, Ohio to Wisconsin. May, June. — Very handsome in cultivation.

3. TRIENTÀLIS, L. CHICKWEED-WINTERGREEN.

Calyx mostly 7-parted; the divisions linear-lanceolate, pointed. Corolla mostly 7-parted, spreading, flat, without any tube. Filaments slender, united in a ring at the base : anthers oblong, revolute after flowering. Pod few-seeded. — Low and smooth perennials, with simple erect stems, bearing some alternate usually minute and scale-like leaves below, and a whorl of delicate veiny leaves at the summit. Peduncles one or more, very slender, one-flowered. Corolla white. (A Latin name meaning the third part of a foot, alluding to the size of the plant.)

1. **T. Americana**, Pursh. (STAR-FLOWER.) Leaves elongated lanceolate, tapering to both ends; petals finely pointed. — Damp cold woods, through the Northern States. May. — Leaves 2' - 3' long; very delicate, as is the whole plant.

4. LYSIMÀCHIA, L. LOOSESTRIFE.

Calyx 5-parted. Corolla with a very short tube and a spreading 5-parted limb. Stamens 5 : filaments often united in a ring at the base. Pod globose, 5 - 10-valved, few - many-seeded. (Parts of the flower rarely in fours or sixes.) — Perennials with entire leaves, and axillary or racemed flowers : corolla mostly yellow. (Named in honor of King *Lysimachus*, or from λύσις, *a release*, and μάχη, *strife*.)

§ 1. **TRIDÝNIA**, Raf. — Leaves opposite or whorled, sessile, dotted : calyx and golden-yellow corolla streaked with dark lines : filaments mostly unequal, plainly monadelphous at the base, with no interposed sterile ones : anthers short : pod 5-valved, 2 - 5-seeded.

1. **L. stricta**, Ait. (UPRIGHT LOOSESTRIFE.) Smooth, at length branched, very leafy; *leaves opposite* or rarely alternate, lanceolate, acute at each end; *flowers* on slender pedicels in a long whorled raceme which is leafy at the base; ovules 12-18; seeds only 5.— Low grounds, common. July.— Stems 1^o-2^o high, often bearing oblong bulblets in the axils; raceme 5'-10' long.

2. **L. quadrifolia**, L. (FOUR-LEAVED LOOSESTRIFE.) Somewhat hairy; stem simple; *leaves whorled* in fours or fives (rarely in threes or sixes) ovate-lanceolate; *flowers* on capillary peduncles from the axils of the leaves; ovules only 5.— Moist or sandy soil, common. June.— About a foot high. Peduncles more than an inch long, rather shorter than the leaves.

§ 2. **STEIRONÈMA**, Raf. — *Leaves opposite, not dotted, mostly ciliate at the base: flowers on slender peduncles from the axils of the upper leaves: corolla light yellow, not streaked or dotted, the lobes ovate, pointed, with undulate margins: filaments nearly equal, scarcely monadelphous, with the rudiments of a sterile series interposed at the base in the form of slender teeth or processes: anthers linear, at length curved: pod 5-10-valved, 10-20-seeded.*

3. **L. ciliata**, L. (HAIRY-STALKED LOOSESTRIFE.) *Leaves lanceolate-ovate*, tapering to an acute point, rounded or heart-shaped at the base, all on distinct petioles fringed with hairs; corolla longer than the calyx.— Low ground and thickets, common. July.— Leaves 3'-6', the hairy petioles $\frac{1}{2}$ '-2', in length.

4. **L. lanceolata**, Walt. (LANCE-LEAVED LOOSESTRIFE.) *Leaves lanceolate, acute, narrowed at the base into a short and margined petiole fringed with hairs, or the upper nearly sessile and linear, the lowest oblong or spatulate; corolla rather longer than the calyx.*— Var. 1. **HÝBRIDA** has the leaves varying from lanceolate to nearly oblong. Var. 2. **HETEROPHÝLLA**, with the leaves narrow, sometimes nearly linear and acute at each end.— Swamps, Maine to Penn. and Michigan. July.— Flowers and fruit as in *L. ciliata*.

5. **L. angustifolia**, Lam. (NARROW-LEAVED LOOSESTRIFE.) *Leaves narrowly linear, elongated, sessile, sparingly hairy at the base; corolla longer than the calyx.*— Wet river-banks, on limestone, Falls of Niagara, Ohio and Wisconsin. Aug.— The northern plant is the var. **REVOLÛTA** (*L. revoluta*, Nutt.), which has very smooth and shining obtusish leaves, with revolute margins. Flowers large and showy.

5. NAUMBÚRGIA, Mœnch. TUFTED LOOSESTRIFE.

Calyx 6- (5-7-) parted. Corolla 6- (5-7-) parted almost or quite to the base; the spreading divisions lance-linear, with a small tooth interposed between each. Filaments exerted, distinct. Pod few-seeded.— Perennial, with a simple stem, oppo-

site lanceolate entire leaves, which are dotted, like the yellow flower, &c., with purplish glands. Flowers small, densely crowded in stalked spikes or close racemes, from the axils of the middle leaves.

1. **N. thyrsoflora**, Reichenb. (*Lysimachia thyrsoflora*, L. *L. capitata*, Pursh.) — Cold swamps. June.

6. GLAUX, L. SEA-MILKWORT.

Calyx bell-shaped, 5-cleft, the lobes ovate, petal-like. Corolla wanting. Stamens 5, on the base of the calyx alternate with its lobes. Pod 5-valved, few-seeded. — A low fleshy perennial, with opposite oblong and entire sessile leaves, and solitary nearly sessile (purplish and white) flowers in their axils. (An ancient Greek name, from *γλαυκός*, *sea-green*.)

1. **G. maritima**, L. — Sea-coast of New England as far south as Cape Cod. June. — A span high, bearing many pairs of leaves.

Tribe II. ANAGALLIDÆ. THE PIMPERNEL TRIBE.

7. ANAGALLIS, Tourn. PIMPERNEL.

Calyx 5-parted. Corolla wheel-shaped, with almost no tube, 5-parted, longer than the calyx, the divisions broad. Stamens 5. Pod membranaceous, circumcissile, the top falling off like a lid, many-seeded. — Small, spreading or procumbent herbs, with opposite or whorled entire leaves, and solitary flowers on axillary peduncles.

1. **A. arvensis**, L. (COMMON PIMPERNEL.) Leaves ovate, sessile, shorter than the peduncles; petals obovate, obtuse, fringed with minute teeth, longer than the stamens. ① — Waste sandy fields, introduced from Europe. June - Aug. — Flowers variable in size, scarlet, sometimes purple, blue or white, quickly closing at the approach of bad weather; whence the popular name of "*Poor Man's Weather-glass*."

Tribe III. SAMOLÆ. THE WATER-PIMPERNEL TRIBE.

8. SAMOLUS, L. WATER PIMPERNEL. BROOK-WEED.

Calyx 5-cleft, the tube adherent to the base of the ovary. Corolla somewhat bell-shaped, 5-cleft, with 5 sterile filaments in the sinuses. Stamens 5, on the tube of the corolla, included. Pod

5-valved at the summit, many-seeded. — Smooth herbs, with alternate entire leaves, and small white flowers in racemes. (Name from *Samos*, the island where the original species is said to have been first found.)

1. **S. floribundus**, Kunth. (AMERICAN WATER-PIMPERNEL.) Diffusely branched, leafy; leaves oval, oblong, or obovate; racemes numerous, loose, paniculate; the capillary pedicels spreading, with a minute bractlet above the middle; lobes of the calyx ovate, a little shorter than the corolla; valves of the pod reflexed after opening. — Wet places, common. June — Sept. — Stems and racemes more diffuse than in the European *S. Valerandi*, the minute flowers and capsules only half the size.

Tribe IV. HOTTONIÆ. THE FEATHERFOIL TRIBE.

9. **HOTTONIA**, L. FEATHERFOIL.

Calyx 5-parted, the divisions linear. Corolla salver-shaped, with a short tube; the limb 5-parted. Stamens 5, included. Pod many-seeded, 5-valved, the valves cohering at the base and summit. Seeds attached by their base, anatropous. — Aquatic perennials, with the immersed leaves pectinate, and the erect hollow flower-stems almost leafless. Flowers white or whitish, whorled at the joints, forming a sort of interrupted racemes. (Name in honor of *Prof. Hotton*, of Leyden, in the 17th century.)

1. **H. inflata**, Ell. (INFLATED FEATHERFOIL.) Leaves dissected into thread-like divisions, scattered on the floating and rooting stems, or whorled and crowded at the base of the cluster of peduncles, which are strongly inflated between the joints; pedicels mostly shorter than the calyx, and much shorter than the linear bracts; corolla not thickened at the throat, shorter than the calyx; anthers shorter than the filaments; style very short. — Pools and ditches. June. — The singularly inflated peduncles are often as thick as one's finger.

ORDER 65. **LENTIBULACEÆ**. (BLADDERWORT FAM.)

Small herbs (growing in water or wet places), with a 2-lipped calyx, and a 2-lipped personate corolla, 2 stamens with one-celled anthers, and a one-celled ovary with a free central placenta, bearing anatropous seeds. — Corolla deeply 2-lipped, spurred at the base in front; the palate usually

bearded. Ovary free: style very short or none: stigma 1-2-lipped, the lower lip larger and revolute over the approximate anthers. Capsule often bursting irregularly. Seeds with a straight embryo and no albumen. Scapes 1-few-flowered.

1. *UTRICULÀRIA*, L. BLADDERWORT.

Lips of the 2-parted calyx entire, or nearly so. Corolla personate, the palate on the lower lip projecting, and often closing the throat. — Aquatic and immersed, with capillary dissected leaves bearing little bladders, which are filled with air and float the plant at the time of flowering, or rooting in the mud, and sometimes with few or no leaves or bladders. Scapes 1-few-flowered. (Name from *utriculus*, a little bladder.)

* *Upper leaves in a whorl, floating by means of large bladders formed of the inflated petioles: the lower bearing little bladders.*

1. *U. inflàta*, Walt. (INFLATED BLADDERWORT.) *Stalks of the whorled floating leaves inflated each into an oblong bladder, pointed at the ends, and branched near the apex, bearing fine thread-like divisions, like those of the lower leaves; flowers 5-10 (large, yellow); the slender conical spur half the length of the corolla; style distinct.* — Ponds, Maine to New Jersey and Wisconsin. Aug.

* * *Leaves all many-cleft into fine thread-like divisions, and bearing small air-bladders, the stalks not inflated: plant sometimes rooting, but commonly swimming free.* (Mostly perennial, being propagated from year to year by a sort of buds; the terrestrial species annual.)

+ *Flowers purple.*

2. *U. purpùrea*, Walt. (PURPLE BLADDERWORT.) *Swimming free; leaves whorled along the long immersed stems, petioled, decomposed, capillary, bearing many bladders; flowers 2-4; spur appressed to the lower lip of the corolla and about half its length.* — Ponds, New England to New Jersey. Aug. - Sept. — Flowers violet-purple, about as large as in No. 4.

3. *U. resupinàta*, Greene. (REVERSED BLADDERWORT.) *Rooting; leaves thread-shaped, erect or floating, bearing very few fine divisions and some bladders near the base; scape slender, 1-flowered; the oblong-conical spur turned upwards, and remote from the corolla, which is thrown backward.* — Sandy borders of ponds, Tewksbury and Plymouth, Massachusetts, to Rhode Island. Aug. — Leaves 1' - 2' long, looking like shooting stems. Stalk 2' - 8' high.

+ + *Flowers yellow.*

4. *U. vulgàris*, L. (COMMON OR GREATER BLADDERWORT.)

Leaves crowded on the long immersed stems, *pinnately compound*, capillary, *bearing many bladders*; flowers 5-12; *upper lip of the closed corolla scarcely longer than the prominent palate*; the conical spur stretched out toward the lower lip and much shorter than it; pedicels drooping in fruit. — Ponds and slow streams, everywhere. June-Aug. — Immersed stems 1°-3° long: scapes 6'-12' high. Corolla $\frac{1}{2}$ - $\frac{3}{4}$ ' broad.

5. **U. minor**, L. (SMALLER BLADDERWORT.) *Leaves* scattered on the thread-like immersed or somewhat rooting stems, 2-4 times *forked*, short, capillary, *bladder-bearing*; flowers 3-7; *upper lip of the gaping corolla not longer than the depressed palate*, very much smaller than the obovate entire lower lip; *spur obsolete or very short* and obtuse, turned down; pedicels drooping in fruit. — Shallow water in bogs, N. New York to Wisconsin. July. — Leafy stems 3'-5': the scape weak, 3'-7' high. Flowers one quarter the size of the last.

6. **U. intermedia**, Hayne. (INTERMEDIATE BLADDERWORT.) *Leaves* crowded on the immersed stems, 2-ranked, 4-5 times *forked*, rigid; the divisions linear-awl-shaped, minutely bristle-toothed along the margins, *not bladder-bearing*, the bladders being on separate leafless branches; flowers 1-4; *upper lip of the corolla much longer than the palate* and nearly as long as the rounded lower one; *spur appressed to the lower lip and nearly as long as it*; pedicels erect in fruit. — Shallow pools, N. England to Michigan, rare. June, July. — Leafy stems 3'-6' long. Scapes 3'-7' high. Flowers intermediate in size between No. 5 and No. 6.

7. **U. striata**, Le Conte. (STRIPED BLADDERWORT.) *Leaves* crowded or rather whorled on the small immersed or somewhat rooting stems, *several times forked*, capillary, *bladder-bearing*; flowers 2-5, on long pedicels; lips of the corolla nearly equal, broad and much expanded, the upper undulate, concave, plaited-striate in the middle; *spur nearly linear*, obtuse, *approaching the lower lip which it almost equals in length*; pedicels erect-spreading in fruit. — Shallow pools in pine barrens, New Jersey. July, Aug. — Scape 8'-12' high. Flowers large as No. 4.

8. **U. gibba**, L. (GIBBOUS-SPURRED BLADDERWORT.) *Scape* (1'-3' high) 1-2-flowered, at the base furnished with very slender short branches bearing sparingly dissected capillary root-like leaves, with scattered bladders; lips of the corolla broad and rounded, nearly equal; *spur very thick and obtuse, somewhat gibbous, approaching the lower lip and shorter than it*. — Shallow water, New England to New Jersey. July, Aug. — Corolla in size between No. 5 and No. 6.

9. **U. clandestina**, Nutt. Mss. (CLANDESTINE-FRUITED BLADDERWORT.) *Flowers of two kinds, viz., 3-6 on a slender scape*, with the very thick and obtuse rather gibbous spur shorter than the 3-lobed lower lip of the corolla, *and also others scattered along the im-*

mersed elongated leafy stems, on very short peduncles, with a minute corolla, fruit-bearing, deflexed; leaves several times forked, capillary, copiously bladder-bearing. — Pools, Tewksbury, Massachusetts, *Mr. Greene*, Seekonk, *Mr. Olney*, and Rhode Island, *Mr. Hunt*. July. — Leafy stems 6'–9' long. Scapes 4' high. Bracts linear, half as long as the pedicels. Flower as large as in *U. gibba*, sterile; the immersed ones fertile, never expanding their minute corolla, their pods ripening seeds copiously.

* * * *Leaves few and simple, fugacious, or none: scape solitary, rooting, the roots sometimes sparingly bladder-bearing. (Flowers yellow.)*

10. **U. subulata**, L. (TINY BLADDERWORT.) Stem very slender (3'–5' high), 2–7-flowered; *pedicels capillary; lower lip of the corolla flat* or with the margins recurved, equally 3-lobed, much larger than the ovate upper one; *spur oblong, acute, straight, appressed* to the lower lip which it nearly equals in length. — Sandy swamps, New Jersey. June. — Pedicels 3''–6'' long. Corolla 3''–4'' broad.

11. **U. cornuta**, Michx. (HORNED BLADDERWORT.) Stem strict ($\frac{1}{2}$ °–1° high), 2–7-flowered; *pedicels not longer than the calyx; lower lip of the corolla large and helmet-shaped*, the centre very convex and projecting while the sides are strongly reflexed, the upper obovate and much smaller; *spur awl-shaped, turned downward* and outward, often as long as the corolla. — Peat-bogs, or sandy swamps, New England and New York to Wisconsin. June–Aug. — Flowers close together, large, deep yellow.

2. PINGUÍCULA, L. BUTTERWORT.

Upper lip of the calyx 3-cleft, the lower 2-cleft. Corolla with an open hairy or spotted palate. — Small and stemless perennials growing on damp rocks, with 1-flowered scapes, and broad and entire leaves all clustered at the root, soft-fleshy and mostly greasy to the touch; whence the name, from *pinguis*, fat.

1. **P. vulgaris**, L. Leaves ovate or elliptical; scape and calyx a little pubescent; lips of the corolla very unequal, the tube funnel-form; spur straightish. — Wet rocks, Rochester, New York; also at Crooked Lake, *Sartwell*. L. Superior and northward. July. — Scape 3'–5' high; the drooping flower violet; the palate bearded with white hairs.

ORDER 66. OROBANCHÆACEÆ. (BROOM-RAPE FAM.)

Herbs destitute of green foliage (root-parasites), monopetalous, didynamous, the ovary one-celled with 2 or 4 pari-

etal placentæ: pod many-seeded. — Calyx persistent, 4-5-toothed or parted. Corolla tubular, more or less 2-lipped, ringent, persistent and withering; the upper lip entire or 2-lobed, the lower 3-lobed. Stamens 4, more or less didynamous, inserted on the tube of the corolla: anthers 2-celled, persistent. Ovary free, ovoid, pointed with a long style which is curved at the apex: stigma large. Pod 1-celled, 2-valved, the valves each bearing on their face one placenta or a pair. Seeds very numerous, minute, anatropous, with a minute embryo at the base of transparent albumen. — Low, often thick and fleshy herbs, bearing scales in place of leaves, lurid yellowish, or brownish throughout. Flowers solitary or spiked.

Synopsis.

* Flowers polygamous, or of two sorts.

1. **EPIPHĒGUS.** Upper flowers sterile, with a tubular corolla; the lower fertile, with the corolla minute and not expanding. Bracts inconspicuous.

* * Flowers all perfect.

2. **CONOPHOLIS.** Flowers in a dense spike; scaly throughout. Corolla ventricose-2-lipped. Stamens protruded.
3. **APHYLLON.** Flowers solitary on naked peduncles or scapes. Corolla tubular. Stamens included.

1. EPIPHĒGUS, Nutt. BEECH-DROPS. CANCER-ROOT.

Flowers racemose or spiked, scattered on the branches; the upper sterile, with a long tubular corolla and long filaments and style; the lower fertile, with a very short corolla which almost never opens, but is forced off from the base by the growth of the pod; the stamens and style very short. Calyx 5-toothed. Stigma capitate, a little 2-lobed. Pod 2-valved at the apex, with 2 approximate placentæ on each. (Name composed of *ἐπί*, upon, and *φηγός*, the Beech, because it grows on the roots of that tree.)

1. **E. Virginiàna, Bart.** (*E. Americanus, Nutt.*) — Herb purplish-brown, common under the shade of Beech-trees, parasitic on their roots, 6' - 12' high, much branched, slender, with scattered and inconspicuous scales. Corolla of the upper flowers whitish and purple, 6'' - 8'' long, curved, 4-toothed; the upper tooth or lip broadest,

notched at the apex, arched, not longer than the others. Seeds very numerous, straw-color, shining. Aug. — Oct.

2. CONÓPHOLIS, Wallr. SQUAW-ROOT. CANCER-ROOT.

Flowers in a thick scaly spike, perfect, with 2 bractlets at the base of the irregular calyx. Corolla tubular, swollen at the base, obviously 2-lipped; the upper lip arched, notched at the summit; the lower shorter, 3-parted, spreading. Stamens protruded. Stigma depressed. Pod with 4 placentæ, approximate in pairs on the middle of each valve. — Upper scales forming bracts to the flowers; the lower covering each other in regular order, not unlike those of a fir-cone; whence the name, from *κῶνος*, a *fir-cone*, and *φολίς*, a *scale*.

1. **C. Americàna**, Wallroth. (Orobánche Americana, L.) — Oak woods, not rare, growing in clusters among fallen leaves. May, June. — A singular plant, chestnut-colored or yellowish throughout, as thick as a man's thumb, 3'–6' long, covered with scales, which are at first fleshy, then dry and hard.

3. APHÝLLON, Mitchell. NAKED BROOM-RAPE.

Flowers perfect, solitary on long naked scapes, without bractlets. Calyx 5-cleft, regular. Corolla with a long curved tube and a spreading border, somewhat 2-lipped; the upper lip deeply 2-cleft, the lobes similar to the 3 of the lower lip. Stamens included. Stigma broadly 2-lipped. Capsule with 4 equidistant placentæ, 2 borne on each valve half-way between the midrib and the margin. (Name from a privative and *φύλλον*, *foliage*, alluding to the naked stalks.)

1. **A. uniflòrum**, Torr. & Gr. (ONE-FLOWERED CANCER-ROOT.) Stem subterranean or nearly so, very short, scaly, often branched, each branch sending up 1–3 slender one-flowered scapes (3'–5' high); divisions of the calyx lance-awl-shaped; lobes of the corolla obovate. (Orobanche uniflora, L.) — Woods, common. April, May. — Hairy, brownish-yellow. Corolla 1' long, tinged and edged with purple, with 2 yellow bearded folds in the throat.

ORDER 67. **BIGNONIÀCEÆ**. (BIGNONIA FAMILY.)

Woody or sometimes herbaceous plants, monopetalous, didynamous, with the ovary commonly 2-celled by the meeting of the placentæ or of a projection from them, many-seeded:

the anatropous seeds with a large flat embryo and no albumen. — Calyx 2-lipped, 5-cleft, or entire. Corolla tubular or bell-shaped, 5-lobed, somewhat irregular and 2-lipped, deciduous; the lower lobe largest. Stamens inserted on the corolla; the fifth or posterior one, and sometimes the shorter pair, sterile or rudimentary. Ovary free, bearing a long style and a 2-lipped stigma. — Leaves opposite, or the upper alternate. Flowers large and showy. (Plants of warmer climates, none, except the *Trumpet Creeper*, indigenous to the Northern States.)

Synopsis.

Suborder I. BIGNONIÆÆ. THE TRUE BIGNONIA FAM.

Fruit a 2-valved pod. Seeds flat, winged. Cotyledons heart-shaped at the base and notched at the end, broader than long. — Trees or woody vines.

1. *TECOMA*. Calyx 5-toothed. Fertile stamens 4. Leaves pinnate.
2. *CATALPA*. Calyx 2-lipped. Fertile stamens 2. Leaves simple.

Suborder II. SESAMÆÆ. THE SESAMUM FAMILY.

Pod or fleshy and woody fruit falsely 4-5-celled. Seeds wingless.

3. *MARTYNIA*. Calyx 5-cleft. Pod fleshy and woody, beaked.

1. *TÉCOMA*, Juss. TRUMPET-FLOWER.

Calyx bell-shaped, 5-toothed. Corolla funnel-form, 5-lobed, a little irregular. Stamens 4, didynamous. Pod long and narrow, 2-celled, the partition contrary to the valves. Seeds in a single row in each cell. — Leaves pinnate. Woody vines. (Abridged from the Mexican name.)

1. *T. radicans*, Juss. (TRUMPET CREEPER.) Climbing, fixing itself by rootlets; leaflets 5-11, ovate, pointed, toothed; flowers in corymbs; stamens not protruded beyond the tubular-funnel-form corolla. (*Bignonia radicans*, L.) — Penn. and Ohio; but cultivated in New York and New England. July. — In the Southern States climbing high trees, and forming large stems. Corolla 2'-3' long, orange and scarlet, showy.

2. *CATÁLPA*, Scop., Walt. *CATALPA*. INDIAN BEAN.

Calyx deeply 2-lipped. Corolla bell-shaped, swelling; the undulate 5-lobed and spreading border irregular. Stamens 5, but

usually only 2 of them anther-bearing. Pod very long and slender, nearly cylindrical, 2-celled; the partition contrary to the valves. Seeds in a single row in each cell, broadly winged on each side, the wings cut into a fringe. (The aboriginal name.)

1. **C. bignonioides**, Walt. Leaves heart-shaped, pointed, downy beneath; flowers in open compound panicles. — Cultivated in the Northern States: a well-known ornamental tree, with large leaves, and showy flowers, which are white, slightly tinged with violet and dotted with purple and yellow in the throat, opening in July. Pods hanging till the next spring, often 1° long.

3. **MARTYÑIA**, L. UNICORN-PLANT.

Calyx 5-cleft. Corolla gibbous, bell-shaped, 5-lobed, irregular. Fertile stamens 4, or only 2. Pod fleshy, and with the inner part soon woody, terminated by a long beak, which at length splits into 2 hooked horns, the pod opening at the apex between the beaks, imperfectly 5-celled, owing to the divergence of the two plates of each of the two partitions or placentæ which leave a space in the centre while by reaching and cohering with the walls of the fruit they form 4 other cells. Seeds several, wingless, with a thick and spongy roughened coat. — Low branching annuals, clammy-pubescent, exhaling a heavy odor: stems thickish: leaves simple, rounded. Flowers racemed, large. (Dedicated to *Prof. Martyn*, of Cambridge, a well-known botanist of the last century.)

1. **M. proboscidea**, Glox. Leaves heart-shaped, oblique, entire, or undulate, the upper alternate; the hooked horns much longer than the body of the fruit; the woody endocarp crested on one side. — Escaped from gardens and becoming naturalized in some places; native in the Southwestern States. June–Sept. — Corolla dull white, tinged or spotted with yellow and purplish.

ORDER 68. **ACANTHACEÆ**. (ACANTHUS FAMILY.)

Chiefly herbs, with opposite simple leaves, didynamous or diandrous stamens, inserted on the tube of the more or less 2-lipped corolla, the lobes of which are convolute in the bud: fruit a 2-celled and few-seeded pod: seeds anatropous, without albumen, usually flat, supported by hooked projections of the placentæ. — Calyx 5-cleft. Style thread-form: stigma simple or 2-cleft. Pod loculicidal. Flowers much bracted.

1. DIÁNTHERA, Gronov. DIANTHERA.

Calyx 5-parted. Corolla deeply 2-lipped; the upper lip erect, notched; the lower spreading, 3-parted. Stamens 2: anthers 2-celled, the cells placed one lower down than the other. Pod obovate, compressed, contracted at the base into a short stalk, 4-seeded. — Perennial herbs, growing in water, with narrow and entire leaves, and purplish flowers in axillary peduncled spikes or heads. (Name from *δίς*, *double*, and *ἀνθηρά*, *anther*, the separated cells giving the appearance of two anthers on each filament.)

1. **D. Americana**, L. (WILLOW-LEAVED DIANTHERA.) Leaves linear-lanceolate, elongated; spikes oblong, dense, long-peduncled. (*Justicia pedunculosa*, Michx.) — Borders of streams and ponds, N. W. Vermont and along the Great Lakes and their tributaries to Ohio and Wisconsin. July.

2. DIPTERACÁNTHUS, Nees. (RUÉLLIA partly, L.)

Calyx deeply 5-cleft. Corolla funnel-form, the spreading ample limb almost equally and regularly 5-cleft. Stamens 4, included, didynamous: cells of the somewhat arrow-shaped anthers parallel and nearly equal. Pod somewhat compressed, and stalked at the base, 8–12-seeded. Seeds with a mucilaginous coating. — Perennial herbs, not aquatic, with ovate or elliptical nearly entire leaves, leafy bracts, and clustered blue or purple flowers. (“Name from *δίπτερος*, *two-winged*, and *ἄκανθος*, the *Acanthus*; on account of the 2-leaved peduncles.”)

* *Corolla large and conspicuous.*

1. **D. strèpens**, Nees. *Somewhat smooth*; leaves ovate or ovate-oblong; peduncles axillary, very short; *calyx-lobes lanceolate, acute, ciliate*, spreading, shorter than the tube of the elongated funnel-form corolla. (*Ruellia strepens*, L. partly.) — Rich soil, from Penn. and Ohio westward and southward. July–Sept. — Plant 1°–2° high: corolla 2' long. Primary bracts ovate.

2. **D. híbridus**, Nees. *More or less hairy*; leaves oval or oblong; peduncles axillary, very short; *calyx-lobes slender thread-form* from a linear-lanceolate base, *hairy*, scarcely shorter than the tube of the elongated funnel-form corolla, equalling the linear or lanceolate bracts. (*R. hybrida*, Pursh.) — Rich soil, Ohio and southward.

* * *Corolla small and inconspicuous, very deciduous.*

3. **D. micránthus**, Engelm. & Gray. Smoothish; leaves

lanceolate-oblong, acute at both ends ; flower-clusters axillary, shorter than the oval bracts ; calyx-lobes lance-awl-shaped, hairy, as long as the corolla. — Low woods and banks, Ohio and southward. — Resembles the preceding in foliage, but the whitish corolla is only 4" long, 5-toothed, commonly falling away before expansion.

ORDER 69. SCROPHULARIACEÆ. (FIGWORT FAM.)

Chiefly herbs, with didynamous or diandrous (or very rarely 5 perfect) stamens inserted on the tube of the 2-lipped or more or less irregular corolla, the lobes of which are imbricated in the bud : fruit a 2-celled and usually many-seeded pod with the placentæ in the axis : seeds anatropous with a small embryo in copious albumen. — Style single. Leaves and inflorescence various.

Synopsis.

Suborder I. ANTIRRHINIDEÆ. THE SNAPDRAGON FAM.

Upper lip of the corolla covering the lobes of the lower in the bud. Pod usually septicial.

* Corolla nearly wheel-shaped. Leaves all alternate.

1. VERBASCUM. Anther-bearing stamens 5.

* * Corolla tubular, with a palate, and a spur or sac at the base on the lower side. Pod opening by 2 chinks or pores.

2. LINARIA. Corolla spurred at the base. Stamens 4.

* * * Corolla tubular or deeply 2-lipped, not spurred nor sac-like below. Pod 2-4-valved.

+ Anther-bearing stamens 4, the fifth a scale or sterile filament.

3. SCROPHULARIA. Corolla inflated, globular or oblong, with a short border, the 4 upper lobes erect, the lower one spreading. Rudimentary stamen a scale.

4. COLLINSIA. Corolla deeply 2-lipped, gibbous on the upper side; the middle lobe of the lower lip keeled-sac-shaped, inclosing the stamens.

5. CHELONE. Corolla tubular, inflated above. Anthers woolly. Seeds winged.

6. PENTSTEMON. Corolla tubular, often enlarging above. Seeds wingless.

+ + Anther-bearing stamens 4, no rudiment of the fifth.

7. MIMULUS. Calyx prismatic, 5-angled, 5-toothed. Corolla tubular.

8. CONOBEA. Calyx 5-parted, the divisions equal. Corolla short.

9. HERPESTIS. Calyx 5-parted, unequal, the upper division broadest and often largest. Corolla short.

++ Anther-bearing stamens only 2.

10. *GRATIOLA*. Calyx 5-parted. Stamens all included; the sterile pair present or wanting.
11. *ILYSANTHES*. Calyx 5-parted. Anther-bearing stamens included; the sterile pair of glandular filaments inserted in the throat, and protruded.
12. *HEMIANTHUS*. Calyx 4-toothed. Sterile filaments none. Corolla irregular.

Suborder II. RHINANTHIDEÆ. YELLOW-RATTLE FAM.

Lateral lobes of the corolla or one of them (never the upper lip) outermost in the bud. Pod commonly loculicidal.

* Lobes of the corolla flat and open.

13. *LIMOSELLA*. Calyx 5-toothed. Corolla open bell-shaped, 5-cleft. Stamens 4. Flowers single. Small and creeping fleshy annuals.
14. *SYNTHYRIS*. Calyx 4-parted. Corolla somewhat bell-shaped, variously 2-4-lobed, irregular. Stamens 2, rarely 4. Flowers spiked.
15. *VERONICA*. Calyx 4-parted. Corolla wheel-shaped or sometimes tubular. Stamens 2.
16. *BUCHNERA*. Calyx 5-toothed. Corolla salver-form. Stamens 4: anthers truly 1-celled.
17. *SEYMERIA*. Calyx deeply 5-cleft. Tube of the corolla broad, not longer than the spreading lobes. Stamens 4, nearly equal: anthers 2-celled.
18. *GERARDIA*. Calyx 5-toothed or 5-cleft. Corolla enlarged above. Stamens 4, strongly didynamous: anthers 2-celled.

* * Upper lip of the tubular corolla erect, arched (galeate), including the 4 didynamous stamens.

+ Anther-cells unequal and separated. Pod many-seeded.

19. *CASTILLEJA*. Calyx cleft down the lower, and often also on the upper, side. Lower lip of the corolla very small.

++ Anther-cells equal. Pod many-several-seeded.

20. *SCHWALBEA*. Calyx 5-toothed, very oblique, the upper tooth smallest.

21. *EUPHRASIA*. Calyx 4-cleft. Pod oblong: seeds grooved.

22. *RHINANTHUS*. Calyx inflated, ovate. Pod orbicular: seeds winged.

23. *PEDICULARIS*. Calyx not inflated. Pod ovate or sword-shaped: seeds wingless.

+++ Anther-cells equal. Pod 1-4-seeded.

24. *MELAMPYRUM*. Calyx 4-cleft. Ovary 2-celled, 4-ovuled.

Suborder I. ANTIRRHINIDÆ. THE SNAPDRAGON FAM.

1. **VERBÁSCUM**, L. MULLEIN.

Calyx 5-parted. Corolla 5-lobed, open or concave, wheel-shaped; the lobes broad and rounded, a little unequal. Stamens 5; all the filaments, or the 3 upper, woolly. Style flattened at the apex. Pod globose, or ovoid, many-seeded. — Tall and usually woolly biennial herbs, with alternate leaves, those of the stem sessile or decurrent. Flowers in terminal racemes, ephemeral. (The ancient Latin name, altered from *Barbascum*.)

1. **V. Thápsus**, L. (COMMON MULLEIN.) *Densely woolly throughout; stem tall and stout, simple, winged by the decurrent bases of the oblong acute leaves; flowers (yellow) in a prolonged and very dense cylindrical spike; lower stamens usually beardless.* — Fields and road-sides, very common; also in recent clearings, introduced from Europe, as are the following.

2. **V. Blattària**, L. (MOTH MULLEIN.) *Green and smoothish, slender; lower leaves petioled, oblong, doubly serrate, sometimes lyre-shaped, the upper partly clasping; raceme long and loose; filaments all bearded with violet wool.* — Road-sides, common. Corolla either yellow or white with a tinge of purple.

3. **V. Lychnìtis**, L. (WHITE MULLEIN.) *Clothed with a thin powdery woolliness; stem and branches angled above; stem-leaves ovate, acute, not decurrent, greenish above; flowers (yellow, rarely white) in a pyramidal panicle; filaments with whitish wool.* — Road-sides, Penn., rare, and sandy fields at the head of Oneida Lake, New York, where it hybridizes freely with the common Mullein.

2. **LINÀRIA**, Tourn. TOAD-FLAX.

Calyx 5-parted. Corolla personate, with the prominent palate nearly closing the throat, spurred at the base on the lower side. Stamens 4. Pod thin, opening below the summit by one or two pores or chinks, the orifice split into teeth. Seeds many. — Herbs, with the lower leaves opposite or whorled, the upper alternate. (Name from *Linum*, the Flax, which the leaves of some species resemble.)

1. **L. Canadénsis**, Spreng. (WILD TOAD-FLAX.) *Smooth; stem slender, erect, mostly simple; with scattered linear leaves; those from prostrate shoots from the base oblong, crowded, chiefly opposite or whorled; flowers blue, in a slender raceme, short-pedicelled; spur thread-shaped, curved.* ① ② — Sandy soil, rather common. June - Aug. — Flowers small, variable in size.

2. **L. vulgàris**, Mill. (COMMON TOAD-FLAX. RAMSTED.) *Smooth and glaucous*; stem erect; *leaves* alternate, crowded, linear-lanceolate; *flowers* (yellow) in a dense raceme, on pedicels shorter than the bracts; spur awl-shaped. ♀ — Fields and road-sides, a showy, but pernicious, weed. Flowers 1' long, pale yellow, the palate deep orange, hairy in the throat. — The *Peloria* state, with a regular 5-cleft border to the corolla, 5 spurs, and 5 stamens, has been observed in Pennsylvania by Dr. Darlington.

3. **L. Elátine**, Mill. (HALBERT-LEAVED TOAD-FLAX.) *Hairy*, branched from the base, *procumbent*; *leaves* alternate, *ovate-halbert-form*, petioled; *flowers* (yellow and purplish, small) *axillary*, on slender *peduncles* which are usually longer than the leaves; spur slender. ♂ — Fields and banks, sparingly introduced in Massachusetts and New York.

3. SCROPHULARIA, Tourn. FIGWORT.

Calyx deeply 5-cleft. Corolla with a somewhat globular tube; the 4 upper lobes of the short border erect (the two upper longer), the lower spreading. Stamens 4, declined, with the anther-cells transverse and confluent into one; the vestige of the fifth stamen present in the form of a scale-like rudiment at the summit of the tube of the corolla. Pod many-seeded. — Rank herbs, with mostly opposite leaves, and small greenish-purple or lurid flowers in loose cymes, forming a terminal narrow panicle. (So called because a reputed remedy for *scrofula*.)

1. **S. nodòsa**, L. (COMMON FIGWORT.) Smooth, tall and branching; stem 4-sided; leaves ovate, oblong, or the upper lanceolate, acute, cut-serrate, rounded or heart-shaped at the base. ♀ (*S. Marilandica*, L., and *S. Lanceolata*, Pursh.) — Damp copses and banks. July.

4. COLLINSIA, Nutt. COLLINSIA.

Calyx deeply 5-cleft. Corolla declined, with the tube gibbous at the base on the upper side, deeply 2-lipped; the upper lip 2-cleft, the lobes partly folded backwards; the lower 3-cleft, its middle lobe keeled and sac-like, infolding the 4 declined stamens and style. Fifth stamen a slender rudiment. Pod many-seeded. — Slender branching annuals, with opposite leaves, and handsome party-colored flowers in umbel-like clusters, appearing whorled in the axils of the upper leaves. (Dedicated to the late *Zaccheus Collins*, of Philadelphia, an accurate botanist.)

1. **C. vérna**, Nutt. Nearly smooth, slender (6'–20' high);

leaves ovate; the lower petioled; the upper ovate-lanceolate, clasping by the heart-shaped base, toothed; *whorls about 6-flowered; flowers long-peduncled; corolla (blue and white) twice the length of the calyx.* — Rich shady places, W. New York and Ohio. May, June.

2. **C. parviflora**, Dougl. Nearly smooth, small; lower leaves ovate or rounded, petioled; the upper oblong-lanceolate, mostly entire; *whorls 2-6-flowered; flowers short-peduncled; the small (blue) corolla scarcely exceeding the calyx.* — South shore of Lake Superior, *Pitcher*; thence westward.

C. BICOLOR, Benth., a showy Californian species, is becoming common in cultivation.

5. CHELONE, Tourn. TURTLE-HEAD. SNAKE-HEAD.

Calyx of 5 distinct imbricated sepals. Corolla inflated-tubular, with the mouth a little open; the upper lip broad and arched, keeled in the middle, notched at the apex; the lower woolly-bearded in the throat, 3-lobed at the apex, the middle lobe smallest. Stamens 4, with woolly filaments and very woolly heart-shaped anthers; and a fifth sterile filament smaller than the others. Seeds many, wing-margined. — Smooth perennials, with upright branching stems, opposite serrate leaves, and large white or purple-rose-colored flowers, which are nearly sessile in spikes or clusters, and closely imbricated with round-ovate concave bracts and bractlets. (Name from *χελώνη*, a *tortoise*, the corolla much resembling in shape the head of that animal.)

1. **C. glabra**, L. Leaves very short-petioled, lanceolate, pointed. Varies with the leaves narrowly or very broadly lanceolate, finely or coarsely serrate; the flowers white, rose-color, or purple. (*C. obliqua*, L., &c.) — Wet places, common. July - Sept. — Called also *Shell-flower*, *Balmory*, &c.

6. PENTSTEMON, Mitchell. PENTSTEMON.

Calyx 5-parted. Corolla tubular and more or less inflated, mostly 2-lipped; the upper lip 2-lobed, and the lower 3-cleft. Stamens 4, declined at the base, ascending above; and a fifth sterile filament usually as long as the others, either naked or bearded. Seeds numerous, wingless. — Perennials, branched from the base, simple above, with opposite leaves, the upper sessile and mostly clasping. Flowers showy, thyrsoid-panicled. (Name from *πέντε*, *five*, and *στίμων*, *stamen*; the fifth stamen being present and conspicuous, although sterile.)

1. **P. pubescens**, Solander. Somewhat hairy; root-leaves petioled, ovate or oblong; those of the stem lanceolate from a clasping base, serrate, sometimes entire; flowers loosely paniced; tube of the 2-lipped corolla gradually enlarged upwards, flattened and 1-ridged on the upper side, with 2 infolded lines on the lower which are more or less bearded within; sterile filament bearded lengthwise. — Sometimes quite smooth, when it is *P. lævigatus*, Soland., &c. — Hills and river-banks, Connecticut to Wisconsin. June – Sept. — Flowers pale violet-purple or white: pedicels, &c., somewhat clammy-pubescent.

P. DIGITALIS, Nutt., with a larger and more inflated open corolla, is to be expected in S. Ohio.

7. MIMULUS, L. MONKEY-FLOWER.

Calyx prismatic, 5-angled, 5-toothed, the upper tooth largest. Corolla tubular; the upper lip erect or reflexed-spreading, 2-lobed; the lower spreading, 3-lobed. Stamens 4. Stigma 2-lipped, the lips ovate. Seeds numerous. — Herbs, with opposite leaves, and mostly handsome flowers on solitary axillary peduncles. (Name from *μῦμός*, *an ape*, on account of the gaping corolla.)

1. **M. ringens**, L. (PURPLE MONKEY-FLOWER.) Erect, smooth, perennial; stem square; leaves oblong or lanceolate, pointed, serrate, clasping by a heart-shaped base; peduncles longer than the flower; calyx-teeth taper-pointed from a broad base. — Wet places, common. Aug. — Plant 1° – 2° high: corolla large, violet.

2. **M. alatus**, Ait. (WING-STEMMED MONKEY-FLOWER.) Stem a little winged at the angles above; leaves oblong-ovate, tapering into a petiole; peduncles usually shorter than the calyx, the very short teeth of which are abruptly pointed: otherwise like the last, but larger-leaved. — Low grounds, from Connecticut southward.

8. CONÓBEA, Aublet. (CAPRÀRIA, Michx.)

Calyx 5-parted, equal. Upper lip of the corolla 3-lobed, the lower 3-parted. Stamens 4, all fertile, the anthers approximate by pairs. Style 2-lobed at the apex, the lobes wedge-form. Seeds numerous, striate. — Low branching herbs, with opposite leaves, and small solitary flowers on axillary 2-bractleted peduncles. (Name unexplained.)

1. **C. multifida**, Benth. Diffusely spreading, much branched, minutely pubescent; leaves petioled, pinnately parted, the divisions linear-wedge-shaped; corolla (greenish-white) scarcely longer

than the calyx. ① (*Capraria multífida*, Pursh.)—Sandy river-banks, Ohio and southward. July – Sept.

9. HERPÉSTIS, Gærtn. HERPESTIS.

Calyx 5-parted; the upper division broadest, the innermost frequently very narrow. Upper lip of the corolla notched or 2-lobed, the lower 3-lobed. Stamens 4, all fertile. Style concave-dilated or 2-lobed at the apex. Seeds numerous. — Herbs with opposite leaves and solitary axillary flowers. (Name from *έρπηστῆς*, a *creeping thing*, the species being chiefly procumbent.)

1. **H. amplexicaulis**, Pursh. Stems creeping at the base, hairy; leaves clasping, ovate, obtuse, entire; calyx longer than the peduncle, shorter than the corolla, the upper division heart-shaped. ♀ — Wet places, New Jersey and southward. Aug. — Corolla blue, ephemeral.

10. GRATIOLA, L. HEDGE-HYSSOP.

Calyx 5-parted, the divisions narrow and nearly equal. Upper lip of the corolla entire or 2-cleft, the lower 3-cleft. Fertile stamens 2, included, posterior; the anterior pair mere sterile filaments, or wanting. Style dilated or 2-lipped at the apex. Pod 4-valved, many-seeded. — Low, mostly branched and diffuse herbs, with opposite sessile leaves, and axillary 1-flowered peduncles, usually with 2 bractlets at the base of the calyx. (Name from *gratia*, grace or favor, on account of its supposed excellent medicinal properties.)

* *Sterile filaments none or minute: annual?*

1. **G. Virginiãna**, L. (COMMON HEDGE-HYSSOP.) Smooth or nearly so; leaves lanceolate, sparingly serrate, narrowed at the base; peduncles longer than the leaves; tube of the *corolla whitish*, twice the length of the calyx; pod ovate-globose, acutish. — Wet places, common. July, Aug. — Plant 4'–6' high; corolla scarcely $\frac{1}{2}$ ' long, whitish, the tube pale yellow, often tinged with purple.

* * *Sterile filaments manifest, minutely capitate: perennial.*

2. **G. aurea**, Muhl. (GOLDEN HEDGE-HYSSOP.) Smooth; branches 4-angled, ascending; leaves oblong-lanceolate, nearly entire, 1–3-nerved; peduncles scarcely equalling the leaves; *corolla golden-yellow* ($\frac{1}{2}$ ' long); pod ovate. — Sandy wet places, Massachusetts to New Jersey, and southward. June – Sept. — Stems creeping at the base. Leaves $\frac{1}{2}$ ' long: flowers handsome.

11. ILYSÁNTHES, Raf. (LINDÉRNIA, *Muhl.*)

Calyx 5-parted, nearly equal. Upper lip of the corolla short, erect, 2-lobed; the lower larger and spreading, 3-cleft. Fertile stamens 2, included, posterior; the anterior pair sterile, inserted in the throat of the corolla, 2-lobed, without anthers; one of the lobes glandular; the other smooth, usually short and tooth-like. Style 2-lipped at the apex. Pod ovate or oblong, many-seeded. — Small smooth herbs, with opposite leaves, and small axillary flowers, or the upper racemed. (Name from *ἰλύς*, *mud* or *mire*, and *ἄνθος*, *flower*, alluding to the places where these plants grow.)

1. **I. gratioloides**, Benth. (FALSE PIMPERNEL.) Much branched, diffusely spreading; leaves ovate, rounded, or oblong, or the lower obovate, sparingly toothed or entire, mostly obtuse, the upper partly clasping; pod ovoid-oblong, a little longer than the calyx. ① (*Capraria gratioloides*, L. *Lindernia dilatata*, and *L. attenuata*, *Muhl.*) — Low grounds, and along rivulets, common: flowering all summer. — Variable in size and foliage: earlier peduncles shorter, but the later ones much longer than the leaves. Corolla pale purplish-blue.

12. HEMIÁNTHUS, Nutt. HEMIANTHUS.

Calyx 4-toothed, equal. Corolla 2-lipped; the upper lip very short, entire; the lower 3-lobed, with the middle lobe elongated and spreading. Stamens 2, anterior, with a scale at the base of the filament: sterile filaments none. Style short. Pod globular, membranaceous, the thin partition vanishing. Seeds rather numerous. — A very small and inconspicuous annual, creeping and rooting on the wet muddy banks of rivers, with crowded opposite round leaves, and minute solitary flowers sessile in their axils. (Name from *ἥμι*, *half*, and *ἄνθος*, *flower*, in reference to the unequally divided corolla.)

1. **H. micranthemoides**, Nutt. — Inundated banks of the Delaware below Philadelphia. — Stems 1' – 2' long, branched.

Suborder II. RHINANTHÍDEÆ. YELLOW-RATTLE FAM.

13. LIMOSÉLLA, L. MUDWORT.

Calyx bell-shaped, 5-toothed. Corolla short, spreading bell-shaped, 5-cleft, nearly regular. Stamens 4: anthers by confluence 1-celled. Style short, club-shaped. Pod globular, many-

seeded; the partition thin and vanishing. — Small annuals, growing in mud, usually near the sea-shore, creeping by slender runners, and with almost no ascending stems; the entire fleshy leaves in dense clusters around the simple 1-flowered peduncles. Flowers small, white or purplish. (Name a diminutive of *limus*, mud, in which these little plants delight to grow.)

1. **L. tenuifolia**, Nutt. Leaves (or rather petioles destitute of a proper blade) terete, awl-shaped or thread-form, not enlarged or flattened above. (*L. subulata*, *Ives.*) — Brackish marshes, Maine to New Jersey. Aug. — Plant 1'–2' high.

14. SYNTHYRIS, Benth. SYNTHYRIS.

Calyx 4-parted. Corolla somewhat bell-shaped, variously 2–4-lobed or cleft. Stamens 2, inserted just below the sinuses on each side of the upper lobe of the corolla, occasionally with another pair from the other sinuses, exerted: anther cells not confluent into one. Style slender: stigma simple. Pod flattened, rounded, obtuse or notched, 2-grooved, 2-celled (rarely 3-lobed and 3-celled), many-seeded. — Perennial herbs, with simple scape-like stems beset with partly clasping bract-like alternate leaves, the root-leaves rounded and petioled, crenate. Flowers in a raceme or spike, with bracted pedicels. (Derivation of the name unexplained.)

1. **S. Houghtoniàna**, Benth. Hairy; root-leaves round-ovate, heart-shaped; raceme spiked, dense; corolla not longer than the calyx, usually 2–3-parted. (*Gymnandra Houghtoniana*, *Torr.*) — High prairies and hills, Wisconsin, *Lapham*. Michigan, *Wright*. May. — Spike 5'–12' long. Corolla greenish-white, for the most part deeply 2-parted, with the upper lip entire, a little longer and narrower than the lower, which is 3-crenulate or 3-toothed; often 3-parted, with the upper lip notched or 2-lobed. When there are 4 stamens the lower pair appear later than the others.

15. VERÓNICA, L. SPEEDWELL.

Calyx 4-parted. Corolla with a 4-cleft spreading border, the lateral lobes or the lower one commonly narrower than the others. Stamens 2, one each side of the upper lobe of the corolla, exerted: anther-cells confluent at the apex. Style entire: stigma single. Pod flattened, usually obtuse or notched at the apex, 2-celled, few–many-seeded. — Chiefly herbs, with various foliage; the

flowers axillary or in terminal racemes, blue, flesh-color, or white. (Name of doubtful derivation; perhaps the flower of *St. Veronica*.)

§ 1. **LEPTÁNDRA**, Nutt. — *Tall perennials, with mostly whorled leaves: racemes terminal, dense, spiked: bracts very small: tube of the corolla longer than its limb and much longer than the calyx.*

1. **V. Virgínica**, L. (TALL SPEEDWELL. CULVER'S-ROOT.) Smooth or rather downy; stem simple, straight; leaves whorled in fours to sevens, short-petioled, lanceolate, acute or pointed, finely serrate; spikes paniced, crowded; stamens much exerted. — Rich moist places, Vermont to Michigan and southward: often cultivated. July. — Plant 2°–6° high. Corolla small, nearly white. Pod oblong-ovate, not notched, opening by 4 teeth at the apex, many-seeded.

§ 2. **BECCABÚNGA**, Benth. — *Perennials with opposite usually serrate leaves: flowers in axillary opposite racemes: corolla wheel-shaped with a very short tube: pod notched, rather many-seeded.*

2. **V. Anagállis**, L. (WATER SPEEDWELL.) Smooth, creeping and rooting at the base, then erect; leaves sessile, most of them clasping by a heart-shaped base, ovate-lanceolate, acute, serrate or entire; pedicels spreading; pod orbicular, slightly notched. — Brooks and ditches, not so common as the next. June–Aug. — Leaves 2'–3' long. Corolla pale blue with purple stripes.

3. **V. Americàna**, Schweinitz. (AMERICAN BROOKLIME.) Smooth, decumbent at the base, then erect; leaves mostly petioled, ovate or oblong, acutish, serrate, thickish, truncate or slightly heart-shaped at the base; the slender pedicels spreading; pod rounded, turgid, notched. (*V. Beccabúnga*, *Amer. authors.*) — Brooks and ditches, common. June–Aug. — Stems 8'–15' high. Flowers as in the last; the leaves shorter and broader.

§ 3. **CHAMÆDRYS**, Benth. — *Perennials, with diffuse or ascending branches from a decumbent base: leaves opposite: racemes axillary, from alternate axils: corolla wheel-shaped: pod strongly flattened, several-seeded.*

4. **V. scutellàta**, L. (MARSH SPEEDWELL.) Smooth, ascending, slender and weak; leaves sessile, linear, acute, remotely denticulate; racemes very slender and zigzag, with the flowers few and scattered, on elongated spreading or reflexed pedicels; pod flat, much broader than long, notched at both ends, appearing double shield-shaped. — Bogs, common northward. June–Aug. — Plant 8'–12' high, bearing 1 or 2 lateral racemes: corolla bluish.

5. **V. officinàlis**, L. (COMMON SPEEDWELL.) Pubescent throughout; stem prostrate, rooting at the base; leaves short-petioled, obovate-elliptical or wedge-oblong, obtuse, serrate; racemes densely many-flowered; pedicels shorter than the calyx; pod obovate-triangular, broadly notched. — Dry hills and woods, rare in the Northern

States, certainly indigenous in some places, especially in the mountains southward. July.

§ 4. *VERONICÁSTRUM*, Benth. — *Leaves opposite: flowers in a terminal raceme, the lower bracts resembling the stem-leaves: corolla wheel-shaped: pods flat, several-seeded.*

* *Perennials (mostly turning blackish in drying).*

6. *V. alpina*, L. (ALPINE SPEEDWELL.) Stems branched from the base, erect, simple, leafy; *leaves elliptical*, or the lowest rounded, entire or toothed, *nearly sessile*; *raceme hairy, few-flowered, crowded*; stamens short; pod obovate, notched. — Alpine summits of the White Mountains, New Hampshire, *Oakes*. — Plant 2' - 6' high: flowers blue.

7. *V. serpyllifolia*, L. (THYME-LEAVED SPEEDWELL.) Much branched at the diffusely prostrate base, low, *smooth or nearly so*; branches ascending and simple; *leaves ovate or oblong*, obscurely crenate, *the lowest petioled* and rounded, the upper passing into lanceolate bracts, entire; *raceme loose*; pod rounded, broader than long, obtusely notched. — Road-sides and fields, common: introduced and indigenous. May - July. — Corolla whitish or pale blue, with deeper stripes.

* * *Annuals: floral leaves like those of the stem, so that the flowers appear axillary and solitary: corolla shorter than the calyx.*

8. *V. peregrina*, L. (NECK-WEED. PURSLANE SPEEDWELL.) *Nearly smooth*, ascending, branched; *lowest leaves petioled, oval-oblong, toothed*; the others sessile, oblong, obtuse; the upper oblong-linear and entire, longer than the almost sessile flowers; *pod orbicular, slightly notched*. — Cultivated grounds, common, introduced. April - June. — Leaves thickish: corolla whitish.

9. *V. arvensis*, L. (CORN SPEEDWELL.) Simple or diffusely branched, *hairy*; *lower leaves petioled, ovate, crenate*; the uppermost sessile, lanceolate, entire; peduncles shorter than the calyx; *pod inversely heart-shaped*, the lobes rounded. — Cultivated grounds, common, introduced. June. — Stem 3' - 8' high: calyx unequal: corolla pale blue.

§ 5. *OMPHALÓSPORA*, Besser. — *Annuals: stem-leaves opposite, the upper alternate and bearing solitary peduncled flowers in their axils: corolla wheel-shaped: pod flat: seeds cup-shaped.*

10. *V. agréstis*, L. (FIELD SPEEDWELL.) Prostrate, hairy; *leaves petioled, round or ovate, crenate-toothed*; the floral somewhat similar, about the length of the recurved peduncles; calyx-lobes ovate-lanceolate; *ovary many-ovuled*, but the nearly orbicular sharply notched pod few-seeded. — Sandy fields, introduced. May - Oct. — Flowers small, blue or white.

11. *V. hederæfolia*, L. (IVY-LEAVED SPEEDWELL.) Prostrate, hairy; *leaves petioled, roundish, 3-5-toothed or lobed*; the

floral rather shorter than the recurved peduncles; calyx-lobes triangular and somewhat heart-shaped, acute, at length erect; *ovary* 4-ovuled; the turgid and wrinkled pod 2-4-seeded. — Shady rocks and hills, Long Island to Penn.; sparingly naturalized. March - May.

16. BUCHNÈRA, L. BLUE-HEARTS.

Calyx tubular, obscurely nerved, 5-toothed. Corolla salverform, with a straight or curved tube, and an almost equally 5-cleft limb; the lobes oblong or obovate, flat. Stamens 4, included, approximate in pairs: anthers one-celled (the other cell wanting). Style club-shaped and entire at the apex. Pod 2-valved, many-seeded. — Perennial rough-hairy herbs, turning blackish in drying, with opposite leaves, or the uppermost alternate; the flowers opposite in a terminal spike, bracted and with 2 bractlets. (Named in honor of *J. G. Buchner*, an early German botanist.)

1. **B. Americàna, L.** Rough-hairy; stem mostly simple and wand-like; lower leaves obovate-oblong, obtuse, the others oblong and lanceolate, sparingly and coarsely toothed, veiny; the uppermost linear-lanceolate, entire; spike interrupted; calyx longer than the bracts, one third the length of the deep purple corolla. — Moist places, Penn. and W. New York (*Sartwell*). June - Aug. — Stem 1°-2° high: leaves 2' - 3' long. Corolla hairy, 1' long, with pretty large wedge-obovate lobes.

17. SEYMÈRIA, Pursh. SEYMERIA.

Calyx bell-shaped, deeply 5-cleft. Corolla with a short and broad tube not longer than the 5 ovate or oblong nearly equal and spreading lobes. Stamens 4, somewhat equal: anthers approximate by pairs, oblong, 2-celled, the cells equal and pointless. Pod many-seeded. — Erect branching herbs, with the leaves mostly opposite and dissected or pinnatifid, the uppermost alternate and bract-like. Flowers yellow, interruptedly racemed or spiked. (Named by Pursh after *Henry Seymer*, an English naturalist.)

1. **S. macrophýlla, Nutt.** Rather pubescent; stem tall; leaves large, the lower pinnately divided, with the broadly lanceolate divisions pinnatifid and incised; the upper lanceolate, entire or serrate; tube of the corolla broad and incurved, very woolly inside, as are the filaments except their apex; style short, dilated and notched at the point; pod ovate, flattened and pointed at the apex. — Shady banks of the Little Miami, Ohio, *Nuttall*. July.

18. GERÁRDIA, L. GERARDIA.

Calyx bell-shaped, 5-toothed or 5-cleft. Corolla bell-shaped-funnel-form, or somewhat tubular, swelling above, with 5 more or less unequal spreading lobes, the 2 upper usually rather smaller and more united. Stamens 4, strongly didynamous, included, hairy: anthers approaching by pairs, 2-celled; the cells parallel, often pointed at the base. Style elongated, mostly enlarged and flattened at the apex. Pod ovate, pointed, many-seeded. — Erect branching herbs, with the stem-leaves opposite, or the upper often alternate, the uppermost reduced to bracts and subtending 1-flowered peduncles, which often form a raceme or spike. Flowers showy, purple or yellow. (Dedicated to the early English botanist *Gerard*.)

§ 1. GERARDIA proper. — *Calyx-teeth short: corolla purple or rose-color: anthers all alike, nearly or quite pointless: leaves linear, entire. (Ours are annuals.)*

1. **G. purpùrea**, L. (PURPLE GERARDIA.) Upright, with long and rigid widely spreading branches; *leaves linear, acute, rough-margined; flowers large (1' long); peduncles shorter than the calyx, which has sharp-pointed teeth shorter than the tube.* — Low grounds, chiefly towards the coast, but occasionally in the interior. Aug. — Stem 1°-2° high, smooth or roughish; the bright purple corolla very showy, smooth or minutely downy. — *G. áspera*, *Dougl.*, a closely allied species, with longer peduncles and calyx-teeth, may be expected in Wisconsin and Michigan.

2. **G. marítima**, Raf. (SEA-SIDE GERARDIA.) Low, branched from the base, upright; *leaves linear, mostly obtuse, fleshy, the floral minute; peduncles about the length of the calyx, which has very short obtuse teeth.* — Salt marshes along the coast. Aug. — Plant 4' - 10' high: the flowers half as large as in the last.

3. **G. tenuifòlia**, Vahl. (SLENDER GERARDIA.) Much branched, *very slender, diffuse, nearly smooth; leaves linear, acute, the floral mostly like the others; peduncles thread-form, rather longer than the leaves and many times exceeding the calyx, which has very short acute teeth; corolla rather small ($\frac{1}{2}$ ' - $\frac{1}{3}$ ' long, pale purple).* — Dry woods, common. Aug. — Plant 8' - 20' high: leaves variable.

§ 2. DASÝSTOMA, Raf. — *Calyx 5-cleft, the lobes often toothed: corolla yellow; the tube elongated, woolly inside, as well as the anthers and filaments: anthers all alike, scarcely included, the cells awn-pointed at the base: leaves rather large, all of them or the lower pinnatifid or toothed. (Perennial.)*

4. **G. fláva**, L. partly. (DOWNY FALSE FOXGLOVE.) *Pubes-*

cent with a fine close down; stem tall, mostly simple; leaves ovate-lanceolate or oblong, obtuse, entire, or the lower usually sinuate-toothed or pinnatifid; peduncles very short; calyx-lobes oblong, obtuse, rather shorter than the tube. — Copses, common. Aug. — Stem 3°–4° high. Corolla 1½' long.

5. **G. quercifolia**, Pursh. (GLAUCCOUS FALSE FOXGLOVE.) Smooth and glaucous, tall, usually branching; lower leaves twice-pinnatifid; the upper oblong-lanceolate, pinnatifid or entire; peduncles nearly as long as the calyx, the lanceolate-linear acute lobes of which are as long as the at length inflated tube. — Rich woods, common, especially southward. Aug. — Stem 3°–6° high; the leaves more cut than in the last. Corolla 2' long.

6. **G. integrifolia**. (SMALLER FALSE FOXGLOVE.) Smooth, not glaucous; stem low and mostly simple; leaves lanceolate, acute, entire, or the lowest obscurely toothed; peduncles shorter than the calyx. (*Dasystoma quercifolia*, var. ? *integrifolia*, Benth.) — Woods and barrens, from Ohio and Kentucky southward along the mountains. Aug. — Plant 1°–2° high. Corolla 1' long, shaped as in the last.

7. **G. pediculària**, L. (BUSHY GERARDIA.) Smoothish or pubescent, much branched; leaves ovate-lanceolate, pinnatifid, the lobes cut and toothed; pedicels longer than the calyx; lobes of the calyx as long as the hairy tube, mostly toothed. — Dry copses, common. Aug. — Plant 2°–3° high, very leafy. Corolla 1' or more in length.

§ 3. **OTOPHYLLA**, Benth. — Calyx deeply 5-cleft, the lobes unequal: corolla purple (rarely white), sparingly hairy inside, as well as the very unequal stamens: anthers pointless, those of the shorter pair much smaller than the others. (Annual?)

8. **G. auriculàta**, Michx. Rough-hairy; stem erect, nearly simple; leaves lanceolate or ovate-lanceolate, sessile; the lower entire; the others with an oblong-lanceolate lobe on each side at the base; flowers nearly sessile in the axils of the upper leaves, forming a prolonged and interrupted leafy spike. — Low grounds, Penn. to Michigan, rare. Aug. — Plant 9'–20' high: corolla nearly 1' long.

19. CASTILLÈJA, Mutis. PAINTED-CUP.

Calyx tubular, flattened, cleft at the summit on the anterior, and usually on the posterior side also; the divisions entire or 2-lobed. Tube of the corolla included in the calyx; upper lip long and narrow, arched, keeled and flattened laterally, inclosing the stamens; the lower short, 3-lobed. Stamens 4: anther-cells oblong-linear, unequal, the outer fixed by the middle, the inner pendulous. Pod many-seeded. — Herbs, with alternate entire or cut-lobed leaves; the floral ones dilated, colored, and usually more

showy than the pale yellow or purplish spiked flowers. (Dedicated to *Castillejo*, a Spanish botanist.)

1. **C. coccinea**, Spreng. (SCARLET PAINTED-CUP.) Hairy; stem simple; root-leaves clustered; those of the stem lanceolate, mostly incised; the floral 3-cleft, bright scarlet towards the summit; *calyx almost equally 2-cleft, the lobes dilated at the apex, nearly entire*, about the length of the greenish-yellow corolla. ① ② (*Euchroma coccinea*, Nutt.) — Low grounds, not uncommon. May-July. — A variety is occasionally found with the bracts dull yellow instead of scarlet.

2. **C. septentrionalis**, Lindl. (MOUNTAIN PAINTED-CUP.) Smooth or sparingly hairy; leaves lanceolate, often incised; the floral oblong or obovate, incised or toothed, whitish, rarely tinged with purple; *calyx cleft more deeply in front, the divisions 2-cleft*, the ovate-oblong lobes mostly shorter than the whitish corolla; *lower lip of the corolla very short*. † (*Bártsia pallida*, Bigel.) — Alpine region of the White Mountains, New Hampshire, and Green Mountains, Vermont. August.

3. **C. sessiliflora**, Pursh. Hairy, low; leaves mostly 3-cleft, with narrow diverging lobes; the floral broader and scarcely colored; spike many-flowered, crowded; *calyx deeper cleft in front, the divisions 2-cleft*, shorter than the tube of the long and narrow greenish-yellow corolla; *lobes of the lower lip of the corolla slender*, pointed, half the length of the upper. (*Euchroma grandiflora*, Nutt.) — Prairies, Wisconsin, *Lapham*, and westward. — Corolla 2' long.

20. SCHWÁLBEA, Gronov. CHAFF-SEED.

Calyx oblique, tubular, 10 - 12-ribbed, 5-toothed; the posterior tooth much smallest, the 2 anterior united much higher than the others. Upper lip of the corolla arched, oblong, obtuse, entire; the lower rather shorter, erect, 2-plaited, with 3 very short and broad obtuse lobes. Stamens 4, included in the upper lip: anthers 2-celled, the cells equal and parallel, obscurely pointed at the base. Style club-shaped or rather tongue-shaped at the apex. Pod ovate, acutish, many-seeded. Seeds linear, with a loose chaff-like coat. — A perennial minutely pubescent upright herb, with leafy simple stems, terminated by a loose spike of rather large dull purplish-yellow flowers; the leaves alternate, sessile, 3-nerved, entire, ovate or oblong, the upper gradually reduced into lanceolate and linear bracts. Pedicels very short, with 2 bractlets under the calyx. (Dedicated to *C. G. Schwalbe*, an obscure Dutch botanist.)

1. **S. Americana**, L.—Wet sandy soil, Sandwich, Massachusetts, to New Jersey and southward. May—July. Plant 1°–2° high.

21. EUPHRÀSIA, Tourn. EYE-BRIGHT.

Calyx tubular or bell-shaped, 4-cleft. Upper lip of the corolla scarcely arched, 2-lobed, the lobes broad and spreading: lower lip spreading, 3-cleft, the lobes obtuse or notched: palate not plaited. Stamens 4, under the upper lip: anther-cells equal, pointed at the base. Pod oblong, flattened. Seeds numerous, oblong, grooved lengthwise. — Herbs with branching stems, and opposite toothed or cut leaves. Flowers small, in one-sided terminal spikes. (Name *εὐφρασία*, *cheerfulness*, in allusion to its reputed medicinal properties.)

1. **E. officinàlis**, L. (COMMON EYE-BRIGHT.) Low; leaves ovate, oblong, or lanceolate, the lowest crenate, the floral bristly-toothed; lobes of the lower lip of the (white or reddish) corolla deeply notched. ① — Alpine summits of the White Mountains, New Hampshire, *Oakes*: a dwarf variety, 1'–5' high, with very small flowers.

22. RHINÁNTHUS, L. YELLOW-RATTLE.

Calyx membranaceous, flattened, much inflated in fruit, 4-toothed. Upper lip of the corolla arched, ovate, obtuse, flattened, entire at the summit, but furnished with a minute tooth on each side below the apex; lower lip 3-lobed. Stamens 4, under the upper lip: anthers approximate, hairy, transverse; the cells equal, pointless. Style thread-form, entire, with a minute obtuse stigma. Pod orbicular, flattened, many-seeded. Seeds orbicular, winged. — Annual upright herbs, with opposite leaves; the lower oblong or linear; the upper lanceolate, toothed; the floral rounded and cut-serrate with bristly teeth; the solitary yellow flowers nearly sessile in their axils, and crowded in a one-sided spike. (Name composed of *ῥίς*, a *snout*, and *ἄνθος*, a *flower*, from the beaked upper lip of the corolla in some species formerly referred to this genus.)

1. **R. Crista-gàlli**, L. (COMMON YELLOW-RATTLE.) Smooth, or a little hairy above; leaves oblong or lanceolate; seeds broadly winged (when ripe they rattle in the large inflated calyx, whence the English popular name). — Moist meadows, Plymouth, Massachusetts (introduced?), and White Mountains, N. Hampshire, *Tuckerman* and *Oakes*.

23. PEDICULÀRIS, Tourn. LOUSEWORT.

Calyx tubular or bell-shaped, variously 2-5-toothed and more or less cleft in front. Corolla strongly 2-lipped; the upper lip arched, flattened, often beaked at the apex; the lower erect at the base, 2-crested above, 3-lobed, the lobes commonly spreading, the lateral ones rounded and larger. Stamens 4, under the upper lip: anthers transverse; the cells equal, pointless. Pod ovate or lanceolate, mostly oblique, several-seeded. — Perennial herbs, with chiefly alternate pinnatifid leaves, the floral bract-like. Flowers spiked, rather large. (Name from *pediculus*, a louse, of no obvious application.)

1. **P. Canadénsis**, L. (COMMON LOUSEWORT. WOOD BETONY.) Hairy; stems simple, low, clustered; *leaves scattered; the lowest pinnately parted; the others half-pinnatifid*; spike short and dense; calyx split in front, otherwise almost entire, oblique; upper lip of the (dull greenish-yellow and purplish) corolla hooded, incurved, 2-toothed under the apex; *pod compressed, somewhat sword-shaped*. — Copses and banks, common. May - July. — Plant 5' - 12' high.

2. **P. lanceolata**, Michx. (TALL LOUSEWORT.) Stem upright, tall (1° - 3° high), nearly simple, leafy, mostly smooth; *leaves partly opposite, oblong-lanceolate, doubly cut-toothed*; spike crowded; calyx 2-lobed; upper lip of the (pale yellow) corolla incurved and bearing a short truncate beak at the apex; the lower erect, so as nearly to close the throat; *pod ovate, scarcely longer than the calyx*. (*P. pallida*, Pursh.) — Swamps, Connecticut to New Jersey and Ohio. Aug., Sept. — Calyx-lobes leafy-crested: corolla 1' long.

24. MELAMPÝRUM, Tourn. COW-WHEAT.

Calyx bell-shaped, 4-cleft; the taper lobes bristly-pointed, the posterior usually larger. Tube of the corolla cylindrical, enlarging above; upper lip arched, compressed, rectilinear in front, rather shorter than the lower lip, which is erect-spreading, biconvex, 3-lobed at the apex. Stamens 4, under the upper lip: anthers approximate, oblong, nearly vertical, hairy, the equal cells minutely pointed at the base. Ovary 2-celled, with 2 ovules in each cell. Pod flattened, oblique, 1-4-seeded. — Erect branching annuals, with opposite leaves, the lower entire, the upper mostly larger and fringed with bristly teeth at the base. Flowers solitary in the axils of the upper leaves, or crowded in leafy spikes. (Name composed of *μέλας*, *black*, and *πυρός*, *wheat*, from the color of the seeds, as they appear mixed with grain.)

1. **M. pratense**, L. Var. **AMERICANUM**, Benth. Flowers remote, one-sided; floral leaves lanceolate, the upper, or all of them, beset with a few teeth at the base; lobes of the smooth calyx about half the length of the tube of the corolla (yellowish, sometimes tinged with purple). — Dry copses, common. June, July.

ORDER 70. **VERBENACEÆ.** (VERVAIN FAMILY.)

Herbs or shrubs, with opposite leaves, more or less 2-lipped or irregular corolla, and didynamous stamens, the 1-4-celled fruit, dry or drupaceous, usually splitting when ripe into as many 1-seeded indehiscent nutlets; differing from the following order in the ovary not being 4-lobed, the style therefore terminal. — Seeds with little or no albumen; the radicle of the straight embryo pointing to the base of the fruit.

Synopsis.

1. **VERBENA.** Calyx 5-toothed. Border of the corolla 5-cleft.
2. **PHRYMA.** Calyx and corolla 2-lipped. Fruit 1-celled, 1-seeded.
3. **LIPPIA.** Calyx and corolla 2-lipped. Fruit 2-celled, 2-seeded.

1. VERBENA, L. Vervain.

Calyx tubular, 5-toothed, one of the teeth often shorter than the others. Corolla tubular, often curved, salver-form, the border somewhat unequally 5-cleft. Stamens included; the upper pair occasionally without anthers. Style slender: stigma capitate. Fruit splitting into 4 seed-like nutlets. — Flowers sessile, in single or often paniced spikes, bracted. (The Latin name for any sacred herb: derivation obscure.) — The species present numerous spontaneous hybrids.

1. **V. hastata**, L. (BLUE Vervain.) Tall; *leaves lanceolate or oblong-lanceolate, taper-pointed, cut-serrate, petioled, the lower often lobed and sometimes halbert-form at the base; spikes linear, erect, densely flowered, corymbed or paniced.* ♀ (*V. paniculata*, Lam., when the leaves are not lobed.) — Low and waste grounds, common. July – Sept. — Flowers purplish-blue.

2. **V. urticifolia**, L. (NETTLE-LEAVED Vervain.) Rather tall; *leaves oval or oblong-ovate, acute, coarsely serrate, petioled; spikes very slender, at length much elongated with the flowers remote, loosely paniced.* ♀ — Old fields and road-sides, common: introduced?

July - Sept. — Roughish-hairy, with slender spreading branches: flowers white, very small.

3. **V. spùria**, L. (CUT-LEAVED VERVAIN.) *Loosely branched, diffuse; leaves sessile, pinnatifid, the lobes cut-toothed; spikes very slender, with the flowers at length remote, loosely paniced: upper stamens imperfect.* ① ② — Sandy fields and road-sides, rather rare. Aug. - Oct. — Flowers very small, purplish-blue or rose-color.

4. **V. angustifòlia**, Michx. (NARROW-LEAVED VERVAIN.) *Dwarf, simple or sparingly branched; leaves linear-lanceolate, tapering to the base, remotely toothed; spikes solitary, the flowers at first crowded.* † — Dry or sandy fields, chiefly southward. July - Sept. — Plant 6' - 12' high; the purplish-blue flowers larger than in No. 1.

5. **V. stricta**, Vent. (HOARY VERVAIN.) *Downy with soft whitish hairs; stem nearly simple; leaves sessile, obovate or oblong, serrate; spikes thick and very densely flowered, somewhat clustered.* † — River-banks, Ohio and westward. Aug. — Plant 1° - 2° high: flowers blue, larger than in No. 1.

2. PHRYMA, L. LOPSEED.

Calyx cylindrical, 2-lipped; the upper lip of 3 bristle-awl-shaped teeth; the lower shorter, 2-toothed. Corolla 2-lipped; upper lip notched; the lower much larger, 3-lobed. Stamens included. Style slender: stigma 2-lobed. Fruit oblong, 1-celled and 1-seeded! — A perennial herb, with slender branching stems, and coarsely toothed ovate leaves, the lower long-petioled; the small opposite flowers in elongated and slender terminal spikes, reflexed in fruit and bent close against the common peduncle. Corolla purplish or pale rose-color. (Derivation of the name unknown.)

1. **P. Leptostàchya**, L. — Rich copses, common. July. — Plant 2° - 3° high: leaves 3' - 5' long, thin.

3. LÍPPIA, L. (ZAPÀNIA, Juss.)

Calyx often flattened, 2 - 4-toothed, splitting into 2 lips. Corolla strongly 2-lipped: upper lip notched; the lower much larger, 3-lobed. Stamens included. Style slender: stigma obliquely capitate. Fruit 2-celled, 2-seeded. (Dedicated to *Lippi*, an Italian naturalist and traveller.)

1. **L. nodiflòra**, Michx. (FOG-FRUIT.) *Procumbent or creeping, perennial; leaves wedge-ovate or oblanceolate, serrate above; peduncles axillary, slender, bearing solitary closely bracted heads of bluish-white flowers.* (*Zapania nodiflora* and *Z. lanceolata*, *Pers.*) — River-banks, Pennsylvania and westward. July - Sept.

ORDER 71. LABIATÆ. (MINT FAMILY.)

Chiefly herbs, with square stems, opposite aromatic leaves, more or less 2-lipped corolla, didynamous or diandrous stamens, and a deeply 4-lobed ovary, which forms in fruit 4 little seed-like nutlets or achenia surrounding the base of the single style in the bottom of the persistent calyx, each filled with a single erect seed. — Albumen nearly none: radicle at the base of the fruit. Upper lip of the corolla 2-lobed or sometimes entire; the lower 3-lobed. Stamens, as in all the allied families, inserted on the tube of the corolla. Style 2-lobed at the apex. Flowers axillary, chiefly in cymose clusters, which are often aggregated in terminal spikes or racemes.

Synopsis.

* Corolla with the border somewhat equally 4-5-cleft.

1. ISANTHUS. Stamens 4, nearly equal. Corolla 5-lobed.
2. MENTHA. Stamens 4, distant. Corolla 4-lobed; lobes spreading.
3. LYCOPUS. Stamens 2. Corolla 4-lobed; lobes spreading.
4. ORIGANUM. Stamens 4. Corolla 4-lobed, the upper lobe or lip erect.

* * Corolla evidently 2-lipped.

- + Stamens 2 (the others wanting or rudimentary): anthers not halved.
5. COLLINSONIA. Calyx 2-lipped. Corolla elongated, somewhat 2-lipped, the pendent middle lobe of the lower lip much larger than the others, lacerate-fringed. Stamens much exerted, diverging.
 6. HEDEOMA. Calyx 2-lipped; the lower lip 2-cleft. Upper lip of the corolla flat, the lower equally 3-lobed. Stamens ascending, scarcely exerted.
 7. CUNILA. Calyx equally 5-toothed. Upper lip of the corolla flat-tish, the lower somewhat unequally 3-lobed. Stamens erect, exerted.
 8. BLEPHILIA. Calyx short, 2-lipped; the 3 teeth of the upper lip awned. Corolla dilated at the throat, the lips oblong; the upper erect.
 9. MONARDA. Calyx elongated, 5-toothed. Lips of the corolla linear, the upper involving the filaments.
- ++ Stamens 2: anther-cells widely separated or one of them wanting.
10. SALVIA. Calyx and corolla strongly 2-lipped. Connective long and thread-shaped, jointed with the filament.

- + + + Stamens 4, the upper pair longer.
11. *CEDRONELLA*. Stamens all ascending. Upper lip of the corolla flattish; the throat much enlarged. Anther-cells parallel.
12. *NEPETA*. Stamens all ascending. Upper lip of the corolla more or less concave or vaulted. Anthers mostly approximate in pairs; the cells divergent.
13. *DRACOCEPHALUM*. Stamens all ascending. Anther-cells diverging. Upper tooth of the calyx largest, ovate. Bracts awn-toothed.
14. *LOPHANTHUS*. Stamens diverging; the upper pair curved downward, the lower ascending.
- + + + + Stamens 4, the lower pair longer.
- + + Stamens straight, distant or divergent. Upper lip of the corolla nearly flat.
15. *PYCNANTHEMUM*. Calyx equally 5-toothed, or slightly 2-lipped, naked in the throat.
16. *THYMUS*. Calyx 2-lipped, woolly in the throat.
- +++ Stamens ascending, approximate in pairs under the concave or vaulted upper lip.
- = Calyx 13-nerved, more or less 2-lipped, 5-toothed. Upper lip of the corolla flattish.
17. *CALAMINTHA*. Calyx woolly in the throat. Flowers loose.
18. *CLINOPODIUM*. Calyx nearly naked in the throat. Flowers clustered: bracts awl-shaped.
19. *MELISSA*. Calyx naked in the throat. Flowers loose: bracts ovate.
- == Calyx irregularly nerved or veiny, 2-lipped, closed in fruit. Upper lip of the corolla arched.
20. *PRUNELLA*. Upper lip of the calyx truncate, 3-toothed, flat.
21. *SCUTELLARIA*. Lips of the vaulted calyx entire.
- === Calyx 5-10-nerved or veiny, nearly equal, 3-10-toothed.
22. *SYNANDRA*. Calyx 4-toothed. Filaments bearded above: anthers of the shorter pair united by one of their cells.
23. *PHYSOSTEGIA*. Calyx 5-toothed, obscurely veiny, inflated-bell-shaped after flowering. Upper lip of the inflated corolla somewhat spreading.
24. *LAMIUM*. Calyx 5-nerved, 5-toothed, the teeth not spiny. Throat of the corolla inflated: lateral lobes truncate, or with a tooth-like appendage.
25. *LEONURUS*. Calyx 5-nerved, 5-toothed, the awl-shaped teeth rigid or spine-like. Lateral lobes of the corolla oblong. Achenia truncate. Valves of the anther naked.
26. *GALEOPSIS*. Calyx 5-10-nerved, with 5 somewhat spiny-pointed teeth. Throat of the corolla inflated. Anthers transversely 2-valved, the smaller valve bristly-fringed.

27. *STACHYS*. Calyx 5-10-nerved, 5-toothed. Throat of the corolla scarcely dilated. Achenia obtuse. Stamens projecting beyond the tube of the corolla.
28. *MARRUBIUM*. Calyx tubular, mostly 10-toothed; the teeth somewhat spine-like. Stamens included in the tube of the corolla.
29. *BALLOTA*. Calyx funnel-form, 5-10-toothed. Stamens projecting beyond the tube of the corolla.
30. *PHLOMIS*. Calyx tubular, 5-toothed, the truncate teeth abruptly awned. Upper lip of the corolla strongly arched.
- +++ Stamens curved, ascending and much longer than the corolla, projecting from its upper side.
31. *TRICHOSTEMA*. Calyx unequally 5-cleft. Limb of the corolla somewhat equally 5-cleft; the lobes declined.
32. *TEUCRIUM*. Calyx equally or unequally 5-toothed. Corolla deeply cleft between the 2 upper lobes, the stamens exerted from the cleft.

1. ISÁNTHUS, Michx. FALSE PENNYROYAL.

Calyx bell-shaped, deeply 5-toothed, equal. Corolla scarcely longer than the calyx; the border bell-shaped, with 5 nearly equal and rounded spreading lobes. Stamens 4, slightly didynamous, erect, distant, scarcely as long as the corolla. Achenia wrinkled and pitted. — A low and branching annual herb, clammy-pubescent, with entire oblong-lanceolate strongly 3-nerved leaves, and small pale blue flowers on short axillary 1-3-flowered peduncles. (Name from *ἴσος*, *equal*, and *ἄνθος*, *flower*, referring to the nearly regular corolla.)

1. *I. cærùleus*, Michx. — Gravelly banks, Maine and New York to Ohio, and southwestward. July, Aug.

2. MÉNTHA, L. MINT.

Calyx bell-shaped or tubular, 5-toothed, equal or nearly so. Corolla with a short included tube; the bell-shaped border somewhat equally 4-cleft; the upper lobe broadest, entire or notched at the apex. Stamens 4, equal, erect, distant. Achenia smooth. — Odeorous herbs, with the small flowers mostly in close clusters forming axillary capitate whorls, sometimes approximated in interrupted spikes. Corolla pale purple or whitish. (*Μίνθη* of Theophrastus, from a Nymph of that name, fabled to have been changed into Mint by the jealous Proserpine.)

* *Nearly smooth : naturalized.*

1. **M. viridis**, L. (SPEARMINT.) *Leaves almost sessile, ovate-lanceolate, unequally serrate; whorls of flowers approximate in loose paniced spikes; calyx somewhat hairy.* † — Wet places, perfectly naturalized. July, Aug.

2. **M. piperita**, L. (PEPPERMINT.) *Leaves petioled, ovate-oblong, acute, serrate; whorls crowded in short obtuse spikes, interrupted at the base; calyx-teeth hairy.* † — Low grounds and along brooks, less naturalized than the last. Aug. — Multiplying, like the Spearmint, by running under-ground shoots.

3. **M. arvensis**, L. (CORN MINT.) *Stem hairy downwards; leaves petioled, ovate or oblong, serrate; the floral all similar and longer than the globose remote whorls of flowers; calyx usually hairy.* † — Sparingly naturalized in Westchester, Penn., and in Central Ohio. — Odor like that of decayed cheese.

* * *Truly indigenous species.*

4. **M. Canadensis**, L. (WILD MINT.) *Stem low, spreading, whitish-hairy; leaves petioled, oblong, tapering to both ends, serrate, the upper narrower; flowers numerous, in globular axillary whorls; calyx hairy; stamens exserted.* — Varies with smoother stems and shorter stamens (*M. borealis*, Michx.) † — Shady brooks, common, especially northward. July - Sept. — Plant grayish-green, with the odor of Pennyroyal, 1° - 2° high.

3. **LÝCOPUS**, L. WATER HOREHOUND.

Calyx oblong-bell-shaped, 4 - 5-toothed. Corolla bell-shaped, scarcely longer than the calyx, nearly equally 4-lobed. Stamens 2, distant; the upper pair either sterile rudiments or wanting. Achenia smooth, with thickened margins. — Perennial low herbs, differing from *Mentha* in being diandrous, with sharply toothed or pinnatifid leaves, the floral ones similar and much longer than the dense axillary whorls of small flowers. Corolla mostly white. (Name compounded of *λύκος*, a wolf, and *ποῦς*, foot, from some fancied likeness in the leaves.)

1. **L. Virgínicus**, L. (BUGLE-WEED.) *Stem obtusely 4-angled, producing slender runners from the base; leaves oblong or ovate-lanceolate, toothed, entire towards the base, short-petioled; calyx-teeth 4, ovate, blunt.* — Shady moist places, common. Aug. — Smooth, 10' - 15' high, often purplish, with small capitate clusters of minute flowers.

2. **L. sinuatus**, Ell. (WATER HOREHOUND.) *Stem erect, sharply 4-angled (without runners?); leaves oblong-lanceolate, narrowed at both ends, petioled; the lowest pinnatifid, the others sinuate-toothed, or the uppermost linear and almost entire; calyx-teeth 5,*

spiny-pointed. (L. Europæus, Pursh.) — Low grounds, common. — Smoothish, 1° - 2° high, with larger flower-clusters than the last.

4. ORÍGANUM, L. WILD MARJORAM.

Calyx ovate-tubular, hairy in the throat, striate, nearly equally 5-toothed. Tube of the corolla about the length of the calyx, slightly 2-lipped; the upper lip rather erect and slightly notched, the lower of 3 nearly equal spreading lobes. Stamens 4, exserted, somewhat didynamous. — Herbs, with nearly entire leaves, and purplish flowers crowded in cylindrical or oblong spikes which are imbricated with colored bracts. (An ancient Greek name, said to be from ὄρος, a mountain, and γάμος, delight.)

1. **O. vulgàre**, L. Perennial, upright, hairy, corymbosely branched at the summit; leaves petioled, round-ovate; bracts ovate, obtuse, longer than the calyx, purplish. — Dry banks, sparingly naturalized in many parts of New England and southward. June - Oct.

5. COLLINSÒNIA, L. HORSE-BALM.

Calyx ovate, declined in fruit, 2-lipped; upper lip truncate, 3-toothed, the lower 2-toothed. Corolla elongated, expanded at the throat, somewhat 2-lipped, with the 4 upper lobes nearly equal but the lower larger and longer, pendent, toothed or lacerate-fringed. Stamens 2 (sometimes 4), much exserted, diverging: anther-cells divergent. — Strong-scented perennials, with large ovate leaves, and yellowish flowers on slender pedicels in loose and paniced terminal racemes. (Named in honor of *Peter Collinson*, a well-known patron of science and correspondent of Linnæus, and who introduced this plant into England.)

1. **C. Canadénsis**, L. Nearly smooth; leaves broadly ovate, serrate, pointed, petioled; panicle loose, many-flowered; stamens 2. — Rich moist woods, common. July - Sept. — Plant 1° - 3° high: the pale yellow corolla $\frac{2}{3}$ ' long, exhaling the odor of lemons.

6. HEDEÒMA, Pers. MOCK PENNYROYAL.

Calyx ovoid or tubular, gibbous on the lower side near the base, 2-lipped; the upper lip 3-toothed, the lower 2-cleft. Corolla 2-lipped; the upper lip erect, flat, notched at the apex; the lower spreading, 3-cleft, the lobes nearly equal. Fertile stamens 2; the 2 upper mere sterile filaments or wanting. — Low odorous plants, with small leaves, and loose axillary clusters of flowers,

somewhat approximated in terminal leafy racemes. (A Greek name for Mint, alluding to its agreeable odor.)

1. **H. pulegioides**, Pers. (AMERICAN PENNYROYAL.) Erect, branching, hairy; leaves oblong-ovate, obscurely serrate, narrowed at the base, petioled, the floral similar; whorls few-flowered; corolla (bluish, pubescent) scarcely exceeding the calyx; sterile filaments tipped with abortive anthers. ① (*Cunila pulegioides*, L.) — Open barren woods and dry fields. July - Sept. — Plant 6' - 10' high, with nearly the taste and odor of the true *Pennyroyal* (*Mentha Pulegium*) of Europe.

7. CUNILA, L. DITTANY.

Calyx ovate-tubular, equally 5-toothed, hairy in the throat. Corolla 2-lipped; upper lip erect, flattish, mostly notched; the lower spreading, somewhat equally 3-cleft. Stamens 2, erect, exerted, distant; no sterile filaments. — Perennials, with small white or purplish flowers, in corymbed cymes or close clusters. (An ancient Latin name, of unknown origin.)

1. **C. Mariàna**, L. (COMMON DITTANY.) Stems tufted, corymbosely branched; leaves smooth, ovate, serrate, rounded or heart-shaped at the base, nearly sessile; cymes peduncled, loosely corymb-ed; calyx strongly striate; middle lobe of the rose-colored corolla longer than the others. — Dry hills, S. New York and westward. July - Sept. — Plant 1° high, sprinkled with resinous and pellucid dots; the leaves 1' long, strongly straight-veined.

8. BLEPHÍLIA, Raf. BLEPHILIA.

Calyx ovoid-tubular, 13-nerved, 2-lipped, naked in the throat; upper lip with 3 awned teeth, the lower with 3 nearly awnless teeth. Corolla inflated in the throat, strongly and nearly equally 2-lipped; the upper lip erect, entire; the lower spreading, 3-cleft, with the lateral lobes ovate and rounded, larger than the oblong and notched middle one. Stamens 2, ascending, exerted (the rudiments of the upper pair minute or none); anthers, &c., as in *Monarda*. — Perennial herbs, with nearly the foliage of *Monarda*; the small pale bluish-purple flowers crowded in axillary and terminal globose capitate whorls. (Name from *βλεφάρις*, the *eyelash*, in reference to the hairy fringed bracts and calyx-teeth.)

1. **B. ciliàta**, Raf. Somewhat downy; leaves almost sessile, oblong-ovate, narrowed at the base, whitish-downy underneath; outer bracts, like the uppermost floral leaves, ovate, acute, colored, ciliate,

as long as the calyx. (*Monarda ciliata*, L.)—Dry open places, Penn. to Michigan. July.—Plant 1°-2° high, less branched than the next, the hairy corolla shorter.

2. **B. hirsuta**, Benth. Hairy throughout; *leaves long-petioled, ovate, pointed, rounded or heart-shaped at the base*; the lower floral ones similar, the uppermost and the bracts *linear-awl-shaped*, shorter than the calyx. (*B. nepetoides*, Raf. *Monarda hirsuta*, Pursh.)—Damp rich woods, N. New York to Wisconsin. July.—Plant 2°-3° high, with spreading branches, and numerous close whorls, the lower remote. Calyx-teeth fringed with long hairs. Corolla smoothish, pale, with darker purple spots.

9. MONARDA, L. HORSE-MINT.

Calyx tubular, elongated, 15-nerved, nearly equally 5-toothed, usually hairy in the throat. Corolla with an elongated tube, a slightly expanded throat, and a strongly 2-lipped limb; the lips linear or oblong, somewhat equal; the upper erect, entire or slightly notched; the lower spreading, 3-lobed at the apex, the lateral lobes ovate and obtuse, the middle one narrower and slightly notched. Stamens 2, elongated, ascending, inserted in the throat of the corolla: anthers linear, the divaricate cells confluent at their contiguous points.—Odorous erect herbs, with entire or toothed leaves, and pretty large flowers in a few capitate whorls, closely surrounded with bracts. (Dedicated to *Monardes*, an early Spanish botanist.)

* *Stamens and style exerted beyond the upper lip of the corolla: perennial.*

1. **M. didyma**, L. (OSWEGO TEA.) Somewhat hairy; leaves petioled, ovate-lanceolate, pointed, rounded or slightly heart-shaped at the base; the floral ones and the large outer bracts tinged with red; *calyx smooth, incurved, nearly naked in the throat*; *corolla smooth, much elongated (2' long), bright red.* (*M. Kalmiana*, Pursh.)—Moist woods and meadows, common northward; often cultivated (under the name of *Balm* or *Bee-Balm*). July.—Plant 2° high, with very showy flowers.

2. **M. fistulosa**, L. (WILD BERGAMOT.) Smoothish or downy; *leaves petioled, ovate-lanceolate* from a rounded or slightly heart-shaped base; the uppermost and outer bracts somewhat colored (whitish or purplish); *calyx slightly curved, very hairy in the throat*; *corolla purplish, rose-color, or almost white*, smooth or hairy.—Woods and rocky banks, Vermont to Penn. and Wisconsin; abundant westward. July-Sept.—Very variable in appearance, 2°-5° high; the pale corolla smaller than in the last.

3. **M. Bradburiana**, Beck. *Leaves nearly sessile, ovate-lanceolate, rounded at the base, clothed with long soft hairs, especially underneath*; the floral and the outer bracts somewhat heart-shaped, purplish; *calyx* smoothish, *contracted above, very hairy in the throat, with awl-shaped awned teeth*; corolla smoothish, bearded at the tip of the upper lip, scarcely twice the length of the calyx, pale purplish, the lower lip dotted with purple. — River-banks and plains, Ohio (?) and westward. July.

* * *Stamens not exceeding the upper lip of the corolla: annual or biennial?*

4. **M. punctata**, L. (HORSE-MINT.) *Minutely downy*; leaves petioled, lanceolate, narrowed at the base; bracts lanceolate, obtuse at the base, sessile, yellowish and purple; teeth of the downy calyx short and rigid, awnless; corolla nearly smooth, yellowish, the upper lip spotted with purple, the tube scarcely exceeding the calyx. — Sandy fields and dry banks, Long Island and New Jersey. Owego, New York, *Knieskern*, and Jefferson county, *Vasey*. Aug., Sept. — Stem 2° - 3° high, very odorous and pungent to the taste.

10. SÁLVIA, L. SAGE.

Calyx rather bell-shaped, 2-lipped; the upper lip mostly 3-toothed, the lower 2-cleft. Corolla deeply 2-lipped, ringent; the upper lip straight or scythe-shaped, entire or barely notched; the lower spreading or pendent, 3-lobed, the middle lobe larger. Stamens 2, on short filaments, jointed with the elongated transverse connective, one end of which ascending under the upper lip bears a linear 1-celled (half) anther, the other usually descending and bearing an imperfect or deformed (half) anther. — Flowers usually large and showy, in spiked, racemed, or paniced whorls. (Name from *salvo*, to save, in allusion to the reputed healing qualities of Sage.)

1. **S. lyrata**, L. (LYRE-LEAVED SAGE.) *Low, somewhat hairy; stem nearly simple and naked; root-leaves obovate, lyre-shaped or sinuate-pinnatifid, sometimes almost entire; those of the stem mostly a single pair, smaller and narrower*; the floral oblong-linear, not longer than the calyx; whorls loose and distant, forming an interrupted raceme; upper lip of the blue-purple pubescent corolla short, straight, not vaulted. ♀ — Woodlands and meadows, New Jersey to Ohio and southward. June. — Plant 10' - 20' high.

2. **S. urticifolia**, L. (NETTLE-LEAVED SAGE.) *Downy with clammy hairs, leafy; leaves rhombic-ovate, pointed, crenate, rounded or rather heart-shaped at the base, narrowed into a short petiole, the*

floral nearly similar; whorls remote, many-flowered; upper lip of the blue corolla erect, one third the length of the lower; style bearded. ¶ — Woodlands, New Jersey? and W. Penn.? southward. — Corolla $\frac{1}{3}$ ' long; the lateral lobes deflexed, the middle notched.

S. CLAYTONI, Ell., probably does not grow north of Virginia.

S. OFFICINÀLIS, L., is the well-known GARDEN SAGE.

11. CEDRONÉLLA, Mœrch. CEDRONELLA.

Calyx rather obliquely 5-toothed, many-nerved. Corolla very ample, much expanded at the throat, 2-lipped; the upper lip flat-tish or concave, 2-lobed; the lower 3-cleft, spreading, the middle lobe largest. Stamens 4, ascending, shorter than the upper lip; the lower pair shorter than the other! Anthers 2-celled, the cells parallel. — Sweet-scented perennials, with pale purplish flowers. (Name a diminutive of *κέδρος*, *Cedar*, from the aromatic leaves of the original species, *C. triphylla*, the *Balm-of-Gilead* of English gardens.)

1. **C. cordata**, Benth. Low, creeping by slender runners, hairy; leaves broadly heart-shaped, crenate, petioled, the floral shorter than the calyx; whorls few-flowered, approximate at the summit of short ascending stems; corolla hairy inside, $1\frac{1}{2}$ ' long. (*Dracocéphalum cordatum*, Nutt.) — Low shady banks of streams, W. Penn. and southward, rare. June.

12. NÉPETA, L. CAT-MINT.

Calyx tubular, often incurved, obliquely 5-toothed. Corolla naked and dilated in the throat, 2-lipped; the upper lip rather concave, erect, notched or 2-cleft; the lower spreading, 3-cleft, the middle lobe largest. Stamens 4, ascending under the upper lip, the lower pair shorter! Anthers approximate in pairs; the cells divergent. — Perennial herbs. (A name used by Pliny, by Linnæus thought to be derived from *Nepet*, a town in Tuscany.)

§ 1. CATÀRIA, Benth. — *Clusters dense and many-flowered, forming interrupted spikes or racemes: upper floral leaves small and bract-like.*

1. **N. Catària**, L. (CATNIP.) Downy, erect, branched; leaves heart-shaped oblong, deeply crenate, petioled, whitish-downy underneath; spiked racemes somewhat panicled; corolla whitish, dotted with purple, twice the length of the calyx. — Waste and cultivated grounds, a very common naturalized weed. July, Aug.

§ 2. GLECHÒMA, L. — *Floral leaves resembling the others, the axillary clusters loosely few-flowered.*

2. **N. Glechòma**, Benth. (GROUND IVY. GILL.) Creeping and trailing; leaves petioled, round kidney-shaped, crenate, green both sides; corolla thrice the length of the calyx, light blue. (*Glechoma hederacea*, L.) — Shaded places, perfectly naturalized in waste grounds. May – Aug. — Anthers with the cells diverging at a right angle, each pair approximate and forming a cross.

13. DRACOCÉPHALUM, L. DRAGON-HEAD.

Calyx tubular, 13 – 15-nerved, straight, 5-toothed; the upper tooth much largest. Corolla dilated in the throat, 2-lipped; the upper lip slightly arched and notched; the lower spreading, 3-cleft, with its middle lobe largest and 2-cleft or notched at the end. Stamens 4, ascending under the upper lip; the lower pair shorter! Anthers approximate by pairs, the cells divergent. — Whorls of flowers mostly spiked or capitate, and subtended by awn-toothed or fringed leafy bracts. (Name from *δράκων*, a dragon, and *κεφαλή*, head, alluding to the form of the corolla.)

1. **D. parviflòrum**, Nutt. (SMALL-FLOWERED DRAGON-HEAD.) Biennial; stem erect, somewhat branched, leafy; leaves ovate-lanceolate, sharply cut-toothed, petioled; whorls crowded in a terminal globular or oblong capitate spike; upper tooth of the calyx ovate, nearly as long as the bluish corolla. — Rocky places, Watertown, New York, *Dr. Crawe*. May – Aug. — Plant 8' – 20' high.

14. LOPHÁNTHUS, Benth. GIANT HYSSOP.

Calyx tubular-bell-shaped, 15-nerved, oblique, 5-toothed, the upper tooth rather longer than the others. Corolla 2-lipped; the upper lip nearly erect, notched; the lower somewhat spreading, 3-cleft, with the middle lobe broader and crenate. Stamens 4, exserted; the upper pair declined; the lower ascending, shorter! Anther-cells nearly parallel. — Perennial upright herbs, with petioled serrate leaves, and small flowers crowded in terminal spikes. (Name from *λόφος*, a crest, and *ἄνθος*, a flower.)

1. **L. nepetoïdes**, Benth. Smooth, or nearly so; leaves ovate, somewhat pointed; calyx-teeth ovate, rather obtuse, little shorter than the pale greenish-yellow corolla. (*Hýssopus nepetoïdes*, L.) — Borders of woods, W. Vermont to Wisconsin. Aug. — Stem stout, 4° – 6° high, sharply 4-angled. Leaves 2' – 4' long, coarsely crenate-toothed. Spikes 2' – 4' long, crowded with the ovate pointed bracts.

2. **L. scrophulariæfòlius**, Benth. Stem and lower surface of the ovate acute leaves more or less pubescent; calyx-teeth lan-

ceolate, acute, shorter than the purplish corolla. (*Hýssopus scrophulariæfolius, Willd.*) — Borders of rich woods, New York and Penn., and common westward. Aug. — Much like the last. Stem with strong obtuse angles. Leaves often heart-shaped at the base.

15. PYCNÁNTHEMUM, Michx. MOUNTAIN MINT.

Calyx ovate-oblong or tubular, about 13-nerved, equally 5-toothed, or the three upper teeth more or less united, naked in the throat. Corolla with a short tube and a somewhat 2-lipped border; the upper lip nearly flat, entire or slightly notched; the lower 3-cleft; lobes all ovate and obtuse. Stamens 4, distant, the lower pair rather longer: anther-cells parallel. — Perennial upright herbs, with a pungent mint-like flavor, corymbosely branched above; the floral leaves often whitened; the many-flowered whorls dense, crowded with bracts, and usually forming terminal heads or close cymes. Corolla whitish or flesh-color, the lower lip mostly dotted with purple. (Name composed of *πυκνός, dense*, and *ἀνθεμον, a blossom*, from the crowded or capitate flowers.)

* Calyx 2-lipped from the union of the 3 upper teeth, which are bristly-bearded at the summit: flowers in flattened cymes: leaves petioled.

1. **P. incànum, Michx.** (COMMON MOUNTAIN MINT. WILD BASIL.) *Leaves ovate-oblong, acute, remotely toothed, downy above and hoary with whitish wool underneath, the uppermost whitened both sides; cymes peduncled, compound, open; bracts linear-awl-shaped.* — Rocky woods and hills, common southward. Aug. — Plant 2°–4° high, the taste intermediate between that of Pennyroyal and Spearmint, as also in most of the following species.

2. **P. clinopodioides, Torr. & Gr.** *Leaves oblong-lanceolate, scarcely toothed, short-petioled, not whitened; the upper surface often smooth, the lower, as well as the stem, downy; cymes contracted; bracts and calyx-teeth shorter than in the last.* — Dry copses around New York. Aug. — Sept. — Intermediate between No. 1 and No. 3.

* * Calyx equally 5-toothed, or nearly so: leaves almost or quite sessile.

† Heads of flowers rather loose or open: bracts shorter than the corolla.

3. **P. Torrèyi, Benth.** *Somewhat downy, sparingly branched; leaves linear-lanceolate or oblong-linear, smoothish, nearly entire, narrowed at the base into a short petiole; calyx-teeth and the loose bracts awl-shaped, somewhat hairy; stamens exserted.* — Dry soil, S. New York and New Jersey. Aug. — Intermediate in aspect between No. 2 and No. 6.

4. **P. pilòsum**, Nutt. *Downy with long and soft whitish hairs, much branched; leaves lanceolate, acute at both ends, nearly entire and sessile, the floral not whitened; calyx-teeth ovate-lanceolate, acute, and with the bracts hoary-haired.* — Dry hills and plains, Ohio and southward. July, Aug.

5. **P. mùticum**, Pers. *Smooth or minutely hoary throughout, corymbosely much branched; leaves ovate or broadly ovate-lanceolate, acute, rounded or slightly heart-shaped at the base, mostly sessile, minutely toothed, rigid, prominently veined; the floral ones, with the bracts and triangular-ovate calyx-teeth hoary with a fine close down.* (*P. aristatum*, Bigelow, not of Michx. *Brachystemum muticum*, Michx.) — Dry hills, Maine to Ohio, common southward. Aug. — Plant 1° - 2° high, bushy. Flowers in rather dense heads; the outer bracts ovate-lanceolate and pointed, the others pointless, not longer than the calyx.

+ + *Flowers in close heads, crowded with rigid bracts.*

6. **P. lanceolatum**, Pursh. *Smoothish or minutely downy, corymbosely much branched above, very leafy; leaves lanceolate or almost linear, entire, rigid, obtuse at the base, sessile; bracts ovate-lanceolate, barely pointed, downy, as well as the short triangular teeth of the calyx.* (*Brachystemum Virginicum*, Michx.) — Thickets and hills, common. July - Aug. — Plant 2° high, the small dense heads numerous, clustered.

7. **P. linifolium**, Pursh. *Smooth, or nearly so; leaves narrowly linear, crowded; bracts slightly arched; calyx-teeth lanceolate-awl-shaped: otherwise nearly as No. 6.* — Thickets, from Nantucket and Connecticut southward and westward. July.

8. **P. aristatum**, Michx. *Smooth or minutely hoary, sparingly branched; leaves ovate-oblong, acute, slightly toothed, rigid, rounded at the base, short-petioled; the floral often whitened; flowers in few and dense rather compound clusters; bracts and calyx-teeth awl-shaped and unpointed, as long as the corolla.* — Pine barrens of New Jersey, and southward, rare.

16. THÝMUS, L. THYME.

Calyx 2-lipped, 13-nerved, hairy in the throat; the upper lip 3-toothed, spreading; the lower 2-cleft, with the awl-shaped divisions ciliate. Corolla short, slightly 2-lipped; the upper lip straight and flattish, notched at the apex; the lower spreading, equally 3-cleft, or the middle lobe longest. Stamens 4, straight and distant, usually exerted. — Low mostly prostrate and diffuse perennials, with small and entire veiny leaves, and purplish or whitish flowers. (The ancient Greek name of the Thyme, probably from *θύω*, to burn perfumes, because it was used for incense.)

1. **T. Serpýllum**, L. (GARDEN THYME.) Leaves green, flat, ovate, obtuse, entire, short-petioled, more or less ciliate; flowers approximate at the end of the branches in an oblong head. — Old fields, escaped from cultivation and sparingly naturalized in Pennsylvania: also in E. New England, *Oakes*. July.

17. CALAMÍNTHA, Mœnch. CALAMINT.

Calyx tubular, 13-nerved, nearly equal at the base, hairy in the throat, more or less 2-lipped; the upper lip 3-cleft, the lower 2-cleft. Corolla inflated in the throat, distinctly 2-lipped; the upper lip erect, flattish, entire; the lower spreading, 3-parted, the middle lobe usually largest. Stamens 4, ascending; anthers approximate in pairs; the cells diverging. — Perennials, with the axillary flowers, or small and loose peduncled clusters, racemed on the branches and one-sided; bracts minute; corolla purplish. (Name composed of *καλός*, *beautiful*, and *μίνθα*, *Mint*.)

1. **C. Nuttállii**. Low, nearly smooth, with upright and branching flowering stems and prostrate runners from the base; stem-leaves oblong-linear, sessile, obtuse, entire, those of the runners ovate, short-petioled; upper peduncles 1-flowered, the lower 3-5-flowered; pedicels slender; calyx obscurely 2-lipped, the teeth awl-shaped. (*Hedeoma glabra*, *Nutt.* *Micromeria Nuttallii*, *Torr. Cat. N. Y. M. glabélla*, var. *angustifolia*, *Torr. N. Y. State Fl.*) — Wet calcareous rocks, Niagara Falls, to Ohio and Michigan, along the Lakes. July-Sept. — Stems 3'-6' high, bearing leaves $\frac{1}{2}$ ' long or less, those of the runners still smaller. Corolla pale violet, twice the length of the calyx.

18. CLINOPÓDIUM, L. BASIL.

Whorls many-flowered, capitate, with numerous linear-awl-shaped exterior bracts forming a sort of involucre: otherwise nearly as in *Calamintha*. (Name composed of *κλίση*, *a bed*, and *ποῦς*, *a foot*, from the stalked and flattened head of flowers.)

1. **C. vulgàre**, L. Erect, hairy; leaves ovate, petioled, slightly toothed; clustered heads of flowers axillary and terminal; bracts and calyx equal in length, very hairy. ♀ — Hills and old fields, naturalized. July. — Corolla light purple.

19. MELÍSSA, L. BALM.

Calyx slightly gibbous at the base, 2-lipped, open, more or less hairy in the throat; the upper lip 3-toothed, the lower 3-cleft. Corolla with a recurved-ascending tube, the border and stamens

nearly as in the two preceding. — Clusters few-flowered, loose, one-sided, with few and mostly ovate bracts resembling the leaves. (Name from *μέλισσα*, a bee; the flowers yielding abundance of honey.)

1. **M. officinàlis**, L. (COMMON BALM.) Upright, branching; leaves broadly ovate, crenate-toothed, petioled, more or less hairy. ♀ — Escaped from gardens to the road-sides in some places. Aug. — Plant exhaling the odor of lemons; the corolla white or cream-color.

20. PRUNÉLLA, L. SELF-HEAL.

Calyx tubular-bell-shaped, somewhat 10-nerved and veiny, flattened on the upper side, naked in the throat, closed in fruit, 2-lipped; the upper lip broad and flat, truncate, with 3 short teeth; the lower 2-cleft. Corolla rather contracted at the throat and dilated at the lower side just beneath it, 2-lipped; the upper lip erect, arched, entire; the lower reflexed-spreading, 3-cleft; the lateral lobes oblong; the middle one rounded, concave, finely toothed. Stamens 4, ascending under the upper lip: filaments 2-toothed at the apex, the lower tooth bearing the anther. Anthers approximate in pairs, their cells diverging. — Low perennials, with nearly simple stems, and 6-flowered clusters of flowers sessile in the axils of rounded and bract-like membranaceous persistent floral leaves, imbricated in a capitate spike. (Name said to be taken from the German *braune*, a disease of the throat for which this plant was a reputed remedy.)

1. **P. vulgàris**, L. (COMMON SELF-HEAL OR HEAL-ALL.) Leaves ovate-oblong, entire or toothed, petioled, hairy or smoothish; corolla (violet or flesh-color) not twice the length of the calyx. — Woods and fields, common. Aug. — Plant 8'–12' high; floral leaves concave, short-pointed, tinged with purple.

21. SCUTELLÀRIA, L. SKULLCAP.

Calyx bell-shaped, gibbous, 2-lipped; the lips entire; the upper consisting of the 2 lateral sepals, deciduous after flowering, when the calyx is closed by the arched and separate upper sepal applied to the lower lip like a lid. Corolla with an elongated tube, dilated at the throat; the upper lip arched, entire or nearly so; the middle lobe of the lower dilated and spreading, convex, its lateral lobes often connected with the upper lip. Stamens 4, as-

ending under the upper lip; anthers approximate in pairs, ciliate; those of the lower stamens halved, of the upper, 2-celled and heart-shaped. — Bitter herbs (perennial), not aromatic, with axillary or else spiked or racemed flowers; the short peduncles chiefly opposite, 1-flowered, often 1-sided. (Name from *scutella*, a dish, in allusion to the form of the calyx.)

* *Flowers (blue) in terminal racemes; the floral leaves, at least all but the lower, being very small.*

1. **S. versicolor**, Nutt. Tall and upright, *hairy; leaves broadly ovate, deeply heart-shaped, long-petioled, crenate, very veiny and rugose*; the floral broadly ovate and sessile, rather longer than the hairy calyx, crowded. — Copses, Ohio and southward. July. — Flowers large; upper lip blue, the lower white.

2. **S. canescens**, Nutt. Tall and rather slender; *leaves ovate or ovate-lanceolate, acute, crenate, the upper narrowed, but the lower rounded or slightly heart-shaped at the base, petioled, nearly smooth above, whitish and mostly hoary like the stem with a minute down underneath*; the floral oblong, longer than the hoary calyx. — Copses and meadows, Penn. to Ohio and westward. July. — Plant 2° - 3° high: the hoary racemes paniced.

3. **S. serrata**, Andrews. Rather slender, upright; *leaves ovate, serrate, acute or pointed at both ends, all tapering into the petiole, green and nearly smooth (as well as the stem) on both sides, the floral lanceolate, the upper shorter than the slightly hairy calyx; raceme mostly simple, loose, leafy at the base; upper lip of the corolla incurved.* — Woods, S. Penn.? and southward. July. — Near the last, but smooth.

4. **S. saxatilis**, Riddell. *Nearly smooth; stems ascending, slender, branched; leaves ovate-heart-shaped, long-petioled, strongly crenate, obtuse, thin; the upper floral ovate-oblong, shorter than the somewhat downy calyx; racemes loose, simple or paniced, leafy at the base; upper lip of the corolla almost straight.* — Hills and shaded banks, Ohio and southward. June. — Plant 6' - 18' high.

5. **S. pilosa**, Michx. Stem upright, nearly simple (1° - 2° high), *hairy; leaves rhombic-ovate, crenate, obtuse, more or less hairy, remote; the lowest rounded and often heart-shaped; the others wedge-shaped at the base, short-petioled; the upper floral spatulate, shorter than the hairy calyx; raceme small.* — Dry copses, S. New York, Penn., and southward. June, July.

6. **S. integrifolia**, L. *Downy all over with a minute hoariness; stem upright, nearly simple; leaves oblong-lanceolate or linear, mostly entire, obtuse, remote, the upper very short-petioled, the floral longer than the calyx; raceme often branched; corolla much enlarg-*

ed above. A narrow-leaved form is *S. hyssopifolia*, L.—Open copses, S. New York, Penn., and southward. July.—About as tall as the last, with larger and deeper-colored flowers.

* * *Flowers (blue or violet, short-peduncled) solitary in the axils of floral leaves which are quite similar to the lower ones.*

7. **S. nervosa**, Pursh. *Smooth, simple or branched, slender; lowest leaves petioled, roundish; the middle ones ovate, toothed, somewhat heart-shaped, sessile; the upper floral ovate-lanceolate, entire; flowers small; the corolla about twice the length of the calyx.* (*S. gracilis*, Nutt.)—Moist thickets, New York and Pennsylvania to Ohio. June.—Plant 10'–15' high: the leaves about 1' long, thin: the nerve-like veins prominent underneath.

8. **S. parvula**, Michx. *Minutely downy, dwarf (3'–6' high), branched and spreading; lowest leaves round-ovate, short-petioled; the others sessile, ovate or lanceolate-ovate, obtuse, all entire or nearly so and slightly heart-shaped; flowers very small, the corolla little dilated above, scarcely twice the length of the calyx.* (*S. ambigua*, Nutt.)—Dry banks, W. Vermont and Connecticut to Wisconsin. May–June.—Leaves $\frac{1}{2}$ ' long.

9. **S. galericulata**, L. *Smooth or a little downy, mostly branching; leaves all similar, ovate-lanceolate, acute, serrate, roundish and slightly heart-shaped at the base, very slightly petioled; corolla large ($\frac{2}{3}$ '–1' long), much longer than the calyx, greatly enlarged above; the upper lip rather shorter than the lower.—Wet shady places, common, especially northward. Aug.—Plant 1°–2° high.*

* * * *Flowers (blue) in axillary, and often also in terminal, racemes; the lower floral leaves like the others, the upper small and bract-like.*

10. **S. lateriflora**, L. *Smooth; stem upright, much branched; leaves lanceolate-ovate or ovate-oblong, pointed, coarsely serrate, rounded at the base, petioled, the upper floral scarcely longer than the calyx; flowers small, 1-sided.—Wet shaded places, common. Aug.—Stem 1°–2° high; leaves 2'–3' long. Corolla $\frac{1}{4}$ ' long, not dilated above, the upper lip scarcely arched.—A quack having formerly vaunted its virtues as a remedy for hydrophobia, this species bears the name of *Mad-dog Skullcap*.*

22. SYNÁNDRA, Nutt. SYNANDRA.

Calyx bell-shaped, inflated, membranaceous, irregularly veiny, almost equally 4-toothed! Corolla with a long tube, much expanded above and at the throat; the upper lip slightly arched, entire; the lower spreading and 3-cleft, with ovate lobes, the middle one broadest and notched at the end. Stamens 4, ascending: filaments hairy: anthers approximate in pairs under the upper lip; the upper pair each with one fertile and one smaller sterile

cell, the latter cohering with each other. Achenia large. (Name from *σύν*, *together*, and *ἀνθήρ*, for *anther*, on account of the union of the anthers.)

1. **S. grandiflora**, Nutt. — Copses and banks, Ohio and southward. June. — A biennial hairy herb, with nearly simple stems, 1° high. Lower leaves long-petioled, broadly ovate and heart-shaped, crenate, thin, the lower floral sessile and somewhat similar. Peduncles 2-flowered, short. Corolla 1½' long, yellowish-white.

23. PHYSOSTÉGIA, Benth. FALSE DRAGON-HEAD.

Calyx nearly equally 5-toothed, obscurely 10-nerved, after flowering inflated-bell-shaped. Corolla with a much exerted long tube and inflated throat; the upper lip rather erect, entire; the lower 3-parted, spreading; its lateral lobes small, the middle broad and rounded. Stamens 4, ascending under the upper lip: anthers approximate, the cells parallel. — Perennial smooth herbs, with upright wand-like stems, and sessile lanceolate serrate leaves. Flowers large and showy, or flesh-color variegated with purple, opposite, in simple or panicled terminal leafless spikes, crowded. (Name from *φύσα*, a *bladder*, and *στέγω*, to *cover*, on account of the inflated calyx and corolla.)

1. **P. Virginiàna**, Benth. Leaves varying from lanceolate-linear to ovate-lanceolate; spikes dense; bracts shorter than the calyx, ovate, pointed. (*Dracocéphalum Virginianum*, L.) — Moist places, along rivers, from New York and Penn. westward. July, Aug. — Very variable, 1°–4° high; the corolla nearly 1' long.

24. LAMIUM, L. DEAD-NETTLE.

Calyx tubular-bell-shaped, about 5-nerved, with 5 nearly equal awl-pointed teeth. Corolla dilated at the throat; the upper lip ovate or oblong, arched, narrowed at the base; the middle lobe of the spreading lower lip broad, notched at the apex, contracted as if stalked at the base, the lateral small, at the margin of the throat. Stamens 4, ascending under the upper lip: anthers approximate in pairs, 2-celled, the cells divergent. Achenia truncate at the apex. — Herbs, decumbent at the base, the lowest leaves small and long-petioled, the middle ones heart-shaped and doubly toothed, the floral similar but nearly sessile, subtending the axillary whorled clusters of flowers. (Name from *λαίμός*, the *throat*, in allusion to the ringent corolla.)

1. **L. amplexicaule**, L. Leaves rounded, deeply crenate-toothed or cut, the upper clasping; lower whorls remote, the upper crowded; corolla (purple) elongated, the upper lip bearded, the lower spotted; lateral lobes truncate. ① — Waste and cultivated grounds, common, introduced. May — Oct.

25. LEONÛRUS, L. MOTHERWORT.

Calyx top-shaped, 5-nerved, with 5 nearly equal teeth which are awl-shaped and when old rather spiny at the point and spreading. Upper lip of the corolla oblong and entire, somewhat arched; the lower spreading, 3-lobed; the middle lobe larger, broad and inversely heart-shaped, the lateral oblong. Stamens 4, ascending under the upper lip: anthers approximate in pairs, the valves naked at the edge. — Upright herbs, with cut-lobed leaves, and close whorls of flowers in their axils. (Name from λέων, a lion, and οὐρά, tail, i. e. *Lion's-tail*.)

1. **L. Cardiaca**, L. (COMMON MOTHERWORT.) Somewhat hairy, tall; leaves long-petioled; the lower rounded, palmately lobed; the floral wedge-shaped at the base, 3-cleft, the lobes lanceolate; upper lip of the pale purple corolla bearded. 4 — Waste places, around houses, naturalized. July — Sept.

26. GALEÓPSIS, L. HEMP-NETTLE.

Calyx tubular-bell-shaped, about 5-nerved, with 5 somewhat equal and spiny-tipped teeth. Corolla dilated at the throat; the upper lip ovate, arched, entire; the lower 3-cleft, spreading; the lateral lobes ovate, the middle one inversely heart-shaped; the palate with 2 teeth at the sinuses. Stamens 4, ascending under the upper lip: anther-cells transversely 2-valved; the inner valve of each cell bristly-fringed, the outer one larger and naked. — Annuals or biennials, with spreading branches, and several-many-flowered whorls in the axils of floral leaves nearly like the lower ones. (Name composed of γαλέη, a weasel, and ὄψις, resemblance, from some likeness of the corolla to the head of a weasel.)

1. **G. Tetràhit**, L. (COMMON HEMP-NETTLE.) Stem swollen below the joints, bristly-hairy; leaves ovate, coarsely serrate; corolla purplish, or variegated, about twice the length of the calyx; or, in var. GRANDIFLÒRA, 3-4 times the length of the calyx, often yellowish with a purple spot on the lower lip. — Waste places, naturalized, rather common northward. Aug.

2. **G. Ládanum**, L. (RED HEMP-NETTLE.) Stem smooth or

pubescent; leaves oblong-lanceolate, more or less downy both sides; corolla red or rose-color (the throat often spotted with yellow), usually much exceeding the calyx. — Waste places, introduced, not common. Chelsea Beach, near Boston, Bigelow. Aug.

27. STÀCHYS, L. HEDGE-NETTLE.

Calyx tubular-bell-shaped, 5 – 10-nerved, equally 5-toothed, or the upper teeth united to form an upper lip. Corolla not dilated at the throat; the upper lip erect or rather spreading, often arched, entire or nearly so; the lower usually longer and spreading, 3-lobed, with the middle lobe largest and nearly entire. Stamens 4, ascending under the upper lip (often reflexed on the throat after flowering): anthers approximate in pairs. Achenia obtuse, not truncate. — Whorls 2 – many-flowered, approximate in a terminal raceme or spike; whence the name, from *στάχυς, a spike*.

1. **S. áspera**, Michx. (ROUGH HEDGE-NETTLE.) *Stem bristly, especially on the angles, with stiff mostly reflexed hairs; leaves short-petioled, ovate-oblong or oblong-lanceolate, acute, serrate, rounded at the base, bristly on the mid-rib and veins; whorls about 6-flowered; calyx bristly; the spreading teeth with somewhat spinous tips. ♀ — Wet banks and thickets. June – Aug. — Plant 2° high: flowers purple, the whorls not crowded.*

2. **S. palústris**, L. (MARSH HEDGE-NETTLE.) *Stem pubescent with soft spreading hairs, or smooth below; leaves nearly sessile, oblong-lanceolate, crenate-toothed, rounded or heart-shaped at the base, rugose, hairy; whorls 6 – 10-flowered. ♀ — Wet banks: nearly resembles the last: more common westward.*

3. **S. arvénsis**, L. (WOUNDWORT.) *Slender and decumbent, hairy; leaves petioled, ovate, obtuse, crenate, heart-shaped at the base; whorls 4 – 6-flowered, distant; corolla (purplish) scarcely longer than the calyx. ① — Sparingly naturalized in New England (Oakes).*

4. **S. hyssopifòlia**, Michx. (NARROW-LEAVED HEDGE-NETTLE.) *Smooth or nearly so; stems slender (1° high), ascending; leaves linear-oblong, sessile, obscurely toothed towards the apex; whorls 4 – 6-flowered, rather distant; corolla (violet-purple) twice or thrice the length of the calyx. ♀ — Wet sandy places, Plymouth, Massachusetts, to N. Jersey, and sparingly westward. July.*

28. MARRÙBIUM, L. HOREHOUND.

Calyx tubular, 5 – 10-nerved, nearly equally 5 – 10-toothed; the teeth more or less spiny-pointed and spreading at maturity. Upper lip of the corolla erect, flattish, notched; the lower spreading,

3-cleft, the middle lobe broadest. Stamens 4, included in the tube of the corolla: anther-cells divergent and somewhat confluent. Achenia obtuse. — Whitish-woolly bitter-aromatic perennials, branched at the base, with rugose and crenate or cut leaves, the floral nearly similar and exceeding the whorls. (A name of Pliny, said to be derived from the Hebrew *marrob*, a bitter juice.)

1. **M. vulgare**, L. (COMMON HOREHOUND.) Stems ascending; leaves round-ovate, petioled, crenate-toothed; flowers in distant and dense capitate whorls; calyx with 10 recurved teeth, the alternate ones shorter. — This well-known herb has escaped from gardens, and is naturalized in many places. Aug. — Corolla small, white.

29. BALLÔTA, L. FETID HOREHOUND.

Calyx nearly funnel-form, the 10-ribbed tube expanded above into a spreading regular border, with 5–10 teeth. Anthers exerted beyond the tube of the corolla, approximate in pairs. Otherwise nearly as in *Marrubium*. (The Greek name, of uncertain origin.)

1. **B. nigra**, L. (BLACK HOREHOUND.) More or less hairy but green, erect; leaves ovate, toothed; whorls many-flowered, dense; calyx-teeth 5, awl-pointed from a broad base, longer than the tube of the purplish corolla. ♀ — Waste places, sparingly naturalized, Massachusetts and Connecticut. Aug. — A homely fetid plant.

30. PHLÔMIS, L. JERUSALEM SAGE.

Calyx tubular, 5–10-ribbed, truncate or equally 5-toothed. Upper lip of the corolla arched; the lower spreading, 3-cleft. Stamens 4, ascending and approximate in pairs under the upper lip, the filaments of the upper pair with an awl-shaped appendage at the base: anther-cells divergent and confluent. — Leaves rugose. Whorls dense and many-flowered, axillary, remote, bracted. (An old Greek name of a woolly species, employed by Dioscorides, of obscure derivation.)

1. **P. tuberôsa**, L. Tall (3°–5° high), nearly smooth; leaves large, ovate-heart-shaped, crenate, petioled; the floral oblong-lanceolate; bracts awl-shaped, hairy; calyx-teeth awl-shaped and spreading from a very short truncate and notched base; upper lip of the purple corolla densely bearded with white hairs on the inside. ♀ — Naturalized on the shore of Lake Ontario near Rochester, *Prof. Hadley, Prof. Dewey*.

31. TRICHOSTÈMA, L. BLUE CURLS.

Calyx bell-shaped, oblique, deeply 5-cleft; the 3 upper teeth elongated and partly united, the 2 lower very short. Corolla 5-lobed; the lobes oblong, declined, the 3 lower more or less united to form the lower lip. Stamens 4, exserted much beyond the corolla, declined and then curved upwards: anther-cells divergent and at length confluent. Achenia strongly reticulated and pitted. — Low annuals, somewhat clammy-glandular and balsamic, branched, with entire leaves, and mostly solitary 1-flowered pedicels terminating the branches, becoming lateral by the production of axillary branchlets; the flower thus appearing to be reversed, namely the short teeth of the calyx upward, &c. Corolla blue, small. (Name composed of *θρίξ*, *hair*, and *στῆμα*, *stamen*, from the capillary filaments.)

1. **T. dichótomum**, L. (BASTARD PENNYROYAL.) *Leaves lanceolate-oblong or rhombic-lanceolate*, rarely lanceolate-linear, short-petioled. — Sandy fields, New England to Penn. July — Sept. — Plant 8' — 12' high. Corolla very small, but the curved stamens $\frac{1}{2}$ ' long.

2. **T. lineàre**, Nutt. *Leaves linear*, nearly smooth. — Sandy pine barrens of New Jersey and southward. — Rather taller and less forked than the last, the corolla larger. — Too near narrow-leaved forms of the foregoing.

32. TEUCRIUM, L. GERMANDER.

Calyx equally 5-toothed, or the upper tooth larger. Corolla with the 4 upper lobes nearly equal, oblong, declined; the lower one larger. Stamens 4, exserted from the cleft between the 2 upper lobes of the corolla: anther-cells confluent. Achenia wrinkled. (Named for *Teucer*, king of Troy.)

1. **T. Canadèuse**, L. (AMERICAN GERMANDER. WOOD SAGE.) Herbaceous, downy; stem simple, erect; leaves ovate-lanceolate, serrate, rounded at the base, short-petioled, hoary underneath; the floral scarcely longer than the oblique unequally toothed calyx; whorls about 6-flowered, crowded in a long and simple wand-like spike. ♀ — Low grounds, not rare. July. — Stem 1° — 3° high. Corolla purple, rarely white; the upper lobes turned down, with a deep cleft between them, so that there appears to be no upper lip. (T. *Virginicum*, L., is the same plant.)

The familiar cultivated plants of this family, not mentioned above, are the SWEET BASIL (*Öcymum Basilicum*); the LAVENDER (*Laván-*

dula Spica); SWEET MARJORAM (*Marjoràna horténsis*); SUMMER SAVORY (*Saturèia horténsis*); and the HYSSOP (*Hyssòpus officinàlis*); the latter beginning to be naturalized in some places.

ORDER 72. **BORAGINÀCEÆ.** (BORAGE FAMILY.)

Herbs, chiefly rough-hairy (not aromatic), with alternate entire leaves, and symmetrical flowers with a 5-parted calyx, a regular 5-lobed corolla, 5 stamens inserted on its tube, and a deeply 4-lobed ovary (as in Labiatæ), which forms in fruit 4 seed-like nutlets surrounding the base of the single style, each with a single pendulous (anatropous) seed. — Albumen none. Cotyledons plano-convex: radicle at the apex of the fruit. Calyx valvate, the corolla imbricated (in *Myosotis convolute*) in the bud. Flowers axillary, or mostly in one-sided racemes or spikes which are revolute (circinate) before expansion, and often bractless.

Synopsis.

* Corolla obliquely irregular! naked in the throat.

1. **ECHIUM.** Stamens unequal, exserted.

* * Corolla perfectly regular.

+ Nutlets fixed to the receptacle by a broad and excavated base.

2. **LYCOPSIS.** Corolla funnel-shaped, with a curved tube, and with 5 obtuse hairy scales at the throat.

3. **SYMPHYTUM.** Corolla cylindrical-bell-shaped, 5-toothed; the throat closed with 5 awl-shaped scales.

-- Nutlets fixed to the receptacle by a small flat scar (closed).

4. **ONOSMODIUM.** Corolla oblong or ovate-tubular, the lobes erect or converging; throat naked.

5. **LITHOSPERMUM.** Corolla funnel-form, open (imbricated in the bud). Calyx 5-parted. Flowers bracted.

6. **MYOSOTIS.** Corolla salver-form, short, convolute in the bud; the throat half closed with obtuse scales. Calyx 5-cleft. Raceme bractless.

7. **MERTENSIA.** Corolla tubular-funnel-form, elongated, with a wide-spreading border: scales none. Racemes or clusters bracted only at the base.

+++ Nutlets (prickly or margined) obliquely or somewhat laterally fixed to the central column or base of the style (closed).

8. **ECHINOSPERMUM.** Corolla salver-form. Nutlets prickly-margined.

9. **CYNOGLOSSUM.** Corolla funnel-form. Nutlets prickly all over.

1. ÈCHIUM, Tourn. VIPER'S BUGLOSS.

Corolla with a cylindraceous or funnel-form tube, and a more or less unequal spreading 5-lobed border, the lobes rounded, the expanded throat naked. Stamens mostly exerted, unequal. Style thread-form. Nutlets roughened or wrinkled, fixed by a small not perforate base. (A name of Dioscorides, from *ἔχίς*, a viper.)

1. **E. vulgàre**, L. (BLUE-WEED.) Rough-bristly; stem erect (2° high), mostly simple; stem-leaves linear-lanceolate, sessile; flowers in short lateral spikes, at first spreading, then erect, disposed in a long and narrow raceme; corolla reddish-purple changing to violet-blue (rarely pale), the tube shorter than the calyx. ② — Road-sides and meadows, introduced, rare in the Northern States, a troublesome weed in Virginia. June. — Flowers showy.

2. LYCÓPSIS, L. BUGLOSS.

Corolla funnel-shaped, with a curved tube; the throat closed with 5 convex obtuse bristly scales placed opposite the lobes. Stamens and style included. Nutlets rough-wrinkled, concave (perforate) at the base. — Annuals. (Name from *λύκος*, a wolf, and *ὄψις*, appearance, it is not clear for what reason.)

1. **L. arvénis**, L. (SMALL BUGLOSS.) Very rough-bristly (1' high); leaves lanceolate, obscurely toothed, the upper partly clasping; flowers in leafy racemes; calyx as long as the tube of the small blue corolla. — Dry or sandy fields, sparingly naturalized in N. England and New York. June, July.

3. SÝMPHYTUM, Tourn. COMFREY.

Corolla oblong-tubular, inflated above, 5-toothed, the short teeth spreading; the throat closed with 5 converging linear-awl-shaped scales. Stamens included: anthers elongated. Style thread-form. Nutlets smooth, ovate, fixed by a large excavated (perforate) base. — Coarse perennial herbs, with thickened mucilaginous roots, and one-sided nodding racemes, either single or in pairs. (Name from *συμφεῖν*, to grow together, probably in allusion to its reputed healing virtues.)

1. **S. officinàle**, L. (COMMON COMFREY.) Hairy, branched and winged above by the decurrent leaves; the lower ones ovate-lanceolate, tapering into a petiole, the upper narrower; corolla yellowish-white, rarely purplish. — Moist places, escaped from gardens, sparingly naturalized. June.

4. **ONOSMÓDIUM**, Michx. FALSE GROMWELL.

Corolla oblong-tubular, seldom twice the length of the 5-parted erect calyx, with 5 erect lobes, naked in the throat, the sinuses minutely hooded-inflexed. Anthers included, almost sessile, arrow-shaped, apiculate. Style much exerted, smooth. Nutlets ovoid, smooth and shining, fixed by a flat base (closed). — Perennial herbs, with oblong and sessile nerved leaves, and yellowish-white flowers in terminal and one-sided, at length elongated and erect, spiked racemes, leafy-bracted. (So called from the near resemblance to the genus *Onosma*.)

1. **O. Virginiànum**, DC. *Clothed all over with harsh and rigid appressed bristles*; stems rather slender (1°-2° high); *leaves oblong, or oblong-lanceolate, the lower narrowed at the base*; *corolla rather longer than the calyx*; *the lobes lanceolate-awl-shaped, bearded with long bristles outside*. (*O. hispídum, Michx. Lithospérmum Virginiànum, L.!*) — Banks and hill-sides, S. New England to Penn. and southward. June-Aug. — Leaves 1' - 2½' long. Corolla smaller than in the others: anthers smooth, as also in Nos. 2 and 3, oblong-arrow-shaped, on very short flattened filaments.

2. **O. Caroliniànum**, DC. (excl. syn. *Michx.*) *Clothed all over with long and spreading bristly hairs*; stem stout, upright (3°-4° high); *leaves ovate-lanceolate or oblong-lanceolate, acute*; *corolla twice the length of the calyx*; *the lobes deltoid-ovate, obtusish*; anthers oblong, longer than the narrow filaments. (*O. mólle, Beck, &c. Lithosp. Carolinianum, Lam.*) — River-banks, W. New York and Michigan to Virginia and southward. June, July. — Stout and larger-leaved than the last, thickly clothed with less rigid long and shaggy whitish hairs. Lobes of the corolla more or less hairy on the back, appearing slightly heart-shaped by the inflexion of the sinuses. This very distinct species has been confounded by some preceding authors with No. 1, by others with No. 3.

3. **O. mólle**, Michx. *Hoary with fine and close strictly appressed hairs*; *leaves oblong-ovate, obtusish, soft-downy underneath*; *corolla longer than the calyx, the lobes lanceolate-ovate or triangular, acute*; anthers linear, much longer than the vertically dilated filaments. — Probably confined to the Western States; it abounds in Tennessee and Illinois, and probably extends to Ohio. — Corolla rather larger than in the last: the lobes more or less hairy along the middle.

5. **LITHOSPÉRMUM**, Tourn. GROMWELL.

Corolla funnel-form, or rarely salver-form; the tube equalling or exceeding the 5-parted calyx; the throat open, mostly furnished

with 5 small folds or gibbous projections; lobes rounded. Anthers oblong, almost sessile, included. Nutlets ovate, smooth or wrinkled, fixed by a small truncate base (closed). — Herbs, usually with thickish roots yielding a red coloring matter, more or less roughish-hairy or downy usually sessile leaves, and spiked or racemed leafy-bracted flowers. (Name compounded of λίθος, a stone, and σπέρμα, seed, from the hard or stony nutlets.)

* *Nutlets roughened-wrinkled. (Annual.)*

1. **L. arvése**, L. (CORN GROMWELL.) Slender, hoary with minute appressed hairs, somewhat branched; leaves lanceolate, acutish, nearly veinless; racemes few-flowered, the lower flowers remote; corolla (yellowish-white) not longer than the calyx. Dry fields, introduced. June, July. — Plant 8'–12' high: leaves 1' long.

* * *Nutlets smooth and polished, stony, white. (Perennial.)*

+ *Corolla yellowish, short.*

2. **L. officinale**, L. (COMMON GROMWELL.) Much branched above (12'–18' high); leaves broadly lanceolate, acute, veiny, rough; *calyx as long as the tube of the corolla; nutlets very smooth.* — Waste grounds, introduced, sparingly naturalized. June.

3. **L. latifolium**, Michx. (BROAD-LEAVED GROMWELL.) Stem branching (2°–3° high); leaves ovate-lanceolate, acute, somewhat ribbed, minutely roughened above and downy underneath; those of the root large and rounded; flowers few and scattered; *calyx longer than the tube of the corolla, enlarged and spreading in fruit; nutlets marked with impressed punctures, turgid.* — Dry banks, W. New York (Niagara, &c.), to Michigan, and southwestward. June. — Larger and broader-leaved than the last.

+ + *Corolla deep yellow, large; lobes spreading. (Bátschia, Michx.)*

4. **L. hirtum**, Lehm. (HAIRY PUCCOON.) Stem simple; leaves linear-lanceolate, rough-hairy, obtuse; the floral ovate-lanceolate; *tube of the corolla scarcely longer than the calyx, bearded at the base inside, the lobes obovate.* (Batschia Gmelèni, Michx.) — Dry woods, Penn.? (Muhl.), Michigan, and southward.

5. **L. canéscens**, Lehm. (HOARY PUCCOON. ALKANET.) Stem sparingly branched above, *very leafy; leaves oblong, obtuse, somewhat hoary* with close and soft downy hairs; *tube of the showy orange-yellow corolla 2–3 times the length of the calyx, the lobes round.* (Batschia canescens, Michx.) — Open places, W. New York (Hadley) to Wisconsin. May. — Root long, red: stems 6'–12' high.

6. MYOSÒTIS, L. SCORPION-GRASS. FORGET-ME-NOT.

Corolla salver-form, the tube about the length of the 5-toothed or 5-cleft calyx, the throat with 5 short arching appendages oppo-

site the rounded lobes, which are convolute in the bud! Stamens included, on very short filaments. Nutlets smooth, compressed, fixed by a minute scar at the base (not perforate). — Low and mostly soft-hairy herbs, with entire leaves, those of the stem sessile, and small flowers in naked racemes, which are entirely bractless, or rarely with one or two small leaves towards the base. (Name from *μῦς*, *mouse*, and *οἶς*, *ὠτός*, *ear*, in allusion to the appearance of the short and soft leaves in some species: one popular name is MOUSE-EAR.)

* *Calyx open in fruit, the hairs appressed and simple.*

1. **M. palustris**, With. (TRUE FORGET-ME-NOT.) *Perennial*, more or less hairy; stem angled; leaves oblong-lanceolate, acutish; *style nearly as long as the 5-toothed calyx*. — Corolla bright blue, with a yellow eye. The common European species, probably wrongly attributed to this country also, the following having been mistaken for it.

2. **M. laxa**, Lehm. *Biennial*; the ascending stems rooting along the base, terete, branching, sprinkled with minute appressed hairs; leaves linear-oblong, obtuse; *pedicels filiform, longer than the flowers, spreading; calyx 5-cleft; style very short*. (*M. palustris*, Pursh.) — Very wet places, common. June – Sept. — Plant 9'–20' high; the corolla light blue with a yellowish eye, paler and only half as large as in the last, hardly 2" long.

** *Calyx closing in fruit, clothed with spreading hairs, which are often minutely hooked at the apex.*

3. **M. stricta**, Link. *Annual*, low (3'–8' high); stem hairy; leaves oblong, obtuse, somewhat hoary; raceme leafy at the base; pedicels erect in fruit, rather shorter than the 5-cleft calyx; tube of the (blue, or nearly white, and very small) corolla included. (*M. arvensis*, Pursh. *M. verna*, Nutt. *Lycópsis Virgínica*, Pursh.) — Dry hill-sides, &c. May – July. — Probably *M. versicolor*, and one or two others, are to be identified in the Northern States.

7. MERTÉNSIA, Roth. SMOOTH LUNGWORT.

Corolla trumpet-shaped, much longer than the 5-parted calyx, naked, or with 5 small folds in the open throat; the spreading border 5-lobed. Stamens rising from the throat, protruding. Style long and thread-form. Nutlets ovoid, smooth or somewhat wrinkled, rather fleshy, obliquely attached by the prominent internal angle (closed). — Smooth! perennial herbs, with pale and entire ovate leaves, and handsome purplish-blue (rarely white) flowers

in terminal racemes, which are bractless above, but with one or two leaves at the base. (Named for *Prof. Mertens*, an early German botanist.)

1. **M. Virgínica**, DC. (VIRGINIAN COWSLIP.) *Stem upright*; racemes at first corymbed, elongated in fruit; *corolla 4 times the length of the calyx*, naked in the throat, the much spreading border slightly 5-lobed; filaments slender. *Pulmonària Virgínica*, L. — Alluvial banks, W. New York to Wisconsin. May. — A showy plant, often cultivated; the corolla nearly 1' long. Root-leaves becoming 5' - 6' long, obovate. Disk bearing 2 glands as long as the ovaries.

2. **M. marítima**, Don. (SEA LUNGWORT.) *Stems spreading*; leaves rather fleshy; *corolla twice the length of the calyx*, the border 5-cleft; filaments broad and short. (*Pulmonària marítima*, L. *Lithospèrmum*, *Lehm.*) — Sea-coast, Plymouth, Massachusetts, *Russell*, and doubtless in Maine; thence northward. July.

M. DENTICULÀTA probably does not belong to the United States.

8. ECHINOSPÈRMUM, Swartz. STICKSEED.

Corolla salver-form, short, nearly as in *Myosotis*, but imbricated in the bud, the throat closed with 5 short scales. Stamens included. Nutlets erect, fixed laterally to the central column, triangular or compressed, the back armed next the margins with 1-3 rows of prickles which are barbed at the apex, otherwise naked. — Rough-hairy and grayish herbs, with small blue flowers in bracted racemes. (Name compounded of *ἐχίvos*, a hedgehog, and *σπέρμα*, seed, from the prickly nutlets.)

1. **E. Láppula**, *Lehm.* Stem upright, branched above; pedicels erect; leaves lanceolate, sessile, bristly-ciliate; nutlets each with a double row of prickles at the margins, and more or less tubercled between them. ① ② — Waste places, probably introduced. July. — A homely weed, 1° - 2° high.

9. CYNUGLÓSSUM, Tourn. HOUND'S-TONGUE.

Corolla funnel-form, the tube about the length of the 5-parted calyx, the throat closed with 5 obtuse scales; the lobes rounded. Stamens included. Nutlets depressed or convex, laterally affixed to the base of the style, covered with short hooked prickles. — Coarse herbs, with a strong unpleasant scent, and mostly panicled racemes which are naked above but usually bracted at the base.

Lower leaves petioled. (Name from *κύν, a dog*, and *γλῶσσα, tongue*.)

1. **C. officinale**, L. (COMMON HOUND'S-TONGUE.) *Clothed with short soft hairs, leafy, paniced above; upper leaves lanceolate, closely sessile by a rounded or slightly heart-shaped base; racemes nearly bractless; corolla reddish-purple; nutlets flattened from above, margined.* ② — Waste grounds, introduced, a familiar and troublesome weed; the large nutlets adhering to the fleece of sheep, &c.

2. **C. Virginicum**, L. (WILD COMFREY.) *Roughish with spreading bristly hairs; stem simple, few-leaved; stem-leaves lanceolate-oblong, clasping by a deep heart-shaped base; racemes few and corymbed, raised on a long naked peduncle, bractless; corolla pale blue; nutlets tumid, clothed with very short prickles.* † — Rich woods, Vermont and Penn., and common westward. June. — Plant 2° - 3° high; lower leaves large. Flowers much smaller than in the last, much larger than in the next.

3. **C. Morisoni**, DC. (BEGGAR'S LICE.) *Stem hairy, very broadly branched, leafy; leaves oblong-ovate, taper-pointed, also tapering at the base, thin, minutely downy underneath and roughish above; racemes paniced, forking, diverging, hairy, leafy-bracted at the base; corolla white or pale blue (minute), pedicels reflexed in fruit; nutlets convex, the prickles with barbed points.* ① (*Myosotis Virginica*, L. *Echinospérmum*, *Lehm.*) — Copses, common. July. — A vile weed, 2° - 4° high.

BORAGO OFFICINÀLIS, L. (BORAGE), is sometimes spontaneous about gardens.

HELIOTRÒPIUM ÍNDICUM, L. (INDIAN HELIOTROPE), belonging to a division of the family in which the 4 nutlets are united until maturity, as in *Verbena*, the style therefore terminal, is naturalized from Maryland southward, and perhaps sparingly in the Western States.

ORDER 73. HYDROPHYLLÀCEÆ. (WATERLEAF FAM.)

Herbs, commonly hairy, with mostly alternate and cut-lobed leaves, regular 5-merous and 5-androus flowers, as in the Borage Family, but the ovary ovoid and entire, 1-celled, with 2 parietal few - many-ovuled placentæ, which usually project into the cell and often line it like an interior pod. — Style 2-cleft above. Pod globular, 2-valved, few-seeded. Seeds reticulated or pitted, amphitropous, with a minute embryo in cartilaginous albumen. — Flowers chiefly

blue or white, in one-sided cymes or racemes which are coiled from the apex when young : pedicels bractless.

Synopsis.

1. **HYDROPHYLLUM.** Corolla convolute in the bud. Pod 1-4-seeded, nearly filled by the 2 fleshy 2-ovuled placentæ, which appear like an interior pericarp.
2. **PHACELIA.** Corolla imbricated in the bud. Pod 4-seeded, the 2 placentæ linear.
3. **EUTOCA.** Pod several-seeded, 8-many-ovuled.

1. **HYDROPHÝLLUM, L.** WATER-LEAF.

Calyx 5-parted, and rarely with a small appendage in each sinus. Corolla bell-shaped, 5-cleft, the lobes convolute in the bud; the tube furnished with 5 longitudinal linear appendages opposite the lobes which cohere by their middle, while their edges are folded inwards, forming a nectariferous groove. Stamens exerted : filaments more or less bearded. Ovary bristly-hairy (as is usual in the family); the 2 fleshy placentæ expanded so as to line the cell and nearly fill the cavity, each bearing a pair of ovules on the inner face. Pod ripening 1-4 seeds, spherical. — Perennial herbs, from matted rootstocks, with petioled ample leaves, and white or pale blue cymose-clustered flowers. (Name compounded of ὕδωρ, *water*, and φύλλον, *leaf*, of no obvious application to these plants.)

* *Sinuses of the calyx naked : filaments much longer than the corolla.*

1. **H. macrophýllum, Nutt.** (GREAT WATER-LEAF.) *Rough-hairy; leaves oblong, pinnate and pinnatifid; the divisions 9-13, ovate, obtuse, coarsely cut-toothed; peduncle very long; calyx-lobes lanceolate-pointed from a broad base, very hairy.* — Rocky, shaded banks, Ohio and southwestward. July. — Root-leaves 1° long: cyme globular, crowded.

2. **H. Virginicum, L.** (VIRGINIAN WATER-LEAF.) *Smoothish; leaves pinnately divided; the divisions 5-7, ovate-lanceolate or oblong, pointed, sharply cut-toothed, the lowest mostly 2-parted, the uppermost confluent; peduncles longer than the petioles of the upper leaves; calyx-lobes narrowly linear, bristly-ciliate.* — Damp rich woods, Maine to Wisconsin. June. — Rootstocks slender, nearly even: stems 1° high. Peduncles forked: clusters rather dense.

3. **H. Canadense, L.** (CANADIAN WATER-LEAF.) *Nearly smooth; leaves palmately 5-7-lobed, rounded, heart-shaped at the*

base, unequally toothed; those from the root sometimes with 2-3 small and scattered lateral leaflets; *peduncles much shorter than the long petioles*, forked, the crowded flowers on very short pedicels; calyx-lobes linear-awl-shaped, nearly smooth. — Damp rich woods, W. New England to Wisconsin, common northward. June, July. — Rootstock thickened and very strongly toothed in 2 rows by the persistent bases of the stout petioles: leaves 3' - 5' broad. Corolla white or nearly so.

* * *Sinuses of the calyx with short reflexed appendages: filaments scarcely exceeding the corolla (nearly smooth).*

4. **H. appendiculatum**, Michx. (HAIRY WATER-LEAF.) Hairy; stem-leaves palmately 5-lobed, rounded, the lobes toothed and pointed, the lowest pinnately divided; cymes rather loosely flowered; pedicels (at length slender) and calyx bristly-hairy. (*Nemophila paniculata*, Spreng.) — Woods, Western States to Penn. and Monroe county, New York (*Dr. Bradley*). Corolla pale purplish-blue.

2. PHACÉLIA, JUSS. PHACELIA.

Calyx 5-parted; the sinuses naked. Corolla open-bell-shaped, 5-cleft, the lobes imbricated in the bud; the scale-like appendages in the tube manifest or obsolete. Ovary with 2 linear adherent placentæ, each 2-ovuled. Pod ovoid, 4-seeded. — Hairy herbs, with the flowers in one-sided often forked racemes or raceme-like cymes, usually pale blue. (Name from *φάκελος*, a fascicle, probably in allusion to the clustered or forked racemes.)

1. **P. bipinnatifida**, Michx. Stem upright, branching, hairy; *leaves long-petioled, pinnately 3-5-divided; the divisions or leaflets ovate or oblong-ovate, acute, coarsely and often sparingly cut-lobed or pinnatifid*; racemes elongated, many-flowered; pedicels about the length of the calyx; lobes of the (bright blue) corolla entire, shorter than the bearded filaments, the tube with 10 folds inside. † — Shaded banks, central Ohio and southward. May. — Plant 1° high: corolla $\frac{1}{2}$ broad.

2. **P. Purshii**, Buckley. Stem upright or ascending, slender, sparsely hairy; *lower leaves pinnate; the upper deeply pinnatifid, sessile and partly clasping; the lobes lanceolate, acute or pointed, entire; raceme many-flowered*; pedicels elongated; *calyx-lobes lanceolate-linear, acutish, bristly-ciliate, shorter than the strongly laciniate-fringed blue corolla, which is nearly destitute of folds or scales inside.* ①
② (*P. fimbriata*, Pursh., not of Michx. *Cosmáanthus fimbriatus*, Nolte.) — Moist copses and river-bottoms, from W. Penn. and Ohio southward and westward. April - June. — Plant 8' - 12' high, with rather large and showy flowers.

3. EUTOCA, R. Br. EUTOCA.

Placentæ each 4 – many-ovuled; the pod 8 – many-seeded: otherwise as in *Phacelia*. Chiefly annuals. (Name from *εὐτοκος*, *fruitful*, in allusion to the more numerous seeds than in *Phacelia*.)

1. **E. parviflora**, R. Br. Low, diffuse, somewhat hairy; stems slender; leaves pinnatifid; the uppermost 3-cleft or sometimes entire, sessile; lobes of the lower ovate, of the upper oblong, entire; raceme solitary, elongated; fruiting pedicels much longer than the calyx; stamens about the length of the (pale blue) corolla; ovary 12 – 16-ovuled. (*Phacelia parviflora*, *Pursh*. *Cosmanthus*, *DC.*) — River-banks, Penn. and southward. April – June. — Plant 5' – 8' high, with small flowers.

ORDER 74. **POLEMONIACEÆ.** (POLEMONIUM FAM.)

Herbs, with alternate or opposite leaves, regular 5-merous and 5-androus flowers, the lobes of the corolla convolute in the bud, a 3-celled ovary and 3-lobed style; the pod 3-celled, 3-valved, loculicidal, few – many-seeded; the valves usually breaking away from the triangular central column. — Seeds between anatropous and amphitropous, the coat frequently mucilaginous when moistened and emitting spiral threads. Embryo straight in the axis of copious hard or fleshy albumen. Calyx 5-cleft, persistent. Corolla with a 5-parted border. Stamens often unequal or unequally inserted on the tube of the corolla. Flowers cymose-panicled. (Only two genera are indigenous in the Northern States, but several North American species of *Gilia*, &c., are becoming common in cultivation.)

1. POLEMONIUM, TOURN. GREEK VALERIAN.

Calyx bell-shaped. Stamens equally inserted at the summit of the very short tube of the open-bell-shaped corolla; filaments slender, declined, hairy-appendaged at the base. Pod few – several-seeded. — Low branching herbs, with alternate pinnate leaves, the upper leaflets sometimes confluent; the (blue or white) corymbose flowers nearly bractless. (Name employed by Dioscorides, from *πόλεμος*, *war*, of doubtful application.)

1. **P. réptans**, L. (JACOB'S LADDER.) Smooth, diffusely branched; leaflets 7-11, ovate-lanceolate or oblong, acute, entire; corymbs few-flowered; flowers (blue) nodding; calyx-lobes acute; pods about 3-seeded. ♀ — Shady river-banks, Penn. and W. New York to Wisconsin. May. — The name is inappropriate, as the plant is not creeping. Smaller and much fewer-flowered than the *P. cæruleum*, which is common in gardens.

2. PHLOX, L. PHLOX.

Calyx somewhat prismatic. Corolla salver-form, the tube slender. Stamens very unequally inserted in the tube of the corolla, included. Pod ovoid, with a single seed in each cell. — Chiefly perennials, with opposite and sessile perfectly entire leaves, the floral often alternate. Flowers cymose, mostly bracted; the open clusters terminal or crowded in the upper axils: corolla purple or pink, often varying to white. (Φλόξ, *flame*, an ancient name of *Lychnis*, transferred to this North American genus.)

* *Stem upright: panicle pyramidal or oblong, many-flowered: peduncles and pedicels very short: lobes of the corolla entire.*

1. **P. paniculata**, L. Tall and stout, smooth; leaves oblong-lanceolate and ovate-lanceolate, pointed, large, tapering at the base, the upper often heart-shaped at the base; *panicle ample, pyramidal-corymbed; calyx-teeth awn-pointed.* (*P. undulata*, *Ait.*, &c.) — Var. *acuminata* (*P. acuminata*, *Pursh*) has the broader and taper-pointed leaves beneath downy, like the stem, which is also sometimes rough-hairy and occasionally spotted below. — Rich woods, from Penn. westward and southward. June, July. — Common in gardens. Flowers pink-purple, varying to white.

2. **P. maculata**, L. Smooth or barely roughish; *stem* rather tall and slender, simple, *spotted with purple*; lower leaves lanceolate, the upper nearly ovate-lanceolate, tapering to the apex from the broad and rounded or somewhat heart-shaped base; *panicle elongated-thyrsiform or oblong, leafy below; calyx-teeth triangular-lanceolate, short, scarcely pointed*; corolla purple, sometimes white, when it is *P. suavæolens*, *Ait.* Lower branches of the panicle rarely elongated, so as to become pyramidal, when it is *P. pyramidalis*, *Smith.* — Rich woods and river-banks, common from N. Penn. southward and westward; very common in gardens. June.

* * *Stems ascending (rarely upright), spreading, or creeping: flowers fewer, in terminal corymbose cymes: peduncles or pedicels often slender.*

+ *Lobes of the corolla rounded, entire: leaves not crowded.*

3. **P. Carolina**, L. Smooth; stem rather slender, branched

at the base, *ascending*; leaves *oblong-lanceolate* or the upper *ovate-lanceolate*, *acute*, the lower with a slender tapering base, the upper sessile by a rounded or rarely heart-shaped base; flowers rather few in a short corymbed panicle; *calyx-teeth lanceolate, short-pointed*.—Copses, W. Penn. to Michigan, but more common along the mountains southward. June, July.—Stem 1°–2° high from a decumbent or creeping base. Leaves rather fleshy, the upper much as in No. 2, often 1' or more wide. Flowers large, pink-purple.

4. **P. glabérrima**, L. *Very smooth throughout*; stems *upright*, slender; leaves *linear-lanceolate*, or the upper more broadly *lanceolate* from a roundish base, tapering gradually to the apex, *all closely sessile*; panicle corymbed, mostly compound and many-flowered; *calyx-teeth triangular-awl-shaped, short-pointed*. (P. *revoluta*, Aiken. P. *cárnea*, Sims.)—Prairies and barrens, from Wisconsin and Ohio southward. July.—Stem 2°–3° high, much more leafy and strict than the last, the leaves more slender (often 4' long and $\frac{1}{3}$ ' wide) and rigid, with slightly revolute margins when dry. Corolla pink or rose-purple, showy.

5. **P. pilòsa**, L. *Downy-haired throughout*; stems slender, rather *upright*; leaves *lanceolate-linear*, or narrowly *oblong-lanceolate*, acute, the uppermost broadest at the base; flowers loosely corymbed; *calyx-teeth hairy, slender awl-shaped, tapering to awn-like points*. (P. *aristàta*, Darlingt.)—Copses and prairies, New Jersey to Wisconsin and southward. May, June.—Stems weak, 10'–20' high, the hairiness rather clammy at the apex; the leaves usually quite narrow. Corolla rose-purple or pale.

6. **P. réptans**, Michx. *Hairy*; runners *creeping and bearing roundish-obovate leaves* (rather fleshy) tapering into short margined petioles; flowering stems low (4'–10' high) ascending, clammy-pubescent, with small oval or oblong obtuse leaves; *cyme simple, 3–8-flowered*; *calyx-teeth linear-awl-shaped*.—Damp woods, Penn. and southward. May.—Flowers large, reddish-purple.

++ Lobes of the corolla notched at the end.

7. **P. divaricàta**, L. Minutely downy, loosely branched from the base, the flowering stems ascending (9'–15' high); leaves *oblong or oval-lanceolate, remote*; cyme corymbose-panicled, loosely flowered; *calyx-teeth linear-awl-shaped*; *corolla pale lilac or bluish-purple*, the lobes inversely heart-shaped.—Rocky damp woods, N. New York to Penn. and Wisconsin. May.

8. **P. subulàta**, L. (GROUND OR MOSS PINK.) Minutely downy, *depressed, tufted*; leaves *awl-shaped* or narrowly linear, small, rather rigid, *crowded*, and with numerous smaller ones clustered in the axils; cymes 3–5-flowered; *calyx-teeth awl-shaped*; *corolla pink-purple or rose-color (rarely white)*, the lobes wedge-shaped. (P.

setacea, L.) — Dry rocky hills and sandy banks, from New Jersey and Michigan southward. April, May. — Common in gardens: forming low and matted nearly prostrate tufts, very handsome in blossom, being nearly covered with flowers.

P. DRUMMÓNDII, Hook., a very showy Texan annual species, is becoming common in cultivation.

ORDER 75. DIAPENSIACEÆ. (DIAPENSIA FAMILY.)

Dwarf and tufted somewhat shrubby plants (only two in number), with small and evergreen heath-like foliage; the fruit agreeing with Polemoniaceæ, as do the flowers, except in the following points, viz. Calyx of 5 separate and strongly imbricated persistent sepals, like the bracts. Stamens 5, inserted in the very sinuses of the bell-shaped corolla: filaments short and flat: anthers opening transversely across the cells on the inside. Style single: stigma minutely 3-lobed.

1. DIAPÉNSIA, L. DIAPENSIA.

Anther-cells oblong, pointless, opening by an obliquely transverse line. Pod several-seeded. — An alpine dwarf evergreen, growing in very dense convex tufts, with the stems imbricated below with cartilaginous narrowly spatulate leaves, terminated by a nearly naked scape-like 1-flowered peduncle. Corolla white. (The ancient Greek name of the Sanicle, of obscure meaning, strangely applied by Linnæus to this plant.)

1. **D. Lappónica**, L. — Alpine summits of the White Mountains, New Hampshire, and Essex Mountains, N. New York. July. — Corolla open bell-shaped, $\frac{1}{2}$ ' broad.

2. PYXIDANTHÈRA, Michx. PYXIDANTHERA.

Anther-cells pointed at the base, opening by a strictly transverse line. Pod several-seeded. — A small prostrate and creeping evergreen, with narrowly oblanceolate and awl-pointed crowded leaves, which are alternate on the sterile branches, and somewhat hairy near the base. Flowers solitary and sessile, numerous, white or pale rose-color. (Name from *πυξίς*, a small box, and *ἀνθήρα*, anther, the anther opening as if by a lid.)

1. **P. barbulàta**, Michx. (Diapensia, Ell.)—Sandy pine barrens of New Jersey and southward. April, May.—Sepals nearly equal. Corolla $\frac{1}{4}$ ' long. Leaves $\frac{1}{2}$ ' long.

ORDER 76. CONVULVULACEÆ. (CONVOLVULUS FAM.)

Twining or trailing herbs, with alternate entire or lobed leaves, and regular 5-androus flowers with a calyx of 5 imbricated persistent sepals, a 5-plaited or 5-lobed corolla which is twisted or convolute in the bud, and a 2-celled (rarely 3-celled) ovary, with a pair of erect ovules from the base of each cell; the cells often doubled by a false partition. Fruit a globular 2–6-seeded (often septifragal) pod. Embryo large, curved or coiled in sparing mucilaginous albumen.—Flowers usually large and showy, and opening but for one day: pedicels articulated, often 2-bracted.

Synopsis.

Suborder I. CONVOLVULEÆ. THE TRUE CONV. FAM.

Green and leafy plants. Cotyledons large and foliaceous, variously folded and crumpled, the radicle curved.

1. CALYSTEGIA. Calyx inclosed in a pair of bracts. Style 1: stigmas 2.

2. CONVOLVULUS. Calyx naked. Style 1, or barely cleft at the apex: stigmas usually 2.

Suborder II. CUSCUTINEÆ. THE DODDER FAMILY.

Parasitic and yellowish or reddish plants, with thread-like naked stems and minute scales in place of leaves. Embryo slender, spirally coiled, entirely destitute of cotyledons.

3. CUSCUTA. The only genus of the suborder.

Suborder I. CONVOLVULÈÆ. THE TRUE CONV. FAM.

1. CALYSTÈGIA, R. Br. BRACTED BINDWEED.

Calyx inclosed in 2 large and mostly heart-shaped leafy bracts: sepals equal. Corolla between bell-shaped and funnel-form, the border obscurely 5-lobed or entire. Stamens included. Style 1: stigmas 2: ovary imperfectly 2-celled. Pod 1-celled, 4-seeded.—Perennials, with heart-shaped or arrow-shaped leaves, and axillary 1-flowered peduncles. (Name from κάλυξ, *calyx*, and στέγω, *to cover*, alluding to the bracts inclosing the calyx.)

1. **C. sèpium**, R. Br. (HEDGE BINDWEED.) *Smooth; stem twining; leaves arrow-shaped or somewhat halbert-form, pointed, the lobes at the base obliquely truncate and often toothed; peduncles 4-angled; corolla white, or slightly rose-color.* (Convolvulus sepium, L.) — Var. **RÈPENS** (Conv. repens, L.) is more or less prostrate, the flowers tinged with pink, growing on gravelly shores. — Moist grounds, common. June, July. — The common American plant climbs over bushes, and has larger flowers than the European (over 2' long), often tinged with rose-color. They open at dawn, or in cloudy afternoons.

2. **C. spithamæa**, Pursh. (DOWNY BINDWEED.) *Downy; stem low and mostly simple, upright or ascending, not twining; leaves oblong, with a more or less heart-shaped or auricled base, obtuse or pointed at the apex; peduncles usually longer than the leaf; corolla white.* (Conv. stans, Michx.) — Dry copses, Maine to Wisconsin. July. — Stems 6' - 12' long: corolla 2' long.

2. CONVÓLVULUS, L. BINDWEED. MORNING-GLORY.

Calyx naked. Corolla bell-shaped or funnel-form with a spreading nearly entire or 5-lobed border. Stamens mostly included. Style 1, often 2-cleft at the apex. Stigmas 2, rarely 3. — Chiefly twining or trailing plants, often with milky juice; the axillary peduncles 1 - many-flowered. (Name from *convolvere*, to entwine.)

§ 1. CONVOLVULUS proper. — *Stigmas 2, linear: pod 2-celled.* (None indigenous.)

1. **C. arvénsis**, L. (BINDWEED.) *Stem procumbent or twining, low, angled, rather hairy; leaves ovate-oblong, arrow-shaped, with the lobes at the base acute; peduncles mostly 1-flowered; bracts minute, remote; corolla ($\frac{3}{4}$ ' long) white or tinged with reddish.* † — Fields introduced from Europe, sparingly naturalized from Maine to Penn.; likely to become a troublesome weed. June.

§ 2. IPOMŒA, L. — *Stigmas 2, globular, or united into one: pod, or at least the ovary, 2-celled, and without intermediate partitions.*

2. **C. panduràtus**, L. (WILD POTATO-VINE. MAN-OF-THE-EARTH.) *Smooth or nearly so when old, trailing or sometimes twining; leaves regularly heart-shaped, pointed, occasionally some of them contracted at the sides so as to be fiddle-shaped; peduncles longer than the petioles, 1 - 5-flowered; sepals smooth, ovate-oblong; corolla open-funnel-form ($\frac{3}{4}$ ' long), white with purple in the tube; stigmas 2.* † — Sandy fields and dry banks, from Connecticut and W. New York southward and westward; rare at the north. July, Aug. — Stems long and stout, from a thick root which often weighs 10 - 20 pounds. Flowers opening in the forenoon.

3. **C. lacunòsus**, Spreng. (SMALL-FLOWERED MORNING-

GLORY.) Rather smooth; stem twining and creeping, slender; leaves heart-shaped, pointed, entire or angled-lobed, long-petioled; peduncles very short, 1-3-flowered; sepals oblong-lanceolate, acute, ciliate or hairy, half the length of the sharply 5-lobed (white) corolla; stigmas united; pod hairy, 2-celled. ① (Ipomœa, L. C. micranthus, Riddell.) — Woods and fields, Ohio (rare) and southward. Aug. — Corolla $\frac{1}{2}$ ' long.

4. **C. Pickeringii**, Torr. (SLENDER-LEAVED MORNING-GLO-
RY.) Stems prostrate, slender, branching, whitish-downy, very leafy; leaves all narrowly linear, obtuse, tapering to the base into a slight petiole; peduncles filiform, about the length of the leaves, mostly 1-flowered; bracts like the leaves, as long as the flower; sepals ovate, silky, half the length of the (small and white) bell-funnel-form corolla; style exserted, 2-lobed at the apex; pod by obliteration 1-celled.

‡ — Sandy pine barrens of N. Jersey (and N. Carolina). July. — Plant with the aspect of *Evolvulus*, the slender stems 2°-4° long; leaves 1'-2' long, the lowest linear-spatulate; the others 1" wide. Lower peduncles, or branchlets, mostly 3-flowered. Border of the expanded corolla $\frac{1}{2}$ ' wide. — Entirely distinct from *C. aquaticus* and *C. tenellus*, combined by Choisy under the name of *Stylisma evolvuloides*, and to which he has appended this plant as a narrow-leaved variety, although it does not accord with his generic character, having the styles united nearly to the top.

§ 3. PHARBÏTIS, Choisy. — *Stigmas mostly 3, united, capitate: pod 3-celled: the cells 2-seeded.*

5. **C. purpureus**, L. (COMMON MORNING-GLO-
RY.) Twining, hairy; leaves roundish-heart-shaped, entire, pointed; peduncles elongated, 3-5-flowered; pedicels clustered, thickened; sepals ovate-lanceolate, acute; corolla (1'-2' long) funnel-form with a spreading entire border, purple, violet, or nearly white. ① — Commonly cultivated, and becoming spontaneous about gardens and dwellings. July-Sept. — Flowers opening at dawn, closing early in the forenoon.

C. (PHARBÏTIS) NIL, L., a pale blue Morning-Glory with 3-lobed leaves, which is indigenous or spontaneous at the South, is sometimes cultivated, but not naturalized, in the Northern States.

C. (BATÀTAS) JALAPA, L., the *C. macrorhizus*, Ell., is also wholly a Southern species.

C. BATÀTAS, L. (*Batatas edulis*, Choisy), is the cultivated SWEET POTATO.

QUAMOCLIT COCCÍNEA, *Mærch.* (*Ipomœa*, L.), with small scarlet or yellowish-tinged flowers, is beginning to be naturalized in Southern Ohio.

Q. VULGÀRIS, Choisy (*Ipomœa Quamoclit*, L.), remarkable for its delicate pinnated leaves and slender scarlet flowers, is well known in cultivation as the *Cypress-vine*.

Suborder II. CUSCUTINEÆ. THE DODDER FAMILY.

3. CÚSCUTA, Tourn. DODDER.

Calyx 5- (rarely 4-) cleft, or of 5 sepals. Corolla globular-urn-shaped, bell-shaped, or somewhat tubular, the spreading border 5- (rarely 4-) cleft. Stamens attached to the tube of the corolla, furnished with a scale-like often fringed appendage at their base. Ovary 2-celled, 4-ovuled: styles distinct (or rarely united). Pod mostly 4-seeded. Embryo thread-shaped, spirally coiled in the rather fleshy albumen, entirely destitute of cotyledons! — Leafless herbs, chiefly annuals, yellowish or reddish in color, with thread-like stems, bearing a few minute scales in place of leaves, rising from the soil in germination, soon becoming entirely parasitic on the bark of herbs and shrubs over which they twine, and to which they adhere by means of papillæ developed on the surface in contact. Flowers small, cymose-clustered, mostly white. (Name of uncertain, supposed to be of Arabic, derivation.) — A new and complete monograph of this genus may soon be expected from Dr. Engelmann.

§ 1. *Stigmas elongated: pod opening regularly around near the base by circumcissile dehiscence, leaving the partition behind.* (Natives of the Old World.)

1. **C. Epilinum**, Weihe. (FLAX DODDER.) Stems very slender; flowers in small and dense scattered heads; corolla globular-cylindrical, scarcely exceeding the 5-parted calyx, left surrounding the base of the pod in fruit; scales small; styles at first upright, not longer than the ovary. — In Flax-fields, where it is sometimes very injurious: sparingly introduced with flax-seed into the Northern States. June.

§ 2. *Stigmas capitate: pods indehiscent, rarely bursting irregularly.*

* *Ovary depressed-globular, not pointed: pod thin and membranous, greenish or yellowish.*

2. **C. chlorocárpa**, Engelm. Low, orange-colored; flowers almost sessile, clustered; corolla mostly 4-cleft, open-bell-shaped, the tube about the length of the acute lobes and calyx-teeth, remaining persistent around the base of the depressed pod, the scales cut-fringed or cleft (rather small); stamens as long as the lobes. (C. Polygonorum, Engelm.) — Low grounds, covering Polygona and other herbs, Ohio and westward.

3. **C. tenuiflora**, Engelm. Much branched, twining high, pale-colored; flowers at length peduncled and in rather loose cymes;

tube of the corolla cylindrical (ventricose after flowering), *twice the length of the obtuse spreading lobes* and of the ovate obtuse calyx-lobes, in fruit borne on the summit of the depressed pod; scales ovate, cut-fringed; stamens shorter than the lobes of the corolla. (*C. Cephalanthi*, *Engelm.*)—Swamps, common through the Western States, on *Cephalanthus* and various tall herbs.

* * *Ovary more or less pointed at the apex (with a stylopodium): pod brownish, of firmer texture.*

+ *Flowers sparingly bracted: calyx 4-5-cleft.*

4. **C. umbròsa**, *Beyrich* (fide *Engelm.*). Flowers peduncled in umbel-like cymes; *tube of the (mostly 4-cleft) fleshy corolla cylindrical, as long as the ovate acutish and minutely crenate inflexed lobes*, and the acute keeled calyx-lobes; *scales minute and few-toothed*, appressed; *pod depressed-globose, covered with the remains of the corolla.* (*C. Córyli*, *Engelm.*)—Prairies and barrens, Western States. Allied to the last.

5. **C. Gronòvii**, *Willd.* Flowers peduncled, in close or open cymes; *corolla bell-shaped, the tube longer than the ovate and obtuse entire open lobes* and the ovate obtuse and somewhat keeled calyx-lobes; *scales large and converging, copiously fringed*, confluent at the base; *the remains of the corolla persistent at the base of the globose pod.* (Calyx and corolla more or less dotted with pellucid glands: these are wanting in *C. Saurùri*, *Engelm.*, which also has a more open corolla, more oblong lobes, &c.; but it is probably no more than a variety of the present species.) (*C. vulgivàga*, *Engelm.* *C. Americana*, *Pursh*, &c. *C. umbrosa*, *Torr. Fl. N. Y.*)—Low grounds, extremely common, especially northward and eastward; chiefly on herbs. Aug., Sept.—*C. rostràta*, *Shuttlew.*, a larger-flowered species with a pointed pod, common in the Alleghanies from Maryland southward, is probably to be found in Pennsylvania.

+ + *Calyx of 5 separate broad sepals, imbricated beneath with several nearly similar bracts: remains of the corolla in fruit borne on the globose somewhat pointed pod.* (*Lepidánche*, *Engelm.*)

6. **C. compácta**, *Juss.* Flowers sessile, in dense clusters; *bracts (4-5) and sepals orbicular, concave, appressed, slightly crenate*, much shorter than the slender cylindrical tube of the corolla; stamens shorter than the linear-oblong spreading lobes of the corolla; scales pinnatifid-fringed. (*C. coronàta*, *Beyrich*, fide *Engelm.*)—Dry ground, on shrubs, &c., S. Penn. and southward.

7. **C. glomeràta**, *Choisy.* Flowers sessile, very densely clustered, forming knotty masses closely encircling the stem of the foster plant, much imbricated with scarious oblong *bracts with recurved-spreading tips; sepals nearly similar*, shorter than the oblong-cylindrical tube of the corolla; stamens nearly as long as the oblong-lanceolate spreading or reflexed lobes of the corolla; scales large, fring-

ed. (*Lepidanche compositarum*, *Engelm.*)—Moist prairies, &c., from Ohio and Michigan westward; growing on Sunflowers, Golden-rods, &c.: the close coils of flowers appear like ropes twisted around their stems.

ORDER 77. **SOLANACEÆ.** (NIGHTSHADE FAMILY.)

Herbs (or rarely shrubs), with a colorless juice and alternate leaves, regular 5-merous and 5-androus flowers, on bractless pedicels; the corolla plaited or infolded-valvate in the bud, and the fruit a 2-celled (rarely 3-5-celled) many-seeded pod or berry.—Embryo small, mostly slender and curved in fleshy albumen. Calyx usually persistent. Stamens mostly equal, inserted on the corolla. Style and stigma single. Placentæ in the axis, often projecting far into the cells. Seeds nearly amphitropous.

Synopsis.

- * Corolla tubular or funnel-form: stamens separate.
- 1. **NICOTIANA.** Calyx tubular-bell-shaped, 5-cleft. Pod smooth, 2-4-valved at the apex, entirely 2-celled.
- 2. **DATURA.** Calyx prismatic, 5-toothed. Pod prickly, 4-valved, spuriously and imperfectly 4-celled.
- 3. **HYOSCYAMUS.** Calyx bell-shaped or urn-shaped, 5-lobed. Corolla somewhat irregular. Pod 2-celled, opening by a lid.
- ** Corolla bell-shaped or wheel-shaped: stamens convergent.
- 4. **NICANDRA.** Calyx 5-parted, 5-angled, at length bladdery and inclosing the 3-5-celled and pod-like dry berry.
- 5. **PHYSALIS.** Calyx 5-cleft, at length enlarged and bladdery and inclosing the 2-celled berry. Anthers opening lengthwise.
- 6. **SOLANUM.** Calyx mostly 5-cleft, spreading in fruit. Berry mostly 2-celled. Anthers opening by pores at the apex.

1. NICOTIANA, L. TOBACCO.

Calyx tubular-bell-shaped, 5-cleft. Corolla funnel-form or salver-form, usually with a long tube, the plaited border 5-lobed. Stigma capitate. Pod 2-celled, 2-4-valved from the apex. Seeds minute.—Rank acrid-narcotic herbs, mostly clammy-pubescent, with ample entire leaves, and lurid racemed or paniced flowers. (Named after *John Nicot*, who was thought to have introduced the Tobacco into Europe.)

1. **N. rústica**, L. (WILD TOBACCO.) Leaves ovate, petioled; tube of the dull greenish-yellow corolla cylindrical, two thirds longer than the calyx, the lobes rounded. ① — Sparingly naturalized near dwellings and old fields in New York and westward: introduced by the Indians.

N. TABÀCUM, L., is the cultivated TOBACCO.

2. DATÙRA, L. JAMESTOWN-WEED. THORN-APPLE.

Calyx prismatic, 5-toothed, separating transversely above the base in fruit. Corolla funnel-form, with a large and spreading 5-toothed plaited border. Stigma 2-lipped. Pod globular, prickly, 4-valved, 2-celled, with 2 thick placentæ projected from the axis into the middle of the cells, thence connected with the walls by an imperfect false partition, so that the pod is 4-celled except near the top, with the placentæ seemingly borne on the middle of the alternate partitions. Seeds rather large. — Rank weeds, narcotic-poisonous, with an unpleasant odor when bruised, bearing ovate angular-toothed leaves, and large and showy flowers on short peduncles in the forks of the branching stem. (Altered from the Arabic name *Tatorah*.)

1. **D. Stramòonium**, L. (STRAMONIUM.) Leaves ovate, smooth; stem green; corolla white; calyx-teeth pointed; pod prickly. — Var. **TÁTULA**, has the stem and corolla tinged with purple. ① — Waste grounds; a well-known introduced weed, with large flowers (3' long). July — Sept.

3. HYOSCÝAMUS, Tourn. HENBANE.

Calyx bell-shaped or urn-shaped, 5-lobed. Corolla funnel-form, oblique, with a 5-lobed more or less unequal plaited border. Stamens declined. Pod covered by the persistent calyx, 2-celled, opening transversely all round near the apex which falls off like a lid. — Clammy-pubescent rank herbs, with lurid flowers in the axils of angled or toothed leaves. (Name composed of *ύς*, *ύός*, a hog, and *κύαμος*, a bean; the plant said by Ælian to be poisonous to swine.)

1. **H. niger**, L. (BLACK HENBANE.) Leaves clasping, sinuate-toothed and angled; flowers sessile, in one-sided at length recurved leafy spikes; corolla dull yellowish strongly reticulated with purple veins. ① — Introduced, sparingly found by road-sides. July. — A fetid narcotic plant.

4. NICÁNDRA, Adans. APPLE OF PERU.

Calyx 5-parted, 5-angled, the divisions arrow-shaped, enlarged and bladder-like in fruit, inclosing the 3-5-celled globular dry berry. Corolla open-bell-shaped, the plaited border nearly entire. Stamens converging. — An annual smooth herb, with ovate sinuate-toothed or angled leaves, and solitary pale blue flowers on axillary and terminal peduncles. (Named after the poet *Nican-der* of Colophon.)

1. **N. physaloides**, Gært. — Sparingly naturalized near dwellings; a homely plant, native of Peru. August.

5. PHÝSALIS, L. GROUND CHERRY.

Calyx 5-cleft, reticulated and enlarging after flowering, at length much inflated and inclosing the 2-celled globular berry. Corolla spreading-bell-shaped, with a very short tube, marked with 5 concave spots at the base; the plaited border somewhat 5-lobed. Stamens 5, converging; anthers opening lengthwise. — Herbs (in this country), with the leaves often unequally in pairs, and the 1-flowered peduncles extra-axillary, as in the next genus. (Name from $\phi\upsilon\sigma\alpha$, a bladder, alluding to the inflated calyx.)

1. **P. viscòsa**, L. Perennial, clammy-pubescent, low, very diffusely branched, at first erect; leaves ovate or lanceolate-ovate, heart-shaped or acute at the base, somewhat angled-toothed or entire; flowers nodding; corolla pale greenish-yellow with 5 brownish spots at the base; berry (yellowish) wholly inclosed in the much inflated calyx. — Dry fields and hill-sides, common. July, Aug. — Apparently very variable and embracing many nominal species.

2. **P. Philadélfica**, Lam. Annual, smoothish, erect; leaves obliquely ovate, pointed, angled; calyx in fruit open, scarcely inclosing the berry. — Dry river-banks, "New England to Virginia. July. — Flowers larger than in the preceding species, yellow, with brown stripes." *Pursh*.

6. SOLÁNUM, L. NIGHTSHADE.

Calyx chiefly 5-parted, spreading. Corolla mostly wheel-shaped and 5-cleft, plaited in the bud, with the margins of the lobes induplicate. Stamens exerted, converging around the style: filaments very short: anthers opening at the apex by 2 pores. Berry usually 2-celled. — Herbs, or shrubs in warm climates, the larger leaves often accompanied by a smaller lateral (rameal) one;

the peduncles also mostly lateral and extra-axillary. (Name of unknown derivation.)

1. **S. Dulcamàra**, L. (BITTERSWEET.) *Stem somewhat shrubby, climbing, nearly smooth; leaves ovate-heart-shaped, the upper halbert-shaped, or with two ear-like lobes at the base; flowers (purple) in small cymes which become lateral (opposite the leaves); berries oval, scarlet.*—Moist banks and around dwellings, naturalized.

2. **S. nigrum**, L. (COMMON NIGHTSHADE.) *Annual, low, much branched and often spreading, rough on the angles; leaves ovate, wavy-toothed; flowers (very small, white) in small and umbel-like lateral clusters, drooping; berries globular, black.*—Waste places, introduced? July–Aug. — A homely weed, said to be poisonous.

3. **S. Carolinense**, L. (HORSE NETTLE.) *Perennial, low (1° high); stem erect, prickly; leaves ovate-oblong, acute, sinuate-toothed or angled, hoary-pubescent, prickly along the midrib, as also the calyx; flowers (pale blue or white, large) in simple loose racemes; berries globular, orange-yellow.*—Sandy soil, Connecticut to Ohio, southward. June–Aug.

S. TUBEROSUM, L., the POTATO, and **S. MELONGÈNA**, L., the EGG-PLANT, are familiar cultivated representatives of the genus. — Other cultivated plants of the family are **LYCOPÉRSICUM ESCULÉNTUM**, Mill. (the TOMATO), and **CÁPSICUM ÁNNUUM**, L. (CAYENNE or RED PEPPER).

ÁTROPA BELLADÓNNA, L. (DEADLY NIGHTSHADE), a plant with purplish black, very poisonous berries, is rarely found spontaneous around gardens.

LÝCIUM BÁRBARUM, L. (BARBARY BOX-THORN, or MATRIMONY-VINE), a slightly thorny trailing shrubby vine, well known in cultivated grounds, is rarely found spontaneous.

ORDER 78. GENTIANÀCEÆ. (GENTIAN FAMILY.)

Smooth herbs, with a colorless bitter juice, mostly opposite and sessile entire leaves and no stipules, regular flowers with the stamens as many as the lobes of the corolla, which, in the true Gentian Family, are convolute in the bud, a 1-celled ovary with 2 parietal placentæ; the fruit mostly a 2-valved (septicidal) many-seeded pod. — Calyx persistent. Corolla mostly withering-persistent; the stamens inserted on its tube. Seeds anatropous, with a minute embryo in fleshy albumen.

Synopsis.

Suborder I. GENTIANEÆ. THE TRUE GENTIAN FAMILY.

Lobes of the corolla twisted to the right in the bud, with the folds at the sinuses, when present, plaited. Leaves almost always opposite or whorled, entire, those of the stem sessile. Seed-coat cellular.

* Style distinct and slender, deciduous.

1. *SABBATIA*. Corolla wheel-shaped, 5 - 12-parted : anthers curved.
2. *ERYTHRÆA*. Corolla funnel-form, 4 - 5-cleft : anthers spiral.

* * Style (if any) and stigmas persistent : anthers straight.

+ Corolla without glands or spurs.

3. *BARTONIA*. Corolla 4-parted ; no folds or fringes. Leaves minute.
4. *GENTIANA*. Corolla 5-4-lobed, with folds at the sinuses, or fringed on the throat or margins.

+ + Corolla with a glandular spot on each lobe.

5. *HALENIA*. Corolla 4 - 5-cleft, bell-shaped, 4 - 5-spurred.
6. *FRASERA*. Corolla 4-parted, wheel-shaped, regular ; no spurs.

Suborder II. MENYANTHIDEÆ. THE BUCKBEAN FAM.

Lobes of the corolla valvate in the bud, with the edges turned inwards. Stem-leaves alternate, petioled. Seed-coat hard or bony.

7. *MENYANTHES*. Corolla bearded inside. Leaves 3-foliolate.
8. *LIMNANTHEMUM*. Corolla smooth above. Leaves simple, rounded.

Suborder III. OBOLARIEÆ. THE OBOLARIA FAMILY.

Lobes of the corolla imbricated in the bud. Leaves opposite, sessile. Ovules covering the whole inner surface of the ovary !

9. *OBOLARIA*. Calyx 2-leaved. Corolla 4-cleft.

Suborder I. GENTIANEÆ. THE TRUE GENTIAN FAMILY.

1. *SABBÁTIA*, Adans. AMERICAN CENTAURY.

Calyx 5 - 12-parted, the divisions slender. Corolla 5 - 12-parted, wheel-shaped. Stamens 5 - 12 : anthers recurved. Style 2-parted, slender. — Biennials, with slender stems, and cymose-panicled handsome (white or rose-purple) flowers. (Dedicated to *Sabbati*, an early Italian botanist.)

* Corolla 5-parted, or rarely 6-parted.

+ Branches opposite : flowers strictly cymose : peduncles short.

1. *S. lanceolata*, Torr. & Gr. Stem simple, obscurely 4-angled, bearing a flat-topped cyme ; leaves varying from ovate to lanceolate, 3-nerved, acute, or the lower obtuse ; calyx-lobes setaceous-

linear, more than half the length of the white corolla. (*S. corymbosa*, *Baldw.*) — Wet pine barrens, N. Jersey and southward. June — August.

2. **S. angulàris**, Pursh. Stem square and 4-angled, stiff, erect, much branched above, the branches many-flowered; leaves ovate-heart-shaped, clasping; calyx-lobes lanceolate-linear, nearly half the length of the rose-purple (rarely white) corolla. — Dry river-banks, S. New York to Michigan. July. — Stem 1°-2° high, bushy. Corolla showy, with a yellowish-green 5-rayed star in the centre.

+ + Loosely paniced-branched; the branches alternate or forked: peduncles slender, 1-flowered.

3. **S. stellàris**, Pursh. Stem weak, nearly round; leaves oblong or ovate-lanceolate, the uppermost linear; calyx-lobes very narrow, shorter than the corolla, which is bright purple-rose-color, with a yellow star-like eye edged with crimson. — Brackish meadows, Plymouth, Massachusetts, to New Jersey and southward. July, Aug. — Flowers smaller than in No. 2.

4. **S. gràcilis**, Salisb. Stem, branches, and peduncles very slender, diffuse; leaves linear, or the lowest rather oblong, the uppermost thread-form; calyx-lobes setaceous, about the length of the corolla, which is nearly as in No. 3, but with a less bright eye. — Salt-marshes, New Jersey and southward.

* * Corolla 7-12 parted.

5. **S. chloroïdes**, Pursh. Stem nearly round; loosely paniced above; the peduncles slender, 1-flowered; leaves oblong-lanceolate; calyx-lobes linear, half the length of the deep rose-colored (rarely white) corolla. — Borders of brackish ponds, Plymouth, Massachusetts, to New Jersey and southward. July-Sept. — Stem 1°-2° high, slender; the very handsome (9-11-parted) flowers 1½'-2' broad.

S. CALYCOSA, Pursh, is not known in the Northern States.

2. ERYTHRÆA, Pers. CENTAURY.

Calyx 4-5-parted, the divisions slender. Corolla funnel-form or salver-form, with a slender tube and a 4-5-parted limb, which in withering twists on the pod. Anthers exserted, erect, twisting spirally. Style slender, single: stigma capitate or 2-lipped. — Low and small branching annuals, chiefly with rose-purple or reddish flowers; whence the name, from *ἐρυθρός*, *red*. (All our Northern species were doubtless introduced from Europe, and occur only in a few localities.)

1. **E. Centaurium**, Pers. (CENTAURY.) Stem upright, corymbosely branched above; leaves oblong or elliptical, acutish; the

uppermost linear; *cymes clustered, flat-topped, the flowers all nearly sessile*; tube of the (purple-rose-colored) corolla less than twice the length of the oval lobes. — Oswego, New York, naturalized near the old fort. July. — Plant 6' – 12' high: corolla 3" – 4" long.

2. **E. ramosíssima**, Pers., var. **PULCHÉLLA**, Griseb. Low (2' – 6' high); *stem many times forked above and forming a diffuse cyme*; leaves ovate-oblong or oval; *flowers all on short pedicels*; tube of the (pink-purple) corolla thrice the length of the elliptical-oblong lobes. (*E. Muhlenbergii*, Griseb., as to Penn. plant. *Éxacum pulchellum*, Pursh.) — Wet or shady places, Flushing, Long Island, Penn. and southward: certainly introduced, rare. — Flowers smaller than in No. 1.

3. **E. spicàta**, Pers. Stem strictly upright; the *flowers sessile and spiked along one side of the simple or rarely forked branches*; leaves oval and oblong, rounded at the base, acutish; tube of the (rose-colored or whitish) corolla scarcely longer than the calyx, the lobes oblong. (*E. Pickeringii*, Oakes.) — Sandy shore, Nantucket, Oakes. — Plant 6' – 10' high, remarkable for the spike-like arrangement of the flowers.

3. **BARTÒNIA**, Muhl. (CENTAURÉLLA, Michx.)

Calyx 4-parted. Corolla deeply 4-cleft, destitute of glands; fringes, or folds. Stamens short. Pod oblong, pointed with a large persistent at length 2-lobed stigma. Seeds minute. — Small annuals, or biennials, with thread-like stems and little awl-shaped greenish scales in place of leaves. Flowers small, yellowish-white, peduncled. (Dedicated, in the year 1801, to the late *Prof. Barton*, of Philadelphia.)

1. **B. tenélla**, Muhl. Stems (3' – 10' high), branched above; the branches or peduncles mostly opposite, 1 – 3-flowered; lobes of the corolla oblong, acutish; anthers roundish; style none. — Open woods, common. Aug. — Petals rather longer than the calyx, or sometimes twice as long. — *Centaurella Mosèri*, Griseb., is only a variety with the scales and peduncles mostly alternate, and the petals acute.

4. **GENTIÀNA**, L. GENTIAN.

— Calyx 4 – 5-cleft. Corolla 4 – 5-lobed, regular, usually with intermediate plaited folds which bear appendages at the sinuses. Style short or none: stigmas 2, persistent. Pod oblong, 2-valved, many-seeded. — Flowers solitary or cymose, showy. (Name from *Gentius*, king of Illyria, who used some species medicinally.)

§ 1. **AMARELLOIDES**, Torr. & Gr. — *Corolla tubular funnel-form, with-*

out crown or plaited folds, the lobes naked : anthers separate, versatile : pod stalked : seeds wingless : annuals.

1. **G. quinqueflora**, Lam. (FIVE-FLOWERED GENTIAN.) Stem rather slender, branching (1° high); leaves ovate-lanceolate from a partly clasping and heart-shaped base, 3-7-nerved, tipped with a minute point; branches racemed or paniced, about 5-flowered at the summit; lobes of the small 5-cleft calyx awl-shaped-linear; lobes of the pale blue corolla triangular-ovate, bristle-pointed; one fourth the length of the slender obconical tube. — Var. OCCIDENTALIS has linear-lanceolate calyx-lobes which are more leaf-like, and about half the length of the corolla. — Dry hilly woods, Vermont to Penn., and the var. through the Western States. Aug., Sept. — Corolla light purplish-blue, nearly 1' long, in the variety proportionally shorter.

§ 2. **CROSSOPÉTALUM**, Frœl. — *Corolla funnel-form, gland-bearing between the bases of the filaments, without crown or plaited folds, the lobes fringed or toothed on the margins : anthers separate and versatile : pod somewhat stalked : seeds wingless, clothed with little scales : annuals or biennials.*

2. **G. erinita**, Frœl. (FRINGED GENTIAN) Flowers solitary on long peduncles terminating the stem or simple branches; leaves lanceolate or ovate-lanceolate from a partly heart-shaped or rounded base; lobes of the 4-cleft calyx unequal, ovate and lanceolate, as long as the bell-shaped tube of the sky-blue corolla, the lobes of which are wedge-obovate, and strongly fringed around the summit; ovary lanceolate. — Low grounds, N. England to Michigan, rather common. Sept. — Plant 1° - 2° high : the showy corolla 2' long.

3. **G. detónsa**, Fries. (SMALLER FRINGED GENTIAN.) Stem simple, or with slender branches, terminated by solitary flowers on very long peduncles; leaves linear or lanceolate-linear; lobes of the 4- (rarely 5-) cleft calyx unequal, ovate or triangular and lanceolate, pointed; lobes of the sky-blue corolla spatulate-oblong, with ciliate-fringed margins, the fringe shorter or nearly obsolete at the summit; ovary elliptical or obovate. — Moist grounds, Niagara Falls to Wisconsin (Lapham), and northward. Sept. — Resembles the last.

§ 3. **PNEUMONÁNTHE**, Necker. — *Corolla bell-shaped or obconical, 5-lobed, with plaited folds which project into appendages in the sinuses : anthers erect, often converging or cohering with each other : pod finally stalked : seeds commonly winged : perennials.*

* Flowers nearly sessile, clustered, rarely solitary, 2-bracteolate.

4. **G. Pneumonánthe**, L. (MARSH GENTIAN.) Stem slender, erect; flowers terminal and axillary, sometimes solitary; leaves linear, obtuse, nearly smooth; calyx-lobes linear, about the length of the tube and half the length of the tube of the corolla; lobes of the club-shaped-funnel-form open (deep blue) corolla ovate, com-

monly mucronate; *appendages short, triangular and entire*; anthers united; seeds narrowly winged. (*G. Saponària*, var. *lineàris*, *Griseb.* partly.) — Swamps near Portland, Maine: mountains of N. New York, and northward. Aug.

5. **G. Saponària**, L. (SOAPWORT GENTIAN.) Stem erect or ascending, often roughish above; the flowers clustered at the summit and more or less so in the axils; *leaves ovate-lanceolate, oblong, or lanceolate-obovate, with rough margins*, narrowed at the base; calyx-lobes linear or spatulate, acute, equalling or exceeding the tube, half the length of the corolla; *lobes of the club-bell-shaped blue corolla roundish-ovate, mostly obtuse, erect or converging, or sometimes expanding, more or less longer than the conspicuous 2-cleft and minutely toothed appendages*; anthers united; *seeds acute, narrowly winged*. (*G. Catesbàei*, *Walt.*) — Var. 1. *FRÆLICHII*, *Torr. & Gr.* Slender and wand-like, smooth; leaves linear, elongated (3' long, 4" wide), acutish; appendages of the corolla less cleft. (*G. lineàris*, *Fræl.* *G. rubricaulis*, *Schwein.*) — Var. 2. *PUBÉRULA*, *Torr. & Gr.* Rigid, roughish with a minute pubescence; leaves varying from oblong-lanceolate to narrowly-linear, usually short, often broader next the base; corolla open; anthers soon separating; lobes of the corolla acutish, fully twice the length of the appendages. (*G. puberula*, *Michx.*) — Woods, S. New York (*Herb. Schwein.*) and New Jersey, rare; common southward: the var. 1 in mountain bogs and glades from Penn. southward: var. 2 in dry barrens and prairies; Ohio and westward. Sept. — A variable species; the primary form resembling *G. Andrewsii*, from which the manifest corolla-lobes distinguish it; the var. 1 too near No. 4; while the var. 2, on account of its rigid foliage, roughness, and open corolla larger in proportion, ordinarily appears like a very distinct species.

6. **G. ochroleuca**, *Fræl.* (YELLOWISH-WHITE GENTIAN.) Stems ascending, mostly smooth; the flowers in a dense terminal cluster and often also in axillary clusters; *leaves obovate-oblong*, the lowest broadly obovate and obtuse, the uppermost somewhat lanceolate, *all narrowed at the base*; *calyx-lobes linear*, unequal, much longer than its tube, *rather shorter than the greenish-white open corolla*, which is painted inside with green veins and lilac-purple stripes; its lobes ovate, very much exceeding the small and sparingly toothed oblique appendages; anthers separate; *pod included* in the persistent corolla; *seeds entirely wingless!* — Dry grounds, S. Penn. (rare), and common through the middle and low country of the Southern States. Sept., Oct. — Very different from the next, which *Grisebach* confounded with it.

7. **G. álba**, *Muhl. Cat.!* (WHITISH GENTIAN.) Stems upright, stout, very smooth; flowers closely sessile and much crowded in a dense terminal cluster, and sometimes also clustered in the upper

axils; *leaves ovate-lanceolate from a heart-shaped closely clasping base, gradually tapering to a point; calyx-lobes ovate, shorter than the top-shaped tube, and many times shorter than the tube of the corolla, reflexed-spreading; corolla white more or less tinged with greenish or yellowish, inflated-club-shaped, at length open, its short and broad ovate lobes nearly twice the length of the toothed appendages; anthers at first united; pod nearly included; seeds broadly winged.* (*G. flavida*, Gray, in *Sill. Jour. (n. ser.)* 1. p. 80. *G. ochroleuca*, Sims., *Darlingt., Griseb.* in part, &c.) — Glades and low grounds, S. W. New York and Penn. to Wisconsin. Aug. — Although the name given by Muhlenberg (which I have ascertained to belong here) is not the most appropriate, and was not published with a character, yet I revive it for this truly distinct but greatly misunderstood species, which is nearest to No. 8 in the foliage, calyx, and seeds, while the corolla is more like No. 5, but with the color of No. 6.

8. **G. Andréwsii**, Griseb. (CLOSED GENTIAN.) Stems upright, smooth; flowers closely sessile in terminal and upper axillary clusters; *leaves ovate-lanceolate and lanceolate from a narrower base, gradually pointed, rough-margined; calyx-lobes ovate or oblong, recurved, shorter than the top-shaped tube, and much shorter than the inflated club-shaped blue corolla, which is closed at the mouth, with the proper lobes obliterated, the apparent lobes consisting of the broad fringe-toothed and notched appendages; anthers united; pod finally protruded beyond the persistent corolla; seeds broadly winged.* (*G. Saponaria*, Fræl., &c., not of L.) — Moist rich soil, common from New England to Wisconsin. Sept. — Corolla 1' or more long, blue fading to purplish, striped inside, the folds whitish, the orifice never expanding.

* * *Flower solitary and terminal, peduncled.*

9. **G. angustifolia**, Michx. (NARROW-LEAVED GENTIAN.) Stems slender and ascending (6' - 15' high), simple; leaves linear or the lower oblanceolate, rigid; corolla funnel-form, azure-blue (2' long), about twice the length of the thread-like calyx-lobes, its ovate spreading lobes twice the length of the cut-toothed appendages; the tube striped with yellowish. — Moist pine barrens, New Jersey and southward. Sept. - Nov.

5. HALÈNIA, Borkh. SPURRED GENTIAN.

Calyx 4 - 5-parted. Corolla short bell-shaped, 4 - 5-cleft, without folds or fringe, prolonged at the base underneath the erect lobes into spurs, which are glandular in the bottom. Stigmas 2, sessile, persistent on the oblong flattish pod. Seeds rather numerous, oblong. — Small and upright herbs, with yellowish or

purplish paniced-cymose small flowers. (Name of unknown meaning.)

1. **H. defléxa**, Griseb. Biennial, leafy (1° high), simple or branched above; leaves 3-5-nerved, the lowest oblong-spatulate and petioled; the others oblong-lanceolate, acute, nearly sessile; spurs cylindrical, obtuse, curved and descending, half the length of the acutely 4-lobed corolla. (*Swertia corniculata*, L. partly.) — Damp woods, in the northern parts of Maine, New York, and Michigan. July, August.

6. FRASÈRA, Walt. AMERICAN COLUMBO.

Calyx deeply 4-parted. Corolla deeply 4-parted, wheel-shaped, each division with a glandular and fringed pit on the upper side. Filaments awl-shaped, usually somewhat monadelphous at the base: anthers oblong, versatile. Style persistent: stigma 2-lobed. Pod oval, flattened, 4-14-seeded. Seeds large and flat, wing-margined. — Tall and showy herbs, with upright and mostly simple stems, bearing whorled leaves and numerous peduncled flowers in open cymes, which are disposed in an ample elongated panicle. (Dedicated to *John Fraser*, a well-known and indefatigable collector in this country towards the close of the last century.)

1. **F. Caroliniénsis**, Walt. Smooth, tall (3°-8° high); leaves mostly in fours, lance-oblong, the lowest spatulate (1° long), veiny; panicle pyramidal, loosely-flowered; divisions of the corolla oblong, mucronate, longer than the narrowly lanceolate calyx-lobes, the large and round gland on their middle bordered by a strong and even fringe, pod much flattened parallel with the flat valves. ♀ ? — Rich dry soil, S. W. New York to Wisconsin and southward. July. — Root very thick and bitter. Corolla 1' broad, light greenish-yellow with brown-purple dots.

Suborder II. MENYANTHIDÈÆ. THE BUCKBEAN FAM.

7. MENYÁNTHES, Tourn. BUCKBEAN.

Calyx 5-parted. Corolla short funnel-form, 5-parted, deciduous, the whole upper surface white-bearded. Style slender, persistent: stigma 2-lobed. Pod bursting somewhat irregularly, many-seeded. Seed-coat hard, smooth, and shining. — A perennial herb, with a thickish creeping rootstock, sheathed by the membranous bases of the long petioles, which bear 3 oval or oblong leaflets at the summit; the flowers racemed on the naked scape,

white or slightly reddish. (The ancient Theophrastian name, probably from μήν, *month*, and άνθος, *a flower*, some say from its flowering for about that time.)

1. **M. trifoliàta**, L. — Bogs, very common northward. May, June. — Scape 1° high : flowers handsome.

8. LIMNÁNTHÈMUM, Gmelin. FLOATING HEART.

Calyx 5-parted. Corolla almost wheel-shaped, 5-parted, the divisions fringed or bearded at the base or margins only, bearing a glandular appendage near the base. Style short or none : stigma 2-lobed, persistent. Pod few - many-seeded, at length bursting irregularly. Seed-coat hard. — Perennial aquatics, with rounded floating leaves on very long petioles, which, in most species, bear near their summit the umbel of flowers with a cluster of short and spur-like roots, sometimes shooting forth new leaves and so spreading by a sort of proliferous stolons. (Name compounded of λίμνη, *a marsh or pool*, and άνθεμον, *a blossom*, from the situations where they grow.)

1. **L. lacunòsum**, Griseb. (partly). Leaves round-heart-shaped, thickish ; lobes of the (white) corolla broadly oval, naked, except the crest-like yellowish gland at their base, twice the length of the lanceolate calyx-lobes ; style none ; seeds perfectly smooth and even. (*Villársia lacunosa*, *Vent.* *V. cordàta*, *Ell.*) — Shallow ponds, from Maine and E. New York to New Jersey and southward. June - Sept. — Leaves 1' - 2' broad, entire, on petioles 4' - 15' long, according to the depth of the water. — *L. trachyspèrmum* of the South has roughened seeds, as its name denotes, and is entirely distinct.

Suborder III. OBOLARIÈÆ. THE OBOLARIA FAMILY.

9. OBOLÀRIA, L. OBOLARIA.

Calyx of 2 spatulate spreading sepals, resembling the leaves. Corolla tubular-bell-shaped, withering-persistent, 4-cleft ; the lobes oval-oblong, or with age spatulate, imbricated in the bud. Stamens inserted at the sinuses of the corolla, short. Style short, persistent : stigma 2-lipped. Pod ovoid, 1-celled, but by intrusion of the lining half 2 - 4-celled ; the seeds covering the whole face of the walls : seed-coat cellular. — A low and very smooth purplish-green perennial, with a simple or sparingly branched stem, opposite wedge-obovate leaves ; the dull white or purplish

flowers solitary or in clusters of three, terminal and axillary, nearly sessile. (Name from ὀβολός, a small Greek coin, to which, however, the leaves of this plant certainly bear no manifest resemblance.)

1. **O. Virgínica**, L. (*Gray, Chlor. Bor.-Am., t. 3.*) — Rich soil, in woods, from New Jersey to Ohio and southward, rare, often nearly concealed by dead leaves. April, May. — Plant 4' - 8' high.

ORDER 79. **APOCYNÀCEÆ.** (DOGBANE FAMILY.)

Plants with milky acrid juice, entire chiefly opposite leaves without stipules, regular 5-merous and 5-androus flowers, with the 5 lobes of the corolla convolute and twisted in the bud, the filaments distinct, inserted on the corolla, and the pollen granular, the calyx entirely free from the two ovaries, which are usually quite distinct, though their styles are coalescent. — Seeds amphitropous or anatropous, with a large straight embryo in sparing albumen. — Chiefly tropical, represented in the Northern States only by the genus

1. **APÓCYNUM**, Tourn. DOGBANE. INDIAN HEMP.

Calyx 5-parted, the lobes acute. Corolla bell-shaped, 5-cleft, bearing 5 triangular appendages in the throat opposite the lobes. Stamens inserted on the very base of the corolla, shorter than the arrow-shaped anthers, which converge around the ovoid obscurely 2-lobed stigma, and are slightly adherent to it by their inner face. Fruit of 2 long and slender follicles. Seeds provided with a long tuft of silky down at the apex (*coma*). — Perennial herbs, not climbing, with mucronate-pointed leaves, a tough fibrous bark, and small and pale cymose flowers on short pedicels. (An ancient Greek name, composed of ἀπό, *from*, and κύων, *a dog*, to which the plant was thought to be poisonous.)

1. **A. androsæmifolium**, L. (SPREADING DOGBANE.) Smooth, branched above, the *branches diverging; forking; leaves ovate, distinctly petioled; cymes loose, spreading, mostly longer than the leaves; corolla* (pale rose-color) *open-bell-shaped, with revolute lobes, the tube much longer than the ovate pointed divisions of the calyx.* — Varies, also, with the leaves downy underneath. — Borders of

copses, common. June, July. — Corolla $\frac{1}{2}$ broad. Pods 3' - 4' long, pendent.

2. **A. cannabinum**, L. (INDIAN HEMP.) Stem and branches *upright or ascending*, terminated by *erect and close many-flowered cymes*, which are usually shorter than the leaves; *corolla* (greenish-white) *with nearly erect lobes, the tube not longer than the lanceolate divisions of the calyx*. — Var. 1. **GLABÉRRIMUM**, DC. Entirely smooth; leaves oblong or oblong-lanceolate, on short but manifest petioles, obtuse or rounded, or the upper acute at both ends. — Var. 2. **PUBÉSCENS**, DC. Leaves oblong, oval, or ovate, downy underneath or on both sides, as well as the cymes. (*A. pubescens*, R. Br.) — Var. 3. **HYPERICIFOLIUM**. Leaves more or less heart-shaped at the base and on very short petioles, commonly smooth. (*A. hypericifolium*, Ait.) — Copses and river-banks, common. July, Aug. — Plant 2^o - 3^o high, much more upright than the last, the flowers scarcely half the size: the different varieties run into one another greatly.

ORDER 80. ASCLEPIADACEÆ. (MILKWEED FAM.)

Plants with milky juice and opposite or whorled (rarely scattered) entire leaves, follicular pods, seeds, &c., just as in the last family; from which they differ in the commonly valvate corolla, and singular connection of the anthers with the stigma, the cohesion of the pollen into wax-like masses, &c., as explained under the typical genus.

Synopsis.

- * Filaments monadelphous: anthers 2-celled, vertical: pollen-masses 10, suspended in pairs from 5 glands of the stigma.
- 1. **ASCLEPIAS**. Calyx and corolla reflexed, deeply 5-parted. Crown of 5 hooded lobes (nectaries, L.) with an incurved horn rising from the base of each.
- 2. **ACERATES**. Calyx and corolla reflexed-spreading. Lobes of the crown concave, hornless.
- 3. **ENSLÉNIA**. Calyx and corolla erect. Lobes of the crown flat, hornless, abruptly tipped with a 2-parted awn.
- * * Filaments monadelphous: anthers 2-celled, opening transversely: pollen-masses 10, horizontal.
- 4. **GONOLOBUS**. Corolla convolute in the bud. Crown a small wavy-lobed ring.
- * * * Filaments distinct: pollen-masses granular.
- 5. **PERIPLOCA**. Corolla flat. Crown 5-cleft, 5-awned. Anthers bearded.

1. ASCLÉPIAS, L. MILKWEED. SILKWEED.

Calyx 5-parted, persistent, the divisions small, spreading. Corolla deeply 5-parted; the divisions valvate in the bud, reflexed, deciduous. *Crown* of 5 hooded lobes (nectaries, *L.*) seated on the tube of stamens, each containing a horn-like incurved process. Stamens 5, inserted on the base of the corolla: filaments united in a tube (*gynostegium*) which incloses the pistil: anthers adherent to the stigma, with 2 vertical cells opening lengthwise, tipped with a membranaceous appendage, each cell containing a flattened pear-shaped and waxy pollen-mass; the two contiguous pollen-masses of adjacent anthers forming pairs which hang by their slender summits from the descending processes of 5 cloven glands that grow on the angles of the stigma (usually extricated from the cells by the agency of insects, and directing copious pollen-tubes into the point where the stigma joins the apex of the styles). Ovaries 2, tapering into very short styles: a large depressed 5-angled fleshy stigma common to the two. Follicles 2, one of them often abortive, soft, ovate or lanceolate. Seeds anatropous, flat, margined, downwardly imbricated all over the large placenta which separates from the suture at maturity, furnished with a long tuft of silky hairs (*coma*) at the hilum. Embryo large, with foliaceous cotyledons in thin albumen. — Perennial upright herbs, with thick and deep roots: peduncles terminal or mostly lateral and between the petioles, bearing simple many-flowered umbels. Leaves usually transversely veiny. (The Greek name of *Æsculapius*, to whom the genus is dedicated.)

* *Pods clothed with soft spinous projections.*

1. **A. Cornūti**, Decaisne. (COMMON MILKWEED or SILKWEED.) Stem large and stout, somewhat branched; *leaves ovate-elliptical*, with a slight point, *spreading, contracted at the base into a short but distinct petiole, minutely velvety-downy underneath* as well as the peduncles and branches; divisions of the corolla ovate (greenish-purple), about one fourth the length of the very numerous pedicels; *hoods of the crown ovate, obtuse, with a lobe or tooth on each side of the short and stout claw-like horn; pods ovate, covered with weak spines and woolly.* (*A. Syriaca, L.*, but the plant is a native of this country only.) — Rich soil, fields, &c., common. July. — Plant 3°–4° high; leaves 4'–8' long, pale.

2. **A. Sullivántii**, Engelm. Mss. (SMOOTH MILKWEED.) *Very smooth throughout, tall; leaves ovate-oblong from a heart-shaped*

sessile base, erect; hoods of the crown obovate, entire, obtusely 2-eared at the base on the outside, with a slender but obtuse claw-like horn; pods ovate-lanceolate, with small and scattered warty spines chiefly on the beak. — Near Columbus, Ohio, *Sullivant*. (Also Missouri, *Engelmann*.) July. — Resembles No. 1 in appearance, petals, &c.; the hoods larger, and exceeding the anthers by one half.

* * *Pods not warty-roughened or prickly.*

+ *Leaves all opposite, or the middle ones sometimes in fours.*

+ *Stems simple or nearly so.*

3. **A. phytolaccoides**, Pursh. (POKE-MILKWEED.) Stem tall, smooth; *leaves broadly ovate, or the upper oval-lanceolate and pointed at both ends, short-petioled, smooth or slightly downy underneath; pedicels loose and nodding, numerous, elongated and slender, nearly as long as the peduncle, many times longer than the ovate-oblong divisions of the (greenish) corolla; hoods of the crown (white) truncate, the margins 2-toothed at the summit, the horn with a long projecting awl-shaped point; pods minutely downy.* — Moist copses, not rare. June. — Stem 3°–5° high, above marked with 2 opposite lines of minute pubescence, as in most of the following: peduncles 1'–3' long. Leaves 5'–8' long.

4. **A. purpurascens**, L. (PURPLE MILKWEED.) Stem rather slender (2°–3° high); *leaves elliptical or ovate-oblong, the lower mucronate, the upper taper-pointed, minutely velvety-downy underneath, smooth above, contracted at the base into a short petiole; pedicels shorter than the mostly terminal peduncle, about twice the length of the dark purple lanceolate-ovate divisions of the corolla; hoods of the crown oblong, abruptly narrowed above; the horn broadly scythe-shaped, with a narrow and abruptly inflexed horizontal point; pods smooth.* (*A. amœna*, L., *Michx.*) — Border of copses, N. England to Michigan, not common eastward. July. — Flowers as large as in No. 1: peduncle and pedicels downy along one side.

5. **A. variegata**, L. (VARIEGATED MILKWEED.) *Nearly smooth (1°–2° high); leaves ovate, oval, or obovate, somewhat wavy, mucronate, contracted into short petioles; pedicels (numerous and crowded) and peduncle short, downy; divisions of the corolla ovate (white); hoods of the crown orbicular, entire, the horn semilunar with a horizontal point; pods slightly downy.* (*A. nivea*, L., in part. *A. hybrida*, *Michx.*) — Dry woods, S. New York to Penn., Ohio, and southward. July. — Remarkable for its very compact umbels of nearly white flowers, often purple in the centre. Leaves 4–5 pairs, the middle ones sometimes whorled; veins often purple. Peduncles 1–3, usually ½' long.

6. **A. quadrifolia**, Jacq. (FOUR-LEAVED MILKWEED.) *Nearly smooth (10'–18' high), slender; leaves ovate or sometimes ovate-lanceolate, petioled, usually taper-pointed, the middle ones in whorls of*

four; *pedicels capillary*; divisions of the corolla oblong (pale pink); hoods of the white crown elliptical-ovate, the incurved horn short and thick; pods linear-lanceolate, smooth. — Dry woods and hills, common. June. — Leaves 2' - 4' long, variable on the same plant, sometimes all opposite, rarely with two whorls. Umbels 2-5; peduncles 1' - 1½' long: the handsome flowers barely half as large as in Nos. 5 and 1.

7. **A. obtusifolia**, Michx. (WAVY-LEAVED MILKWEED.) Smooth and glaucous; *stem* simple (2° - 3° high), bearing a single long-peduncled terminal umbel; *leaves* oblong or ovate-elliptical, very obtuse but mucronate, sessile and partly clasping by a heart-shaped base, the margins very wavy; *pedicels* very numerous, elongated; divisions of the corolla oblong (greenish-purple); hoods of the crown truncate and somewhat toothed at the summit, shorter than the slender awl-pointed horn; pods smoothish. — Sandy woods and fields, not rare, especially southeastward. July. — Leaves 3' - 5' long. Flowers larger than in No. 1.

8. **A. rubra**, L. (RED-FLOWERED MILKWEED.) Smooth, slender (1° - 2° high), bearing 1 - 3 few-flowered umbels at the naked summit of the stem; *leaves* ovate-lanceolate or oblong-ovate, tapering to a very sharp point, rounded or slightly heart-shaped at the base, very short-petioled; divisions of the corolla lanceolate, acute (reddish-purple); hoods of the crown oblong, acutish (purple tinged with orange), with an awl-shaped and slightly incurved short horn; pods smooth. (*A. laurifolia*, Michx. *A. acuminata*, Pursh.) — Low grounds, New Jersey, Penn., and southward, rare. July. — Leaves 2' - 4' long, roughiliate. Umbel mostly solitary on a peduncle 2' - 3' long.

9. **A. paupercula**, Michx. (SLENDER LONG-LEAVED MILKWEED.) Very smooth; *stem* wand-like, slender (2° - 3° high), bearing 1 - several few-flowered umbels at the summit of a naked and usually elongated terminal peduncle (rarely with one or two lateral ones); *leaves* linear, much elongated, slightly petioled; divisions of the (purple) corolla linear-oblong, half the length of the pedicels; hoods of the crown (orange-yellow) spatulate-oblong, much longer than the awl-shaped incurved horn. — Wet pine barrens, New Jersey, rare, and southward. July, Aug. — Leaves 5' - 10' long, 1" - 6" broad; the few but showy flowers larger than in No. 1.

+++ *Stem paniculately branching.*

10. **A. incarnata**, L. (SWAMP MILKWEED.) Smooth, or nearly so, the stem with two downy lines above and on the branches and peduncles; *leaves* oblong-lanceolate, acute or pointed, obtuse at the base, distinctly petioled; umbels many-flowered, somewhat panicled, on peduncles half the length of the leaves; divisions of the corolla ovate, reddish-purple; hoods of the crown (flesh-color) ovate, about the length of the ascending or scythe-form awl-shaped horns;

Pods veiny, smooth. — Varies with the leaves a little heart-shaped at the base, and, in var. *PÚLCHRA*, with broader and shorter-petioled leaves, more or less hairy as well as the stem. (*A. pulchra*, *Willd.*)—Wet grounds; the smooth form very common northward; the hairy var. southward. July, Aug. — Plant 2°–3° high, very leafy; the milky juice scanty.

++ *Leaves alternate-scattered, or the lowest opposite: juice not milky.*

11. **A. tuberòsa**, L. (BUTTERFLY-WEED. PLEURISY-ROOT.) Roughish-hairy; stems erect or ascending, very leafy, usually divaricately branching at the summit, and bearing the umbels in a terminal corymb; leaves varying from linear to oblong-lanceolate, sessile or slightly petioled; divisions of the corolla ovate-oblong (greenish-orange); hoods of the crown narrowly oblong, bright orange, scarcely longer than the nearly erect and slender awl-shaped horns; pods hoary. (*A. decumbens*, L.) — Dry hills and fields, common, especially southward. July–Sept. — Plant 1°–2° high, leafy to the summit, usually with numerous corymbed short-peduncled umbels of very showy flowers, which are rather smaller than in No. 1. Root thick and fleshy, as in most species.

+++ *Leaves nearly all whorled, crowded.*

12. **A. verticillàta**, L. (WHORLED MILKWEED.) Smoothish; stems slender, simple or sparingly branched, minutely hoary in lines, very leafy to the summit; leaves very narrowly linear, with revolute margins; umbels small, lateral and terminal; divisions of the corolla ovate (greenish-white); hoods of the crown roundish-oval, about half the length of the incurved hooked-claw-shaped horns; pods very smooth. — Dry hills, from New England to Wisconsin, especially southward. July–Sept. — Leaves 2'–3' long, scarcely 1" wide, 3–6 in a whorl, or the lowest and uppermost nearly opposite. Flowers small.

2. ACERÀTES, Ell. GREEN MILKWEED.

Nearly as in *Asclepias*; but the pollen-masses more slender, with longer stalks, and the concave upright hoods of the crown destitute of a horn; whence the name, from a *privative*, and *képas*, -*aros*, a horn.

1. **A. viridiflòra**, Ell. (GREEN-FLOWERED MILKWEED.) Downy-hoary; stems low and stout, ascending; leaves varying from oval or obovate to lanceolate or almost linear, slightly petioled, mucronate-acute or obtuse, thick, at length smoothish; umbels nearly sessile, densely many-flowered, globose, lateral; divisions of the corolla oblong; hoods of the crown oblong, strictly erect, sessile at the base of the tube of filaments, shorter than the anthers; pods nearly smooth. (*Asclèpias viridiflòra*, *Pursh.* *A. lanceolàta*, *Ives.* *A. obo-*

vata, *Ell.*) — Dry hills and sandy fields, Massachusetts to Wisconsin, common southward. July – Sept. — Flowers greenish, when expanded about the length of the pedicel. Leaves singularly variable in form.

2. **A. longifolia**, *Ell.* (LONG-LEAVED GREEN MILKWEED.) Minutely hoary; *stem slender*, upright; leaves elongated-linear, roughish; *umbels peduncled, open*, many-flowered; divisions of the corolla ovate-oblong, several times shorter than the pedicels; *hoods of the crown short and rounded, raised on the tube of filaments*; pods smooth. — Moist places, Ohio and southward. June, July. — Leaves 5' – 7' long, $\frac{1}{4}$ ' – $\frac{1}{2}$ ' wide. Flowers half as large as in the last, tinged with yellowish and purplish.

3. ENSLÉNIA, Nutt. ENSLENIA.

Calyx 5-parted. Corolla 5-parted; the divisions erect, ovate-lanceolate. Crown of 5 free membranaceous leaflets, which are truncate or obscurely lobed at the apex where they bear a pair of flexuous awns united at their base. Anthers nearly as in *Asclepias*: pollen-masses oblong, obtuse at both ends, fixed below the apex to the descending processes of the gland. Pods oblong-lanceolate, smooth. Seeds with a silky tuft, as in *Asclepias*. — A perennial twining herb, smooth, with opposite heart-ovate and pointed long-petioled leaves, and small whitish flowers in raceme-like clusters on slender axillary peduncles. (Dedicated to *A. Enslén*, an Austrian botanist who collected in the Southern United States early in this century.)

1. **E. albida**, Nutt. — River-banks, Ohio and southward, common. July – Sept. — Climbing 8° – 12° high: leaves 3' – 5' wide.

4. GONÓLOBUS, Michx. GONOLOBUS.

Calyx 5-parted. Corolla 5-parted, wheel-shaped, sometimes reflexed-spreading; the lobes convolute in the bud. Crown a small and fleshy wavy-lobed ring in the throat of the corolla. Anthers horizontal, partly hidden under the flattened stigma, opening transversely. Pollen-masses 5 pairs, horizontal. Pods turgid, more or less ribbed, and armed with soft warty processes. Seeds with a silky tuft. — Twining herbaceous or shrubby plants, with opposite heart-shaped leaves, usually hairy, and racemed or cymbed greenish or dingy purple flowers, on peduncles rising from between the petioles. (Name composed of *γωνος*, an angle, and *λοβός*, a pod, from the ribbed follicles.)

1. **G. hirsûtus**, Michx. Minutely pubescent, with longer scattered hairs interspersed; leaves ovate-heart-shaped, obtusish or pointed; *peduncles few-flowered, shorter than the petioles*; pedicels very short; *bractlets awl-shaped*; lobes of the corolla oblong, minutely papillose-hairy outside (dingy purple above); *Pods armed with spine-like soft processes*.—Rich river-banks, W. Pennsylvania and southward. July.

2. **G. macrophýllus**, Michx. Leaves broadly ovate-heart-shaped, pointed; *peduncles and pedicels longer than the petioles*; *bractlets linear*; lobes of the corolla linear or narrowly oblong, downy outside (dingy purple above); *Pods ribbed-angled*.—Shady banks, Pennsylvania and southward. July.—Hairy, like the last; the leaves 3'–6' wide.

5. PERÍPLOCA, L. PERIPLOCA.

Calyx 5-parted. Corolla 5-parted, wheel-shaped, with 5 awned scales in the throat. Filaments distinct: anthers coherent with the apex of the stigma, bearded on the back: pollen-masses 5, each of 4 united, singly affixed directly to the glands of the stigma. Stigma hemispherical. Pods smooth, widely divergent. Seeds with a silky tuft.—Twining shrubby plants, with smooth opposite leaves, and paniced-cymose flowers. (Name from περιπλοκή, a coiling round, in allusion to the twining stems.)

1. **P. Græca**, L. Leaves ovate or ovate-lanceolate, shorter than the loosely-flowered cymes; divisions of the brownish-purple corolla linear-oblong, very hairy above, the margins revolute.—Introduced from Europe, and sparingly naturalized near Rochester, &c., in W. New York. Aug.

ORDER 81. OLEACEÆ. (OLIVE FAMILY.)

Trees or shrubs, with opposite and pinnate or simple leaves, a 4-cleft (or sometimes obsolete) calyx, a regular 4-cleft or nearly or quite 4-petalous corolla which is valvate in the bud, sometimes apetalous, but only 2, or rarely 3, stamens, and a 2-celled ovary with 2 suspended ovules in each cell.—Seeds anatropous, with a large straight embryo usually in hard fleshy albumen.—A small family of which the OLIVE is the type, also represented by the LILAC (*Syrínga vulgàris*, *S. Pérsica*, &c.) and the PRIVET in common cultivation, and by two indigenous genera, of which the ASH

constitutes the distinct tribe FRAXINEÆ, remarkable for its 2-4-petalous or apetalous and polygamous flowers, while CHIONANTHUS has seeds without albumen!

Synopsis.

- * Fruit a drupe or berry. Leaves simple.
1. **LIGUSTRUM**. Calyx 4-toothed. Corolla funnel-form, 4-lobed.
 2. **CHIONANTHUS**. Calyx 4-parted, small. Corolla of 4 almost distinct long petals.
- ** Fruit a kind of samara. Leaves odd-pinnate.
3. **FRAXINUS**. Calyx 4-cleft or none. Corolla of 2 or 4 petals, or often none.

1. **LIGUSTRUM**, Tourn. PRIVET.

Calyx short tubular, 4-toothed, deciduous. Corolla funnel-form, 4-lobed; the lobes ovate, obtuse. Stamens 2, on the tube of the corolla, included. Stigma 2-cleft. Berry spherical, 2-celled, 2-1-seeded. — Shrubs with entire leaves on short petioles, and small white flowers in terminal thyrsoid panicles. (The classical name.)

1. **L. vulgare**, L. (COMMON PRIVET or PRIM.) Leaves elliptical-lanceolate, smooth, thickish, deciduous. — Introduced from Europe, used for low hedges: naturalized by the agency of birds in E. New England and New York. May, June. — Berries black.

2. **CHIONANTHUS**, L. FRINGE-TREE.

Calyx 4-parted, very small, persistent. Corolla of 4 long and linear petals which are barely united at the base. Stamens 2, on the very base of the corolla, very short. Stigma notched. Drupe fleshy, globular, becoming 1-celled and 1-seeded. Albumen none. Cotyledons large and thick. — Low trees or shrubs, with deciduous and entire petioled leaves, and delicate flowers in loose and drooping graceful racemes or panicles. (Name from *χιών*, snow, and *άνθος*, blossom, alluding to the light snow-white clusters of flowers.)

1. **C. Virginica**, L. Leaves oval, oblong, or obovate-lanceolate, smoothish or rather downy, veiny; flowers on slender pedicels; drupe purple, with a bloom. — River-banks, S. Pennsylvania and southward: very ornamental in cultivation. June. — Petals about 1' long, narrowly linear, acute, rarely 5-6 in number.

3. FRÁXINUS, Tourn. Ash.

Flowers polygamous or diœcious. Calyx small and 4-cleft, or obsolete. Petals 4, slightly cohering in pairs at the base, or only 2, oblong or linear, or commonly altogether wanting in the North American species. Stamens 2, sometimes 3 (rarely 4). Style single: stigma 2-cleft. Fruit a 1-2-celled samara, or key, flattened, winged at the apex, 1-2-seeded. Cotyledons elliptical: radicle slender. — Light timber-trees, with petioled pinnate leaves of 3-15 either toothed or entire leaflets; the small flowers in crowded panicles or racemes from the axils of last year's leaves. (The classical Latin name, thought to be derived from *φράξις*, a separation, from the facility with which the wood splits.)

* *Calyx present: corolla wanting.*

1. **F. Americàna**, L. (WHITE ASH.) *Leaflets 7-9, stalked, oblong-ovate, pointed, nearly entire, glaucous underneath; at length smooth except on the veins beneath; samara spatulate-linear, obtuse, with a long narrowed base.* (*F. acuminàta*, Lam.) — Rich woods, common. April, May. — A large forest-tree, with gray furrowed and cracked bark, and smooth greenish-gray branchlets: buds rust-colored.

2. **F. pubéscens**, Walt. (RED ASH.) *Leaflets 7-9, velvety-downy underneath, as well as the petioles and usually the young branchlets, lanceolate or ovate-lanceolate, pointed, somewhat serrate, stalked; samara narrowly lanceolate-spatulate, obtuse usually with an abrupt point, tapering at the base.* (*F. tomentòsa*, Michx.) — Woods, along streams, New England to Ohio and southward. May. — A large tree, variable in foliage and pubescence; the wood less valuable than that of No. 1.

3. **F. juglandifòlia**, Lam. (GREEN OR YELLOW ASH.) *Leaflets 7-9, ovate, serrate, smooth, rather downy on the veins underneath, stalked; samara wedge-lanceolate, obtuse, scarcely tapering at the base.* (*F. víridis*, Michx.) — Wet woods, Maine to Ohio and southward. May. — Wood brittle and less valuable than in No. 1: branchlets greenish.

4. **F. quadrangulàta**, Michx. (BLUE ASH.) *Leaflets 5-9, lanceolate-elliptical, serrate, pointed at both ends, almost sessile, downy underneath; the smooth branchlets with 4 winged angles; samara spatulate-oblong, obtuse at both ends.* — Wet woods, from Ohio westward and southward. May. — A large tree, yielding valuable timber.

* * *Calyx and corolla both wanting.*

5. **F. sambucifòlia**, Lam. (BLACK ASH.) *Leaflets 9-11, sessile by an obtuse base, elliptical-lanceolate, pointed, more or less*

hairy on the veins beneath; samara elliptical-oblong, very obtuse at both ends.—Swamps, Maine to Wisconsin, very common northward. A slender tree, 40°–60° high, with a very tough wood (used for hoops, baskets, &c.). Branches ash-color, with dark dots: the bruised leaves exhale the odor of Elder.

Division III. APÉTALOUS EXÓGENOUS PLANTS.

Corolla none; the floral envelopes in a single series (calyx), or sometimes wanting altogether.

ORDER 82. ARISTOLOCHIACEÆ. (BIRTHWORT FAM.)

Climbing shrubs or herbs, with perfect flowers, the conspicuous lurid calyx (valvate in the bud) coherent below with the 6-celled ovary, which forms a many-seeded 6-celled pod or berry in fruit. Stamens 6–12, more or less united with the style: anthers adnate, extrorse. — Leaves petioled, mostly heart-shaped and entire. Seeds anatropous, with a large fleshy raphe, and a minute embryo in fleshy albumen.

1. ÁSARUM, Tourn. ASARABACCA.

Calyx bell-shaped; limb 3-parted, the tube wholly adherent to the ovary. Stamens 12: filaments awl-shaped, cohering with the apex of the ovary, continued beyond the short anthers into a slender point. Styles united into a short column, bearing 6 radiating crested stigmas at the apex. Fruit fleshy, globular, crowned with the persistent calyx, bursting irregularly. — Stemless herbs, with aromatic-pungent creeping matted rootstocks, bearing a terminal nodding flower close to the ground, between the long petioles of a pair of kidney-heart-shaped and veiny deciduous leaves. (An ancient name, thought to be derived from a privative, and *σείρον*, bound, because rejected from garlands.) (Cf. *Gray, in Sill. Jour.* 42, p. 18.)

1. **A. Canadense**, L. (WILD GINGER.) Downy; filaments adherent to the dilated base of the united styles. — Hill-sides in rich woods, common, especially northward. May. — Leaves round-kidney-shaped, at length 3'–4' wide. Calyx-lobes reflexed-spreading from the middle, pointed, brown-purple inside.

HETERÓTropa VIRGÍNICA (*Asarum*, L.) is to be sought in S. Penn.

2. ARISTOLÒCHIA, Tourn. BIRTHWORT.

Calyx tubular, the tube variously inflated above the ovary, in the subgenus *SIPHO* curved and contracted at the mouth, with an abruptly spreading equally 3-lobed border. Stamens 6, the nearly sessile anthers wholly adnate to the back of the short and fleshy 5- (3-) lobed or angled stigma. Pod naked, 6-valved. Seeds flat. — Twining, climbing, or sometimes upright perennial herbs or shrubs, with alternate leaves and lateral or axillary greenish or lurid-purple flowers. (Named from its reputed medicinal properties.)

1. **A. Serpentària**, L. (VIRGINIA SNAKEROOT.) *Herbaceous*, low (8' - 15' high), branched at the base, pubescent; *leaves ovate or oblong from a heart-shaped base, or halbert-form*, mostly acute or pointed; *flowers all next the root*, short-peduncled; calyx strongly bent and inflated at the curvature, the border obtusely 3-lobed. — A narrow-leaved variety is *A. sagittàta*, *Muhl.*, and *A. hirsuta*, *Nutt.* — Rich woods, Connecticut to Ohio, and southward, not common except near the Alleghany Mountains. July. — The fibrous, aromatic-stimulant root is well known in medicine. Calyx bent like a letter S, inflated at the two ends. Stigma 3-lobed, with 2 closely approximate 2-celled anthers (making 4 cells) on the back of each lobe.

2. **A. Sïpho**, L'Her. (DUTCHMAN'S PIPE.) *Woody, twining* and climbing, smooth; *leaves round-heart-shaped*, slightly downy underneath; peduncles solitary, 1-flowered, with a clasping bract; calyx ascending-curved, contracted at the throat, the (brown-purple) border obtusely 3-lobed. — Rich woods, mountains from Penn. southward. May. — Stems sometimes 2' in diameter, climbing trees, the full-grown leaves 8' - 12' broad. Calyx 1½' long. Stigma slightly 3-lobed, with a pair of very closely approximate anthers (making 4 contiguous cells) under each lobe.

ORDER 83. CHENOPODIÀCEÆ. (GOOSEFOOT FAM.)

Chiefly herbs, of homely aspect, more or less succulent, with chiefly alternate leaves, and no stipules nor scarious bracts; minute greenish flowers, with the free calyx imbricated in the bud; the stamens as many as its lobes (or rarely fewer) and inserted opposite them or on their base, a 1-celled ovary, becoming a 1-seeded utricle in fruit. Embryo coiled into a ring or spiral. — Calyx persistent, inclosing the fruit. Styles 2, rarely 3 - 5. Flowers commonly perfect.

Synopsis.

I. SPIROLÒBEE. Embryo spiral: albumen none.

1. SALSOLA. Calyx horizontally winged in fruit. Embryo conical-spiral (cochleate).
2. SUEDA. Calyx wingless, succulent. Embryo flat-spiral.

II. CYCLOLÒBEE. Embryo curved around the albumen.

* Flowers perfect and similar.

+ Stems jointed; leafless.

3. SALICORNIA. Stamens 1-2. Flowers immersed-spiked.
++ Stems not jointed: leaves flat: flowers clustered, bractless.
 4. CHENOPODIUM. Stamens 5. Seed horizontal: embryo a ring.
 5. AMBRINA. Stamens 5. Embryo an incomplete ring.
 6. BLITUM. Stamen usually 1. Seed vertical: embryo a perfect ring. Calyx berried or herbaceous.
- * * Flowers polygamous, monœcious or diœcious. Seed vertical.
7. AGATHOPHYTUM. Flowers polygamo-monœcious, all similar in form and without bracts. Stamens 5.
 8. ATRIPLEX. Flowers polygamous; the fertile with a pair of rhombic or halbert-shaped bracts and no calyx. Stamens 3-5.
 9. OBIONE. Flowers monœcious or diœcious; the fertile with a pair of coalescent bracts which are inflated and corky or pod-like in fruit. Stamens 4-5. Styles 2.
 10. ACNIDA. Flowers diœcious, all bractless and with a calyx. Stamens 5. Stigmas 3-5. Achenium 3-5-angled.

1. SALSÒLA, L. SALTWORT.

Flowers perfect, with 2 bractlets. Calyx 5-parted, persistent and inclosing the depressed fruit in its base, the divisions at length horizontally winged on the back, forming a broad and circular scarious border. Stamens mostly 5. Styles 2. Seed horizontal, without albumen, filled by the embryo which is coiled in a conical spiral (cochleate). — Herbs, or slightly shrubby branching plants, of the sea-shore, with fleshy and cylindrical leaves, often spiny-tipped, and sessile axillary flowers. (Name from *sal*, salt, in allusion to the alkaline salts these plants copiously contain.)

1. **S. Kàli**, L. (COMMON SALTWORT.) Annual, diffusely branching, rough or smoothish; leaves alternate, awl-shaped, prickly-pointed; flowers single; calyx with the converging lobes forming a sort of beak over the fruit, the large purplish wing nearly orbicular and spreading. — Sandy coasts. August. — A very prickly bush-like plant.

2. SUÆDA, Forsk. SALT GOOSEFOOT.

Flowers perfect. Calyx urn-shaped, 5-parted, the divisions not appendaged or winged, becoming succulent and inclosing the depressed fruit. Stamens 5. Styles united: stigmas 2-5. Embryo coiled in a flat spiral, with no albumen or very little. — Smooth branching herbs, with sessile linear or thread-shaped fleshy leaves, and clustered axillary flowers with minute bractlets. (Etymology unknown.)

1. **S. marítima**, Moquin. Annual; leaves elongated, semi-cylindrical, acutish; flowers 2-3 together; calyx inflated in fruit, the lobes slightly keeled; seed horizontal. (*Chenopodium maritimum*, and *Salsòla salsa*, L.) — Salt marshes on the coast. Aug. — Plant 1°-2° high, erect or spreading.

3. SALICÓRNIA, Tourn. GLASSWORT. SAMPHIRE.

Flowers perfect, 3 together, sessile and immersed in hollows of the thickened upper joints, forming spikes, the two lateral sometimes sterile. Calyx small and bladder-like, with a toothed or torn margin, at length spongy and narrowly wing-bordered, inclosing the flattened fruit. Stamens 1-2: styles 2, partly united. Seed vertical, with the embryo coiled or commonly bent into a more or less complete ring around the albumen. — Herbaceous or somewhat shrubby low saline plants with succulent and leafless jointed stems, and opposite branches; the flower-bearing branchlets forming the spikes. (Name composed of *sal*, salt, and *cornu*, a horn; saline plants with horn-like branches.)

1. **S. herbàcea**, L. Annual, erect or ascending; the joints somewhat thickened at their summit, and with two short and blunt or notched teeth; spikes elongated, tapering but rather obtuse at the apex. — Salt marshes of the coast, and at Salina, New York, and other interior salt springs. Aug. — Plant 8'-12' high.

2. **S. mucronàta**, Lag.? Bigelow. Annual, erect, sparingly branched (4'-8' high); the joints 4-angled at the base, and with 2 ear-like ovate and pointed teeth at their summit; spikes short and thick, obtuse. — Salt marshes, Maine to New York. Sept.

3. **S. ambígua**, Michx. Perennial, herbaceous, or a little woody, procumbent, lead-colored, with flexuous ascending branches; the joints truncate, dilated upward, flattish, slightly 2-toothed. — Salt mud or sand, coast from Massachusetts to New Jersey and southward. — Root long; the prostrate stems 2°-5° in length; the ascending branches 3'-6' high.

4. CHENOPÓDIUM, L. GOOSEFOOT. PIGWEED.

Flowers perfect, all bractless. Calyx 5-parted, not appendaged or becoming succulent, more or less enveloping the depressed fruit. Stamens 5. Styles 2. Seed horizontal, lenticular: embryo coiled into a ring perfectly encircling the mealy albumen. — Smooth weeds, usually more or less covered with a white mealiness; the leaves petioled, triangular or rhombic, toothed or entire. Flowers sessile in small clusters collected in spiked panicles. (Name from *χῆν*, a goose, and *ποῦς*, foot, in allusion to the shape of the leaves.) — Our species are all annuals, flowering through the summer, growing around dwellings, in manured soil, cultivated grounds, &c., and were doubtless all introduced from the Old World.

1. **C. álbum, L.** (LAMB'S-QUARTERS.) Stem upright, somewhat branched; *leaves rhomboid-ovate with a wedge-shaped entire base, coarsely sinuate-toothed, pale, mealy-whitened underneath, the uppermost oblong-linear and entire; panicles racemes spiked, somewhat leafless, compact; calyx-lobes keeled on the back in fruit; seed smooth and shining, with acute margins.* — Very common about gardens; the leaves whitish-mealy on the lower or both sides: a greener variety is the *C. viride* of most authors. The true *C. víride, L.*, which is perhaps in the country, is said to have a minutely-dotted seed with rather obtuse margins.

2. **C. glaucum, L.** (OAK-LEAFED GOOSEFOOT.) Stems ascending or prostrate, much branched; *leaves ovate-oblong, obtuse, sinuate or toothed, mealy-whitened underneath; racemes spiked, rather dense, ascending, leafless; calyx-lobes not keeled; seeds smooth and shining, with acute margins.* — Not common. (Philadelphia, *Dr. Bromfield.*)

3. **C. úrbicum, L.** (TRIANGULAR-LEAVED GOOSEFOOT.) Stem erect, branching; *leaves triangular-acute, coarsely sinuate-toothed, green both sides; the uppermost lanceolate-linear and almost entire; racemes spiked-panicled, strictly erect; calyx-lobes not keeled; seed obscurely wrinkled-dotted, shining, with obtuse margins.* — Var. **RHOMBIFOLIUM, Moquin** (*C. rhombifolium, Muhl.*), has rather rhombic leaves with more prolonged teeth. — Not very common.

4. **C. muràle, L.** (NETTLE-LEAVED GOOSEFOOT.) Stem ascending, branched; *leaves ovate-rhomboid, acute, coarsely and unequally toothed, green and shining both sides; racemes somewhat corymbed and loose; calyx-lobes slightly keeled in fruit; seed dotted-wrinkled, with acute margins.* — Rare. Boston Common, *Tuckerman.*

5. **C. híbridum, L.** (MAPLE-LEAVED GOOSEFOOT.) Stem erect, much branched; *leaves (large) ovate, heart-shaped at the base,*

pointed, angled with a few large and distant pointed teeth, green both sides; racemes loosely paniced, spreading, leafless; calyx-lobes keeled in fruit; seed dotted, opaque, the margins acutish. — Common; the odor heavy, like Stramonium.

5. AMBRINA, Spach. WORM-SEED.

Flowers perfect, with nearly the same characters as in *Chenopodium*, but the seed either vertical or horizontal, and the embryo not coiled completely into a ring, but forming about two thirds of a circle: styles often 3. — Glandular and often pubescent herbs (never mealy), exhaling an aromatic or balsamic odor. (Etymology unexplained.)

1. **A. Bòtrys**, Moquin. (JERUSALEM OAK.) *Annual*, ascending; leaves oblong, obtuse, sinuate-pinnatifid, the upper spatulate-lanceolate; *racemes cymose-paniced, divergent, leafless; calyx-lobes not keeled; seed horizontal, smooth, with an obtuse margin; styles 2.* (*Chenopodium*, L.) — Dry soil, road-sides, &c., introduced? Aug. — Pleasant-scented.

2. **A. anthelmíntica**, Spach. (WORMSEED.) *Perennial*, erect; leaves ovate-oblong, narrowed at the base into a petiole, coarsely and unequally cut-toothed or sinuate; *racemes elongated and spike-like, slender, leafless; calyx-lobes not keeled; seed horizontal, smooth, rounded on the margin.* (*Chenopodium*, L.) — Road-sides, Connecticut and westward, rare, except at the South. July. — Plant 2° high, very strong-scented: the seeds yield the well-known vermifuge called *Worm-seed oil*.

3. **A. ambrosioides**, Spach. (MEXICAN TEA.) *Annual*, erect, much branched; leaves oblong, narrowed at the base into a petiole, remotely sinuate-toothed, the upper oblong-linear and entire; *racemes leafy, dense; calyx-lobes somewhat keeled; seed (vertical or horizontal?) smooth, obtuse on the margin.* (*Chenopodium*, L.) — Road-sides, common from New York southward, introduced? Aug.

6. BLÏTUM, Tourn. BLITE.

Flowers perfect, bractless. Calyx 3-5-parted, becoming juicy and berry-like in fruit, or unchanged, and inclosing the compressed fruit. Stamens 1-2. Styles 2, united. Seed vertical, compressed-globular; the embryo coiled into a ring perfectly encircling the albumen. — Nearly smooth annuals, with petioled triangular or halbert-shaped sinuate-toothed leaves, and mostly capitate-clustered flowers. (The ancient Greek and Latin name of some insipid pot-herb.)

§ 1. ORTHÓSPORUM, Meyer. — *Calyx herbaceous (not juicy) in fruit.*

1. **B. polymórphum**, Meyer. (PIGWEEED BLITE.) Stem angled, branched; *leaves triangular-ovate*, or with a somewhat wedge-form base, thickish, *strongly toothed*; *clusters in compound axillary spikes*; calyx-lobes 3-5; seed minutely dotted, the margin obtuse. (Chenopodium rubrum, L.) — Moist waste places, E. New England, introduced (*Oakes*), and northward. — A coarse plant, 1°-3° high.

2. **B. marítimum**, Nutt. (COAST BLITE.) Stem angled, much branched; *leaves thickish, triangular-lanceolate, tapering* below into a wedge-shaped base and above into a slender point, *sparingly and coarsely toothed*, the upper linear-lanceolate; *clusters scattered in axillary leafy spikes*; calyx-lobes 3-4; seed shining, the margin acute. — Salt marshes, New Jersey to N. England. Aug.

§ 2. True BLITUM. — *Calyx becoming fleshy and at length berry-like.*

3. **B. capitátum**, L. (STRAWBERRY BLITE.) Stem ascending, branching; *leaves triangular and somewhat halbert-shaped, sinuate-toothed*; *clusters simple (large), interruptedly spiked*, the upper leafless; seed smooth, with a narrow sharp margin. — Dry rich ground, common in W. New York and northward: indigenous? June. — The calyx becomes pulpy and bright red in fruit, when the large clusters look like strawberries. — *B. virgátum*, L., which has a tumid seed with a channelled margin, is probably not in the country.

7. AGATHOPHÝTUM, Moquin. GOOD KING HENRY.

Flowers monœcious or polygamous, all bractless, the fertile and sterile intermixed and similar in form. Calyx 5-parted, dry and unchanged in fruit; the divisions ovate, not keeled. Sterile flowers with 5 stamens; filaments very short: the fertile with 2 distinct awl-shaped styles, the fruit partly covered by the half-open calyx. Seed vertical, compressed; the embryo coiled in a complete ring around the albumen. — A perennial almost smooth herb, with an angled stem, halbert-shaped nearly entire leaves, the clusters of flowers aggregated in a terminal and nearly leafless spike. (Name compounded of *ἀγαθός*, *good*, and *φυτόν*, *plant*; but what this weed is good for does not appear.)

1. **A. Bonus-Henricus**, Moquin. (Chenopodium, L. Blitum, Meyer.) — A common plant in the Old World, sparingly naturalized in W. New York. July.

8. ÁTRIPLEX, Tourn. ORACHE.

Flowers monœcio- or diœcio-polygamous; the staminate and perfect (which rarely fructify) bractless, with a 3-5-parted calyx

and 3 – 5 stamens ; the pistillate without a calyx, consisting of an ovary with 2 partly united styles, placed between a pair of rhombic-ovate or halbert-shaped bracts which inclose the compressed fruit. Seed vertical (or horizontal) : the embryo curved into a complete ring around the albumen ; the radicle pointing downward. — Herbs mealy or silvery with bran-like scales, with triangular or halbert-shaped angled leaves, and spiked-clustered flowers. (Name said to be from a privative, and *τράφειν*, to nourish, because the plants are unfit for food.)

1. **A. pátula**, L.? (SPREADING ORACHE.) Annual, much branched, procumbent ; leaves triangular-halbert-form, entire or sinuate-toothed, thickish, more or less scaly-dotted, the upper lanceolate ; bracts rhombic, acute, united and often finely toothed at the base, the outer surface more or less armed with conical or awl-shaped points ; stamens 4. (*A. laciniàta*, Pursh. *A. Purshiana*, Moquin.) — Salt marshes and brackish river-banks, New Jersey and northward. Aug., Sept. — Probably to be distinguished from the European *A. patula*.

A. HALIMUS, *A. HASTÀTA*, and *A. HORTÉNSIS*, given by Pursh, &c., I have not seen in this country : but the latter is sometimes cultivated as a pot-herb.

9. OBIÒNE, Gærtn. OBIONE.

Flowers monœcious or diœcious, nearly as in *Atriplex*, but the more or less united bracts often inflexed or indurated and pod-like, investing the fruit ; the projecting radicle ascending ! Herbaceous or shrubby. (Origin of the name unknown, unless from the river *Obi*, in Siberia, whence the original species came.)

1. **O. arenària**, Moquin. (SEA-SAND ORACHE.) Annual, silvery-mealy, diffusely spreading ; leaves oblong, narrowed at the base, nearly sessile ; bracts of the fruit broadly wedge-shaped, flat, united, 2–3-toothed at the summit, and with a few prickly points on the sides. — Sea-beach, Long Island and New Jersey, thence southward. August.

10. ACNÌDA, Mitchell. WATER HEMP.

Flowers diœcious, bractless. Sterile flowers with 5 membranaceous oblong sepals and 5 short stamens. Fertile flowers with 3 acute sepals and a 3 – 5-angled ovary bearing 3–5 linear revolute stigmas. Fruit a 3 – 5-angled coriaceous achenium. Seed vertical, compressed. Embryo curved horseshoe-form nearly into a

ring around the mealy albumen. — Smooth and tall annuals, growing in swamps, with lanceolate and taper-pointed entire petioled leaves, and clustered sessile flowers crowded in axillary and terminal spikes or panicles. (Name from a privative, and κνίδη, the nettle, for a nettle-like plant which does not sting.)

1. **A. cannabina**, L. Leaves elongated-lanceolate, tapering to a long mostly obtuse point; fruit acute-angled, smooth. — Common in brackish swamps, N. England to Penn., rare in fresh-water swamps of the interior, Vermont to Michigan. Aug., Sept. — The plant in flower has much the aspect of *Amaranthus*, but the apparent bracts are undeveloped blossoms.

2. **A. rusocarpa**, Michx. Leaves ovate-lanceolate; angles of the fruit blunt and roughened-tubercled. — Salt marshes, New York: common in the S. States.

BËTA VULGARIS, the BEET, with its varieties the *Scarcity* and *Mangel Wurtzel*, and SPINACIA OLERACEA, the SPINACH, well-known esculent plants, also belong to this family.

ORDER 84. AMARANTHACEÆ. (AMARANTH FAM.)

Weedy herbs, with nearly the characters of the last family, but the flowers imbricated with dry and scarious persistent bracts which are usually colored, the sepals very similar; the seed always vertical, and the embryo curved so as partly or completely to encircle the albumen. Chiefly represented by the genus

1. AMARANTHUS, L. AMARANTH.

Flowers monœcious or polygamous, rarely diœcious, 3-bracted. Sepals 3–5. Stamens 3–5, separate: anthers 2-celled. Styles or stigmas 2–3, occasionally 4, thread-like. Utricle opening transversely all round, or indehiscent, 1-seeded. — Weedy herbs, chiefly annuals, of coarse aspect, with alternate and entire petioled leaves, and minute spiked-clustered flowers: bracts and calyx green or purple. (Name compounded of a privative, μαραινω, to fade, and άνθος, flower, because the dry calyx and bracts do not wither.)

* *Monœcious: utriclc opening transversely: upper part falling away.*

+ *Stamens 3.*

1. **A. albus**, L. Smooth; stem upright, angular, with spread-

ing or horizontal branches; leaves obovate or spatulate-oblong, pale green, obtuse or notched and tipped with a short bristle, somewhat wavy-margined; clusters axillary, inconspicuous (greenish); bracts lanceolate-awl-shaped, with spreading spiny tips, much longer than the calyx. (*A. græcizans*, L. *A. Blitum*, Bigel.) — Open waste places and road-sides, common. Aug. — A very homely weed, 1°–3° high: leaves $\frac{1}{2}$ '–2' long; the obscure flowers concealed among the greenish bracts in small clusters.

— — Stamens 5.

2. **A. híbridus**, L. *Roughish-pubescent; stem upright, grooved-angled, sparingly branched, or simple; leaves ovate and lanceolate-ovate; flowers (greenish) crowded in dense compound terminal and axillary naked spikes; bracts awl-shaped, almost bristle-pointed, longer than the flowers.* (*A. paniculatus*, L.?) — A very common greenish and coarse weed in waste and cultivated grounds. July–Oct. — Stem 1°–5° high, stout: leaves 2'–5' long.

3. **A. retrofléxus**, L. *Rough-hairy; stem upright, stout, often zigzag, the lower branches recurved at the base; leaves ovate, wavy-margined; spikes thickened, aggregated, crowded, erect (green); bracts awl-shaped, bristle-pointed, much longer than the flowers.* — Penn. and southward, with the last, which it too closely resembles: a rougher and stouter plant, with thicker and more crowded spikes and larger flowers.

4. **A. hypochondriacus**, L. (PRINCE'S FEATHER.) *Nearly smooth; stem upright, stout; leaves ovate, acute, green with a red-purple spot, or tinged with purple; flowers clustered in upright compound spikes or racemes, bright red-purple, as well as the awl-shaped bracts.* — Native in Virginia, &c.: common around gardens, escaped from cultivation.

5. **A. pūmilus**, Raf. *Very smooth; stems diffusely spreading; leaves ovate, obtuse, fleshy; flowers (greenish and purple) in somewhat crowded axillary clusters; bracts short, pointless.* — Sandy beach, New Jersey to Rhode Island. Aug. — Stems scarcely rising from the ground: leaves $\frac{3}{4}$ ' long, bright shining green, with more or less purplish veins.

* * *Monœcious: utricle thin towards the base, where it bursts irregularly, thickened towards the apex: stamens 5.*

6. **A. spinòsus**, L. *Smoothish, branching; leaves ovate-lanceolate, spiny at the axils; sterile clusters crowded in compound paniced and naked spikes, the fertile mostly compact and globular in the axils (greenish); bracts not longer than the calyx.* — Road-sides, Penn. and southward: introduced. June–Sept. — Stem 1°–3° high, often purplish: the spines $\frac{1}{4}$ '– $\frac{1}{2}$ ' long.

* * * *Monœcious: utricle not dehiscent, but falling away entire.*

7. **A. Blitum**, L. *Smooth*, diffusely spreading; *leaves* ovate or rhomboid, *very obtuse* or notched, often blotched; flowers in small and round axillary clusters and in naked terminal spikes (greenish); bracts shorter than the calyx, not spiny-pointed; stamens 3. — “Frequently a very troublesome weed in gardens.” *Pursh*. Introduced.

8. **A. deflexus**, L.? Stem prostrate, branching from the base, slender (1° long), *pubescent*; *leaves* rhombic-ovate, *rather acute*; clusters axillary, few- (8 - 12-) flowered, loose, roundish; bracts lanceolate, short, not spiny; stamens 3-5. — Suburbs of Albany, *Torrey*. Aug., Sept. — Introduced. “Leaves about $\frac{3}{4}$ ' long, strongly waved on the margins.”

* * * * *Diœcious: utricles (very thin) opening transversely.*

9. **A. tamariscinus**, Nutt. Very smooth, upright, at length with numerous spreading branches; leaves lanceolate and ovate; flowers (yellowish-green) clustered in elongated and naked loosely paniced compound wand-like spikes, and sometimes also in rounded axillary fascicles; in the sterile plant 5-androus; in the fertile with 2-4 elongated and almost plumose stigmas. — Swamps and sandy shores. Otter Creek, Vermont, *Robbins*, Whitehall, New York, *Carey* (S. to Louisiana!), and Milwaukie, Wisconsin, *Lapham*, the latter a smaller-leaved and procumbent variety, or state, with the flowers mostly in dense capitate axillary clusters. July - Sept. — Stems 2°-4° high. Flowers somewhat resembling those of *Acnida*, especially the staminate, which are larger than the pistillate and more scarious, their minute bracts very much shorter than the calyx. In the pistillate, the greenish-pointed bracts equal or exceed the calyx, but are shorter than the conspicuous stigmas.

A. lividus and *A. viridis* are also given by *Pursh* as common species, but it is doubtful if they are really found at the North. — Several other purple species are cultivated.

2. IRÉSINE, Willd. IRESINE.

Flowers diœcio-polygamous, 3-bracted. Sepals 5. Stamens 5: anthers 1-celled. Style short: stigmas 2-3. Utricle bursting irregularly, 1-seeded. — Branching herbs, with opposite petioled leaves, and loosely spicate-paniced very small white flowers. (Name from *ἑρπειώμη*, a branch entwined with fillets of wool borne in processions at festivals.)

1. **I. celosioides**, Willd. Annual, tall and slender, smooth; leaves ovate-lanceolate, pointed; flowers in compound and naked terminal panicles composed of many small (whitish) spikes, the fertile woolly. — Moist river-banks, S. Ohio and southward. Sept. — Plant 3° - 4° high.

ORDER 85. PHYTOLACCÆÆ. (POKEWEED FAM.)

Plants with alternate entire leaves, and perfect flowers, with nearly the characters of Chenopodiaceæ, but usually a several-celled ovary composed of as many carpels united in a ring and forming a berry in fruit; — represented in the Northern States only by the typical genus

1. PHYTOLÁCCA, Tourn. POKEWEED.

Calyx of 5 rounded and petal-like sepals. Stamens 5–30. Ovary of 5–12 carpels, united in a ring, with as many short separate styles, in fruit forming a depressed-globose 5–12-celled berry with a single vertical seed in each cell. Embryo curved in a ring around the albumen. — Tall and stout perennial herbs, with large petioled leaves, and flowers in racemes which, by the axillary prolongation of the stem, become lateral and opposite the leaves. (Name compounded of *φυτόν*, *plant*, and the French *lac*, lake, in allusion to the coloring matter resembling that pigment which the berries yield.)

1. **P. decándra**, L. (COMMON POKE OR SCOKE. GARGET.) Stamens 10: styles 10. — Road-sides and moist ground, common. July–Sept. — A smooth plant, with a rather unpleasant odor, and a very large poisonous root often 4'–6' in diameter, sending up stout stalks (in early spring sometimes eaten as a substitute for Asparagus), which are at length 6°–9° high. Calyx white: ovary green; the long racemes of dark-purple berries filled with crimson juice, ripe in autumn.

ORDER 86. POLYGONÆÆ. (BUCKWHEAT FAMILY.)

Herbs, with alternate leaves furnished with stipules in the form of sheaths (ochreæ) above the swollen joints of the stem; the flowers mostly perfect, with a more or less persistent calyx, a 1-celled ovary bearing 2–3 styles or stigmas, and a single erect orthotropous seed. Embryo curved or straightish, on the outside of the albumen, or rarely in its centre; the radicle pointing from the hilum and towards the apex of the dry seed-like fruit. Stamens 4–12, inserted on the base of the 3–6-cleft calyx. Leaves usually entire.

Synopsis.

* Sepals mostly 5, somewhat equal, all erect in fruit.

1. POLYGONUM. Embryo narrow, curved around one side of the albumen: cotyledons slender or flat.
 2. FAGOPYRUM. Embryo central, with the very broad cotyledons twisted-plaited.
- * * Sepals 4-6, the outer reflexed, the inner erect and enlarging.
3. OXYRIA. Sepals 4. Stigmas 2. Fruit 2-winged, samara-like.
 4. RUMEX. Sepals 6. Styles 3. Fruit 3-angled, inclosed in the enlarged inner sepals.

1. POLY^YGONUM, L. KNOTWEED.

Calyx mostly 5-parted, the divisions often petal-like, all erect in fruit, withering or persistent and inclosing the lenticular or 3-angular achenium. Stamens 4-9. Styles or stigmas 2-3. Embryo placed in a groove on the outside of the albumen and curved half way around it: the radicle and usually the cotyledons slender. — Pedicels jointed. (Name composed of πολύ, *many*, and γόνυ, *knee*, from the numerous joints.)

§ 1. BISTÓRTA, Tourn. — *Calyx petal-like, deeply 5-cleft: stamens 8 or 9: styles 3, slender: achenium 3-sided: stems low and simple from a woody creeping rootstock: flowers in a spike-like raceme.*

1. **P. viviparum**, L. (ALPINE BISTORT.) Smooth, dwarf (4'-8' high), bearing one linear spike of flesh-colored flowers, or often little red bulblets in their place; leaves lanceolate, with somewhat revolute margins. — Alpine summits of the White Mountains, New Hampshire. July.

§ 2. AMBLYÓGONON, Meisn. — *Calyx petal-like, 5-parted: stamens 7: style 2-cleft: stigmas capitate: achenium lenticular (cotyledons incumbent, linear): annuals: flowers crowded in linear-cylindrical terminal spikes.*

2. **P. orientàle**, L. (PRINCE'S FEATHER.) Tall, branching, rather hairy; leaves ovate, pointed, petioled; upper sheaths salverform; spikes numerous, nodding; the large bright rose-colored flowers open. — Escaped from cultivation, and spontaneous in waste grounds. Aug.

§ 3. PERSICÀRIA, Tourn. — *Calyx petal-like, 5-parted: stamens 4-8: styles 2-3: stigmas small: achenium lenticular, or (when there are 3 stigmas) 3-sided (cotyledons accumbent, narrow): roots fibrous: sheaths cylindrical, truncate: flowers crowded in spikes or spike-like racemes.*

3. **P. Carèyi**, Olney. (CAREY'S PERSICARIA.) Stem much branched, upright (3°-5° high), glandular-bristly; leaves lanceolate,

bristly on the midrib and margins; *sheaths bristly-ciliate*; *spikes elongated, cylindrical, drooping*, on long bristly-glandular peduncles, rather dense; stamens 6-8; style 2-parted; fruit lenticular, tumid, very smooth and shining. ①? — Shaded swamps, Vermont to Rhode Island, and doubtless westward. Aug., Sept. — Leaves 4'-10' long, roughish; the spikes 1'-4' long, nodding as in No. 2. Flowers rose-purple, somewhat tinged with green.

4. **P. Pennsylvanicum**, L. (HAIRY-STALKED PERSICARIA.) Stem upright (2°-3° high), *smooth* below, the branches above and *peduncles glandular-hairy*; leaves lanceolate, taper-pointed, roughish on the margins and veins; *sheaths naked*; *spikes oblong, erect or nearly so, densely-flowered*; stamens 6-8; style 2-parted; fruit lenticular, smooth and shining. ① — Moist places, common. July-Oct. Flowers rose-color.

5. **P. Persicària**, L. (LADY'S THUMB.) Stem smooth (12'-18' high); *leaves lanceolate*, pointed, roughish, *usually marked with a dark triangular or lunar spot* near the middle; *sheaths fringed*; *spikes ovoid-oblong or cylindrical, dense, erect, on smooth* (or at least not glandular) *peduncles*; stamens mostly 6; *styles 2, united for nearly half their length*; fruit gibbous-flattened or rarely triangular, smooth and shining. ① — Waste and damp places, very common: introduced. July, Aug. — Spikes about 1' long, greenish-purple. — Plant not acrid.

6. **P. lapathifolium**, L. (PALE PERSICARIA.) Stem smooth; *leaves ovate-lanceolate or oblong-lanceolate*, taper-pointed, smoothish, sometimes roughish-glandular beneath; *upper sheaths somewhat fringed*; *spikes cylindrical or oblong, erect or nodding, on minutely glandular-roughish peduncles*; stamens mostly 6; *styles 2, distinct and at length divergent*; nut flattened, smooth and shining. ① — A polymorphous species, nearly allied to the last, to which Meisner joins it: I have seen no undoubted American specimens.

7. **P. Hydropiper**, L. (WATER-PEPPER. SMART-WEED.) Smooth (12'-18' high); *leaves lanceolate, marked with pellucid dots, wavy-margined*; *sheaths inflated, fringed*; *spikes slender and interrupted, drooping* (finally erect); calyx dotted with glands; stamens 6-8; styles 2-3, united at the base; *fruit either lenticular or 3-sided, opaque, roughish*. ① (*P. hydropiperoides*, Pursh. *P. punctatum*, Ell.) — Low grounds, very common. Aug., Sept. — A well-known, intensely acrid plant. Flowers greenish-white.

8. **P. hydropiperoides**, Michx. (MILD WATER-PEPPER.) Stem smooth, upright or ascending, often rooting at the joints along the base (2°-3° high); leaves lanceolate, roughish or somewhat hairy or ciliate; *sheaths fringed with long bristles*; *spikes slender, loosely-flowered, weak*; stamens 7-8; *styles 3, united below*; *fruit 3-sided, smooth and shining*. ④ (*P. mite*, Pers., not of Schrank.) — Swamps

and along streams. Aug. — Plant not acrid. Calyx rose-color or whitish, not dotted.

9. **P. amphibium**, L. (WATER PERSICARIA.) Leaves elliptical-lanceolate or oblong, pointed or obtusish, either narrowed or rather heart-shaped at the base; spikes very dense, ovoid or cylindrical; *stamens* 5; *styles* 2; fruit flattened, smooth. ♀ — Var. 1. AQUATICUM, L., is floating or procumbent in soft mud, rooting, and nearly smooth, as well as the long-petioled often obtuse floating leaves. (*P. coccineum*, Bigel. *P. fluitans*, Eaton.) — Var. 2. TERRESTRE, Torr., is more or less hairy or bristly, with an upright or ascending stem, growing in marshy or muddy places; the leaves acute or pointed, upper very short-petioled. — Ponds or their low borders, New England to Wisconsin, the var. 1 chiefly northward. July, Aug. — Very variable in foliage, &c.: spike 1' – 3' long, rose-red.

§ 4. AVICULARIA, Meisn. — Calyx mostly petal-like, 5-parted: *stamens* 8, sometimes 3–6; the filaments awl-shaped, 3 of them broader at the base: *stigmas* 3, globose, nearly sessile: *achenium* 3-sided (*cotyledons* incumbent): commonly annuals with small leaves, smooth: flowers axillary, sometimes crowded in interrupted spikes along the leafless summit of the branches.

* Flowers truly axillary, 2–3 together, or rarely solitary: sheaths usually 2–3-parted and cut-fringed or torn.

10. **P. aviculare**, L. (KNOT-GRASS. GOOSE-GRASS. DOOR-WEED.) Prostrate or spreading; leaves sessile, lanceolate or oblong, pale; flowers apparently sessile (greenish-white, sometimes tinged with purple); sheaths much shorter than the lower leaves; fruit inclosed in the calyx, minutely wrinkled-striate, rather dull. — Var. ERÉCTUM, Roth. (*P. erectum*, L.), has upright or ascending stems, larger oval or elliptical leaves, and usually 5 *stamens*. — Road-sides and waste places, everywhere; the var. in more shady or damp soil: introduced. June–November.

11. **P. maritimum**, L. (SEASIDE KNOT-GRASS.) Prostrate, with very short joints; leaves lanceolate, glaucous, fleshy; flowers on pedicels at length a little exerted beyond the conspicuous sheaths, which are about half the length of the leaves; fruit longer than the calyx, smooth and shining (twice or thrice as large as in the last). ① ♀? (*P. glaucum*, Nutt.) — Sandy beach, Long Island, New Jersey, and southward. Aug.

12. **P. ramosissimum**, Michx. (UPRIGHT WESTERN KNOT-GRASS.) Stem tall, upright, paniculately much branched, many-striate; leaves lanceolate, tapering into a petiole; sheaths short; flowers on short exerted peduncles (greenish-white); fruit inclosed in the calyx, minutely wrinkled transversely. — Sandy shore of Lake Michigan and southward. Aug., Sept. — Plant 3° high: stem-leaves 2' long. Flowers larger than in No. 10, in the axils of small leaves loosely disposed on the branchlets.

13. **P. ténue**, Michx. (SLENDER KNOT-GRASS.) *Stem low and slender, upright, sparingly branched, sharp-angled; leaves sessile, narrowly linear, very acute; sheaths capillary-fringed; flowers almost sessile, often solitary, greenish-white; fruit nearly smooth, shining.* — Dry soil, and rocky hills, New England to Penn. and westward, common southward. July–Sept. — Plant 6'–12' high.

* * *Flowers solitary from the axils of closely approximated or imbricated truncate bracts, thus forming many-jointed terminal spikes: sheaths cylindrical, naked and entire.*

14. **P. articulatum**, L. (JOINTWEED.) *Stem upright, paniculately branched, low (4'–12' high), slender; leaves linear-thread-form, deciduous; flowers crowded in slender and spike-like paniced racemes, on recurved pedicels twice the length of the joint-like bracts (rose-color); fruit smooth and shining.* — Sandy soil, Maine to New Jersey and southward near the coast, and Oneida Lake and Albany, New York. Aug. — Singular for its many-jointed spikes or racemes, which are 1'–3' long; the lower bracts tooth-pointed on one side. — Not a Polygonella!

§ 5. ΤΟΥΛΑΡΙΑ, Adans. — *Calyx rather herbaceous (greenish), unequally 4-parted: stamens 5: styles 2, distinct, rigid and persistent on the smooth lenticular achenium (cotyledons oblong, accumbent): perennial: flowers loosely disposed in a naked long and slender spike.*

15. **P. Virginiànnum**, L. (WAND-SPIKED PERSICARIA.) *Almost smooth; stem angled, upright (2°–4° high); leaves ovate, or the upper ovate-lanceolate, taper-pointed, rounded at the base, short-petioled, rough-ciliate; sheaths cylindrical, truncate, hairy and fringed; flowers 1–2 from each bract, somewhat curved, the styles in fruit obliquely bent down, minutely hooked at the tip.* — Thickets in rich soil, common. Aug. — Leaves 3'–6' long. Spike 10'–20' long: pedicels scarcely projecting beyond the sheathing bracts.

§ 6. ΗΕΛΧΙΝΕ, L. — *Calyx 5-parted: stamens mostly 8: styles or capitate stigmas 3, and achenium 3-sided, or, in No. 16, styles 2 and achenium lenticular: twining or climbing annuals, with heart-shaped or arrow-shaped petioled leaves: sheaths semicylindrical.*

* *Stems flaccid, not twining, but somewhat climbing or supported on other plants by the reflexed prickles which beset the angles of the stem and petioles: divisions of the (pale rose-colored or white) calyx not keeled: bracts chaff-like.*

16. **P. arifolium**, L. (HALBERT-LEAVED TEAR-THUMB.) *Stem grooved-angled; leaves halbert-shaped, taper-pointed, long-petioled; flowers somewhat racemed (few); peduncles glandular-bristly; calyx often 4-parted, closed; stamens 6; styles 2, very short; fruit lenticular (large).* — Low grounds. Aug. — Leaves 2'–5' long; the divergent lobes at the base also pointed.

17. **P. sagittatum**, L. (ARROW-LEAVED TEAR-THUMB.) Stem 4-angled; leaves arrow-shaped, short-petioled; flowers capitate; peduncles smooth; stamens mostly 8; styles 3, slender; fruit sharply 3-angled. — Low grounds, common. July – Sept. — Slender, smooth except the angles of the stem and midrib beneath, which are closely beset with a line of fine and very sharp saw-toothed prickles, which cut the hand drawn against them: leaves 1' – 2' long.

* * Stems twining, not prickly: calyx (greenish tinged with white or rose-color) with the 3 outer divisions keeled, at least in fruit: flowers in loose paniced racemes: bracts like the stipules.

18. **P. Convòlvulus**, L. (BLACK BINDWEED.) Stems twining or procumbent, roughish, the joints naked; leaves halbert-heart-shaped, pointed, flowers in small interrupted racemes; outer calyx-lobes keeled; fruit smoothish. — Cultivated and waste grounds, common: probably introduced. July. — A low weed with inconspicuous flowers.

19. **P. cilinòde**, Michx. (FRINGE-JOINTED FALSE BUCKWHEAT.) Minutely downy; the sheaths fringed at the base with reflexed bristles; leaves heart-shaped and slightly halbert-shaped, taper-pointed; racemes paniced; calyx-lobes obscurely keeled; fruit very smooth and shining. — Copses and rocky hills, common northward. July – Sept. — Stems climbing 3° – 9° high.

20. **P. dumetòrum**, L. (CLIMBING FALSE BUCKWHEAT.) Smooth; sheaths naked; leaves heart-shaped or slightly halbert-shaped, pointed; racemes interrupted, leafy; the 3 outer calyx-lobes strongly keeled and in fruit winged; fruit smooth and shining. (*P. scàndens*, L.) — Moist thickets, twining 8° – 12° high over bushes. Aug.

2. FAGOPÿRUM, Tourn. BUCKWHEAT.

Calyx petal-like, equally 5-parted, withering and nearly unchanged in fruit. Stamens 8. Styles 3: stigmas capitate. Achénium 3-sided, longer than the calyx. Embryo large, in the centre of the albumen which it divides into 2 parts, with very broad and foliaceous plaited and twisted cotyledons. — Annuals, with triangular-heart-shaped or halbert-shaped leaves, semicylindrical sheaths, and corymbose racemes or panicles of white flowers, often tinged with green or rose-color. (Name *φηγός*, the beech, and *πυρός*, wheat, from the shape of the grain being that of the beech-nut; whence also the English name *Buckwheat*, from the German *Buche*, beech.)

1. **F. esculéntum**, Mœnch. (BUCKWHEAT.) Smoothish; flower with 8 honey-bearing yellow glands interposed between the

stamens; fruit twice the length of the calyx, the angles acute and entire. (*Polygonum Fagopyrum*, L.) — Old fields, remaining as a weed where the plant has been cultivated. June - Sept.

3. OXYRIA, Hill. MOUNTAIN SORREL.

Calyx herbaceous, of 4 sepals; the two outer smaller and spreading, the two inner broader and erect (but unchanged) in fruit. Stamens 6. Stigmas 2, sessile, tufted. Achenium lenticular, thin, flat, much larger than the calyx, surrounded by a broad veiny wing. Seed flattened in the opposite direction. Embryo straight, in the centre of the albumen, slender. — Low alpine perennials, with round-kidney-form and long-petioled leaves chiefly from the root, obliquely truncate sheaths, and small greenish flowers clustered in paniced racemes on a slender scape. (Name from *ὄξύς*, *sour*, in allusion to the acid flavor of the leaves, like those of Sorrel.)

1. *O. digyna*, Campd. Leaves all round-kidney-form, usually notched at the end; fruit orbicular. (*O. reniformis*, Hook.) — Alpine region of White Mountains, New Hampshire, *Oakes*, &c. July. — Scape 3' - 10' high.

4. RUMEX, L. DOCK. SORREL.

Calyx of 6 sepals; the 3 outer herbaceous, somewhat united at the base, spreading in fruit; the 3 inner (called *valves*) larger, somewhat colored, increasing and valvately convergent over the 3-angled achenium, veiny, often bearing a grain-like tubercle on the outer surface. Stamens 6. Styles 3: stigmas tufted. Embryo slightly curved, lying along one side of the albumen, slender. — Coarse herbs, with small homely (mostly green) flowers, commonly whorled in paniced racemes: petioles somewhat sheathing at the base. (The ancient Latin name, of unknown etymology.)

§ 1. *LAPATHUM*, Tourn. — *Flowers perfect, or sometimes polygamous: styles free: herbage bitter.*

* *Leaves all lanceolate and acute at both ends, flat, smooth: valves of the fruiting calyx entire, or rarely obscurely denticulate.*

1. *R. verticillatus*, L. (SWAMP DOCK.) Racemes nearly leafless, elongated, the flowers in crowded whorls; fruit-bearing pedicels club-shaped, abruptly reflexed, 3-4 times longer than the fruiting calyx; the valves dilated-rhomboid, obtusely somewhat pointed, strongly rugose-reticulated, each bearing a very large grain. — Wet swamps and ditches, rather common. June, July. — Stem 2° - 4° high, branched

above, with pale green and willow-like thickish leaves, and conspicuous sheaths. Grains from $\frac{1}{3}$ to $\frac{1}{2}$ the width of the valve.

2. **R. Británnica**, L. (LARGER-FRUITED SWAMP DOCK.) Racemes spike-like and paniced, nearly leafless; whorls crowded; *pedicels capillary, nodding, not longer than the fruiting calyx; the valves round-heart-shaped, obtuse, thin, 1-3 of them unequally grain-bearing.* (*R. altissimus, Wood.*) — Banks of streams, &c., New England? New York (Peekskill, *Dr. Mead*), to Indiana and southward. June, July. — Leaves 3' - 5' long, mostly oblong-lanceolate, much like the last; the valves fully twice as large, two of the grains small or abortive, or sometimes all three wanting.

3. **R. salicifólius**, Weinmann, Hook. (WILLOW-LEAVED DOCK.) Racemes spiked, somewhat leafy below; the whorls much crowded; *pedicels shorter than the fruiting calyx; the valves ovate, obtusish, rugose-reticulated, (1-2 or) all of them nearly covered with a large and thick grain.* (*R. pállidus, Bigelow.*) — Low grounds near salt water, from Nahant and Danvers, Massachusetts (*Dr. Nichols, Oakes*), northward. June. — Stems 1° - 2° high, ascending. Leaves thinner than in the two preceding, their margins a little wavy. Fruiting calyx smaller than in No. 1, so short-pedicelled and crowded as to appear sessile.

4. **R. Hydrolápathum**, Hudson. (GREAT WATER-DOCK.) Racemes upright in a large compound panicle, nearly leafless; whorls crowded; *pedicels capillary, nodding, longer than the fruiting calyx; the valves broadly ovate, obtuse (large), all grain-bearing; leaves oblong-lanceolate, pointed, with minutely crenulate-wavy margins.* (*R. Britanica, Pursh? Bigel., &c. R. aquaticus, Smith, Pursh.*) — Wet places, New England to Michigan. July. — Stem 5° high, stout. Lower leaves 1° or more long and 3' - 5' wide, the stout midrib produced into a flat petiole. Valves thin, $\frac{1}{4}$ ' long, rather denticulate, more rounded in our specimens than in European.

* * *Leaves wavy, the lower more or less heart-shaped at the base: whorls in paniced racemes or spikes.*

5. **R. obtusifólius**, L. (BROAD-LEAVED OR BITTER DOCK.) Stem roughish; *lowest leaves ovate-heart-shaped, obtuse, rather downy on the veins underneath, somewhat wavy-margined, the upper oblong-lanceolate, acute; whorls loose and distant; valves ovate-halbert-shaped, sharply denticulate at the base, strongly reticulated, one of them principally grain-bearing.* — Fields, &c.; introduced: a rather common weed. July. — Root-leaves about 1° long, 5' - 6' wide.

6. **R. crispus**, L. (CURLED DOCK.) Smooth; *leaves with strongly wavy-curved margins, lanceolate, acute, the lower truncate or rather heart-shaped at the base; whorls crowded in prolonged wand-like racemes, leafless above; valves round-heart-shaped, obscurely denticulate or entire, one or all of them grain-bearing.* — A very common

weed in cultivated and waste grounds: introduced. June, July.— Stem 3°–4° high, from a deep spindle-shaped yellow root.

7. **R. conglomeratus**, Murray. (SMALLER GREEN DOCK.) *Leaves oblong*, pointed, slightly wavy-margined, the lower heart-shaped at the base; *whorls distant, leafy*; pedicels very short; *valves linear-oblong, rather broadest next the base*; *obtuse, entire*, each bearing a single (reddish) grain. (*R. acutus*, Smith, &c.) Moist places, sparingly introduced. July.—Resembles the green variety of the next. Fruit and leaves smaller.

8. **R. sanguineus**, L. (BLOODY-VEINED DOCK.) *Leaves lanceolate*, wavy-margined, the lowest heart-shaped at the base; *whorls distant, in long and slender leafless interrupted spikes*; pedicels very short; *valves narrowly oblong, broadest above their middle, obtuse, entire*, one at least grain-bearing;—veins of the leaf red, or in var. *VIRIDIS*, green.—Waste and cultivated grounds, sparingly introduced. June.

9. **R. maritimus**, L. (GOLDEN DOCK.) Low, smooth or minutely pubescent, diffusely branched; *leaves linear-lanceolate*, very wavy; the lower abrupt or often auriculate-dilated at the base; *whorls excessively crowded* in leafy and compact or interrupted spikes; *valves rhombic-oblong, lance-pointed, each bearing 2–3 long awn-like bristles on each side*, and a large grain on the back. (Also *R. persicarioides*, L.)—Sea-shore, Block Island to Nantucket, Robbins, Oakes. Aug.—Plant 6'–12' high; remarkable for the crowded, almost orange-colored flowers, beset with bristles which are usually longer than the width of the valves.

§ 2. **ACETOSÉLLA**, Tourn.—*Flowers diacious: styles adherent to the angles of the ovary: herbage acid.*

10. **R. Acetosélla**, L. (FIELD OF SHEEP SORREL.) Low; leaves lanceolate-halbert-form, at least those of the root, the narrow lobes entire; whorls leafless, in slender paniced racemes; valves scarcely enlarging in fruit, ovate, not grain-bearing.—An abundant weed in sterile and worn fields. May.—The fertile panicles usually turn reddish in summer.

RHÈUM RHAPÓNTICUM is the PIE RHUBARB, so commonly cultivated for the sake of its fleshy and acid esculent leaf-stalks.

ORDER 87. LAURÀCEÆ. (LAUREL OR BAY FAMILY.)

Aromatic trees or shrubs, with alternate simple leaves mostly marked with minute pellucid dots, and flowers with a regular calyx of 4–6 colored sepals, which are barely united at the base, imbricated in 2 rows in the bud, free from

the 1-celled and 1-ovuled ovary, and mostly fewer than the stamens : anthers opening by 2-4 uplifted valves. — Flowers clustered. Style single. Fruit a 1-seeded berry or drupe. Seed anatropous, suspended, filled by the large almond-like embryo.

1. SÁSSAFRAS, Nees. SASSAFRAS.

Flowers diœcious, with a 6-parted spreading calyx ; fertile with 9 stamens inserted on the base of the calyx in 3 rows, the 3 inner with a pair of stalked glands at the base of each ; anthers 4-celled, 4-valved : fertile flowers with 6 short rudiments of stamens and an ovoid ovary. Drupe ovoid, supported on a club-shaped fleshy pedicel. — Trees, with spicy-aromatic bark, very mucilaginous twigs and foliage, the latter deciduous, often lobed. Flowers greenish-yellow, in clustered and peduncled corymbed racemes, appearing with the leaves. (The popular name, of Spanish origin.)

1. **S. officinale,** Nees. Leaves ovate, entire, or some of them 3-lobed, the younger ones and the buds silky-downy. (*Laurus Sassafras, L.*) — Rich woods, common. April. — Tree 15°-50° high, with yellowish-green twigs : the dark blue fruit borne on a red stalk, ripe in September.

2. BENZÒIN, Nees. WILD ALLSPICE. FEVER-BUSH.

Flowers polygamous-diœcious, with a 6-parted open calyx ; the sterile with 9 stamens in 3 rows, the inner 1-2-lobed and gland-bearing at the base ; anthers 2-celled and 2-valved : fertile flowers with 15-18 rudiments of stamens in 2 forms and a globular ovary. Drupe obovoid, the stalk not thickened. — Shrubs, with entire deciduous leaves, and honey-yellow flowers in almost sessile lateral umbel-like clusters appearing before the leaves ; the clusters composed of smaller clusters or umbels of 4-6 flowers, surrounded by an involucre of deciduous scales. (Named from the aroma, which has been likened to that of *benzoin*.)

1. **B. odoriferum,** Nees. (SPICE-BUSH. BENJAMIN-BUSH.) Nearly smooth ; leaves oblong-obovate, pale underneath ; pedicels scarcely as long as the flower. (*Laurus Benzoin, L.*) — Damp woods, April : the ovoid red fruit ripe in Sept. — Shrub 5' - 10' high.

ORDER 88. **THYMELEACEÆ.** (MEZEREUM FAMILY.)

Shrubs, with acrid and very tough (not aromatic) bark, entire leaves, and perfect flowers with a regular and simple petal-like calyx, bearing usually twice as many stamens as its lobes, free from the 1-celled and 1-ovuled ovary, which forms a berry-like drupe in fruit, with a single suspended anatropous seed. Embryo large and almond-like: albumen little or none.—Represented in North America only by the genus

1. DÍRCA, L. LEATHERWOOD. MOOSE-WOOD.

Calyx petal-like, tubular-funnel-shaped, truncate, the border wavy or obscurely about 4-toothed. Stamens long and slender, inserted on the calyx above the middle, exserted, the alternate ones longer. Style thread-form: stigma capitate. Drupe oval (reddish).—A much-branched bush, with jointed branchlets, oval-ovate alternate leaves, at length smooth, deciduous, on very short petioles, the bases of which conceal the buds of the next season. Flowers light yellow, preceding the leaves, 3 in a cluster from a dark-hairy bud, from which soon after proceeds a leafy branch. (*Δίρκη*, the name of a fountain near Thebes, applied by Linnæus to this North American genus, for no imaginable reason, unless because the bush frequently grows in the neighbourhood of rivulets.)

1. D. palústris, L.—Damp rich woods, seldom in swamps; common northward. April.—Shrub 2°–5° high; the wood white, soft and very brittle, but the fibrous bark remarkably tough, used by the Indians for thongs, whence the popular names. In N. New England also called *Wicopy*.

ORDER 89. **ELÆAGNACEÆ.** (OLEASTER FAMILY.)

*Shrubs or small trees, with silvery-scurfy leaves and mostly diœcious flowers; further distinguished from the Meze-
reum Family by the ascending albuminous seed, and the
calyx-tube becoming pulpy and berry-like in fruit inclos-
ing the achenium; and from the two following by the calyx-
tube not cohering with the ovary, &c.*

1. SHEPHERDIA, Nutt. SHEPHERDIA.

Flowers diœcious; the sterile with a 4-parted calyx (valvate in the bud) and 8 stamens, alternating with as many processes of the thick disk: fertile with an urn-shaped 4-cleft calyx, inclosing the ovary (the orifice closed by the teeth of the disk), and becoming berry-like in fruit. Style slender: stigma 1-sided. — Leaves opposite, entire, deciduous; the small flowers nearly sessile in their axils on the branchlets, clustered, or the fertile solitary. (Named for *John Shepherd*, formerly curator of the Liverpool Botanic Garden.)

1. **S. Canadensis**, Nutt. (CANADIAN SHEPHERDIA.) Leaves elliptical or somewhat ovate, nearly naked and green above, silvery-downy and scurfy with rusty scales underneath; fruit yellowish. — Rocky or gravelly banks, W. Vermont to Wisconsin northward. May. — A straggling shrub, 3°-6° high; the branchlets, young leaves, yellowish flowers, &c., covered with the rusty scales. Fruit insipid.

S. ARGËNTEA, Nutt., of Upper Missouri, which has narrower entirely silvery leaves, and edible, acid, scarlet fruit, is somewhat cultivated for ornament; as also is the OLEASTER (*Elæagnus hortensis*), &c.

ORDER 90. NYSSACEÆ. (TUPELO FAMILY.)

Trees, with diœcious-polygamous flowers, consisting only of the genus Nyssa, which has commonly been appended to the Sandalwood Family, from which it differs in the solitary ovule of the ordinary structure, suspended from the top of the cell.

1. NYSSA, L. TUPELO. PEPPERIDGE.

Sterile flowers with a 5-parted calyx, and about 10 stamens on the outside of a convex disk. Perfect or fertile flowers with the tube of the calyx adherent to the 1-celled ovary, the border 5-parted and deciduous: stamens 5, perfect or imperfect: style elongated, revolute, stigmatic down one side. Fruit an oval or oblong berry-like drupe: endocarp grooved. Seed anatropous, with a straight embryo in sparing albumen: cotyledons leafy. — Trees with alternate deciduous leaves, which are smooth and shining above (and turn scarlet in autumn), and axillary peduncles, bearing sterile flowers in capitate clusters or racemes, and the fertile

2-4 together or sometimes solitary. (The name of a water Nymph, applied by Linnæus to this genus, of which some of the Southern species "grow in the waters.")

1. **N. multiflora**, Wang. (TUPELO. BLACK OR SOUR GUM-TREE.) Leaves oval and obovate, acute or pointed at both ends, entire, the petiole and midrib hairy, deep green and shining above; fertile flowers mostly in threes; drupe oval, blackish-blue. (*N. aquatica*, L., in part. *N. sylvatica*, Marsh. *N. villosa*, Willd.) — Woods, in dry or moist soil, New England to Wisconsin, principally southward. May. — A middle-sized tree, with dark gray bark, horizontal branches with a light flat spray, like the Beech: the wood very unwedgeable, on account of the oblique direction and crossing of the fibre of different layers. Flowers small, greenish. — Probably the only species in the Northern States.

ORDER 91. **SANTALACEÆ.** (SANDALWOOD FAMILY.)

Herbs, shrubs, or trees, with entire leaves; the 4-5-cleft calyx valvate in the bud, its tube coherent with the 1-celled ovary, which contains 2-4 ovules (consisting of a cellular nucleus, destitute of any proper integument) suspended from the apex of a stalk-like free central placenta which rises from the base of the cell, but the (indehiscent) fruit always 1-seeded. — Embryo small, at the apex of copious albumen: radicle directed upward: cotyledons cylindrical. Stamens equal in number to the lobes of the calyx, and inserted opposite them into the edge of the fleshy disk at their base. Style 1.

1. **COMÁNDRA**, Nutt. BASTARD TOAD-FLAX.

Flowers perfect. Calyx bell-shaped or soon urn-shaped, lined above the ovary with an adherent disk which has a 5-lobed free border. Stamens inserted on the edge of the disk between its lobes, opposite the lobes of the calyx, to the middle of which the anthers are connected by a tuft of threads! Fruit dry and rather nut-like, the apex free from the calyx, crowned by its persistent lobes, the cavity filled by the globular seed. — Low and smooth perennial herbs, with alternate oblong and sessile leaves, and greenish-white flowers in terminal or axillary umbel-like cymes.

(Name from *κόμη*, *hair*, and *ἄνδρες*, for *stamens*, in allusion to the hairy tufts attached to the anthers.)

1. **C. umbellata**, Nutt. Leaves obovate-oblong; cymes corymbose-clustered, several-flowered; calyx-tube conspicuously continued beyond the ovary, forming a neck to the globular-urn-shaped fruit; the lobes oblong; style slender, as long as the stamens. — Dry or rocky banks, common. May, June. — Stems branching, 8' - 10' high from a rather woody root, very leafy.

2. **PYRULÀRIA**, Michx. OIL-NUT. BUFFALO-NUT.

Flowers diœcious. Calyx 5-cleft, the lobes recurved. Sterile flowers with 5 stamens on very short filaments, alternate with 5 rounded glands. Fertile flowers with a pear-shaped ovary invested by the adherent calyx, naked at the flat summit: disk with 5 glands: style short and thick: stigma capitate-flattened. Fruit fleshy and drupe-like, pear-shaped, the globose endocarp thin. Embryo small: albumen very oily. — A low straggling shrub, with alternate short-petioled and veiny deciduous leaves; the small greenish flowers sessile in very short and simple terminal spikes. (Name a diminutive of *Pyrus*, from the fruit, which looks like a small pear.)

1. **P. oleifera**. (*P. pùbera*, Michx. *Hamiltônia oleifera*, Muhl.) — Rich wooded banks, mountains of Penn. and southward. May. — Leaves obovate-oblong, pointed at both ends, a little downy, or at length nearly smooth, somewhat succulent, oily to the taste. Spikes ripening but one fruit, which is about 1' long.

ORDER 92. **LORANTHÀCEÆ**. (MISTLETOE FAMILY.)

Shrubby plants with coriaceous greenish foliage, parasitic on trees, represented in the northern temperate zone chiefly by the Mistletoe, distinguished from the preceding family by the truly simple *ovule* (consisting of a naked nucleus alone) being *solitary and suspended from the apex of the cell*. Fruit a 1-seeded berry.

1. **VÍSCUM**, L. MISTLETOE.

Flowers monœcious or diœcious. Calyx fleshy-coriaceous; in the sterile flowers 3 - 4-parted, the triangular lobes valvate in the bud, each with a sessile anther directly adhering to its inner face,

and opening by several pores : in the fertile flowers the tube of the calyx is combined with the ovary, the border obsolete. Stigma sessile. Fruit a globular berry. — Much branched, with jointed stems, opposite leaves, and small flowers in short spikes. (The ancient Latin name, from which is the word *viscosus*, sticky : the glutinous berries yield *birdlime*.)

1. **V. flavescens**, Pursh. (YELLOWISH MISTLETOE.) Branches round, spreading ; leaves obovate or oval, contracted at the base into a short petiole, 3-nerved ; calyx often 3-cleft ; berries yellowish-white. — On the trunks of old trees, especially Elms, Oaks, and Hickories, New Jersey and Ohio, southward. April. — Whole plant yellowish.

ORDER 93. ULMACEÆ. (ELM FAMILY.)

Trees or shrubs, with alternate roughish leaves, and deciduous stipules, perfect or barely polygamous flowers in axillary clusters or solitary, with the definite stamens inserted on the base of the free calyx which is imbricated in the bud, and 2 styles or stigmas, but the 1-celled fruit with a single suspended seed ; distinguished from the Mulberry tribe also by the want of milky juice ; consisting of the Elm Family proper, with a winged fruit, and the Suborder CELTIDEÆ, with the fruit a drupe.

1. **ÚLMUS**, L. ELM.

Calyx bell-shaped, 4–9-cleft. Stamens 4–9, with long and slender filaments. Ovary flat, 2-celled, with a single anatropous ovule suspended from the summit of each cell : styles 2, short, diverging, stigmatic all along the inner edge. Fruit (by obliteration) a 1-celled and 1-seeded membranaceous samara, winged all around. Albumen none : embryo straight, the cotyledons large. — Flowers sometimes polygamous, purplish or yellowish, in lateral clusters, preceding the leaves, which are strongly straight-veined, short-petioled, and oblique or unequally somewhat heart-shaped at the base. (The classical Latin name.)

1. **U. Americana**, L. (AMERICAN OR WHITE ELM.) *Leaves smooth above, downy underneath, oblong-ovate, pointed, sharply doubly serrate ; flowers in umbel-like clusters, conspicuously pedicelled ;*

fruit oval, with woolly-fringed margins. — Moist woods, and alluvial river-banks. April. — A large and well-known, very ornamental tree, with spreading branches and slender pendulous branchlets: young twigs nearly smooth. Calyx 8-9-cleft, hairy. Stamens about 8.

2. **U. racemosa**, Thomas. (CORKY WHITE ELM.) Leaves nearly as in No. 1, obovate-oblong; *flowers in compound racemes, conspicuously pedicelled*; fruit elliptical-oval, with downy-fringed margins; branches mostly corky-ridged or winged. — River-banks, W. New England and New York, and westward. — A large tree, with tougher and finer-grained wood than the last. Branchlets downy.

3. **U. fúlva**, Michx. (SLIPPERY ELM. RED ELM.) *Leaves very rough above, roughish-downy underneath, as well as the branchlets, ovate-oblong, doubly serrate; buds rusty-woolly; flowers nearly sessile in dense clusters*; fruit nearly orbicular, the margins naked. — Woods, in rich, dry, or moist soil; common westward. — A middle-sized or small tree, with straggling branches and rather tough reddish wood, remarkable for the very mucilaginous inner bark. Calyx-lobes and much exerted stamens about 7.

U. CAMPÉSTRIS, L., the ENGLISH ELM, is sparingly introduced near Boston.

2. **CÉLTIS**, Tourn. NETTLE-TREE. HACK-BERRY.

Flowers polygamous. Calyx 5-6-parted, persistent. Stamens 5-6. Ovary 1-celled, with a single suspended ovule: stigmas 2, long and pointed, recurved. Fruit a globular drupe, with thin flesh. Embryo curved, nearly inclosing a little gelatinous albumen: cotyledons folded. — Leaves pointed, petioled. Flowers greenish, axillary, solitary or in pairs, peduncled, appearing with the leaves; the lower usually staminate only. (An ancient Greek name for the Lotus: the fruit European Nettle-tree supposed to have been the food of the *Lotophagi*.)

1. **C. occidentàlis**, L. (SUGAR-BERRY. HACK-BERRY.) Leaves roughish, obliquely ovate, sharply serrate, finely taper-pointed, unequal and often heart-shaped or half heart-shaped at the base; fruit dull-purple or yellowish-brown. — Woods and river-banks, throughout the Northern States, but rare northward and eastward. May. — A small or occasionally pretty large tree, with the aspect of an Elm, with sweet and edible drupes as large as bird-cherries, ripe in autumn and remaining through the winter. — Very variable as to the foliage, &c.

C. CRASSIFÒLIA, Lam., I am unable properly to distinguish.

C. PÙMILA, Pursh, a dwarf, very straggling bush, probably extends northward into Pennsylvania.

ORDER 94. SAURURACEÆ. (LIZARD'S-TAIL FAMILY.)

Herbs, with jointed stems, alternate entire leaves with stipules, and perfect flowers in spikes, entirely destitute of calyx or any floral envelopes, and 3-5 more or less united ovaries. — Ovules few, orthotropous. Embryo heart-shaped, minute, contained in a little sac at the apex of the albumen.

1. SAURURUS, L. LIZARD'S-TAIL.

Stamens mostly 6 or 7, hypogynous, with long and distinct filaments. Fruit somewhat fleshy, wrinkled, of 3-4 pistils united at the base, with recurved stigmas. Seeds usually solitary, ascending. — A perennial marsh herb, with heart-shaped petioled leaves, and white flowers, each from the axil of a small bract, closely aggregated in a slender wand-like and naked peduncled terminal spike (giving rise to the name, from σαῦρος, a lizard, and οὐρά, tail.)

1. **S. cernuus**, L. — Margin of ponds, &c., common. June. — Spike 3' - 6' long, drooping at the end.

ORDER 95. CERATOPHYLLACEÆ. (HORNWORT FAM.)

Aquatic herbs, with whorled finely dissected leaves, and minute axillary and sessile monœcious flowers without any floral envelopes, but with an 8-12-cleft involucre in place of a calyx, the fertile a simple 1-celled ovary, with a suspended orthotropous ovule; the seed filled by a highly developed embryo with 4 cotyledons! and a conspicuous plumule. — Consists only of the genus

1. CERATOPHYLLUM, L. HORNWORT.

Sterile flowers of 12-24 stamens with large sessile anthers. Fruit an achenium, beaked with the slender persistent style. — Herbs growing under water, in ponds or slow-flowing streams: the sessile leaves cut into 2-3-forking thread-like rather rigid divisions. (Name from κέρας, a horn, and φύλλον, leaf.)

1. **C. echinatum**, A. Gr. Achenium elliptical, rough-pointed on the sides, with a terminal and 2 short lateral spines, the slight-

ly winged margins armed with blunt teeth, which finally elongate and equal the lateral spines; divisions of the leaves minutely serrulate, mostly 2-toothed at the apex. — Common. June, July. — Rarely found in fruit. Probably *C. DEMÉRSUM*, L., is also in the country, or all the known forms may belong to one species.

ORDER 96. CALLITRICHÀCEÆ. (WATER-STARWORT.)

Aquatic small annuals, with opposite entire leaves, and solitary polygamous flowers in their axils, usually between a pair of bracts, no proper floral envelopes, and a 4-lobed and 4-celled 4-seeded fruit; — consisting only of the genus

1. CALLITRICHE, L. WATER-STARWORT.

Stamen solitary, in the sterile flowers between the bracts; in the fertile placed between the pistil and the stem, and rarely also one on the outer side: filament thread-like: anther heart-shaped, by confluence becoming 1-celled. Fruit indehiscent, nut-like, 4-lobed and 4-celled, but the styles only 2, awl-shaped, distinct. Seed solitary and suspended, filling each cell, anatropous: embryo slender, in the axis, and nearly the length, of the albumen. (Name from *καλός*, *beautiful*, and *θρίξ*, *hair*, from the almost capillary and usually tufted stems.)

1. **C. vérna**, L. Fruit nearly sessile; the lobes parallel in pairs and bluntly keeled on the back; styles constantly erect; bracts incurved; leaves 3-nerved, the floating ones spatulate or obovate, the immersed linear. — Shallow pools and slow streams, common; variable in foliage and size; when growing in barely muddy places it is apparently *C. terréstris*, Raf. April – July.

2. **C. platycárpa**, Kützing. Fruit nearly sessile; the lobes parallel in pairs, slightly winged on the back; styles erect in the flower, reflexed closely over the fruit. Bracts and foliage much as in the last, the fruit twice as large: growing in similar situations.

3. **C. autumnàlis**, L. Fruit nearly sessile; the lobes stellately diverging, broadly and sharply winged on the back; styles spreading; bracts none; leaves all linear and immersed, broadest at the base, abrupt at the end. — Pools, northward, if really growing in the U. S. June – Oct. — Fruit 4 times as large as in No. 1, some of the lobes often abortive.

4. **C. lineàris**, Pursh. Fruit sessile, the lobes parallel in pairs, rounded or scarcely keeled on the back (not larger than in No. 1); bracts none; leaves all narrowly linear and immersed, abrupt at both

ends, often notched at the apex. (*C. autumnalis?* Michx.) — In clear water, N. New England, &c. — Leaves $\frac{1}{2}$ ' long, delicate and translucent.

ORDER 97. **PODOSTEMÀCEÆ.** (RIVER-WEED FAM.)

Aquatics, growing on stones in running water, with much the aspect of Sea-weeds or Mosses, with the minute naked flowers bursting from a spathe as in Liverworts, producing a 2-3-celled many-seeded ribbed pod; — represented in North America by the genus

1. PODOSTÈMUM, Michx. RIVER-WEED.

Flowers axillary and solitary, pedicelled, from a tubular spathe. Calyx, or bracts, of 2-3 small awl-shaped scales. Stamens 2, or rarely 3: filaments monadelphous below: anthers 2-celled. Styles or stigmas 2, awl-shaped. Pod oval, many-ribbed, 2-celled, 2-valved. Seeds minute, very numerous on a thick persistent central placenta, destitute of albumen. — Leaves finely many-cleft, forking: stipules adherent to the partly sheathing base. (Name from *ποῦς*, *foot*, and *στήμων*, *stamen*; the stamens being apparently raised on a stalk by the side of the ovary.)

1. P. ceratophýllum, Michx. Leaves rigid; filaments united to above the middle. — Not uncommon in the bottom of shallow streams, flowering in July. A small olive-green plant, of firm or almost horn-like texture, somewhat resembling a Sea-weed, and tenaciously fixing itself to loose stones at the bottom, in the manner of a *Fucus*, by fleshy disks or processes in place of roots. Leaves several times forked, 1' - 4' long; the divisions linear-thread-form, flattish.

ORDER 98. **EUPHORBIÀCEÆ.** (SPURGE FAMILY.)

Plants usually with a milky acrid juice, and various, usually monœcious or diœcious flowers; the fruit of 2-3 or several 1-seeded pods united around a central axis separating when ripe (rarely of a single pod). Seed suspended, anatropous. Embryo with flat cotyledons nearly as long as the albumen. Stigmas 2-3 or more, often forked. Calyx usually valvate in the bud, occasionally wanting. Petals sometimes present.

Synopsis.

* Flowers inclosed in a calyx-like or colored involucre.

1. **EUPHORBIA.** Involucre containing a single pistillate flower surrounded by many sterile flowers consisting of single stamens, all stalked and naked.

* * Flowers without an involucre, monœcious.

+ Ovary and pod 3-celled.

2. **PHYLLANTHUS.** Flowers axillary, scattered. Calyx 5-6-parted. Stamens 3, monadelphous.
3. **ACALYPHA.** Sterile fl. spiked above the 1-3 lobed-bracted fertile ones. Calyx 3-4-parted. Stamens 8-16, monadelphous.
4. **PILINOPHYTUM.** Flowers clustered in heads or spikes; the sterile above, with a 5-parted calyx, and about 12 stamens. Fertile calyx unequally 8-parted. Stigmas about 12. Plant woolly.

+ + Ovary and pod 1-celled.

5. **CROTONOPSIS.** Flowers scattered, axillary. Calyx 5-parted. Stamens 5. Stigmas 3, 2-lobed. Plant silvery-scurfy.

1. **EUPHÓRBIA**, L. SPURGE.

Flowers monœcious, included in a cup-shaped 4-5-lobed involucre (*flower* of older authors) resembling a calyx or corolla, usually bearing large and thick glands at its sinuses. Sterile flowers numerous and lining the base of the involucre, each from the axil of a little bract, and consisting merely of a single stamen jointed on a pedicel like the filament: anther-cells globular, separate. Fertile flower solitary in the middle of the involucre, soon protruded on a long pedicel, consisting of a 3-lobed 3-celled ovary with no calyx or a mere vestige. Styles 3, but 2-cleft, the stigmas therefore 6. Pod separating into 3 carpels which split elastically into 2 valves. Seed often caruncled. — Plants (herbs in the United States), with a milky acrid juice, the uppermost leaves often in whorls or pairs. Peduncles lateral or terminal, often umbellate-clustered. (Named after *Euphorbus*, physician to King Juba.)

* *Leaves destitute of stipules, alternate or scattered up to where the flowers begin, the floral ones opposite or whorled, all sessile: stem simply or umbellately several times forked: involucre in the forks and terminal.*

+ *Involucre nearly sessile, greenish: branches umbelled-forked.*

+ + *Involucral glands round or transversely elliptical, entire.*

1. **E. Darlingtonii.** (DARLINGTON'S SPURGE.) *Stem-leaves*

lanceolate-oblong, pale and minutely downy underneath, the secondary floral orbicular-dilated, all entire; umbel divided into 5-8 rays, then several times simply forked; glands obliquely oval, sessile; ovary warty; the fruit obscurely warty; seeds smooth, spherical, a little flattened at the ends. † (E. nemoralis, Darl., not of Kit.) — Copses, Chester county, &c., Penn., Darlington, and southward along the mountains. May, June. — Stem 2°-4° high, smooth. Lowest set of floral leaves oval, very obtuse; all the rest rounded, broader than long, almost truncate at the broad and closely sessile base. — Allied to E. Hiberna.

2. **E. Helioscòpia**, L. (SUN SPURGE.) *Leaves all obovate* and very rounded (or retuse) at the end, finely serrate, those of the stem wedge-shaped; umbel divided into 5 rays, then into threes, or at length simply forked; glands orbicular, stalked; fruit smooth and even; seeds wrinkled-netted. ① — Waste places, rather scarce: introduced. July-Sept. — Rather stout, branched from the root, 6'-12' high, smooth or a little hairy; the branches of the umbels mostly short.

3. **E. platyphýlla**, L. (WARTED SPURGE.) *Stem-leaves obovate-lanceolate*, the floral round-heart-shaped, mucronate, all minutely serrate; umbel once or twice divided into 3-5 rays, then forking; glands oval; fruit warty; seeds smooth and shining, roundish-obovoid, flattish. ① (E. obtusata, Pursh.) — Dry banks, Vermont, Niagara, &c., and southward, doubtless introduced. — Plant 1° high, smooth, or the leaves with scattered and fine hairs underneath and on the margins.

++ ++ *Involucral glands crescent-shaped and 2-horned.*

4. **E. Péplus**, L. (PETTY SPURGE.) *Leaves entire*, very obtuse, the lower oval or obovate and petioled, the floral round-heart-shaped; umbel once or twice divided into 3-4 rays, then forking; glands long-horned; fruit roughish and thickened on the back of each carpel, otherwise smooth; seeds pitted, oval. ① — Waste grounds, Penn., Ohio, and southward: introduced. — Plant 5'-10' high, smooth; the clasping floral leaves broader than long.

5. **E. Ésula**, L. (LEAFY-BRANCHED SPURGE.) *Leaves lanceolate or linear*; the floral (yellowish) broadly heart-shaped, mucronate, entire; umbel divided into many rays, then forking; glands short-horned (brown); fruit smoothish; seeds smooth. † — Escaped from gardens, naturalized in Essex county, Massachusetts, Oakes; likely to become a troublesome weed. June. — Stems 1° high, clustered, smooth, often producing scattered peduncles below the main umbel, and leafy sterile branches lower down.

++ ++ *Involucres conspicuously peduncled: glands entire.*

6. **E. corollata**, L. (FLOWERING SPURGE.) *Stems upright*, nearly simple; leaves oblong, obtuse, entire; the floral small; umbel

divided into 5 or 6 rays, then 3-2-forked; *glands oval* (greenish), each at the base of a conspicuous and petal-like (white) spreading appendage; fruit and seeds smooth. ¶ — Dry banks and copses, S. New York, Penn., and westward. July. — Stem 2°-3° high. Leaves smooth or hairy underneath. Involucres very handsome on account of the white false lobes, which appear like petals; the true lobes minute and incurved.

7. **E. Ipecacuánhæ**, L. (WILD IPECAC.) Stems many from a very long perpendicular root, low and diffusely spreading, flowering and simply forking from near the base; the peduncles therefore solitary, and the leaves nearly all opposite, varying from obovate or oblong to long and narrowly linear, entire; *glands kidney-shaped*, naked (greenish); fruit smooth (very minutely roughish); *seeds areolate-pitted* (white). ¶ — Sandy dry soil, Long Island and New Jersey, southward. May-July. — Leaves extremely variable, often purplish, smooth. Peduncles 1', the fruit-stalk $\frac{1}{2}$ ', long.

* * Leaves all opposite or nearly so: otherwise as in * , + , ++ ++.

8. **E. Láthyris**, L. (CAPER SPURGE.) Leaves linear-oblong, entire, the floral oblong-ovate and heart-shaped, pointed; umbel divided in 3 or 4 rays, then forking; glands short-horned; fruit and seeds smooth, each carpel with a line on the back. ② — Escaped from gardens, where it is common, and naturalized in a few places. — A tall and stout smooth species.

* * * Leaves destitute of stipules, all opposite and similar, petioled: involucres nearly sessile in a small terminal cluster, bractless.

9. **E. dentàta**, Michx. (TOOTHED SPURGE.) Upright, hairy; leaves ovate or oblong-lanceolate, coarsely serrate with blunt teeth, narrowed into a slender petiole; lobes of the involucre cut-fringed; gland mostly solitary, cup-like; fruit smooth, short-stalked; seeds minutely warted. ① (E. Herrónii, Riddell.) — Hill-sides in rich soil, S. Ohio and southward. Aug. — Plant 1° high, with the aspect of Mercurialis, at first simple, afterwards with side branches.

* * * * Leaves furnished with awl-shaped or scaly stipules, all opposite and similar, petioled (small): stems much branched: branches forking: involucres solitary in the forks and clustered on the branchlets. (Annuals.)

10. **E. polygonifòlia**, L. (SEASIDE SPURGE.) Very smooth, glaucous or pale, diffusely procumbent, very much branched from the root; leaves linear-oblong, rather obtuse, entire, veinless; glands transversely oblong, without petal-like appendages; fruit and seeds smooth and even. — Sandy coast; also along the Great Lakes. July-Sept. — Spreading flat on the ground: branches 3'-8' long.

11. **E. maculàta**, L. (SPOTTED SPURGE. MILK PURSLANE.) Hairy, or sometimes smoothish, diffusely prostrate, very much branched from the root; leaves oval, minutely serrulate towards the end,

unequal at the base, slightly 3-ribbed, often purplish, or with a dark purple blotch on the upper side; glands on small petal-like appendages; fruit mostly rather hairy; seeds 4-angled, obscurely wrinkled transversely. (*E. depréssa*, Torr.) — Gravelly banks and open places, common. June–Sept. Forming flat patches, 4'–15' broad: leaves 3–6 lines long. Fruit not larger than a pin's head; the carpels angled on the back.

12. ***E. hypericifolia***, L. (LARGER SPOTTED SPURGE.) Smoothish or rather hairy; *stems ascending*, loosely branched (8'–20' high); *leaves ovate-oblong or oval-oblong, oblique or heart-shaped* at the base, often curved, *finely serrate*, 3–5-ribbed underneath, often blotched with purple; glands on small and slightly stalked roundish petal-like appendages; fruit and seeds as in No. 11, but nearly thrice their size. — Waste and cultivated places, common. July–Sept. — Much larger in all its parts than the last.

2. **PHYLLANTHUS**, L. PHYLLANTHUS.

Flowers monœcious. Calyx 5–6-parted, alike in the sterile and fertile flowers. Stamens 3; filaments united in a column, surrounded by 5–6 glands or a 5–6-lobed glandular disk. Ovary 3-celled, the cells 2-ovuled: styles 3, 2-cleft: stigmas 6. Pod separating into 3 carpels, which split into 2 valves. — Leaves alternate, with small stipules. (Name composed of *φύλλον*, leaf, and *άνθος*, blossom, because the flowers in some species are borne upon what appear like leaves.)

1. ***P. Carolinensis***, Walt. Annual, low and slender, branched; leaves 2-ranked, obovate or oval, short-petioled; flowers commonly 2 in each axil, almost sessile, one staminate, the other fertile. — Gravelly banks, Ohio, W. Penn., and southward. July.

3. **ACÁLYPHA**, L. THREE-SEEDED MERCURY.

Flowers monœcious, the sterile very small, clustered in spikes with the few or solitary fertile flowers at their base, or sometimes in separate spikes. Calyx of the sterile flowers 4-parted; of the fertile 3-parted. Stamens 8–16: filaments short, united at the base: anther-cells separate, long, hanging from the apex of the filament. Styles 3, cut-fringed (red). Pod separating into 3 globular carpels which split into 2 valves. — Annual herbs (in N. America), with the appearance of Nettles or Amaranths; the leaves alternate, petioled, with stipules. Clusters of sterile flowers with a minute bract; the fertile surrounded by a large and leaf-

like cut-lobed persistent bract. (Ἀκαλήφη, an ancient name of the Nettle.)

1. **A. Virginica**, L. *Leaves ovate or oblong-ovate, obtusely serrate, long-petioled; sterile spike rather few-flowered, mostly shorter than the deeply palmately-cleft fruiting bracts.* — Fields and open places, common. Aug. — A homely weed, 1° - 2° high, smoothish or rather hairy, often purplish in autumn. Fertile flowers 1-3 in each axil, with the small and short-peduncled sterile spike: bracts very large and leaf-like, unequally cut into 5-9 lanceolate lobes.

2. **A. gracilens**. *Leaves lanceolate, oblong-lanceolate, or linear, obscurely serrate, short-petioled, mostly obtuse; sterile spike long and slender, much longer than the cut-toothed bract.* — Sandy dry soil, New Jersey, and common southward. — A somewhat downy plant, 6' - 12' high; the heart-ovate fruiting bract sharply cut-toothed or barely cleft at the sides; the sterile spike frequently 1' long and half the length of the leaves.

A. CAROLINIANA, Walt., not of Michx. (*A. ostryæfolia*, Riddell?), is entirely a Southern and peculiar species.

4. **PILINOPHYTUM**, Kl. (CROTON, Michx., partly.)

Flowers monœcious, in capitate clusters or short terminal spikes, which are sterile above and fertile below. Sterile flowers with a 5-parted calyx, 5 petals alternate with 5 glands, and about 12 distinct stamens. Fertile flowers with an unequally 8-parted calyx and a 3-celled ovary: styles 3, several times cleft. Pod separating into 3 two-valved carpels. — Branching upright annuals woolly all over with whitish starry hairs (whence the name, from *πίλιος*, made of felt, and *φυτόν*, plant); the leaves alternate and long-petioled.

1. **P. capitatum**, Kl. *Leaves oval-oblong or narrowly oblong, obtuse at both ends, silvery-woolly underneath, mostly entire; fertile flowers numerous, forming a close head in fruit.* (*Croton capitatum*, Michx.) — Dry barrens, New Jersey, *Knieskern*. Common in Kentucky and westward: nearly 1° high, stout.

5. **CROTONOPSIS**, Michx. CROTONOPSIS.

Flowers monœcious, axillary and terminal, solitary, the lower fertile. Calyx 5-parted. Sterile flowers with 5 petals and 5 stamens: filaments distinct, enlarged at the apex. Fertile flowers with 5 petal-like scales opposite the sepals, and a 1-celled 1-ovuled ovary: stigmas 3, 2-lobed. Fruit dry and indehiscent, small,

1-seeded. — A low annual, with alternate or opposite short-petioled linear or lanceolate leaves, which are green and smoothish above but silvery hoary with starry hairs and scurfy with brownish scales underneath, as well as the branches, &c. (Name compounded of *Κρότων*, and *ὄψις*, *appearance*, for a plant with the aspect of *Croton*.)

1. **C. linearis**, Michx. — Pine barrens of N. Jersey, *Knieskern*, and southward. Aug. — Flowers sessile, small.

RÍCINUS COMMŪNIS, L., the CASTOR-OIL PLANT, often found in gardens, and *BÚXUS SEMPÉRVIRENS*, the BOX, also belong to this family.

ORDER 99. EMPETRÀCEÆ. (CROWBERRY FAMILY.)

Low shrubby evergreens, with the foliage and aspect of Heaths, but the flowers more nearly as in the Spurge Family, except that the fruit is drupe-like and indehiscent; — consisting of three genera, of which two fall within our limits. (Pollen as in Heaths.)

1. ÉMPETRUM, Tourn. CROWBERRY.

Flowers polygamous, scattered and solitary in the axils of the leaves, scaly-bracted. Calyx of 3 spreading and somewhat petal-like sepals. Stamens 3. Style very short: stigma 6-9-rayed. Fruit a berry-like drupe, with 6-9 seed-like nutlets; each containing a single pendulous seed; the radicle pointing upwards. (An ancient name, from *ἐν*, *upon*, and *πέτρος*, *a rock*; the plants growing in rocky places.)

1. **E. nigrum**, L. (BLACK CROWBERRY.) Procumbent and trailing; leaves linear-oblong, scattered; fruit black. — Alpine summits of the mountains of New Hampshire and N. New York. June. — Flowers small and inconspicuous.

2. CORÈMA, Don. (BROOM-CROWBERRY.)

Flowers diœcious or polygamous, collected in terminal heads, each in the axil of a scaly bract, and with 5 or 6 thin and scarious imbricated bractlets, but no proper calyx. Stamens 3, rarely 4, with long filaments. Style slender, 3- (4-5-) cleft: stigmas narrow, often toothed. Fruit a small drupe, with 3 (rarely 4-5) nutlets containing an erect seed; the radicle pointing downwards. — Diffusely much-branched little shrubs, with scattered or

nearly whorled narrowly linear leaves. (Name *κόρημα*, a broom, from the bushy aspect.)

1. **C. Conrădii**, Torrey. Diffusely branched, nearly smooth; drupe very small, dry and juiceless when ripe. (Empetrum, Torr. Tuckermănia, Klotzsch. Oakesia, Tuck.) — Sandy pine barrens and dry rocky places, New Jersey, Long Island; Plymouth, Massachusetts; and Bath, Maine. April. — Shrub 6'–9' high: the sterile plant handsome in flower, on account of the tufted purple filaments and brown-purple anthers. (Gray, *Chlor. Bor.-Am.* t. 1.)

ORDER 100. JUGLANDACEÆ. (WALNUT FAMILY.)

Trees, with alternate pinnate leaves, without stipules; the sterile flowers in catkins (aments) with an irregular calyx; the fertile solitary or in small clusters, with a regular 3–5-lobed calyx adherent to the incompletely 2–4-celled but only 1-ovuled ovary. Fruit a kind of dry drupe, with a bony endocarp (nut-shell), containing a large 4-lobed orthotropous seed. Albumen none. Cotyledons fleshy and oily, sinuous, 2-lobed: radicle short, superior. Petals sometimes present in the fertile flowers.

1. JUGLANS, L. WALNUT.

Sterile flowers in long and simple lateral catkins; the calyx adherent to the entire bracts or scales, unequally 3–6-cleft. Stamens 8–40: filaments very short. Fertile flowers solitary or several together on a peduncle at the end of the branches, with a 4-toothed calyx, bearing 4 small petals at the sinuses. Styles 2, very short: stigmas 2, somewhat club-shaped and fringed. Fruit with a fibrous-fleshy indehiscent epicarp, and a rough irregularly furrowed endocarp or nut-shell. — Trees with strong-scented or resinous-aromatic bark, &c., naked buds, and odd-pinnate leaves of many serrate leaflets. Pith in plates. (Name contracted from *Jovis glans*, the nut of Jupiter.)

1. **J. cinerea**, L. (BUTTERNUT.) Leaflets oblong-lanceolate, pointed, rounded at the base, downy, especially underneath, the *petioles and branchlets downy with clammy hairs; fruit oblong, clammy*, the nut pointed, deeply sculptured and rough with ragged ridges. — Rich woods, common. May: fruit ripe in Sept. — Tree 30°–50° high, with gray bark, and widely spreading branches; wood lighter colored than in the next.

2. **J. nigra**, L. (BLACK WALNUT.) Leaves ovate-lanceolate, taper-pointed, somewhat heart-shaped or unequal at the base, smooth above, the lower surface and the *petioles minutely downy*; *fruit spherical*, roughly dotted, the nut corrugated. — Rich woods, rare in the Eastern, common in the Western States. May: fruit ripe in Oct. — A large, handsome tree, with brown bark, and valuable purplish-brown wood turning blackish with age. Seed sweet, more pleasant-tasted and less oily than the butternut, but greatly inferior to the European walnut (*J. rægia*).

2. CARÿA, Nutt. HICKORY.

Sterile flowers in slender lateral catkins which are mostly in threes on a common peduncle: calyx naked, unequally 3-parted. Stamens 3–8: filaments nearly wanting. Fertile flowers 2–3 together at the end of the branches, with a 4-toothed calyx: petals none. Stigma large, 4-lobed. Fruit globular, with a somewhat fleshy and at length leathery epicarp or husk, which splits into 4 valves, and falls away when ripe from the smooth and slightly 4–6-angled incompletely 4-celled endocarp or nut-shell. — Trees with hard and very tough wood, and odd-pinnate leaves of 5–9 leaflets; the two sorts of flowers from the same scaly buds with these, the sterile aments borne below the leaves. Pith continuous. (*Kapúa*, an ancient name of the Walnut.) All flower in May, and shed their nuts in October.

* *Seed edible and delicious: valves of the husk very thick, falling away from the nut in 4 separate pieces at maturity: bark of old trunks exfoliating in shaggy strips or plates.*

1. **C. álba**, Nutt. (SHELL-BARK OR SHAG-BARK HICKORY.) *Leaflets* 5, minutely downy underneath, finely serrate, the 3 upper obovate-lanceolate, *the lower pair much smaller* and oblong-lanceolate, all taper-pointed; *fruit depressed-globular; nut somewhat flattened, nearly pointless*, with a rather thin whitish shell and a large kernel. — Rich moist woods; common. A tall and handsome tree, the old trunks very rough from the exfoliation of the outer part of the bark, which loosens in large strips adhering by the middle or one end: wood valuable as timber, and especially for fuel; while the fruit furnishes the principal *hickory nuts* of the market. Buds scaly and very conspicuous in spring.

2. **C. sulcàta**, Nutt. (THICK SHELL-BARK HICKORY.) *Leaflets* 7–9, obovate-lanceolate, sharply serrate, downy underneath; *fruit oval, 4-ribbed above the middle with intervening furrows; nut strongly pointed, slightly flattened, with a thick yellowish shell.* —

Valleys along and near the Alleghany Mountains. Nuts nearly a sweet-tasted as in the last.

* * *Seed sweetish, but small : valves of the husk not separating to the base : nut hard-shelled : bark not shaggy.*

3. **C. tomentosa**, Nutt. (MOCKER-NUT. WHITE-HEART HICKORY.) *Leaflets 7-9, oblong- or obovate-lanceolate, slightly serrate, roughish-downy underneath as well as the petiole ; aments hairy ; fruit globular or ovoid, with a thick and hard husk, which splits almost to the base ; nut somewhat 6-angled, the shell very thick and hard (light brown). Rich woods, common. — A tall tree with resinous-scented foliage, and cracked bark on the larger trunks ; the wood celebrated for its excellence as fuel. The small kernel is difficult of extraction from the thick and bony nut. — A var. MÁXIMA, Nutt., bears fruit as large as an apple, with an exceedingly thick husk.*

4. **C. microcarpa**, Nutt. (SMALL-FRUITED HICKORY.) *Leaflets 5-7, oblong-lanceolate, serrate, glandular underneath (not downy) ; aments smooth ; fruit roundish-ovoid, with a thin husk ; nut slightly 4-angled, the shell rather thin. — Moist woodlands, Penn. (and N. England ?). — Bark even. Fruit only $\frac{3}{4}$ ' in diameter, shaped like that of the last ; the foliage much as in the next species.*

5. **C. glabra**, Torr. (PIG-NUT or BROOM HICKORY.) *Leaflets 5-7, ovate-lanceolate, serrate, smooth or nearly so ; fruit pear-shaped or roundish-obovate, thin, splitting about half way down into 4 coriaceous valves ; nut hard and tough, with a sweetish or bitterish small kernel. (C. porcina, Nutt.) — Woodlands, common. — A large tree, with a close bark, very tough and valuable wood, and exceedingly tough sprouts (used as hickory withes) : the fruit and nuts of variable form.*

* * * *Seed intensely bitter : the nut-shell thin and fragile : husk thin and soft.*

6. **C. amara**, Nutt. (BITTER-NUT or SWAMP HICKORY.) *Leaflets 7-11, oblong-lanceolate, serrate, smooth ; fruit globular, with ridged or prominent seams opening half way down ; nut inversely heart-shaped. — Wet woods, common. — A graceful tree, with close bark, and small pointed buds nearly destitute of scales ; the timber inferior to the other hickories. Nut-shell so fragile that it may be crushed with the hand ; the bitter kernel remarkably corrugated.*

ORDER 101. CUPULÍFERÆ. (OAK FAMILY.)

Trees or shrubs, with alternate and simple straight-veined leaves, deciduous stipules, and monœcious flowers ; the sterile in catkins (aments) (or capitate-clustered in the Beech), the fertile solitary or clustered, furnished with an

involucre which forms a cup or covering to the 1-celled 1-seeded nut. Ovary 2–7-celled, with 1–2 pendulous anatropous ovules in each cell; but all the cells and ovules except one disappearing in the fruit. Calyx adherent to the ovary, the minute teeth crowning its summit. Seed with no albumen, filled with the embryo: cotyledons very thick and fleshy: radicle short, superior.

Synopsis.

* Fertile flowers scattered or few in a cluster.

1. **QUERCUS.** Involucre 1-flowered, of many imbricated small scales, forming a cup around the base of the hard and rounded nut.
2. **CASTANEA.** Involucre 2–3-flowered, forming a prickly burr inclosing 1–3 coriaceous nuts, opening at length by 4 valves.
3. **FAGUS.** Involucre 2-flowered, rather prickly, 4-valved, inclosing 2 sharply 3-angled nuts. Sterile flowers in capitate clusters.
4. **CORYLUS.** Involucre 1–2-flowered, formed of 2–3 confluent scales, which become leafy-coriaceous, much enlarged and cut or torn at the apex, inclosing a bony nut.

* * Fertile flowers clustered in a kind of ament.

5. **CARPINUS.** Involucre a separate open leaf.
6. **OSTRYA.** Involucre a bladderly bag, 1-flowered.

1. QUÉRCUS, L. OAK.

Sterile flowers clustered in slender and naked drooping catkins, without bracts: calyx 6–8-parted: stamens 6–12: anthers 2-celled. Fertile flowers scattered or somewhat clustered, consisting of a 3-celled 6-ovuled ovary with a 3-lobed stigma, inclosed by a scaly bud-like involucre which becomes an indurated cup (*cupule*) around the base of the rounded nut or acorn. Cotyledons remaining underground in germination. — Flowers greenish or yellowish, the fertile inconspicuous. Aments several from the same scaly bud. (The classical Latin name.) All flower in April and May, and shed their nuts in October.

* *Fruit ripening the first year, mostly peduncled: leaves with the teeth or lobes not bristly-pointed.*

+ *Leaves sinuate-lobed or pinnatifid.* (White Oaks.)

1. **Q. álba,** L. (WHITE OAK.) *Leaves smooth, pale or glaucous underneath, bright green above, obovate-oblong, obliquely and deeply cut into 3–5 oblong or linear and obtuse mostly entire lobes; cup hemispherical, roughish, naked, much shorter than the ovoid or ob-*

long acorn. — Rich woods, common. — A well known and invaluable large tree. Nut about 1' long, sweet, edible. Lobes of the leaves variable in breadth, sometimes very shallow.

2. **Q. obtusiloba**, Michx. (POST OAK. ROUGH OR BOX WHITE OAK.) *Leaves grayish-downy underneath, pale and rough above, thickish, sinuately cut into 5-7 roundish divergent lobes, the upper ones much larger and often 1-3-notched; cup hemispherical, naked, about one third the length of the ovoid acorn.* (*Q. stellata*, Willd.) — Sandy soil, coast of Massachusetts and southward, also sparingly westward. — A small tree, with very durable wood. Acorns $\frac{1}{2}$ ' long.

3. **Q. macrocarpa**, Michx. (OVER-CUP WHITE OAK. BURR-OAK.) *Leaves obovate, deeply and lyrate-sinuately lobed, pale or downy underneath, the lobes obtusely toothed; cup conspicuously imbricated, mossy-fringed at the border, more than half inclosing the ovoid very obtuse acorn.* — Dry woods along rivers, rare in W. New England and New York, common from Ohio to Wisconsin. — A handsome middle-sized tree: the acorns $1\frac{1}{2}$ ' long, 1' broad.

4. **Q. olivæformis**, Michx. (MOSSY OVER-CUP OAK.) *Leaves oblong, deeply and unequally sinuate-pinnatifid, smooth, glaucous underneath; cup very deep, mossy-fringed above, inclosing three fourths of the oblong somewhat pointed acorn.* — Rare in S. W. New York and Penn.; not uncommon in Ohio and westward. — Acorns $1\frac{1}{4}$ ' long, narrow; the scales of the upper part of the cup bearing long flexible filaments, which give the moss-like appearance.

+ + *Leaves coarsely sinuate-toothed, not lobed.* (Chestnut Oaks.)

5. **Q. bicolor**, Willd. (SWAMP WHITE OAK.) *Leaves oblong-obovate, wedge-shaped at the base, hoary-downy underneath, coarsely and irregularly sinuate- (8-15-) toothed, short-petioled; peduncle elongated in fruit; cup hemispherical, often a little mossy-fringed at the border, inclosing less than half the oblong-ovoid acorn.* — Low moist woods, common, especially eastward. — A pretty large tree, with brownish valuable wood, light scaly bark, large leaves (6' - 7' long), and acorns nearly 1' long, sweet, as in most *Chestnut Oaks*.

6. **Q. prinus**, L. (SWAMP CHESTNUT OAK.) *Leaves obovate, acute, downy underneath, coarsely serrate with nearly uniform rounded teeth; cup somewhat top-shaped; acorn ovate (large).* — Low woods and river-banks, Penn. and southward. — A large tree.

7. **Q. montana**, Willd. (ROCK CHESTNUT OAK.) *Leaves broadly obovate, coarsely and almost equally serrate with broad and obtuse teeth, whitish-downy underneath; peduncles short; cup hemispherical, with somewhat tubercled scales; acorn ovate (1' - $1\frac{1}{2}$ ' long).* — Rocky hills, rather common. — A middle-sized tree, valuable for timber; the bark prized by tanners.

8. **Q. Castanea**, Willd. (YELLOW CHESTNUT OAK.) *Leaves oblong-lanceolate*, hoary-white underneath, *equally and rather sharply toothed*; peduncles short; cup hemispherical; acorn ovoid. — Rich woods and valleys, rare in N. England, common in Penn. and westward. — This has the leaves shaped more like those of the Chestnut than any other. These three Chestnut Oaks are very difficult to distinguish, and are most probably only varieties of one species.

9. **Q. prinoides**, Willd. (CHINQUAPIN OR DWARF CHESTNUT OAK.) *Leaves obovate and lanceolate oblong, coarsely wavy-toothed*, downy underneath; peduncles short or none; cup hemispherical; acorn ovoid. (*Q. Chinquapin, Pursh.*) — Sandy soil, New England, and Albany, New York, to Penn. and Ohio. — Shrub 2°–6° high.

* * Fruit not maturing until the second year, nearly sessile.

— Leaves entire, narrow. (Willow Oaks.)

10. **Q. Phellos**, L. (WILLOW OAK.) *Leaves linear-lanceolate, narrowed to both ends, smooth, light green*; cup saucer-shaped; acorn globular. — Sandy low woods, Long Island and New Jersey, thence southward. — Tree 30°–50° high, remarkable for the willow-like leaves which are 3'–4' long. Fruit small.

11. **Q. imbricaria**, Michx. (LAUREL OR SHINGLE OAK.) *Leaves lanceolate-oblong, acute at both ends, mucronate, thickish, smooth and shining above, somewhat downy underneath*; cup saucer-shaped; acorn globular. — Barrens and open woodlands, New Jersey to Wisconsin, common westward. — Tree 30°–50° high; the wood used for shingles in the Western States, whence the name.

— Leaves toothed or lobed; the teeth or lobes mucronate or bristle-pointed (the bristles deciduous in No. 13). (Black and Red Oaks.)

12. **Q. illicifolia**, Wang. (BEAR, OR BLACK SCRUB OAK.) *Dwarf; leaves obovate, wedge-shaped at the base, angularly about 5-lobed, whitened-downy underneath*; cup flatish-top-shaped; acorn ovoid. — Sandy barrens and rocky hills. (*Q. Banistèri, Michx.*) — A straggling, crooked shrub, 3°–8° high. Leaves 2'–4' long, thickish. Acorns ½' long.

13. **Q. nigra**, L. (BLACK JACK, OR BARREN OAK.) *Leaves broadly wedge-shaped, but rounded or a little heart-shaped at the base, dilated and slightly 3-lobed (or sometimes 5-lobed) at the end, rusty-downy underneath* when young; acorn ovoid-globular, half covered by the very scaly cup. — Dry sandy barrens, Long Island and New Jersey, thence southward. — Tree 8°–25° high, scraggy, with blackish bark. Leaves coriaceous, shining above, 4'–8' long, with rounded, often obscure lobes; the principal veins projecting into bristle points which are commonly deciduous. Acorn ¾' long.

14. **Q. falcata**, Michx. (SPANISH OAK.) *Leaves grayish-downy underneath, long-petioled, obtuse or rounded at the base, 3–5-*

lobed above; the lobes prolonged, mostly narrow and more or less scythe-shaped, especially the terminal one, entire or sparingly cut-toothed; cup saucer-shaped; acorn spherical. — Dry or sandy soil, New Jersey and southward. — A small or large tree, extremely variable in foliage: a var. with shorter lobes is *Q. triloba*, Willd.

15. *Q. tinctoria*, Bartram. (QUERCITRON OR BLACK OAK.) Leaves more or less rusty-pubescent underneath, obovate-oblong, slightly or sometimes deeply sinuate-lobed, the lobes somewhat toothed; acorn nearly spherical or depressed-globular, one third immersed in a deep conspicuously scaly cup. — Dry woods, common. — A large tree, often confounded with the next, especially the varieties with deeper cut leaves; but these are duller and thicker, more dilated above the middle, somewhat downy underneath until midsummer, and turn yellowish-brown after frost; and the inner bark (*quercitron* of dyers) is very thick and yellow. Wood reddish, coarse-grained, but valuable. Acorns rather small.

16. *Q. coccinea*, Wang. (SCARLET OAK.) Leaves oval in outline, deeply sinuate-pinnatifid, with broad and open sinuses, and divergent sparingly cut-toothed lobes (3-4 on each side), smooth, bright green and shining both sides, broad or truncate at the base; acorn globular-ovoid, one third or more immersed in the thick and somewhat top-shaped conspicuously scaly cup. — Rich woods, common. — A large tree; the long-petioled shining leaves cut two thirds to the midrib, turning bright scarlet in autumn. Acorns rather larger and longer than in the last; the timber and bark less valuable.

17. *Q. rubra*, L. (RED OAK.) Leaves oblong, smooth, pale beneath, sinuately cut with rather narrow sinuses into short and entire or sparingly toothed acute spreading lobes (4-6 on each side); cup saucer-shaped, shallow, even (of very small and close scales), very much shorter than the oblong-ovoid acorn. (*Q. ambigua*, Michx.?) — Rocky woods, common. — A good-sized tree, with reddish very porous and coarse-grained wood, of little value as timber. Leaves turning dark red after frost; the sinuses extending scarcely half way to the midrib. Acorns 1' long.

18. *Q. palustris*, Du Roi. (SWAMP SPANISH, OR PIN OAK.) Leaves oblong, smooth and shining, bright green both sides, deeply pinnatifid, with broad and rounded sinuses; the lobes divergent, cut-lobed and toothed, acute; cup saucer-shaped, even; acorn nearly globose (scarcely $\frac{1}{2}$ ' long). — Low grounds, along streams, S. New York to Wisconsin, chiefly southward. — A very handsome middle-sized tree, with light and elegant foliage, much like that of the Scarlet Oak, but the sinuses reaching three fourths of the way to the midrib, and the lobes more cut, the acorns and cup different. The timber is better than that of the Red Oak.

Q. HETEROPHYLLA, Michx. f., was founded on a single tree raised in Bartram's garden, recently destroyed, which was doubtless a hybrid between *Q. Phellos* and *Q. falcata* or some other species of that section.

Q. LEANA, Nutt., also founded on a solitary individual, near Cincinnati, Ohio, is most probably a hybrid between *Q. imbricaria* and *Q. tinctoria*, as the discoverer, the late Mr. Lea, suggested.

2. **CASTANEA**, Tourn. CHESTNUT.

Sterile flowers interruptedly clustered in long and naked cylindrical catkins: calyx 5-6-parted: stamens 8-15: anthers 2-celled. Fertile flowers 2 or 3 together in an ovoid scaly prickly involucre: calyx with a 5-6-lobed border crowning the 3-7-celled 16-14-ovuled ovary: abortive stamens 5-12: stigmas bristle-shaped, as many as the cells of the ovary. Nuts coriaceous, ovoid, inclosed 2-3 together or solitary in the hard coriaceous and very prickly 4-valved involucre. Cotyledons very thick, somewhat plaited, cohering together, remaining underground in germination. — Leaves strongly straight-veined. Flowers appearing later than the (undivided) leaves; the catkins axillary near the end of the branches, cream-color; the fertile flowers at their base. (The classical name, from that of a town in Thessaly.)

1. **C. véscā**, L. (CHESTNUT.) *Leaves oblong-lanceolate, pointed, serrate with coarse pointed teeth, smooth and green both sides; nuts 2 or 3 in each involucre, therefore flattened on one or both sides. — Rocky or hilly woods, common. June, July. — A large tree, with light coarse-grained wood. The American variety bears smaller and sweeter nuts than the European.*

2. **C. pùmila**, Michx. (CHINQUAPIN.) *Leaves oblong, acute, serrate with pointed teeth, whitened downy underneath, nut solitary, not flattened. — Sandy woods, Long Island? S. Penn. and Ohio, common farther south. June. — Shrub or tree 6°-20° high. Involucres small, often spiked at the base of the sterile catkins; the ovoid pointed nut scarcely half as large as a common chestnut, very sweet.*

3. **FÀGUS**, Tourn. BEECH.

Sterile flowers in small heads on drooping peduncles, with deciduous scale-like bracts: calyx bell-shaped, 5-6-cleft: stamens 8-12: anthers 2-celled. Fertile flowers usually in pairs at the apex of a short peduncle, invested by numerous awl-shaped bractlets, the inner grown together at their bases to form the involucre:

calyx-lobes 4 - 5, awl-shaped : ovary 3-celled with 2 ovules in each cell : styles 3, thread-like, stigmatic along the inner side. Nuts sharply 3-sided, usually 2 in each urn-shaped and soft-prickly coriaceous involucre, which splits to below the middle into 4 valves. Cotyledons thick, folded-plaited internally, coherent, but rising and expanding in germination. Trees with smooth ash-gray bark, undivided strongly straight-veined leaves, and a light horizontal spray. Scales of the taper buds formed of scarious stipules. Flowers yellowish, appearing with the leaves : peduncles axillary at the base of the branchlets. (The classical name, from *φάγω*, *to eat*, in allusion to the esculent nuts.)

1. **F. ferruginea**, Ait. (AMERICAN BEECH.) Leaves oblong-ovate, taper-pointed, distinctly and often coarsely toothed ; petioles and midrib soon nearly naked ; prickles of the fruit recurved or spreading. (*F. ferruginea* and *F. sylvêstris*, *Michx. f.*) — Woods, common. May. — Manifestly different from the European Beech, with longer and less shining leaves, most of the silky hairs early deciduous ; the lower surface then nearly smooth, or on young shoots more or less pubescent with a fine down.

4. **CÓRYLUS**, Tourn. HAZEL-NUT. FILBERT.

Sterile flowers in drooping cylindrical catkins ; the concave bracts and the 2-cleft calyx combined to form 3-lobed scales, to the axis of which the 8 short filaments irregularly cohere : anthers 1-celled. Fertile flowers several together in lateral and terminal scaly buds. Ovary 2-celled with 1 ovule in each : stigmas 2, thread-like. Nut bony, ovoid, separately inclosed in a large leafy-coriaceous involucre, which is composed of 2 - 3 united bracts tubular at the base, and lacerated above. — Shrubs flowering in early spring, before the (roundish unequally serrate) leaves appear. (The classical name, probably from *κόρυς*, *a helmet*, from the involucre.)

1. **C. Americàna**, Walt. (WILD HAZEL-NUT.) Leaves roundish-heart-shaped, pointed, coarsely serrate ; involucre glandular-downy, with a dilated flattened border, about twice the length of the globular nut. — Thickets, common. Shrub 4° - 8° high ; the young twigs, &c., downy and glandular-hairy. Nut of fine flavor, but smaller and thicker-shelled than the European Hazel-nut.

2. **C. rostràta**, Ait. (BEAKED HAZEL-NUT.) Leaves ovate or ovate-oblong, somewhat heart-shaped, pointed, doubly serrate ; involucre

much prolonged above the globular-ovoid nut into a narrow tubular beak, densely clothed with bristles. — Banks of streams, &c., common northward. — Shrub 2° - 5° high, with slender smooth branches.

5. CARPINUS, L. HORNBEAM. IRON-WOOD.

Sterile flowers in drooping cylindrical catkins, consisting of about 12 stamens in the axil of a simple and entire scale-like bract, destitute of a proper calyx: filaments very short: anthers 1-celled, bearded at the apex. Fertile flowers several, spiked in a sort of loose terminal catkin, with small deciduous bracts, each subtending a pair of flowers, consisting of a 2-celled 2-ovuled ovary terminated by 2 thread-like stigmas. Nut small, ovoid, ribbed, stalked, each with a simple, 1-sided, enlarged, open and leaf-like involucre. — Trees with a smooth gray bark, and slender buds like the Beech, and foliage resembling the Beech or Birch, appearing later than the flowers. (The ancient Latin name.)

1. **C. Americana**, Michx. (AMERICAN HORNBEAM. BLUE, or WATER BEECH.) Leaves ovate-oblong, pointed, sharply doubly serrate, nearly smooth; involucre 3-lobed, somewhat halbert-shaped, sparingly cut-toothed on one side. — Along streams, common. — Tree 10° - 20° high, with an irregular ridged trunk, and very hard whitish wood; called, indiscriminately with the Hop-Hornbeam, *Iron-wood*.

6. ÓSTRYA, Micheli. HOP-HORNBEAM. IRON-WOOD.

Sterile flowers nearly as in *Carpinus*; filaments irregularly somewhat united. Fertile flowers numerous in a short terminal catkin, with small deciduous bracts; each inclosed in a membranous sac-like involucre which enlarges and forms a bladderly closed bag in fruit, these imbricated to form a sort of strobile appearing like that of the Hop. Ovary 2-celled, 2-ovuled, crowned with the entire and bearded border of the calyx, forming a small and seed-like smooth nut. — Slender trees with brownish finely furrowed bark, and foliage, &c., nearly as in the last genus. Flowers appearing with the leaves. (The classical name, thought to be derived from *ὄστρεον*, an *oyster-shell*, in allusion either to the fruit, where the resemblance is not apparent, or to the hardness of the wood.)

1. **O. Virginica**, Willd. (AMERICAN HOP-HORNBEAM. LEVER-WOOD.) Leaves oblong-ovate, pointed, very sharply doubly serrate, somewhat downy; buds acute; involucral sacs bristly-hairy at

the base. — Rich woods, not rare. April, May; the large and handsome oval-oblong strobiles full grown in Aug. Tree 20° - 40° high; the whitish wood as hard as in the foregoing.

ORDER 102. **MYRICACEÆ.** (SWEET GALE FAMILY.)

Monœcious or diœcious shrubs, with both kinds of flowers in short scaly catkins, and resinous-dotted often fragrant leaves, — differing from the Birch Family chiefly by the 1-celled ovary with a single erect orthotropous ovule, and a drupe-like nut. Involucre none.

1. MYRICA, L. BAYBERRY. WAX MYRTLE.

Flowers diœcious: the sterile in oblong or cylindrical, the fertile in ovoid catkins, closely imbricated; both destitute of calyx and corolla, solitary under a scale-like bract and with a pair of bractlets. Stamens 2 - 8: filaments somewhat united below. Ovary with 3 scales at its base, and 2 thread-like stigmas. Fruit a small globular nut, studded with resinous grains or wax. (*Mypíkη*, the ancient name of the Tamarisk or some other shrub; perhaps from *μυρίζω*, to perfume.)

1. **M. Gâle, L.** (SWEET GALE.) *Leaves wedge-lanceolate, serrate towards the apex; pale, appearing later than the flowers; sterile catkins closely clustered; nuts in imbricated heads, inclosed in the thick pointed ovate scales which coalesce with its base. — Wet borders of ponds, common northward. April. — Shrub 3° - 5° high.*

2. **M. cerifera, L.** (BAYBERRY. WAX MYRTLE.) *Leaves oblong-lanceolate, narrowed at the base, entire or wavy-toothed towards the apex, shining and resinous-dotted both sides, somewhat preceding the flowers; sterile catkins scattered, oblong; scales wedge-shaped at the base; nuts scattered and naked, incrustated with white wax. — Sandy soil on and near the sea-shore: also on Lake Erie. May. — Shrub 3° - 8° high, with fragrant leaves: the catkins sessile along the last year's branches; the fruits persistent for 2 or 3 years.*

2. COMPTONIA, Solander. SWEET FERN.

Flowers monœcious; the sterile in cylindrical catkins, with kidney-heart-shaped pointed scale-like bracts, and 3 - 6 stamens; the fertile in globular aments, burr-like: ovary surrounded by 5 - 6 long linear-awl-shaped scales, persistent around the ovoid-oblong smooth nut: otherwise as in *Myrica*. — Leaves linear-lanceolate,

pinnatifid with many rounded lobes, thin, appearing rather later than the flowers. Stipules half heart-shaped. (Named after *Henry Compton*, Bishop of London a century ago, a cultivator and patron of botany.)

1. **C. asplenifolia**, Ait. — A common shrub, 1^o–2^o high, on dry hill-sides, with sweet-scented fern-like leaves. April, May.

ORDER 103. BETULACEÆ. (BIRCH FAMILY.)

Monœcious trees or shrubs, with both kinds of flowers in scaly catkins, 2 or 3 under each bract, and no involucre to the naked 1-celled and 1-seeded often winged nut, which results from a 2-celled and 2-ovuled ovary; — otherwise nearly as in the Oak Family.

1. BÉTULA, Tourn. BIRCH.

Sterile flowers 3, and bractlets 2, under each scale or bract of the catkins, consisting each of a calyx of one scale and 4 stamens attached to its base: filaments very short: anthers 1-celled. Fertile flowers 3 under each 3-lobed bract, with no separate bractlets and no calyx, each of a naked ovary with 2 thread-like stigmas, becoming a broadly winged and scale-like nutlet or small samara. Seed suspended, anatropous. Cotyledons flattish, oblong. — Outer bark usually separable in thin horizontal sheets, that of the branchlets dotted. Twigs and leaves often spicy-aromatic. Foliage mostly thin and light. Buds sessile, scaly. Sterile catkins long and drooping, terminal and lateral, formed in summer, remaining naked through the succeeding winter, and expanding their golden flowers in early spring, preceding the leaves: fertile catkins oblong or cylindrical, lateral, protected by scales through the winter, and developed with the leaves. (The ancient Latin name.)

* *Trees with the bark of the trunk white externally, separable in thin sheets: petioles long and slender: fertile catkins cylindrical, peduncled, spreading or drooping.*

1. **B. populifolia**, Ait. (AMERICAN WHITE BIRCH.) *Leaves triangular (deltoid), very taper-pointed, truncate or slightly heart-shaped at the broad base, smooth and shining both sides (glandular-dotted when young); lateral lobes of the fruit-bearing bracts oblong and curved backward. — Common on poor soils, Maine to Penn., eastward, not extending westward. — A small and slender, very grace-*

ful, but useless, tree, 20° - 40° high, with a chalky-white bark, much less separable into thin sheets than in No. 2; the poplar-shaped and very long-pointed leaves as tremulous as an Aspen, on petioles nearly half their length, serrate with small and very short teeth, and also coarsely toothed more or less.

2. **B. papyræa**, Ait. (PAPER BIRCH. CANOE BIRCH.) *Leaves ovate, taper-pointed, heart-shaped or abrupt (or rarely wedge-shaped) at the base, smooth above, dull underneath; lateral lobes of the fruit-bearing bracts short and rounded.* — Woods, N. England to Wisconsin, almost entirely northward. — A large tree, with fine-grained wood, and very tough durable bark splitting into paper-like layers. Leaves dark-green above, pale, glandular-dotted, and a little hairy on the veins underneath, sharply and unequally doubly serrate, 3-4 times the length of the petiole. There is a dwarf mountain var.

* * *Trees with reddish-brown or yellowish bark: petioles short: fertile catkins ovoid-oblong, scarcely peduncled.*

3. **B. nigra**, L. (RIVER or RED BIRCH.) *Leaves rhombic-ovate, acutish at both ends, whitish and (until old) downy underneath; fertile catkins oblong, somewhat peduncled, woolly; the bracts with oblong-linear nearly equal lobes.* (*B. rubra, Michx. f.*) — Low river-banks, Massachusetts to Penn. eastward and southward. — A rather large tree, with reddish-brown bark and compact light-colored wood: leaves somewhat Alder-like, glandular-dotted, sharply doubly serrate.

4. **B. excelsa**, Ait. (YELLOW BIRCH.) *Leaves ovate or elliptical, pointed, narrowed (but mostly heart-shaped) at the base, smoothish, unequally serrate with coarse and very sharp teeth; fruiting catkins ovoid-oblong, slightly hairy; lobes of the scales nearly equal, acute, slightly diverging.* — Moist woods, common northward. Tree 40° - 60° high, with yellowish silvery bark, thin leaves, and the twigs and foliage aromatic, but not so much so as in the next; the wood, also, not so valuable.

5. **B. lénta**, L. (CHERRY BIRCH. SWEET or BLACK BIRCH.) *Leaves heart-ovate, pointed, sharply and finely doubly serrate, hairy on the veins beneath; fruiting catkins elliptical, thick, somewhat hairy; lobes of the veiny scales nearly equal, obtuse, diverging.* — Moist rich woods, very common northward. — A rather large tree, with dark chestnut-brown bark, reddish-bronze-colored on the spray, much like that of the Garden Cherry, which the leaves also somewhat resemble; the twigs and foliage spicy-aromatic: timber rose-colored, fine-grained, valuable for cabinet-work.

* * * *Shrubs, with brownish bark and rounded crenate-toothed leaves: fertile catkins very short-peduncled.*

6. **B. pùmila**, L. (LOW BIRCH.) *Erect or ascending; leaves obovate or roundish-elliptical, coarsely crenate-toothed, those of the*

summer branchlets downy and nearly orbicular; *fruiting catkins cylindrical*; the scales more or less unequally 3-lobed; *fruit broadly winged*. (*B. glandulosa*, Michx.)—Bogs, N. New England (rare), Penn., Ohio, Michigan, and northward. — Shrub 2° - 5° high, with smooth, or sometimes resinous-warty, branchlets; the growing twigs downy. Leaves thickish, 1' - 1½' long, pale or whitish underneath.

7. **B. nana**, L. (DWARF OR ALPINE BIRCH.) *Branches spreading or procumbent*; leaves orbicular, deeply crenate, smooth, reticulated-veiny underneath; *fruiting catkins oblong*; the scales nearly equally 3-cleft; *fruit narrowly winged*. — Alpine summits of the White Mountains, New Hampshire, and of Essex Mountains, New York. Shrub 10' - 24' high, with leaves about ½' wide: varying, in less frigid stations, with the larger leaves twice that size, and the branchlets often conspicuously warty with resinous dots, when it is *B. rotundifolia*, *Spach*, and *B. Littelliana*, *Tuckerm.*

2. **ÁLNUS**, TOURN. ALDER.

Sterile catkins elongated and drooping, with 5 bractlets and 1 to 3 flowers under each scale, each flower usually with a 4-parted calyx and 4 stamens: filaments very short: anthers 2-celled. Fertile catkins ovoid or oblong; the fleshy scales each 2-flowered, with a calyx of 4 little scales coherent with the scales or bracts of the catkin, which are thick and woody in fruit, all coherent below, and persistent. — Shrubs or small trees, with stalked leaf-buds furnished with a single scale, and the (often racemed or clustered) catkins of both sorts produced at the close of summer, remaining entirely naked through the winter, and expanding in early spring. (The ancient Latin name.)

§ 1. **ALNUS** proper. — *Fruit wingless*.

1. **A. incana**, Willd. (SPECKLED OR HOARY ALDER.) *Leaves broadly oval or ovate, rounded at the base, sharply serrate, often coarsely toothed, whitened and mostly downy underneath*; stipules oblong-lanceolate; fertile catkins oval; fruit orbicular. (*A. glauca*, Michx.) — Shrub 8° - 20° high, forming thickets along streams, the common Alder northward from New England to Wisconsin. — The var. *GLAUCA* has the leaves pale, but when old quite smooth, underneath.

2. **A. serrulata**, Ait. (SMOOTH ALDER.) *Leaves obovate, acute at the base, sharply serrate with minute teeth, thickish, smooth and green both sides, a little hairy on the veins beneath*; stipules oval; fertile catkins ovoid-oblong; fruit ovate. — Shrub 6° - 12° high, in similar situations to the preceding; the common Alder of Southern New England, New York, Ohio, and southward.

§ 2. **ALNÁSTER**, Spach. — *Fruit winged: sterile flowers with a calyx of a single scale, much as in Birch.*

3. **A. víridis**, DC. (GREEN OR MOUNTAIN ALDER.) Leaves round-oval or ovate, sometimes heart-shaped, glutinous and smooth or softly downy underneath, serrate with very sharp and closely set teeth, on young shoots often somewhat cut-toothed; fertile catkins long-stalked, ovoid; fruit surrounded by a broadly-winged margin. (*A. undulàta*, Willd. *Betula crísipa*, Michx.) — On mountains and along streams which descend from them, N. New England and New York. Shrub 3° - 8° high.

ORDER 104. **SALICÀCEÆ.** (WILLOW-FAMILY.)*

Diœcious trees or shrubs, with both kinds of flowers in catkins, one under each bract, entirely destitute of calyx or corolla; the fruit a 1-celled and 2-valved pod, containing numerous seeds clothed with a long silky down. — Ovary 1-celled or imperfectly 2-celled: styles 2, very short, or more or less united, each with a 2-lobed stigma. Seeds ascending, anatropous, without albumen. Cotyledons flattened. — Leaves alternate, undivided, with scale-like and deciduous, or leaf-like and persistent stipules. Wood soft and light: bark bitter.

1. **SÁLIX**, Tourn. WILLOW. OSIER.

Bracts (*scales*) of the catkins entire. Sterile flowers of 2-6 (rarely single) stamens, accompanied by 1 or 2 little glands. Fertile flowers also with a small flat gland at the base of the ovary on the inner side: stigmas short. — Trees or shrubs, generally growing along streams, with round flexible branches and large tough roots. Leaves mostly long and pointed, entire or glandularly toothed. Buds covered by a single scale, with an inner adherent membrane (separating in § 2). Catkins appearing before or with the leaves. (The classical name, said to be derived from the Celtic *sal*, near, and *lis*, water.)

§ 1. *Catkins lateral and sessile, appearing before the leaves in April or May: stamens 2: scales dark red or brown becoming black, more or less hairy, persistent.*

* I am indebted to JOHN CAREY, Esq., for the entire elaboration of this difficult family.

* *Ovary stalked, downy, hairy, or woolly.*

+ *Catkins ovoid or short-cylindrical, small: leaves entire or obscurely wavy-toothed, hairy or woolly, with prominent veins and more or less revolute margins. — Shrubs.*

1. **S. cándida**, Willd. (HOARY WILLOW.) Leaves narrowly lanceolate, taper-pointed, or the lowest obtuse, the upper surface and young branches covered with a thin web-like wool more white and dense beneath; stipules small, lanceolate, toothed, about the length of the petioles; catkins oblong-cylindrical closely flowered; ovary densely woolly; style distinct; stigmas 2-cleft; scales oblong, obtuse. (*S. incána, Michx.*, not of *Schrank.*) — New York and New Jersey to Wisconsin, in bogs. — Stems 2° - 5° high, with reddish twigs, smooth and shining at maturity. The whole shrub of a very white aspect in exposed situations, but greener in shade.

2. **S. trístis**, Ait. (DWARF GRAY WILLOW.) Leaves almost sessile, wedge-lanceolate, pointed, or the lower obtuse, grayish-woolly on both sides, the upper side becoming nearly smooth at maturity; stipules minute, hairy, very early deciduous; catkins globular when young, loosely-flowered; ovary with a long tapering beak, clothed with silvery hairs; style short; stigmas 2-lobed. — New England to Penn. and westward. — Shrub 1° - 1½° high, much branched: leaves thick, 1½' long. Stipules seldom seen, often reduced to a mere gland, though not unfrequently present. A variety occurs with very small and rigid contorted leaves.

3. **S. hùmilis**, Marshall. (LOW BUSH WILLOW.) Leaves petioled, lanceolate or obovate-lanceolate, acute or obtuse with an abrupt point, slightly downy above, more thickly so, or sometimes grayish-woolly, beneath; stipules small, semi-ovate and entire, or larger and lunar with 2-4 teeth, shorter than the petioles; catkins often recurved; ovary hairy; style distinct; stigmas 2-cleft. (*S. Muhlenbergiana, Barratt. S. conífera, Muhl.*) — Borders of fields and road-sides, common. — Shrub 3° - 8° high, varying much in size and appearance. The small forms are at times scarcely distinguishable from No. 2, but the leaves are longer, less firm in texture, and generally stipulate; the larger forms, with leaves 3' - 5' long and ¾' - 1' broad, resemble those of the two next species, but retain more or less down on the under surface at maturity. — The species of this and the following section often bear cone-like excrescences on the ends of the branches, formed of closely imbricated leaves, probably occasioned by the puncture of insects.

+ + *Catkins cylindrical, large, clothed with long glossy hairs: leaves more or less serrate, smooth and shining above, glaucous beneath and at length smooth. — Shrubs or small trees.*

4. **S. discolor**, Muhl. (GLAUCOUS WILLOW.) Leaves lanceolate or ovate-lanceolate, acute, irregularly toothed on the sides, entire

at the base and apex; stipules semilunar, toothed; catkins erect; *scales very hairy, oblanceolate, somewhat acute; ovary densely silky.* (*S. sensitiva*, Barratt?) — Low meadows and river-banks, common. — A large shrub or small tree, 8°–15° high. The young leaves are commonly obtuse and pubescent, at length becoming smooth and whitish-glaucous beneath. Stipules in the vigorous shoots equalling the petiole, more often small and inconspicuous. Young catkins 1½' long, glossy, blackish with the conspicuous scales, elongating in fruit to 2½'.

5. **S. eriocéphala**, Michx. (SILKY-HEADED WILLOW.) Leaves oblong-oval, acute, rounded or tapering at base, sparingly and irregularly toothed; stipules semilunar, toothed; *catkins densely flowered, thickly covered with long shining hairs; scales of the sterile ones round-obovate, obtuse; ovary conspicuously stalked, downy.* (*S. prinoides*, Pursh? *S. crassa*, Barratt.) — Low meadows and swamps. — Closely resembles the last; but the aments are more compact and silky, and the scales rounder.

* * *Ovary stalked, silky-gray, shining; catkins ovoid or cylindrical, with a few small leaf-like bracts at the base; leaves finely and evenly serrate, silky-gray or glaucous beneath, drying black; stipules varying from linear to semilunar, toothed, very deciduous.* — Shrubs.

6. **S. sericea**, Marshall. (SILKY-LEAVED WILLOW.) Leaves lanceolate, pointed, downy above, grayish underneath with short silky hairs; sterile catkins small; the fertile narrowly cylindrical, closely flowered; scales obtuse, round-obovate, as long as the stalk of the densely-silky ovoid ovary; stigma 2-lobed, nearly sessile. (*S. grisea*, Willd.) — Sandy river-banks, not rare. — Shrub 4°–10° high. Fertile catkins in flower ¾', at length 1¼', long; the ovaries not spreading or elongating in fruit, thus appearing sessile.

7. **S. petiolàris**, Smith. (PETIOLED WILLOW.) Leaves lanceolate, pointed, smooth above, slightly silky beneath when young, at length smooth and glaucous; fertile catkins ovoid-cylindrical, loosely flowered, scales very hairy, obovate, scarcely as long as the stalk of the silky tapering ovary; style short but distinct; stigma 2-cleft. (*S. rosmarinifolia*, and *S. fuscata*, Pursh?) — Same situations as the last, which this shrub resembles in some respects; but the mature leaves are not silky beneath, and dry less black: the scales are not so dark, and are clothed with longer white hair. Sterile catkins like the last; but the fertile shorter and broader, the pods (at length merely downy) spreading and showing the stalks.

* * * *Ovary sessile, woolly or silky; catkins bracted at the base; leaves not drying black.* — Small trees.

+ *Filaments united to the top, appearing like a single stamen.*

8. **S. purpùrea**, L. (PURPLE WILLOW.) Leaves oblanceolate, pointed, the lower somewhat opposite, smooth, minutely and sparingly toothed; catkins cylindrical; scales round and concave, very

black; stigmas nearly sessile. (*S. Lambertiàna*, *Pursh.*) — Introduced from Europe; recognized at once in the sterile plant by the united filaments giving to the flowers a monandrous appearance. The twigs are polished, and of an ashy-olive color.

— — *Filaments separate.*

9. **S. viminalis**, L. (BASKET OSIER.) *Leaves linear-lanceolate, very long and taper-pointed, entire or obscurely crenate, white and satiny beneath*; catkins cylindrical-ovoid, clothed with long silky hair; ovary long and narrow; styles elongated; stigmas linear, mostly entire. — Wet meadows. Introduced from Europe, and considered the best species for basket-work. Leaves 3'–6' long, of a beautiful lustre beneath. — *S. Smithiàna*, *Willd.*, another species of this section, differing principally in the somewhat broader leaves, has also been introduced, and is occasionally met with.

§ 2. *Catkins lateral, with 4–5 leafy bracts at the base, appearing with or before the leaves in May or June: inner membrane of the scales of the flowering buds separating from the cartilaginous exterior, sometimes elevated on the apex of the bursting catkins: ovary stalked, smooth (under a lens minutely granular, with occasionally a few short hairs at the base): stamens 2: scales dark or black, hairy, persistent.*

10. **S. cordàta**, Muhl. (HEART-LEAVED WILLOW.) *Leaves lanceolate or ovate-lanceolate, truncate or heart-shaped at base, taper-pointed, sharply toothed, smooth, paler beneath; stipules kidney-shaped or ovate, toothed, often large and conspicuous, of the length of the (when young downy) petiole, or sometimes small and almost entire; catkins appearing with the leaves, leafy at base, cylindrical, the fertile elongating in fruit; ovary lanceolate, tapering to the summit.* — Var. 1. **RÍGIDA**, has the leaves large and rigid, with coarser teeth, of which the lowest are somewhat elongated. (*S. rigida*, *Muhl.*) *S. Torreyàna*, *Barratt*, which has leaves of a deeper green beneath, appears to belong here. — Var. 2. **MYRICOÍDES**, has narrower leaves, neither heart-shaped nor truncate at the base. (*S. myricoides*, *Muhl.*) — Inundated banks of rivers and low meadows. — Shrub 2°–6° high: the var. 1. larger, or a small tree 6°–15° high, with leaves 4'–6' long. Fruiting catkins 2'–3' in length.

11. **S. angustàta**, *Pursh.* (NARROW-LEAVED WILLOW.) *Leaves lanceolate, acute, long and tapering to the base, slightly toothed, smooth and scarcely glaucous beneath; stipules half-heart-shaped; catkins large, appearing before the leaves; ovary tapering into a long style.* — New York to Penn. and west to Wisconsin. — Catkins resembling No. 4 in size and aspect; but the ovaries are quite smooth and very white.

§ 3. *Catkins lateral, with a few leafy bracts at the base, appearing with the leaves in May or June: ovary stalked, silky: stamens 2: scales persistent.*

12. **S. rostrata**, Richardson. (LONG-BEAKED WILLOW.) *Leaves oblong or obovate-lanceolate, acute, obscurely toothed, downy above, prominently veined, softly hairy and glaucous beneath; stipules semilunar, toothed; catkins cylindrical, the fertile becoming loose in fruit; pods tapering into a long beak, on stalks longer than the yellow lanceolate scales.* — Borders of woods and meadows, New England to Michigan, northward. — A shrub or small tree, 4°–15° high, with soft velvety leaves, somewhat variable in form. A transformation of the anthers into imperfect ovaries is frequently observable in this species, and occasionally in some others.

13. **S. phylicifolia**, L. (SMOOTH MOUNTAIN WILLOW.) *Leaves lanceolate or ovate-lanceolate, somewhat pointed, or obtuse at each end, remotely and minutely repand-toothed, smooth and shining above, glaucous beneath; fertile catkins ovoid; ovary ovoid-conic, very short-stalked; style elongated; stalk of the mature pods about twice the length of the gland; scales black, sparingly clothed with long white hairs.* — Moist ravines, on the alpine summits of the White Mountains, New Hampshire, *Oakes, Tuckerman.* — A low spreading shrub, with leaves of a coriaceous texture when old.

§ 4. *Catkins peduncled (long and loose), borne on the summit of lateral leafy branches of the season, appearing in May and June: scales greenish-yellow, more or less hairy, falling before the pods are ripe: filaments slightly united, hairy below.* — Shrubs and trees, with the branches very brittle at the base.

* Ovary sessile, smooth: stamens 2.

14. **S. álba**, L. (WHITE WILLOW.) *Leaves lanceolate or elliptic-lanceolate, pointed, toothed, clothed more or less with white and silky hairs, especially beneath; stipules lanceolate; stigmas nearly sessile, thick and recurved.* — Var. 1. VITELLINA, has yellow or light red branches; leaves shorter and broader. (*S. vitellina, Smith & Borrer. S. Pameachiana, Barratt.*) — Var. 2. CÆRULEA, has the leaves nearly smooth at maturity. (*S. cærulea, Smith.*) — An introduced tree, of rapid growth, attaining a height of 50°–80°. Var. 2. greatly resembles the next.

** Ovary stalked, smooth: stamens 2–6.

15. **S. frágilis**, L. (BRITTLE WILLOW.) *Leaves lanceolate, taper-pointed, smooth, glaucous beneath (slightly silky when young), serrate with inflexed teeth; stipules half-heart-shaped; stamens commonly 2.* — Var. 1. DECÍPIENS, has dark brown buds, and the lowest leaves on the branches broadly obovate, very obtuse. (*S. decipiens, Hoffm.*) — Var. 2. RUSSELLIANA, has the leaves long and bright, strongly serrate, the younger ones, and upper branches of the annual shoots, silky-downy towards autumn; stipules large and taper-pointed. (*S. Russelliana, Smith.*) — A tall and handsome tree, with smooth polished branches; introduced from Europe, and cultivated for basket-work.

16. **S. nigra**, Marshall. (BLACK WILLOW.) *Leaves narrowly lanceolate*, pointed and tapering at each end, serrate, *smooth* (except on the petioles and midrib) and *green on both sides*; stipules small, deciduous; *glands of the sterile flowers 2*, large and deeply 2-3 cleft; stamens 4-6, often but 3 in the upper scales. (*S. ambigua*, Pursh.) — Var. **FALCATA** has the *leaves elongated, scythe-shaped*, and the stipules large, broadly lunar, reflexed. (*S. falcata*, Pursh. *S. Purshiana*, Spreng. *S. ligustrina*, Michx. f.) — Tree 15°-25° high, with a rough black bark, frequent on the margins of streams.

17. **S. lucida**, Muhl. (SHINING WILLOW.) *Leaves ovate-oblong or lanceolate and narrow with a long tapering point, smooth and shining on both sides*, serrate; stipules oblong, toothed; stamens commonly 5. — Overflowed banks of streams. — A beautiful species, sometimes flowering at the height of 3°, sometimes becoming a small bushy tree of 12°-15°.

S. BABYLÓNICA, Tourn. (WEEPING WILLOW), belongs to this section, and is much cultivated for ornament. Only the fertile plant is known in the United States. — There is also a remarkable variety of it with curled or annular leaves (*S. annularis*, Forbes), known in gardens as the RING-LEAVED or HOOP WILLOW.

* * * *Ovary stalked, hairy: stamens 2.*

18. **S. longifolia**, Muhl. (LONG-LEAVED WILLOW.) *Leaves linear-lanceolate, very long*, tapering at each end, *nearly sessile, remotely denticulate with projecting teeth*, clothed with gray hairs when young, at length nearly smooth; stipules small, lanceolate, toothed; *scales hairy at the base*, often glandular-toothed at the top in the sterile catkins; *gland long*, in the sterile flowers sometimes deeply 2-3 cleft; in the fertile longer than the *short stalk of the ovary*; *stigmas very large, sessile*. — New England, Western New York, and westward. — Varying in height from 2°-12°; the stems and branches often prostrate, rooting extensively in sandy river-banks.

§ 5. *Catkins peduncled, borne on the lateral, or sometimes terminal, leafy branches of the season, appearing in June: stipules deciduous, or none: scales persistent.* — Small shrubs, with underground spreading stems, sending up short erect or prostrate branches.

19. **S. pedicellaris**, Pursh. (STALK-FRUITED WILLOW.) *Leaves elliptic-obovate, obtuse or somewhat pointed, entire, smooth on both sides, reticulately veined* and rather glaucous beneath; fertile catkins loose and few-flowered; *ovary smooth, on a stalk twice the length of the nearly smooth greenish-yellow scale*; stamens 2. — Cold swamps, New England to Michigan, northward. — An upright shrub, 1°-3° high, with leaves 1'-1½' long, somewhat coriaceous when mature. Catkins ¾' long: pods reddish-green, veined with purple.

20. **S. Uva-Ūrsi**, Pursh. (BEARBERRY WILLOW.) *Leaves elliptical and pointed, or obovate and obtuse, tapering at the base,*

slightly toothed, *strongly veined, smooth and shining above*, rather glaucous beneath; catkins mostly lateral, oblong-cylindrical; *ovary smooth*, stalked; style distinct; *stamen single*; *scales oblanceolate, entire, black, covered with long silky hairs*. (S. Cutlèri, Tuckerman.) — Alpine summits of the White Mountains, New Hampshire, and mountains of Essex county, New York. — A very small, almost prostrate shrub, known at once by the monandrous flowers. *S. retusa*, L., with which this species has been confounded, is a plant of the Southern Alps, having the catkins issuing from the *terminal buds*, with *smooth, notched scales, and two stamens*.

21. **S. rèpens**, L. (CREEPING WILLOW.) *Leaves lanceolate, pointed, when young obovate and obtuse, irregularly repand-toothed, smooth and green above, covered beneath when young with long and shining deciduous hairs*, at maturity smooth and glaucous; catkins ovoid, short; *ovary densely silky*, stalked; style very distinct; *stamens 2-3*; gland sometimes double; scales obovate, obtuse, clothed with long hairs. (S. fùsca, Smith.) — Moist alpine ravines of the White Mountains, New Hampshire. — Whole plant, when young, of a glossy, satiny lustre; the leaves at length becoming quite smooth, with a white and prominent midrib, and slightly elevated veins.

22. **S. herbàcea**, L. (HERB-LIKE WILLOW.) *Leaves roundish-oval, heart-shaped, notched at the apex, serrate, smooth and shining, with reticulated veins; catkins issuing from the terminal buds, small and few-flowered; ovary sessile, smooth; scales smooth, ciliate*. — Alpine summits of the White Mountains, Oakes, Pickering, &c. — A very small herb-like species, the stems seldom rising above an inch or two from the ground.

2. PÓPULUS, Tourn. POPLAR. ASPEN.

Bracts (*scales*) of the catkins irregularly cut-lobed at the apex. Flowers from a cup-shaped disk which is obliquely lengthened in front. Stamens 8-30, or more: filaments distinct. Stigmas elongated. — Trees, with usually broad and more or less heart-shaped or ovate toothed leaves, and mostly angular branches. Buds invested with imbricated scales, covered with resinous varnish. Aments long and drooping, appearing before the leaves. (The ancient name, called *Arbor-Populi*, because it was used to decorate the public walks, or on account of the constant agitation of the leaves by every impulse.)

1. **P. tremuloïdes**, Michx. (AMERICAN ASPEN.) *Leaves roundish-heart-shaped, with a short sharp point, and small somewhat regular teeth, smooth on both sides, with downy margins; scales cut into 3-4 deep linear divisions, fringed with long hairs*. — A com-

mon tree 20° - 50° high, with smooth greenish-white bark. Stalk of the leaf long, slender and laterally compressed, which accounts for the continual agitation observable in the aspens, by the slightest breeze.

2. **P. grandidentata**, Michx. (LARGE-TOOTHED ASPEN.) *Leaves roundish-ovate, with large and irregular sinuate teeth, when young densely covered with white silky wool, at length smooth on both sides; scales cut into 5-6 unequal small divisions, slightly fringed.* — An equally common and rather larger tree than the last, with a smoothish gray bark.

3. **P. heterophylla**, L. (DOWNY-LEAVED POPLAR.) *Branches round; leaves heart-shaped or roundish-ovate, obtuse, serrate, white-woolly when young, at length nearly smooth, except on the elevated veins beneath.* — Swamps, New England and westward. — Tree 40° - 60° high, with large, usually quite blunt leaves; the sinus, when heart-shaped, closed by the overlapping lobes which conceal the insertion of the nearly round leaf-stalk.

4. **P. monilifera**, Ait. (COTTON-WOOD. NECKLACE POPLAR.) *Young branches slightly angled, becoming round; leaves broadly deltoid with spreading prominent nerves, slightly heart-shaped or truncate at the base, taper-pointed, serrate with cartilaginous and incurved slightly hairy teeth; fertile catkins very long; scales lacerate-fringed, not hairy; stigmas nearly sessile, toothed, dilated and very large.* — Margins of lakes and streams, New England and westward. — A large tree, 80° high or upwards; the vigorous branches decidedly angled, bearing large leaves; the more stunted being round, with smaller foliage. (*P. Canadensis, Michx. f.*)

5. **P. angulata**, Ait. (ANGLED COTTON-WOOD.) *Branches acutely angular or winged; leaves broadly deltoid or heart-ovate, smooth, crenate-serrate, or with obtuse cartilaginous teeth.* — Pennsylvania and southward. — Tree large as the last, and like it producing very large and heart-shaped leaves (7' - 8' long, and as much in breadth) on young plants and suckers; whilst on full-grown trees they are only one fourth of that size, and commonly without the sinus.

6. **P. balsamifera**, L. (BALSAM POPLAR. TACAMAHAC.) *Branches round; leaves ovate, gradually tapering and pointed, finely serrate, smooth on both sides, whitish and reticulately veined beneath; scales dilated, slightly hairy; stamens very numerous.* — N. New England to Wisconsin, northward. — A large, tall tree, growing on the borders of rivers and swamps: its large buds, as in the next, varnished with a fragrant resinous matter.

7. **P. cándicans**, Ait. (BALM OF GILEAD.) *Branches round; leaves heart-shaped, pointed, serrate, white and reticulate-veined beneath; petiole commonly hairy.* — N. New England to Wisconsin. — A tree of somewhat less stature than the last, which it very much re-

sembles ; but the leaves are larger and much broader, with a distinct sinus at the base. It is found wild only in the North, but is very common in cultivation.

P. NIGRA, L., was admitted by the elder Michaux into his *Flora*, without any mention of its locality. It was afterwards published by his son, under the name of *P. Hudsonica*: he, however, found it "only on the banks of the Hudson river, above Albany." Lastly, it was described as *P. betulifolia* by Pursh, who further added as its station, "about Lake Ontario." The tree was probably an introduced form of the European *P. nigra*, and was latterly so considered by the younger Michaux himself. A few of these trees are still found in the neighbourhood of Hoboken, New Jersey.

P. DILATATA, Ait., the well-known pyramidal LOMBARDY POPLAR, has been extensively introduced as an ornamental tree, and is found in the vicinity of all old settlements.

ORDER 105. BALSAMIFLUÆ. (SWEET-GUM FAM.)

Trees, with a balsamic colorless juice, alternate palmately lobed leaves, deciduous stipules, and monœcious flowers in separate roundish catkins, destitute of calyx or corolla, the fruit of 2-beaked and 2-celled several-seeded woody pods:— consists only of the genus

1. LIQUIDÁMBAR, L. SWEET-GUM TREE.

Sterile flowers in several globular heads arranged in a conical cluster, naked: stamens numerous, intermixed with minute scales: filaments short. Fertile catkins consisting of 2-celled ovaries, subtended by minute scales, all more or less cohering and hardening in fruit, forming a spherical catkin or head; the pods opening between the 2 awl-shaped or prickly diverging styles. Seeds small, amphitropous, with sparing albumen and a straight embryo: cotyledons foliaceous.—Catkins racemed, nodding, inclosed in the bud by a 4-leaved deciduous involucre. (A mongrel name, from *liquidus*, fluid, and the Arabic *ambar*, amber, in allusion to the terbinthine juice or storax which exudes from the tree.)

1. *L. Styraciflua*, L. (SWEET GUM. BILSTED.) Leaves rounded, deeply 5-7-lobed, smooth and shining, finely glandular-serate, the lobes pointed.—Moist woods, from Connecticut and New Jersey southward. April.—A large and beautiful tree, with fine-grained wood and gray bark, with corky ridges on the branchlets. Leaves fragrant when bruised, turning deep red or crimson in autumn.

ORDER 106. **PLATANACEÆ.** (PLANE-TREE FAMILY.)

Trees, with watery juice, alternate palmately-lobed leaves, sheathing stipules, and monœcious flowers in separate and naked spherical catkins, destitute of calyx or corolla; the fruit club-shaped 1-seeded nutlets, furnished with bristly down along the base: consists only of the genus

1. PLÁTANUS, L. PLANE-TREE. BUTTONWOOD.

Sterile flowers of numerous stamens with club-shaped little scales intermixed: filaments very short. Fertile flowers in separate catkins, consisting of inversely pyramidal ovaries mixed with little scales. Style rather lateral, awl-shaped, or thread-like, simple. Nutlets coriaceous, small, tawny-hairy below, containing a single orthotropous pendulous seed. Embryo in the axis of thin albumen. (The ancient name, from *πλατύς*, *broad*, in allusion to the ample shade of its foliage.)

1. P. occidentàlis, L. (AMERICAN PLANE OR SYCAMORE.) Leaves angularly sinuate-lobed and toothed, the short lobes sharp-pointed; fertile heads solitary, suspended on a long peduncle. — Alluvial river-banks, very common, especially westward. May. — A very large and well-known tree, with a white bark separating early in thin brittle plates. Leaves woolly when young, soon smooth. Nutlets falling away from the globular receptacle in the spring of the second year, and widely scattered by means of the pappus-like down.

ORDER 107. **URTICACEÆ.** (NETTLE FAMILY.)

Plants with monœcious or diœcious flowers, furnished with a regular calyx, free from the 1-celled (rarely 2-celled) ovary which forms a 1-seeded utricle or achenium in fruit, the embryo not curved around albumen. Stamens as many as the lobes of the calyx and opposite them. Comprising several very distinct suborders, as

Suborder I. **MOREÆ.** THE MULBERRY FAMILY.

Trees or shrubs, with milky or yellow juice, alternate leaves with deciduous stipules convolute in the bud, and the flowers spiked on (or inclosed in) a receptacle, becoming succulent in fruit. Styles or stigmas 2. Seed amphitropous, with a curved embryo in copious albumen.

1. MORUS. Flowers spiked. Calyx berry-like in fruit.

Suborder II. CANNABINEÆ. THE HEMP FAMILY.

Herbs, with watery juice, mostly opposite stipuled leaves, and diœcious flowers, the sterile racemed or paniced. Styles 2. Seed orthotropous. Embryo curved, without albumen.

2. HUMULUS. Fruit in a membranous strobile. Leaves 3-5-lobed.
3. CANNABIS. Fruit spiked-clustered. Leaves 5-7-foliolate.

Suborder III. URTICEÆ. THE NETTLE FAMILY PROPER.

Herbs (except in the tropics), with watery juice. Flowers in spikes, heads, or panicles. Style single or none. Seed orthotropous, erect, with a straight embryo in fleshy albumen.

* Sepals distinct.

4. URTICA. Fertile flowers 2-4 sepalled; no rudimentary stamens.
5. PILEA. Fertile flowers with 3 sepals and 3 hooded scales (rudimentary stamens) at their base.

* * Sepals of the fertile flowers united in a 4-toothed tube or cup.

6. BOEHMERIA. Spikes or clusters naked. Stigma 1-sided.
7. PARIETARIA. Clusters involucrate-bracted. Stigma sessile.

Suborder I. MORÈÆ. THE MULBERRY FAMILY.

1. MÒRUS, Tourn. MULBERRY.

Flowers monœcious or diœcious; the two kinds in separate axillary catkin-like spikes. Calyx 4-parted, the sepals ovate. Stamens 4: filaments elastically expanding. Ovary 2-celled, one of the cells smaller and disappearing: styles thread-form, stigmatic down the inside. Achenium ovate, compressed, covered by the succulent berry-like calyx, the whole fertile spike thus becoming a thickened oblong and juicy (edible) aggregate fruit. — Trees with milky juice and rounded leaves; the sterile spikes rather slender. (*Mopéa*, the ancient name.)

1. *M. rubra*, L. (RED MULBERRY.) *Leaves* heart-ovate, serrate, rough above, downy underneath, pointed (on young shoots often variously lobed); flowers frequently diœcious; *fruit dark purple*. — Rich woods, W. New England to Ohio. May. — A small tree, ripening its sweetish blackberry-like fruit in July.

2. *M. alba*, L. (WHITE MULBERRY.) *Leaves* obliquely heart-ovate, acute, serrate, sometimes lobed, smooth and shining; *fruit whitish*. — Naturalized near houses, used for feeding silk-worms.

M. nigra, L., the BLACK MULBERRY, is also occasionally cultivated.

BROUSONËTIA PAPHYRÍFERA, Vent., the PAPER MULBERRY of Japan, &c., is often cultivated as a shade tree.

MACLÛRA AURANTIACA, Nutt., the OSAGE ORANGE, or BOW-WOOD of Arkansas, is sparingly cultivated for hedges.

Suborder II. CANNABINEÆ. THE HEMP FAMILY.

2. *HUMULUS*, L. HOP.

Flowers diœcious; the sterile in loose axillary panicles: sepals and stamens 5. Fertile flowers in short axillary and solitary spikes or catkins: bracts foliaceous, imbricated, each 2-flowered. Calyx 1-sepalled, embracing the ovary. Achenia invested with the enlarged scale-like calyx, together forming a membranaceous strobile. Embryo coiled in a flat spiral. — A rough perennial twining herb, with mostly opposite heart-shaped and 3-5-lobed leaves, and persistent ovate stipules between the petioles. Calyx-scales in fruit covered with orange-colored resinous grains, in which the peculiar bitterness and aroma of the hop resides. (Name a diminutive of *humus*, moist earth, from the alluvial soil where the Hop spontaneously grows.)

1. *H. Lùpulus*, L. — Banks of streams, common northward, truly indigenous. July. Stem twining with the sun.

3. *CÁNNABIS*, Tourn. HEMP.

Flowers diœcious; the sterile in axillary compound racemes or panicles: sepals and stamens 5. Fertile flowers spiked-clustered, 1-bracted: the calyx of a single sepal swollen at the base and folded round the ovary. Embryo simply curved. — A tall roughish annual, with digitate leaves of 5-7 linear-lanceolate coarsely toothed leaflets, the upper alternate; the inner bark of very tough fibres. (The ancient name, of obscure etymology.)

1. *C. sativa*, L. — Waste places, escaped from cultivation, or naturalized in the vicinity of dwellings. June.

Suborder III. URTICEÆ. THE NETTLE FAMILY PROPER.

4. *URTICA*, Tourn. NETTLE.

Flowers monœcious or diœcious; the sterile with 4 (rarely 5) sepals, and as many stamens; the fertile with 4 or 2 separate sepals, and no rudimentary stamens. Achenium oblong or ovate, flattish. — Herbs armed with stinging hairs; the flowers in axil-

lary panicles, racemes, spikes, or heads, greenish. Bark yielding strong fibres like hemp. (The classical name, from *uro*, to burn.)

§ 1. *URTICA* proper. — *Sterile calyx 4-parted; the fertile of 4 very unequal sepals, the 2 outer small, the inner foliaceous: stigma pencil-tufted: leaves opposite.*

1. *U. grácilis*, Ait. (TALL WILD NETTLE.) *Sparingly bristly, tall and slender; leaves ovate-lanceolate, pointed, serrate, 3-5-nerved from the rounded or scarcely heart-shaped base, smoothish, the elongated petioles bristly; flower-clusters in slender and loosely panicled branched spikes.* † (*U. procera*, Willd.) — Fence-rows and moist ground, common, especially northward. July. — Plant 2°-6° high, with slenderer and longer-petioled leaves than the next, not downy, and with scarcely any stinging hairs except on the petioles and sparingly on the principal veins.

2. *U. dioica*, L. (GREAT STINGING NETTLE.) *Very bristly and stinging; leaves ovate, heart-shaped, pointed, very deeply serrate, downy underneath as well as the upper part of the stem; flower-clusters in panicled much-branched spikes.* † — Waste places, about houses, &c.; introduced. June-Aug. — Plant 2°-3° high, copiously beset with stinging bristles. — Like the last mono-dioecious.

3. *U. ùrens*, L. (SMALL STINGING NETTLE.) *Leaves elliptical or ovate, coarsely and deeply serrate with spreading teeth; flower-clusters nearly simple, 2 in each axil, shorter than petioles.* ① — Introduced from Europe, and sparingly naturalized eastward. July. — Plant 8' - 12' high; the leaves 1' - 2' long, including the slender petioles, sparsely beset with stinging bristles.

§ 2. *LAPORTÈA*, Gaud. — *Sterile calyx 5-parted; the fertile of 2 equal sepals: stigma elongated, awl-shaped, persistent on the rounded and flat very oblique achenium: leaves alternate.*

4. *U. Canadénsis*, L. (CANADA OF LARGE-LEAVED NETTLE.) *Leaves ovate, obtusely serrate, pointed; flowers in long and loose divaricately branched panicles, the lower sterile, the upper fertile.* † (*U. divaricata*, L.) — Rich moist woods, along streams, common. Aug. — Stem 2°-5° high, branching. Leaves strongly feather-veined, often 6' long, long-petioled. Commonly very stinging; sometimes the leaves scarcely so, and the stem perfectly naked. Achenium very much larger than the sepals, at length bent partly downward on the wing-margined pedicel, so oblique that the stigma soon appears on the middle of one side and the seed is transverse.

5. *PILÈA*, Lindl. STINGLESS NETTLE.

Flowers monœcious; the two kinds often intermixed in the same panicle, bracted; the sterile of 3-4 sepals and stamens; the fertile with 3 more or less unequal sepals or divisions and an incurv-

ed scale (abortive stamen) before each. Stigma sessile, pencil-tufted. Achenium minutely warty. — Smooth or hairy herbs, with opposite long-petioled leaves; the flowers in axillary clusters.

1. **P. pùmila**. (RICHWEED. CLEARWEED.) Low, annual; stems smooth and shining, translucent; leaves ovate, coarsely toothed, pointed, 3-nerved, smoothish; clusters much shorter than the petioles; sepals of the fertile flowers lanceolate, a little unequal. (*Dubruèlia*, *Gaud.* *Adice*, *Raf.*) — Cool and moist shaded places, common. July – Sept. — Plant 4' – 18' high: the smooth stems pellucid.

6. BOEHMÈRIA, Jacq. FALSE NETTLE.

Sterile flowers as in *Urtica*; the fertile with a tubular or urn-shaped entire or 4-toothed calyx inclosing the ovary. Style awl-shaped, stigmatic down one side. Achenium elliptical, closely invested by the dry or somewhat fleshy persistent calyx. — Flowers clustered in axillary spikes. Hairs not stinging. (Named after *G. R. Boehmer*, Prof. at Wittenberg in the last century.)

1. **B. cylíndrica**, Willd. (FALSE NETTLE.) Smoothish; stem tall and simple; leaves chiefly opposite, oblong-ovate or ovate-lanceolate, pointed, serrate, 3-nerved, long-petioled; flowers diœcious or sometimes intermixed, in clusters which are densely aggregated in simple and elongated axillary spikes, the sterile interrupted, the fertile mostly continuous and interrupted. ♀ — A var. with often alternate leaves is *B. lateriflòra*, *Muhl.* — Moist thickets, &c., common. July – Sept. — Stem 1½° – 3° high. Leaves 2' – 4' long. Spikes often leafy at the summit.

7. PARIETÀRIA, Tourn. PELLITORY.

Flowers monœcious or polygamous (an imperfect ovary in the sterile); the two kinds intermixed in the same involucre-bracted cymose axillary clusters; the sterile as in *Urtica*; the fertile with a tubular or bell-shaped 4-lobed or toothed and nerved calyx inclosing the ovary and the ovoid achenium. Style terminal, short or none: stigma pencil-tufted. — Small herbs, chiefly with alternate leaves; not stinging. (Name from *paries*, a wall, from the places where the European species often grow.)

1. **P. Pennsylvànica**, Muhl. (AMERICAN PELLITORY.) Low, annual, simple or sparingly branched, minutely downy; leaves oblong-lanceolate, very thin, veiny, roughish with opaque dots; flowers often perfect, shorter than the involucre leaves; fertile calyx bell-shaped, 4-cleft to the middle; stigma sessile. — Shaded rocky banks, Vermont to Penn. and Wisconsin, rather rare. June – Aug. A small, homely weed.

Subclass II. GYMNOSPÉRMÆ.

Pistil represented by an open scale, or leaf, or entirely wanting; the ovules and seeds therefore naked (without a pericarp), and fertilized by the direct application of the pollen. Cotyledons often more than two.

ORDER 108. CONÍFERÆ. (PINE FAMILY.)

Trees or shrubs, with resinous juice, mostly with awl-shaped or needle-shaped entire leaves, and monœcious or diœcious flowers in catkins, destitute of calyx or corolla. Ovules orthotropous. Embryo in the axis of the albumen, nearly its length. (Wood destitute of ducts, composed chiefly of a homogeneous large woody fibre which is marked with circular disks on two sides.) Comprises the three following Suborders.

Suborder I. ABIETINÆ. THE PROPER PINE FAMILY.

Fertile flowers in catkins, consisting of open imbricated carpels in the form of scales subtended by a bract; in fruit forming a *strobile* or *cone*. Ovules 2, adherent to the base of each carpellary scale, with the orifice turned downward. Buds scaly.

1. PINUS. Leaves in clusters of 2-5 in a sheath, persistent.
2. ABIES. Leaves all scattered, persistent.
3. LARIX. Leaves many in a cluster, deciduous.

Suborder II. CUPRESSINÆ. THE CYPRESS FAMILY.

Fertile flowers consisting of few carpellary scales, without bracts, bearing 1-several erect ovules on their base (the orifice upward), forming a closed strobile or a sort of drupe in fruit. Buds naked.

- * Flowers monœcious. Strobile dry, opening at maturity.
4. THUJA. Fruit of few imbricated oblong scales. Ovules 2. Leaves scale-like, closely imbricated on the flattened branches.
 5. CUPRESSUS. Fruit of several shield-form thickened scales united in a globular woody cone. Seeds 2 or more on the stalk of each scale. Leaves scale-like or awl-shaped, appressed.
 6. TAXODIUM. Fruit of several thickened and rather shield-shaped scales united in a globular woody cone. Seeds 2 on the base of each scale. Leaves linear, 2-ranked, deciduous.

- * * Flowers chiefly diœcious. Fruit drupe-like, not opening.
7. JUNIPERUS. Fruit composed of 3-6 coalescent 1-3-ovuled scales.

Suborder III. TAXINEÆ. THE YEW FAMILY.

Fertile flower solitary, consisting of a naked ovule, ripening into a nut-like or drupe-like seed. Ovary entirely wanting. Buds scaly.

8. *TAXUS*. Ovule erect, encircled at the base by an annular disk, which forms a berry-like cup around the nut-like seed.

Suborder I. ABIETINEÆ. THE PROPER PINE FAMILY.

I. *PINUS*, Tourn. PINE.

Flowers monœcious. Sterile catkins spiked, consisting of numerous stamens inserted on the axis, with very short filaments and a scale-like connective: anther-cells 2, opening lengthwise. Pollen of 3 united grains. Fertile catkins terminal, solitary or aggregated, consisting of imbricated carpellary scales, each in the axil of a deciduous bract, bearing a pair of inverted ovules at the base. Fruit a cone formed of the imbricated and woody carpellary scales which are thickened at the apex (except in White Pines), persistent, spreading when ripe and dry; the 2 nut-like seeds partly sunk in excavations at the base of the scale, and in separating carrying away a part of its lining in the form of a thin and fragile wing. Cotyledons 3-12, linear. (Embryos sometimes several in the same seed.) — Leaves evergreen, needle-shaped, in fascicles of 2-5 from the same slender buds, sheathed by the scarious bud-scales at the base. Flowering in spring (May, June); the cones maturing the seeds in the autumn of the second year. (The classical Latin name.)

§ 1. *Leaves 2 or 3 in a sheath, rigid: scales of the cones thickened at the end, and mostly tipped with a point or spine: bark rough.*

1. *P. Banksiana*, Lambert. (GRAY, OR NORTHERN SCRUB PINE.) *Leaves in pairs, short, oblique, divergent; cones ovate-conical, usually curved, smooth, the scales pointless.* (*P. rupëstris, Michx. f.*) — Rocky banks, N. Maine and Michigan, thence northward. — A straggling shrub or low tree (5°-20° high); the rigid leaves only 1' long, concave-grooved above; the irregular cones 1½'-2' long.

2. *P. inops*, Ait. (JERSEY OR SCRUB PINE.) *Leaves in pairs, rather short; cones oblong-conical, sometimes curved, the scales tipped with a prominent and straight awl-shaped prickle.* — Barrens and sterile hills, New Jersey and southward. — A straggling tree, 15°-40° high, with spreading or drooping branchlets: young shoots with a purplish glaucous bloom. Leaves 1¾'-2¾' long. Cones 2'-3' long.

3. **P. rígida**, Miller. (PITCH PINE.) *Leaves in threes* (rarely in fours) *from very short sheaths, flattish*; cones ovoid-conical; the scales tipped with a short and stout recurved prickle. — Sandy or spare rocky soil, common. — Tree 30° – 70° high, with very rough and dark bark, and hard wood saturated with resin (a variety sometimes called *Yellow Pine* furnishes much less resinous timber): the rigid dark-green leaves 3' – 5' long. Cones 2' – 3' long, often in clusters.

4. **P. resinosa**, Ait. (RED PINE.) *Leaves in pairs from long sheaths, semicylindrical, elongated*; cones ovoid-conical; the scales pointless, dilated in the middle. (*P. rubra*, Michx. f.) — Dry woods, Maine to N. Penn. and Michigan, rare southward. — Tree 50° – 80° high, with reddish and rather smooth bark, and compact wood, but softer and usually less resinous than in No. 3. Leaves dark green, 5' – 6' long. Cones about 2' long, sometimes aggregated in large and close clusters. — Wrongly called *Norway Pine*.

5. **P. mitis**, Michx. (YELLOW PINE.) *Leaves in pairs* (or rarely in threes) *from long sheaths, channelled, slender*; cones ovoid or oblong-conical; the scales slightly enlarged at the end, tipped with a minute and weak prickly point. (*P. variabilis*, Pursh.) — Dry or sandy soil, W. New England? and New Jersey to Ohio; common southward. — Tree 50° – 60° high, straight, producing a very durable, fine-grained, moderately resinous timber, valuable for flooring, &c. Leaves 3' – 5' long, more soft and slender than in any of the preceding, dark green. Cones nearly 2' long.

§ 2. *Leaves 5 in a sheath, soft and slender: scales of the cones pointless and not thickened at the end: bark smooth.*

6. **P. Stròbus**, L. (WHITE PINE.) *Leaves in fives, very slender, rather glaucous, the sheaths deciduous*; cones narrow, cylindrical, nodding, a little curved. — Cool and damp woods, common. — The White Pine (called in England *Weymouth Pine*) is our tallest tree, often 120° – 160° in a single straight column in primitive forests, invaluable for its soft and light white or yellowish wood, which in large trunks is nearly free from resin. Cones 4' – 6' long; the scales very slightly thickened upwards.

2. ÀBIÉS, Tourn. SPRUCE. FIR.

Sterile catkins scattered or somewhat clustered towards the end of the branchlets. Scales of the strobiles thin and flat, not at all thickened at the apex, nor with a prickly point. Seeds with a persistent wing. — Leaves all scattered, short, frequently 2-ranked. Otherwise nearly as in *Pinus*. (The classical Latin name.)

§ 1. *Cones erect, lateral; the scales, with the more or less projecting bracts, separating from the axis at maturity: sterile catkins clustered: anther-cells opening by a transverse laceration: leaves flat, be-*

coming 2-ranked, silvery-whitened underneath, obtuse or notched at the apex. (*Abies*, *Pliny*, &c. *Picea*, *L.*, *Don*, *Loudon*, not of *Link.*)

1. **A. balsàmea**, Marsh. (BALSAM FIR.) Leaves narrowly linear; cones cylindrical, large, violet-colored; the bracts obovate, serrulate, tipped with an abrupt slender point, slightly projecting, appressed. — Cold damp woods and swamps, New England to Wisconsin northward. — A slender tree, of little value as timber, when young very handsome in cultivation, but short-lived. Leaves 1' or less in length, narrower and lighter green above than those of the European *Silver Fir*; the cones 3' - 4' long, 1' broad, the scales very broad and rounded. Also called *Canada Balsam*, or *Balm-of-Gilead Fir*. The well-known *balsam* is drawn from blisters in the bark of this and the next species.

2. **A. Frasèri**, Pursh. (SMALL-FRUITED, OR DOUBLE BALSAM FIR.) Leaves narrowly linear; cones small, oblong-ovate; the bracts oblong-wedge-shaped, short-pointed, the upper part much projecting and reflexed. (*A. balsamifera*, *Michx. Fl.*) — Mountains of Penn., and common southward on the highest Alleghanies. Also on the mountains of W. New England. — Foliage, &c., not distinguishably different from the last, except that the leaves are perhaps rather shorter, and do not spread so early on the young branches; but the cones are very different and scarcely half as large.

§ 2. Cones hanging, terminal; the bracts evanescent; the scales persistent on the axis: sterile catkins scattered: anther-cells opening lengthwise. (*Picea*, *Link.*, and of the ancients.)

* Leaves 2-ranked, flat, whitened underneath.

3. **A. Canadènsis**, Michx. (HEMLOCK SPRUCE.) Leaves linear, flat, obtuse ($\frac{1}{2}$ ' long); cones oval, of few scales, little longer than the leaves ($\frac{3}{4}$ ' long). — Hilly or rocky woods, very common northward. — A large tree, the most graceful of Spruces, with a light, spreading spray, and delicate foliage, bright green above, silvery underneath. Timber very coarse-grained.

* * Leaves needle-shaped, 4-angular, equally distributed all around the branch.

4. **A. àlba**, Michx. (WHITE OR SINGLE SPRUCE.) Leaves slender, spreading, of a glaucous or light bluish-green hue; scales of the oblong cones entire. — Cold swamps and moist woods, New England, New York, and northward. — Tree 40° - 60° high, slender, with light-colored bark, slender and often drooping branchlets, and the pale leaves slenderer than in the next, rather spreading than erect; the whole aspect of the tree much lighter than any other Spruce of this group. Cones 1' - 1½' long, pale brown. Wood valuable.

5. **A. nìgra**, Poir. (BLACK OR DOUBLE SPRUCE.) Leaves short, erect, rigid, very dark green; scales of the ovate cones wavy and tooth-

ed at the apex. — Swamps and cold or mountain woods, New England and Penn. to Michigan, common northward. — Tree 40°–70° high, with dark bark, stout and stiff spreading branchlets; the leaves $\frac{1}{2}$ ' long, much more appressed and shorter, the tree therefore less handsome, than the **NORWAY SPRUCE** (*A. excelsa*), which is often planted for ornament. Cones 1'–2' long, reddish-brown.

3. **LÀRIX**, Tourn. LARCH.

Catkins lateral and scattered, bud-like. Sterile flowers nearly as in *Pinus*, but the pollen of simple spherical grains. Cones ovoid, erect, the bracts and scales persistent; otherwise as in *Abies*. — Leaves deciduous, soft, very many in a fascicle developed in early spring from lateral scaly and globular buds, which produce (the same or the second year) growing shoots on which the leaves are scattered. Fertile catkins crimson or red in flower. (The ancient name.)

1. **L. Americana**, Michx. (**AMERICAN OR BLACK LARCH. TAMARACK. HACKMATACK.**) Leaves almost thread-form; cones ovoid, of few rounded scales. (*P. pendula*, *Hil.*) — Swamps, chiefly northward. — A slender tree, with heavy, close-grained, and very durable wood, and slender horizontal branches, more slender and usually shorter leaves than the *European Larch*, which is a handsomer tree, and has the scales of its larger cones arranged in the order $\frac{3}{21}$, while those of the American are only $\frac{2}{5}$. — The **RED LARCH** (*P. microcarpa*, *Lambert*) appears to be a Northern variety only.

Suborder II. CUPRESSÍNEÆ. THE CYPRESS FAMILY.

4. **THÚJA**, Tourn. ARBOR VITÆ.

Flowers monœcious on different branches, in very small terminal ovoid catkins. Stamens with a scale-like filament or connective, bearing 4 anther-cells. Fertile catkins of few imbricated scales, fixed by the base, each bearing 2 erect ovules, dry and spreading at maturity. Cotyledons 2. — Small evergreen trees, with very flat 2-ranked spray, on which the minute and appressed scale-like persistent leaves are very closely imbricated. (*Θυία*, *Θύα*, or *Θυεία*, the ancient name of some resin-bearing evergreen.)

1. **T. occidentàlis**, L. (**AMERICAN ARBOR VITÆ.**) Leaves ovate-rhombic, with a gland on the back, appressed-imbricated in 4 rows on the 2-edged branchlets; scales of the nodding cones pointless, 1-seeded; seeds broadly winged. — Swamps and cool rocky

banks, N. New England to Wisconsin, chiefly northward, where it forms extensive "cedar-swamps," and bears the name of **WHITE CEDAR**. — Tree 30°–50° high, straight, with recurved branches, yielding a pungent aromatic oil: wood light, but exceedingly durable.

5. **CUPRÉSSUS**, Tourn. CYPRESS.

Flowers monœcious on different branches, in terminal small catkins. Sterile catkins composed of shield-shaped scale-like filaments bearing 2–4 anther-cells under the lower margin. Fertile catkins globular, of shield-shaped scales in 4 ranks, bearing several erect bottle-shaped ovules. Cone globular, firmly closed, but opening at maturity; the scales thick and woody, pointed or bossed in the middle; the few or several narrowly winged seeds attached to their contracted base or stalk. Cotyledons 2 or 3. — Strong-scented evergreen trees, with very small and scale-like closely appressed-imbricated leaves, and exceedingly durable wood. (The classical name.)

1. **C. thyoides**, L. (**WHITE CEDAR**.) Leaves minute, ovate, with a small gland on the back, closely imbricated in 4 rows on the 2-edged branchlets; anther-cells 2 under each scale. — Swamps, Massachusetts to Ohio, southward. May. — Tree 30°–70° high; the wood and fibrous shreddy bark, as well as the foliage, much like the *Arbor Vitæ*; but the spray much more slender, the leaves finer and dull glaucous-green. Cone scarcely larger than a pea, few-seeded.

6. **TAXÓDIUM**, Richard. BALD CYPRESS.

Flowers monœcious on the same branches. Sterile catkins spiked-paniced, of few stamens: filaments scale-like, shield-shaped, bearing 2–5 anther-cells. Fertile catkins ovoid, in small clusters, scaly, with 2 ovules at the base of each scale. Cone globular, closed, composed of very thick and angular somewhat shield-shaped scales, bearing 2 angled seeds at their base. Cotyledons 6–9. — Trees with linear 2-ranked and deciduous leaves. (Name compounded of *Tάξος*, the *Yew*, and *είδος*, *resemblance*.)

1. **T. distichum**, Richard. (**AMERICAN BALD CYPRESS**.) Leaves linear, strictly 2-ranked and spreading; sometimes awl-shaped and imbricated on the flowering branchlets. — Swamps, S. New Jersey? and Delaware, common southward, where it is a very large and valuable tree. Foliage very light.

7. JUNÍPERUS, L. JUNIPER.

Flowers diœcious, or occasionally monœcious, in very small lateral catkins. Anther-cells 3-6, attached to the lower edge of the shield-shaped scale. Fertile catkins ovoid, of 3-6 fleshy 1-3-ovuled coalescent scales; in fruit forming a sort of drupe or berry, scaly-bracted underneath. Seeds 1-3, bony. Cotyledons 2. — Evergreen trees or shrubs, with awl-shaped or scale-like rigid leaves. (The classical name.)

1. **J. commùnis, L.** (COMMON JUNIPER.) Leaves in threes, linear-awl-shaped, prickly pointed, spreading, bright green except the glaucous-white concave upper surface. — Dry sterile hills, not rare eastward and northward, and along the Great Lakes. May. — Shrub usually spreading nearly flat on the ground, rarely ascending, rigid. Berries dark purple, as large as a pea.

2. **J. Virginiàna, L.** (RED CEDAR. SAVIN.) Leaves 4-ranked, much crowded, on young plants and primary or rapidly-growing shoots awl-shaped and somewhat spreading, in pairs or threes; on older lateral twigs very small and scale-like, closely imbricated, triangular-ovate. — A branching shrub or small tree, becoming 15°-30° high; or, var. *HUMILIS, Hook.*, a widely spreading or almost prostrate shrub. — Dry rocky or sterile hills, common: the prostrate variety chiefly high northern. April. — Wood odorous, reddish, very compact and durable. Berries small, purplish with a glaucous bloom.

Suborder III. TAXÍNEÆ. THE YEW FAMILY.

8. TÁXUS, Tourn. YEW.

Flowers mostly diœcious, axillary from scaly buds; the sterile in small globular catkins formed of naked stamens: anther-cells 3-8 under a shield-like somewhat lobed connective. Fertile flowers solitary, scaly-bracted at the base, consisting merely of an erect sessile ovule, with a cup-shaped disk around its base, which becomes pulpy and berry-like (globular and red) in fruit, and almost incloses the nut-like seed. Cotyledons 2. — Leaves evergreen, flat, mucronate, rigid, scattered, 2-ranked. (The classical name, probably from *τόξον, a bow*; the wood being used for bows.)

1. **T. Canadénsis, Willd.** (AMERICAN YEW. GROUND HEMLOCK.) Stems diffusely spreading; leaves linear, green both sides, with slightly revolute margins. — Moist banks and hills, near streams, especially in the shade of evergreens: common northward. April. — Our Yew is a low and straggling or prostrate bush, never forming an ascending trunk.

CLASS II. MONOCOTYLÉDONOUS or ENDÓGENOUS
PLANTS.

Stems with no manifest distinction into bark, wood, and pith; but the woody fibre and vessels collected into bundles or threads which are irregularly imbedded in the cellular tissue: perennial trunks destitute of annual layers. Leaves mostly parallel-veined (nerved) and sheathing at the base, seldom separating by an articulation, almost always alternate or scattered and not toothed. Parts of the flower commonly in threes. Embryo with a single cotyledon (or if two they are alternate).

ORDER 109. ARÀCEÆ. (ARUM FAMILY.)

Plants with acrid or pungent juice, simple or compound often veiny leaves, and monœcious or perfect flowers crowded on a spadix, which is usually surrounded by a spathe. Floral envelopes none, or of 4–6 sepals. Fruit usually a berry. Seeds with fleshy albumen, or none but filled with the large fleshy embryo in Nos. 2, 4, and 5.

Synopsis.

* Spadix surrounded by a spathe.

1. ARUM. Flowers monœcious or polygamo-diœcious, naked, covering the base only of the spadix.
2. PELTANDRA. Flowers monœcious, naked, covering the whole spadix: spathe long and convolute.
3. CALLA. Flowers perfect, naked (no floral envelopes), covering the spadix: spathe open and spreading.
4. SYMPLOCARPUS. Flowers perfect, with a calyx of 4 hooded sepals, covering the oval spadix, all combined in fruit.

* * Spadix naked (without a spathe). Sepals 4–6.

5. ORONTIUM. Spadix terminating a naked scape.
6. ACORUS. Spadix bursting from the side of a leaf-like scape.

1. ÀRUM, L. WAKE-ROBIN. INDIAN TURNIP.

Flowers monœcious, the upper sterile and the lower fertile, or sometimes polygamo-diœcious, on the base of an elongated spadix which is naked above, and surrounded by a spathe which is convolute below. Floral envelopes none. Anthers crowded and somewhat whorled on the spadix, almost sessile, 2-4-celled. Ovaries distinct, 1-celled, with a nearly sessile stigma: ovules few, orthotropous, erect in the American species § ARISEMA. Berries distinct, 1-several-seeded. Embryo in the axis of albumen. — Low perennial herbs, with a tuberous rootstock or corm, sending up a simple scape sheathed with the petioles of the simple or compound veiny leaves, as if caulescent. (The ancient name, of unknown meaning.)

1. **A. triphýllum, L.** (INDIAN TURNIP.) *Leaves mostly 2, divided into 3 elliptical-ovate pointed leaflets; spadix club-shaped, obtuse, much shorter than the spathe, which is flattened and incurved-hooded at the summit.* — Rich woods, common. May. — Corm turnip-shaped, wrinkled, farinaceous, but with an intensely acrid juice. Spathe with the petioles and sheaths green, or frequently variegated with dark purple and whitish stripes or spots (*A. atrorubens, Ait.*); the limb ovate-lanceolate, pointed. Anthers opening by large pores. Berries bright scarlet, in a dense head, ripe in autumn.

2. **A. Dracóntium, L.** (GREEN DRAGON. DRAGON-ROOT.) *Leaf usually solitary, pedately divided into 7-11 oblong-lanceolate pointed leaflets; spadix tapering to a long and slender point beyond the oblong and convolute pointed spathe.* — Low grounds along streams. May. — Corms clustered. Leaf large and spreading, the petiole 1^o-2^o long, extending much beyond the peduncle. Spathe greenish, rolled into a tube, with a short erect point. Berries scarlet-orange.

2. PELTÁNDRA, Raf. ARROW ARUM.

Flowers monœcious, thickly covering the long and tapering spadix throughout. Spathe elongated, convolute throughout, wavy on the margin, curved at the apex. Floral envelopes none. Anthers sessile, naked, covering all the upper part of the spadix, with 5 or 6 cells surrounding the margin of a thick and truncate shield-like connective, opening by a terminal pore. Ovaries 1-celled at the base of the spadix, bearing several (orthotropous?) ovules at the base: stigma nearly sessile. Berries distinct, 1-3-

seeded. Seed obovate, surrounded by a tenacious jelly, somewhat amphitropous, with the micropyle superior, the base empty; the upper part filled with a large and fleshy spherical embryo, the plumule superior, and no albumen. — A stemless herb, with arrow-shaped leaves and simple scapes from the root of thick tufted fibres. Upper part of the spathe and the sterile portion of the spadix rotting away after flowering, leaving the fleshy base firmly inclosing the globular cluster of green berries. (Name composed of *πέλιτη*, a *target*, and *άνήρ*, for *anther*, from the shield-shaped stamens.)

1. **P. Virgínica**, Raf. (*Arum Virginicum*, L. *Lecóntia*, Torr. *Rensselæria*, Beck.) — Swampy borders of ponds and streams, common: June. — Leaves with their stalks 12' - 18' long, pointed, the lobes at the base blunt or pointed: nerves reticulated next the margin. (It seems to have escaped attention that this plant has an *exalbuminous corm-like embryo*, nearly as in *Symplocarpus*.)

3. CÁLLO, L. WATER ARUM.

Spathe spreading, ovate (abruptly pointed, the upper surface white), persistent. Spadix oblong, entirely covered with flowers, the lower perfect, the upper often of stamens only. Floral envelopes none. Filaments slender: anthers 2-celled, opening lengthwise. Ovary 1-celled, with 5 - 6 erect anatropous ovules: stigma sessile. Berries distinct, few-seeded. Seeds with a conspicuous raphe, and an embryo nearly the length of the hard albumen. — A low perennial herb, growing in cold bogs, with a creeping thickish rootstock, bearing heart-shaped long-petioled leaves, and solitary scapes. (An ancient name, of unknown meaning.)

1. **C. palústris**, L. — Bogs, &c., New England to Wisconsin, common northward. June. — Berries few, in a cluster, red, ripe in autumn: seeds surrounded with jelly.

4. SYMPLOCÁRPUS, Salisb. SKUNK CABBAGE.

Spathe hooded-shell-form, pointed, fleshy, decaying in fruit. Spadix on a short peduncle, entirely covered with perfect flowers which are thickly crowded and their (1-celled or abortively 2-celled) ovaries immersed in the fleshy receptacle. Sepals 4, hooded. Stamens 4, opposite the sepals, with short filaments: anthers extrorse, 2-celled, opening lengthwise. Style 4-angled: stigma

minute. Ovule solitary, suspended, orthotropous. Fruit a large globular or oval mass, composed of the enlarged and spongy spadix, inclosing the spherical seeds just beneath the surface, which is roughened with the persistent and fleshy sepals and pyramidal styles. Seed filled by the large globular and fleshy corm-like embryo, which bears 1 or several plumules at the end next the base of the ovary: albumen none. — Perennial herbs, with a strong odor like that of the skunk, and also somewhat alliaceous, a thick descending rootstock bearing coarse fibrous roots, and a cluster of very large and entire veiny leaves, preceded by the nearly sessile spathes. (Name from *συμπλοκή*, *connection*, and *καρπός*, *fruit*, in allusion to the coalescence of the ovaries, &c., into a compound fruit.)

1. **S. fœtidus**, Salisb. Leaves ovate, heart-shaped, short-petioled; spadix globular, much shorter than the spathe. (*Ictòdes*, *Bigel.*) — Moist grounds, common. March, April. — Leaves 1° - 2° long. Spathe spotted and striped with purple and yellowish-green, ovate, incurved. Fruit ripe in September, forming a roughened globular mass 2' - 3' in diameter, in decay shedding the bulblet-like seeds, which are $\frac{1}{2}$ ' - $\frac{1}{2}$ ' in diameter, and filled with the singular solid fleshy embryo.

5. ORÓNTIUM, L. GOLDEN-CLUB.

Spathe none. Flowers crowded all over a cylindrical spadix, perfect: the lower with 6 concave sepals and 6 stamens, the upper with 4. Filaments flattened: anthers 2-celled, opening obliquely lengthwise. Ovary 1-celled, with 1 amphitropous ovule: stigma sessile, minute. Fruit a green utricle. Seed without albumen. Embryo thick and fleshy, "with a large concealed cavity at the summit, the plumule curved in a groove on the outside" (*Torr.*). — An aquatic perennial, with a deep rootstock, long-petioled and entire nerved floating leaves, and the spadix terminating the naked scape, which thickens upward. (Origin of the name obscure.)

1. **O. aquaticum**, L. — Ponds, Massachusetts to Pennsylvania, near the coast. May.

6. ÁCORUS, L. SWEET FLAG. CALAMUS.

Spadix lateral, sessile, emerging from the side of a scape which resembles the leaves, densely covered with perfect flowers. Sepals 6, concave. Stamens 6: filaments linear: anthers kidney-

shaped, 1-celled, opening across. Ovary 2 - 3-celled, with several pendulous orthotropous ovules in each cell: stigma minute. Fruit at length dry, gelatinous inside, 1 - few-seeded. Embryo in the axis of albumen. — Pungent aromatic plants, especially the thick creeping rootstocks (*calamus* of the shops), which send up 2-edged sword-like leaves, and scapes similar to them, bearing the spadix on one edge, the upper and more foliaceous prolongation sometimes considered as an open spathe. (The ancient name, from a privative, and *κόρη*, *the pupil of the eye*, having been used as a remedy for sore eyes.)

1. **A. Calamus**, L. Scape prolonged and leaf-like far beyond the cylindrical (yellowish-green) spadix. — Margin of rivulets, swamps, and wet meadows; probably introduced from Europe. June.

ORDER 110. LEMNACEÆ. (DUCKWEED FAMILY.)

Minute stemless plants, floating free on the water, destitute of distinct stem and foliage, but a flat frond, producing one or two monœcious flowers from a chink at the edge or upper surface, and usually hanging roots from underneath. — Fructification much as in the Arum Family, of which these plants are minute and greatly reduced forms.

1. **LÉMNA**, L. DUCKWEED. DUCK'S-MEAT.

Flowers appearing from a cleft in the edge of the frond, three together bursting through a thin and membranous urn-shaped spathe; two of them consisting of single stamens (one developed rather earlier than the other), with thread-like filaments and 2-celled anthers; the other a 1-celled ovary forming a utricle in fruit: stigma funnel-form, ovules erect. Embryo in the axis of fleshy albumen. — Roots with a sheath-like appendage on the end. Fronds laterally proliferous by a sort of budding, and producing little bulblets which sink to the bottom of the water in autumn but rise to develop on the surface in spring. Flowers seldom found. (An old Greek name, of uncertain meaning.)

* *Fronds bearing single roots from the lower surface.*

1. **L. perpusilla**, Torr. *Fronds obovate, thin (1" - 1½" long), single or grouped; ovule solitary, anatropous; seed erect, striate.* — Staten Island, New York, Torrey. August.

2. **L. minor**, L. Fronds roundish-obovate, thickish (about 2" long), often grouped; "*ovule solitary, half-anatropous; seed horizontal.*" — Very common, mantling stagnant waters; but not yet found in flower in this country.

3. **L. trisúlca**, L. Fronds oblong-lanceolate from a stalked base, thin, denticulate at the tip ($\frac{1}{2}$ ' - $\frac{3}{4}$ ' long), proliferous from the sides near the middle so as to form crosses; "*ovule solitary, half anatropous.*" — Ponds, not rare; but the flowers little known.

4. **L. gibba**, L. Fronds obovate, nearly flat above, tumid and spongy underneath (hemispherical), proliferous on short and very fragile stalks, therefore seldom found connected (3" - 4" long); *ovules and seeds 2-several, anatropous.* (Telmatophæce, *Schleiden.*) — Ponds, Western New York: rare.

* * Fronds bearing a cluster of roots from the lower surface.

5. **L. polyrhiza**, L. Fronds roundish-obovate, thickish, flat above, slightly convex underneath, palmately veined (3" - 4" long); "*ovules 2, anatropous.*" (*Spiròdela, Schleiden.*) — Pools, &c., less common than No. 2 in this country, where it has not been found in flower.

ORDER 111. TYPHÀCEÆ. (CAT-TAIL FAMILY.)

Marsh herbs, with nerved and linear sessile leaves, and monœcious flowers on a spadix or in heads, destitute of proper floral envelopes. Ovary tapering into a slender style, and usually an elongated tongue-shaped 1-sided stigma. Fruit nut-like when ripe, 1-seeded. Seed suspended, anatropous: the embryo straight in copious albumen. — Comprises only 2 genera, viz.

1. TYPHA, Tourn. CAT-TAIL FLAG.

Flowers in a long and very dense cylindrical spike terminating the stem; the upper part consisting of stamens only, intermixed with simple hairs, and inserted directly on the axis; the lower or fertile part consisting of ovaries, surrounded by club-shaped bristles, which form the copious down of the fruit. Nutlets minute, very long-stalked. — Spathes very deciduous bracts or none. Rootstocks creeping. Leaves sheathing the base of the simple jointless stems, erect, thickish. (Name from *τίφος*, a marsh or fen, alluding to the place of growth.)

1. **T. latifolia**, L. (COMMON CAT-TAIL OR REED-MACE.) *Leaves*

nearly flat; stam. and pist. parts of the spike approximate or almost continuous. — Borders of ponds, &c., common. July. — Stem 4°–5° high; the leaves as long, and $\frac{3}{4}$ ' wide. Fruiting spike brownish on the surface, 1' thick.

2. **T. angustifolia**, L. (NARROW-LEAVED OR SMALL CAT-TAIL.) *Leaves channelled towards the base, narrowly linear*; stam. and pist. parts of the spike usually separated by a considerable interval. — In similar places with the last; a rarer and smaller plant.

2. **SPARGANIUM**, Tourn. BURR-REED.

Flowers collected in separate dense spherical heads, scattered along the summit of the stem, subtended by leaf-like bracts, the upper ones sterile, consisting merely of stamens, with minute scales irregularly interposed; the lower or fertile larger, consisting of numerous sessile pistils, each surrounded by 3–6 scales much like a calyx. Fruit nut-like when mature, 1–2-celled. — Roots fibrous. Stems simple or branching, sheathed below by the base of the linear leaves. (Name from *σπάργανον*, a fillet, from the ribbon-like leaves.)

1. **S. ramosum**, Hudson. (GREAT BURR-REED.) Stem erect, branching above; *leaves triangular at the base, the sides concave*; scales of the fertile heads thickened and dilated above; *stigma linear, longer than the style* (stigmas often 2). — Borders of ponds and ditches, common. July, Aug. — Stem 2° or more high: leaves 1°–2° long, $\frac{1}{2}$ '– $\frac{1}{2}$ ' wide, thickish.

2. **S. Americanum**, Nutt. (SMALLER BURR-REED.) Stem erect, mostly simple; *leaves triangular at the base, the sides flat*; *stigma conical, oblong, oblique, scarcely half as long as the slender style*. — Along small streams, &c., common. — Much smaller than the last. Fruit beaked with the slender style.

3. **S. natans**, L. (FLOATING BURR-REED.) Stem weak; *leaves flat, thin, often floating*, when they are usually elongated, narrow, and pellucid; heads few, the sterile 1–2; *stigma oblong, shorter than the style*. — Ponds and streams, common northward; when terrestrial low (6'–10' high), and shorter leaved. — This genus requires careful study by the fruit.

ORDER 112. **NAIADACEÆ**. (PONDWEED FAMILY.)

Immersed aquatic plants, with jointed stems and sheathing stipules within the petioles, or sessile sheathing bases of the leaves, inconspicuous mono-diacious or perfect flowers,

which are naked or with a free merely scale-like calyx; the ovaries solitary or 2-4 and distinct, 1-celled, 1-ovuled. Seed without albumen, filled by the large embryo, often curved or hooked. Flowers usually bursting from a spathe, sometimes on a spadix.

Synopsis.

* Flowers monœcious or diœcious, axillary, naked, monandrous.

1. *NAIAS*. Pistils solitary: stigmas 2-4.
2. *ZANNICHELLIA*. Pistils about 4 from a cup-shaped involucre.
3. *ZOSTERA*. Pistils and anthers alternately sessile in 2 rows on one side of a linear spadix, inclosed in a leaf. Stigmas 2.

* * Flowers perfect.

4. *RUPPIA*. Flowers naked on a spadix: each of 4 large anther-cells, and 4 ovaries which are raised on long stalks in fruit.
5. *POTAMOGETON*. Flowers and fruit spiked, 4-sepalled. Stamens 4. Ovaries 4.

1. *NAIAS*, L. NAIAD.

Flowers diœcious (or sometimes monœcious), axillary, solitary and sessile; the sterile consisting of a single stamen inclosed in a little membranous spathe: anther at first nearly sessile, the filament at length elongated. Fertile flowers consisting of a single ovary tapering into a short style: stigmas 2-4, awl-shaped: ovule erect, anatropous. Fruit a little seed-like nutlet, inclosed in a loose and separable membranous epicarp. Embryo straight, the radicular end downwards. — Slender branching herbs, growing entirely under water, with opposite and whorled-crowded linear leaves, sessile and dilated at the base. Flowers very small, solitary, but often clustered with the branch-leaves in the axils. (*Naiás*, *water-nymph*; a name inaptly applied to these humble water-weeds, from their place of growth.)

1. *N. flexilis*, Rostk. Leaves membranaceous, spreading, narrowly linear, sparingly very minutely denticulate (under a lens) as well as the sheathing base; stigmas usually 3-4. (*N. Canadensis*, *Michx.* *Caulinia flexilis*, *Willd.*) — Ponds and slow streams, common. July-Sept. — Stem 6'-20' long, many times forked. Leaves less than 1" wide.

N. minor (*Caulinia fragilis*, *Willd.*), with the more rigid and recurved fragile leaves rather strongly toothed, I have not seen in this country.

2. ZANNICHÉLLIA, Micheli. HORNED PONDWEED.

Flowers monœcious, sessile, naked, usually both kinds from the same axil: the sterile consisting of a single stamen, with a slender filament bearing a 2-4-celled anther; the fertile of 2-5 (usually 4) sessile pistils in the same cup-shaped involucre, forming obliquely oblong nutlets in fruit, beaked with a short style which is tipped by an obliquely disk-shaped or somewhat 2-lobed stigma. Seed orthotropous, suspended, straight. Cotyledon taper, inflexed-circinate. — Slender branching herbs, growing entirely under water, with very slender stems, opposite or alternate long and linear thread-form entire leaves, and sheathing membranous stipules. (Named in honor of *Zannichelli*, a Venetian botanist.)

1. **Z. palústris, L.** Style at least half as long as the fruit, which is flattish, somewhat incurved, even, or occasionally more or less toothed on the back (not wing-margined in our plant), nearly sessile, or, in var. *PEDUNCULÀTA*, both the cluster and the separate fruits evidently peduncled. — Ponds and slow streams. July.

3. ZOSTÈRA, L. GRASS-WRACK. EEL-GRASS.

Flowers monœcious; the two kinds naked and sessile and alternately arranged in two rows on the midrib of one side of a linear leaf-like spadix, which is hidden in a long and sheath-like base of a leaf (spathe); the sterile flowers consisting of single ovate or oval 1-celled sessile anthers, as large as the ovaries, and containing a tuft of threads in place of ordinary pollen: the fertile of single ovate-oblong ovaries attached near their apex, tapering upward into an awl-shaped style, and containing a pendulous orthotropous ovule: stigmas 2, long and bristle-form, deciduous. Utricle bursting irregularly, inclosing an oblong longitudinally ribbed seed (or nutlet). Embryo short and thick (proper cotyledon almost obsolete), with an open chink or cleft its whole length, from which protrudes a doubly curved slender plumule. — Grass-like marine herbs, growing wholly under water, with a jointed creeping stem or rootstock, sheathed by the bases of the very long and linear obtuse, entire, grass-like, ribbon-shaped leaves (whence the name, from ζωστήρ, a band).

1. **Z. marina, L.** Leaves obscurely 3-5-nerved. — Common in bays along the whole coast; in water of 5° - 15° deep; thrown upon the shore in great abundance during storms. Aug.

4. **RÚPPIA**, L. DITCH-GRASS.

Flowers perfect, 2 or more approximated on a slender spadix, which is at first inclosed in the sheathing spathe-like base of a leaf, naked (entirely destitute of floral envelopes), consisting of 2 sessile stamens each with 2 large and separate anther-cells, and 4 small sessile ovaries, with a single campylotropous suspended ovule: stigma sessile, depressed. Fruit of little obliquely-ovate pointed drupes, each raised on a slender stalk which appears after flowering; the spadix itself also then raised on an elongated thread-form peduncle. Embryo ovoid, with a short and pointed plumule from the upper end, by the side of the short cotyledon. — Marine herbs, growing under water, with thread-like forking stems, long and almost capillary alternate leaves with a dilated sheathing base or adherent stipule. Flowers brought to the surface at the time of expansion. (Dedicated to *Ruppia*, a German botanical author, early in the 18th century.)

1. **R. marítima**, L. Leaves linear-capillary; nut ovate, obliquely erect; fruiting peduncles capillary ($\frac{1}{2}$ ' - 1' long). — Shallow bays, along the whole coast: chiefly a narrowly leaved var. with strongly pointed fruit, approaching *R. rostellàta*, *Koch*. June - Aug.

5. **POTAMOGÈTON**, Tourn. PONDWEED.

Flowers perfect, spiked. Sepals 4, rounded, valvate in the bud. Stamens 4, nearly sessile, opposite the sepals: anthers 2-celled. Ovaries 4, with an ascending campylotropous ovule: stigma sessile or nearly so. Fruit 4 sessile nutlets, or drupes when fresh, compressed or angled on the inner side. Seed hook-shaped; the radicular end of the embryo thickened and pointing downwards. — Herbs of fresh or barely brackish ponds and streams, with jointed creeping and rooting stems, and 2-ranked pellucid leaves, which are usually alternate, the upper sometimes dilated and floating. Stipules membranous, united and sheathing. Spikes sheathed by the stipules in the bud, raised on a peduncle to the surface of the water. (An ancient name, composed of *ποταμός*, a river, and *γείτων*, a neighbour, from their place of growth.)

§ 1. *Stipules free from the petiole: upper leaves floating on the surface, alternate, or the uppermost opposite, different in figure and in their firmer (herbaceous or coriaceous) texture from the thin and membranaceous immersed ones.*

* *Stem rather large, usually simple.*

1. **P. natans**, L. *Leaves all long-petioled; the floating ones coriaceous, oval, elliptical, or ovate, chiefly rounded or a little heart-shaped at the base, many-nerved; the immersed ones linear or lanceolate, or thread-form (the blade often evanescent by decay); nutlets short-pointed, rounded on the back when fresh, more or less keeled when dry (2' long or more).* — Var. 1. FLÛITANS (*P. fluitans*, Roth.), has narrower oblong-lanceolate or oval leaves, often tapering at the base, the lower more pellucid; fresh nutlets acutish on the back. — Ponds and slow streams. July - Sept. — Floating leaves 2' - 3' long.

2. **P. oblongus**, Viv., Fries. *Leaves, &c., nearly as in No. 1, but mostly narrower; nutlets small (1' long), obtuse and pointless, always rounded on the back.* — Pools and ditches, apparently common, as in N. Europe. — Floating leaves usually oblong-elliptical or oblong-lanceolate: the rounded fruits not half as large as in the true *P. natans*.

3. **P. pùlcher**, Tuckerm. *Floating leaves ovate or broadly oval, rounded or heart-shaped, or the lower tapering at the base, on a petiole about the length of the blade; immersed leaves large, short-petioled, broadly lanceolate or oblong, tapering to both ends, wavy; "nutlets turgid, lunate, acutely keeled on the back."* — Ponds, common through the Northern States. — Whether I am describing the same plant as Mr. Tuckerman is uncertain, as I have not the ripe fruit: but this apparently well-marked species deserves the name. It is quite as large as No. 1; the floating leaves (some of them membranous) often longer than their petioles, 3' - 4' long by 1½' wide, but much exceeded in size by the principal immersed ones, which are 5' - 8' long by 2' or more in width, very pellucid, somewhat taper-pointed, all but the uppermost gradually narrowed at the base into a margined petiole 1' or less in length. It seems to be most allied to *P. plantagineus* and *P. spathulatus*.

4. **P. rufescens**, Schrader. *Floating leaves oblong or obovate, narrowed into a petiole shorter than the blade, only the upper a little coriaceous; immersed leaves all sessile or nearly so, lanceolate, flat, mostly obtuse, tapering to the base; nutlets acutely keeled, tipped with a small pointed beak. (P. fluitans, Smith, &c.)* — Slow streams, &c., northward. — More slender than any of the preceding. Leaves often purplish; the immersed ones 2' - 4' long, about ½' wide, pellucid.

* * *Stems slender or thread-like, usually branched below.*

5. **P. heterophýllus**, Schreber. *Floating leaves elliptical or oblong, or the lowest lanceolate-spatulate, long-petioled; immersed ones lanceolate or linear, sometimes elongated and grass-like, flaccid, obscurely denticulate or roughish on the margins, the lower sessile; peduncles much thicker than the stem, elongated (1' - 2' long); spike*

many-flowered, cylindrical. (P. Claytoni, Tuckerm. P. gramineus, Fries, L. ?) — Pools and shallow slow streams, common. — Floating leaves 1' or so in length, very variable. Nutlets roundish, flattened on the sides, obtuse and ridged on the back.

6. **P. hýbridus**, Michx. *Floating leaves* oval or lanceolate-oblong, 5-7-nerved, on petioles rather shorter than the blade; *immersed leaves capillary* (although flat under a lens); *spike globular, few-flowered*, on a short and somewhat club-shaped peduncle. (P. diversifolius, Barton. P. setaceum, Pursh.) — Shallow pools and streams, New England to Penn. and southward. — A delicate species, the thread-like branching stems 1° or so in length, and the floating leaves $\frac{1}{2}$ ' - $\frac{3}{4}$ ' long, sometimes absent. Fruit nearly round, flattened on the sides, a little keeled and crested on the back.

§ 2. *Stipules free from the petiole or base of the leaf: leaves all immersed and similar, alternate, membranaceous, pellucid, netted-nerved, lanceolate or broader: stems branching.*

7. **P. lucens**, L. *Leaves oval-lanceolate, with a strong midrib and a small or tapering point, narrowed at the base into a more or less distinct petiole*, the margin very minutely denticulate; peduncles thickened upwards; spikes cylindrical, densely flowered; *nutlets slightly keeled*. — Ponds and deep streams. — A pretty large species, with the thin and shining leaves 3' - 6' long by 1' or more broad, sometimes nearly sessile: stipules long and conspicuous.

8. **P. prælóngus**, Wulf. *Leaves elongated-oblong, obtuse at both ends, partly clasping by the sessile base*; peduncles often much elongated; spike cylindrical, many-flowered; *nutlets (when dry) strongly keeled on the back, short-pointed*. — With No. 7 and 9, or in similar situations, and somewhat intermediate between the two. Leaves 1' or less wide, 2' - 7' long, often a little hooded at the blunt apex, the midrib not more conspicuous than two of the nerves. Peduncle in deep water becoming 6' - 12' long.

9. **P. perfoliátus**, L. *Leaves clasping by a heart-shaped base, ovate or ovate-lanceolate, sometimes round-ovate, obtuse*; spikes rather few-flowered; *nutlets rounded on the back (when fresh), very short-pointed*. — Ponds and rivers, common. — Leaves shining, about 1' long, flat; or, in the longer and ovate-lanceolate American forms inclined to be acute and more or less wavy or crisped. — *P. crispum* probably has not been found in this country.

§ 3. *Stipules free from the petiole: leaves all immersed and similar, alternate, grassy-linear or thread-like, sessile: stems much branching.*

10. **P. compréssus**, L. ex Fries. *Stem very flat, nearly the breadth of the narrowly linear abruptly pointed leaves*; spikes cylindrical, 10 - 15-flowered; *nutlets rounded-obovate, lenticular, keeled, tipped with a short terminal point*. (P. zosteræfolius, Schum.) — Ponds,

New England to Ohio northward. — Stems 2°-4° long. Leaves grass-like, 3'-6' long, 1½" wide, minutely many-nerved and with a more conspicuous midrib or 3 nerves, perfectly entire.

11. **P. pauciflorus**, Pursh. Stem very slender and thread-like, but flattish; leaves narrowly linear, acutish; spikes few- (4-6-) flowered, short-peduncled; nutlets obliquely lenticular, distinctly crested on the semicircular back. (*P. gramineus*, Michx.) — Ponds and streams, common, especially southward. — Leaves 1'-3' long, ½"-1" wide, obscurely 3-nerved. Nutlets scarcely 1' long, flattened on the sides, short-pointed from the inner edge, the back obtusely sinuate-toothed on the keel when dry. Nearly allied to the next.

12. **P. pusillus**, L. Stem slender, obscurely compressed; leaves narrowly linear, rather acute, 3-5-nerved; spikes 4-8-flowered, often interrupted, much shorter than the peduncle; nutlets obliquely elliptical (oblong-elliptical, Fries), turgid, obtusely keeled. (*P. compressus*, Smith.) — Crooked Lake, New York, Sartwell, ex Torrey. I have seen no American specimens of this species. The next is by some deemed a variety of it.

13. **P. trichoides**, Cham., Fries. Stem slender and thread-like, very leafy; leaves capillary, obscurely 1-nerved, very acute; spikes 4-8-flowered (long-peduncled); nutlets half orbicular, flattish on the sides, minutely keeled (when dry). — Pond in the Notch of the White Mountains, New Hampshire, Robbins, Oakes, Tuckerman. — Stems 1° or more long. Leaves 2' long, appearing entirely capillary when dried, but flat under a lens, about ¼" wide near the base, tapering upwards to an excessively delicate point. Nutlets larger and flatter than in the last.

§ 4. *Stipules united with the sheathing base of the leaf, scarious: leaves all immersed and similar, alternate, grassy-linear.*

14. **P. pectinatus**, L. Stems thread-like, many times forked; leaves bristle-form, 1-nerved; spikes interrupted, long-peduncled; nutlets rounded-obovate. (*P. marinum*, L.) Brackish ponds and ditches along the coast; also not rare in fresh water, west to Wisconsin. — Leaves 2'-4' long, thickish, tapering gradually to a slender point. Clusters of the spike 3 or 4, separated in fruit by considerable intervals.

15. **P. Robbinsii**, Oakes. Stems sparingly branched, rigid, very leafy; leaves linear, flat, abruptly pointed, many-nerved, serrate-ciliate; stipules bristle-bearing; "spikes oblong." — Ponds, not uncommon in New England, detected in 1829 by Dr. Robbins. — A very remarkable species. Stems 1°-3° long, entirely invested by the sheathing bases of the leaves and the elongated and taper-pointed free portion of the stipules, which also bear long bristles as in *Polygonum*. Leaves 3'-4' long, 3"-4" wide, approximate, strictly 2-ranked, re-

curved-spreading, bright green, shining and pellucid, evenly many-nerved. I have not seen the flowers or fruit.

§ 5. *Stipules wanting: leaves all opposite and immersed.*

16. **P. densus**, L. Leaves pellucid, elliptical or lanceolate, clasping; spike few-flowered, short-peduncled, reflexed in fruit; nutlets beaked and keeled. — Bethlehem, Penn., *Schweinitz (Beck.)*.

ORDER 113. ALISMÀCEÆ. (WATER-PLANTAIN FAM.)

Marsh herbs, with scape-like flowering stems, and perfect or monœcious flowers, not on a spadix, furnished with both calyx and corolla: sepals and petals each 3, distinct. Ovaries 3 – many, distinct or partly so, or if united separating at maturity, forming as many 1 – 2-seeded pods or achenia. Seed ascending or erect. Embryo without albumen. Stamens hypogynous, 6 to many; anthers extrorse, 2-celled. Leaves sheathing at the base.

Synopsis.

Suborder I. JUNCAGINEÆ. THE ARROW-GRASS FAM.

Calyx and corolla colored alike (greenish). Seed anatropous, with a straight embryo. Leaves petiole-like, without a blade.

1. **TRIGLOCHIN**. Flowers perfect. Ovaries 3 – 6, united into one body around a central axis, separating in fruit.
2. **SCHEUCHZERIA**. Flowers perfect. Ovaries 3, nearly distinct.

Suborder II. ALISMEÆ. THE WATER-PLANTAIN FAM.

Calyx green and persistent. Corolla white, deciduous. Seed campylotropous: embryo bent double or hook-shaped. Leaves commonly furnished with a blade.

3. **ALISMA**. Flowers perfect, 6-androus: carpels numerous, whorled.
4. **ECHINODORUS**. Flowers perfect, 7 – 21-androus: carpels capitate.
5. **SAGITTARIA**. Flowers monœcious, polyandrous. Carpels capitate, winged.

Suborder I. JUNCAGINEÆ. THE ARROW-GRASS FAM.

1. **TRIGLOCHIN**, L. ARROW-GRASS.

Sepals and petals nearly alike (greenish), ovate, concave, deciduous. Stamens 6: anthers oval, on very short filaments. Pistils united into a 3 – 6-celled compound ovary: stigmas sessile:

ovules solitary. Pod splitting when ripe into 3–6 carpels, which separate from a central axis. — Leaves rush-like, fleshy, sheathing the base of the wand-like naked and jointless scape. Flowers small, in a spiked raceme, bractless. (Name composed of *τρεις*, *three*, and *γλωχίν*, *point*, from the three points of the ripe fruit in No. 1.)

1. **T. palústre**, L. *Scape and leaves slender; fruit linear-club-shaped; the 3 carpels separating from below upwards when ripe from the triangular axis, awl-pointed at the base.* — Marshes, both fresh and brackish, New York to Ohio. Aug. — Root fibrous. ♂ or ♀? — Scape 6'–18' high. Leaves, as in the others, half-cylindrical or channelled.

2. **T. marítimum**, L. *Scape and leaves thickish, fleshy; fruit ovate, acutish, of 6 carpels which are rounded at the base and slightly grooved on the back; rootstock horizontal.* ♀ — Salt marshes along the coast, and at Salina, New York. Aug. — Scapes 12'–18' high, stout.

3. **T. elàtum**, Nutt. *Scape tall and stout (2° high); fruit ovate-oblong, very obtuse, of 6 linear-oblong carpels, which are rounded at the base, and deeply grooved and sharply almost 2-winged on the back.* ♀ — Cold bogs, W. New York to Wisconsin northward. June, July. — Resembles No. 2.

2. SCHEUCHZÈRIA, L. SCHEUCHZERIA.

Sepals and petals oblong, spreading, nearly alike (greenish-yellow) but the latter narrower, persistent. Stamens 6: anthers linear. Ovaries 3, globular, slightly united at the base, bearing flat sessile stigmas, 2–3-ovuled, in fruit forming 3 diverging and inflated 1–2-seeded pods opening along the inside. — A low bog-herb, with a creeping jointed rootstock, tapering into the ascending simple stem, which is zigzag, partly sheathed by the bases of the grass-like conduplicate leaves, terminated by a loose raceme of a few flowers, with sheathing bracts. (Named in honor of the two brothers *Scheuchzer*, distinguished Swiss botanists.)

1. **S. palústris**, L. — Peat bogs, northward, rather rare. July.

Suborder II. ALISMÈÆ. THE WATER-PLANTAIN FAM.

3. ALÍSMA, L. WATER-PLANTAIN.

Flowers perfect. Petals involute in the bud. Stamens 6. Ovaries many in a simple circle on a flattened receptacle, forming

flattened coriaceous achenia in fruit. — Roots fibrous. Leaves all from the root, several-ribbed, with connected veinlets. Scape with whorled paniced branches. Flowers small, white or pale rose-color. (Name from *ἀλυσμός*, *anxiety*, from the supposed remedial properties.)

1. **A. Plantàgo**, L. Leaves long-petioled, ovate, oblong, or lanceolate, pointed, either narrowed, rounded, or somewhat heart-shaped at the base, 3-9-nerved; panicle loose, compound, many-flowered; carpels 15-20, obliquely obovate, forming an obtusely triangular whorl in fruit. ♀ (*A. trivialis* and *parviflora*, *Pursh.*) — Ditches and marshy places, common. July, Aug. — Scape 1°-2° high. A variable plant: the flowers perhaps generally smaller and the thread-like pedicels longer than in the European form.

4. **ECHINÓDORUS**, Richard, Engelmann.

Flowers perfect. Petals imbricated in the bud. Stamens (6?-) 7-21. Ovaries several or many, crowded without order in a head, forming achenia in fruit, often beaked with a projecting persistent style. — Habit intermediate between the preceding genus and the following. (Name apparently from *ἐχινώδης*, *prickly*, or from *ἐχίvos*, and *δορός*, *a leathern bottle*, applied to the ovary, which is in most species armed with the persistent style, so as to form a sort of prickly head of fruit.) — I adopt this restituted genus from Dr. Engelmann's MSS. *E. rostratus*, *Engelm.* (*Alisma*, *Nutt.*), and *E. radicans*, *Engelm.* (*Sagittaria*, *Nutt.*), are Southern species: the former also grows in Illinois.

1. **E. subulàtus**, *Engelm.* Annual, small; primary or immersed leaves linear, the others with a distinct linear-lanceolate or oval-lanceolate blade acute at both ends; scapes about the length of the leaves, umbellately few- (3-8-) flowered, some of them becoming proliferous runners; pedicels elongated, recurved in fruit; petals inversely heart-shaped; stamens about 9; styles very much shorter than the ovaries; achenia rounded-half-obovate, acutely 3-ridged on the back, pointless. (*Alisma subulata*, *L.*, *Pursh.* *Sagittaria pusilla*, *Nutt.*; but of this I am doubtful, as that is said to be monœcious.) — Muddy margins of ponds and streams, from New York, Penn., and Michigan southward. Aug. — Plant 1'-3' high, ripening 8-15 carpels in each flower.

5. **SAGITTÀRIA**, L. ARROWHEAD.

Flowers monœcious, rarely diœcious. Petals imbricated in the bud. Stamens many. Ovaries many, collected without order in

a spherical head on a globular receptacle, in fruit forming membranaceous winged achenia. — Marsh or aquatic herbs, with milky juice and fibrous roots; the scapes sheathed at the base by the bases of the long cellular petioles; of which the primary ones, and sometimes all of them, are flattened, nerved, and destitute of any proper blade: the latter when present arrow-shaped or lanceolate, nerved and with cross veinlets as in *Alisma*. Flowers mostly whorled in threes, pedicelled, with membranous bracts; the sterile above. (Name from *sagitta*, an arrow, from the prevalent form of the leaves.)

1. *S. variabilis*, Engelm. MSS. Petals white (the claws not purple); scape simple. — This, with its Protean varieties, of which almost every pool and stream furnishes a goodly number, embraces many nominal species of authors, and may safely be held to include all that are found within our limits, “even the diœcious *S. obtusa*, *Muhl.*” The largest states bear triangular-arrow-shaped leaves, 1° or more long and 7' wide: others have both the main blade and the lobes linear: many bear entire leaves, either oblong, lanceolate, or linear, or else mere naked petioles; and in the smallest forms the whole plant is only 3' - 5' high.

ORDER 114. HYDROCHARIDACEÆ. FROG'S-BIT FAM.

Aquatic herbs, with diœcious or polygamous regular flowers on scape-like peduncles from a spathe, and simple or double floral envelopes, which in the fertile flowers are united into a tube and coherent with the 1 - 6-celled ovary. Stamens 3 - 12, distinct, or monadelphous: anthers 2-celled. Stigmas 3 or 6. Fruit ripening under water, indehiscent, many-seeded. Seeds ascending, without albumen: embryo straight.

Synopsis.

- * Stigmas 6-9, two-parted: ovary 6-9-celled. (Floating.)
1. *LIMNOBIUM*. Filaments united in a solid column: anthers 6-12, linear.
 - * * Stigmas 3: ovary 1-celled with 3 parietal placentæ. (Immersed.)
 2. *UDORA*. Tube of the 6-lobed perianth greatly prolonged in the fertile flowers.
 3. *VALLISNERIA*. Tube of the 3-lobed perianth not prolonged beyond the ovary.

1. LIMNÒBIUM, Richard. AMERICAN FROG'S-BIT.

Flowers diœcious (or monœcious?), from sessile or somewhat peduncled spathes; the sterile spathe 1-leaved, producing about 3 long-pedicelled flowers; the fertile 2-leaved, with a single short-pedicelled flower. Calyx 3-parted or cleft; sepals oblong-oval. Petals 3, oblong-linear. Filaments entirely united in a central solid column, bearing 6-12 linear anthers at unequal heights: there are 3-6 awl-shaped rudiments of stamens in the fertile flowers. Ovary 6-9-celled by the prolongation and union of as many placentæ in the axis, forming an ovoid many-seeded berry in fruit: stigmas as many as the cells, but 2-parted, awl-shaped (ovules orthotropous, *Torr.*). — A stemless perennial herb, floating in stagnant water, proliferous by runners, with long-petioled round-heart-shaped leaves, which are spongy-reticulated and purplish underneath; rootlets slender, hairy. Sterile flowers rather small; the fertile larger: peduncle nodding in fruit. Petals white? (Name from *λιμνόβιος*, *living in pools.*)

1. **L. Spóngia**, Richard. (*Hydrocharis*, *Bosc.* *H. cordifolia*, *Nutt.*) — Braddock's Bay (Monroe county), Lake Ontario, *Dr. Bradley*, *Dr. Sartwell*. Aug. — Leaves 1'-2' long, faintly 5-nerved. Peduncle of the sterile flower about 3' long, thread-like; of the fertile only 1', stout.

2. UDÒRA, Nutt. WATER-WEED.

Flowers polygamo-diœcious, solitary and sessile from a sessile and tubular 2-cleft axillary spathe. Sterile flowers minute, with a 6-parted perianth, viz., the sepals and petals each 3, and nearly equally colored, oval: anthers 9, oval, nearly sessile. The fertile flowers also bear 3-6 or more oblong anthers, often apparently well-formed. Perianth of the fertile flowers extended into an extremely long and capillary tube; the small lobes (sepals and petals) obovate, spreading. Ovary 1-celled, with 3 projecting parietal placentæ, each bearing a few orthotropous ovules; the capillary style coherent with the tube of the perianth: stigmas 3, large, 2-lobed, exserted. Fruit oblong, coriaceous, few-seeded. — A perennial? herb, growing under water, with elongated branching stems, thickly beset with pellucid and veinless, 1-nerved, sessile, whorled or opposite leaves. The staminate flowers break off, as in *Vallisneria*, and float on the surface, where they expand and

shed their pollen to fertilize the stigmas, which are raised to the surface by the excessively prolonged calyx-tube, which varies in length according to the depth of the water. (Name from ὑδωρ, *water*.)

1. **U. Canadensis**, Nutt. Leaves oblong-ovate or lanceolate, finely serrulate ($\frac{1}{2}$ ' long). — Ponds and slow streams. July.

3. VALLISNÈRIA, Micheli. TAPE-GRASS. EEL-GRASS.

Flowers strictly diœcious: the sterile numerous and crowded in a head on a conical receptacle, inclosed in an ovate at length 3-valved spathe which is borne on a very short scape: stamens mostly 3. Fertile flowers solitary and sessile in a tubular spathe which is borne on an exceedingly long scape. Perianth (calyx) 3-parted in the sterile flowers; in the fertile with a linear tube coherent with the 1-celled ovary but not extended beyond it, 3-lobed; lobes obovate, and 3 linear small petals alternate with them. Stigmas 3, large, nearly sessile, 2-lobed. Ovules very numerous on 3 parietal placenta, orthotropous! Fruit elongated, cylindrical, berry-like. — Stemless plants, with long and linear, grass-like leaves, growing entirely under water. The staminate clusters being confined to the bottom of the water by the shortness of the scape, the flower-buds themselves spontaneously break away from their short pedicels and float on the surface, where they expand and shed their pollen around the fertile flowers, which are raised to the surface at this time: fertilization being thus accomplished, the thread-form fertile scapes (2–4 feet long according to the depth of the water) coil spirally and draw the ovary under water to ripen. (Named in honor of *Vallisneri*, an early Italian botanist.)

1. **V. spiràlis**, L. Leaves linear, thin, long and ribbon-like (1°–2° long), obscurely serrulate, obtuse, somewhat nerved and netted-veined. — Common in slow rivers, &c. August.

ORDER 115. **ORCHIDACEÆ**. (ORCHIS FAMILY.)

Herbs, distinguished by their irregular flowers, 6-merous perianth adherent to the 1-celled ovary with 3 parietal placenta, gynandrous stamens (only 1 or 2), and pollen cohering in waxy or mealy masses. Fruit a 1-celled 3-valved

pod, with innumerable minute seeds, appearing like fine saw-dust. Perianth of 6 divisions in 2 sets; the 3 outer (*sepals*) of the same petal-like texture and appearance as the 3 inner (*petals*), of which the upper or posterior one, but by the twisting of the ovary or stalk generally appearing the lower or anterior, differs more or less in shape or direction from the others, is often spurred or appendaged, and is called the *lip*. Opposite this, in the axis of the flower, is the *column*, which is composed of a single stamen (or in *Cypripedium* of 2 fertile stamens) entirely coherent and confluent with the style, on which the 2-celled anther is variously situated. — Perennial herbs, often tuber-bearing, or with tuberous or thickened roots. Leaves parallel-nerved. Flowers commonly showy and singular in shape, spiked, racemed, or solitary, bracted.

Synopsis.

I. Anther single.

Tribe 1. MALAXÍDEÆ. — Pollen cohering in definite (4) waxy masses, without any connecting tissue or tail-like prolongation.

* Plants green and with leaves. Sepals spreading: lip flat.

1. MICROSTYLIS. Lip arrow-shaped or heart-shaped. Column minute, round.

2. LIPARIS. Lip entire, dilated. Column elongated, margined at the apex.

** Plants tawny or purplish, leafless, or with a single root-leaf only: sepals and petals conniving.

3. CORALLORHIZA. Lip with a spur or projection at the base adherent to the ovary. Anther terminal: cells oblique.

4. APLECTRUM. Lip spurless, free, raised on a claw. Anther rather lateral.

Tribe 2. VÁNDEÆ. — Pollen cohering in definite (2 or 4) waxy masses, furnished with an elastic prolongation (caudicle).

5. TIPULARIA. Lip long-spurred underneath. Flowers racemed.

6. CALYPSO. Lip inflated-sac-like, spurless, large. Column winged. Flower solitary.

Tribe 3. OPHRÝDEÆ. — Pollen cohering in very numerous grains which are collected on a cobweb-like tissue into 2 large

masses and affixed to the glands of the stigma. (Flower ringent: lip with a spur at the base underneath.)

7. ORCHIS. Anther-cells contiguous and parallel. Glands of the stigma, to which the base of the stalks of the 2 pollen-masses cohere, contained in a common little pouch formed of a fold or hood of the stigma.
8. GYMNADENIA. Anther-cells contiguous and parallel: glands naked.
9. PLATANThERA. Anther-cells widely separated at the base: glands naked.

Tribe 4. ARETHÛSEÆ. — Pollen powdery, in numerous minute and angled loosely cohering grains (forming 2 or 4 masses). Anther terminal, forming a lid over the stigma. (Sepals and petals mostly erect or converging.)

* Pollen-masses 4, angled.

10. ARETHUSA. Lip bearded, united at the base to the linear column.
* * Pollen-masses 2.
11. POGONIA. Lip more or less crested, free. Column club-shaped.
12. CALOPOGON. Lip bearded, stalked, posterior. Column incurved.

Tribe 5. NEOTTIÆ. — Pollen as in Tribe 4. Anther more or less parallel with the stigma or column, erect.

13. SPIRANTHES. Lip nearly entire, channelled, pointless, ascending.
14. GOODYERA. Lip entire, inflated-sac-like below, strap-pointed.
15. LISTERA. Lip flat, spreading or pendulous, 2-lobed.

II. Anthers 2.

Tribe 6. CYPRIPEDIÆ. — Pollen pulpy-granular. Fertile anthers 2, with a dilated petal-like body (the third stamen) between them.

16. CYPRIPEDIUM. Lip inflated, slipper-form.

1. MICRÓSTYLIS, Nutt. ADDER'S-MOUTH.

Sepals spreading. Petals thread-like or linear, spreading. Lip auricled or halbert-shaped at the base, not tubercled, entire or nearly so. Column very small, with 2 teeth or auricles at the summit. Pollen-masses 4, collateral, cohering by pairs at the apex. — Little herbs from solid bulbs, producing simple stems or scapes, which bear 1 or 2 leaves, and a raceme of minute greenish flowers. (Name composed of *μικρός*, *little*, and *στυλίς*, *a diminutive column or style*.)

1. *M. monophýllos*, Lindl. Leaf solitary, sheathing the base of the stem, ovate-elliptical; *raceme spiked, long and slender*;

pedicels not longer than the flowers; lip triangular-halbert-shaped, long-pointed. (*M. brachypoda*, Gray.) — Cold wet swamps, N. New England and New York, and northward. July. — (2' - 6' high.)

2. **M. ophioglossoides**, Nutt. Leaf solitary near the middle of the stem, ovate, clasping; *raceme short and obtuse*; *pedicels much longer than the flowers*; lip obtusely auricled at the base, 3-toothed at the summit. — Damp woods, rather rare. July. — (4' - 10' high.)

2. LÍPARIS, Richard. TWAYBLADE.

Sepals and petals nearly equal, linear, or the latter thread-like, spreading. Lip flat, entire, often bearing 2 tubercles above the base. Column elongated, incurved, margined at the apex. Pollen-masses 4, collateral. — Small herbs, forming solid bulbs, producing 2 root-leaves and a low scape, bearing a raceme of few purplish or greenish flowers. (Name from λιπαρός, *fat* or *shining*, in allusion to the smooth or unctuous leaves.)

1. **L. liliifolia**, Richard. Leaves 2, ovate; petals thread-like, reflexed; *lip large, wedge-obovate, abruptly short-pointed, brown-purplish*. (*Maláxis liliifolia*, Swartz.) — Moist woodlands, commonest in the Middle States. June. — Flowers rather large.

2. **L. Læselii**, Richard. Leaves 2, elliptical-lanceolate or oblong, sharply keeled; *lip obovate or oblong, mucronate at the incurved tip, yellowish-green, shorter than the linear unequal petals and sepals*. (*Maláxis Correàna*, Barton.) — Bogs and wet meadows, New England to Wisconsin, rare. June. — Flowers small, erect.

3. CORALLORHÌZA, Haller. CORAL-ROOT.

Flower ringent; the oblong or lanceolate sepals and petals nearly alike, the lateral ascending and the upper arching: lip recurved-spreading above, 2-ridged below, adherent at the base to the straightish column, the base below usually more or less produced into a protuberance or short spur coalescent with the summit of the ovary. Anther 2-lipped, terminal: pollen-masses 4, obliquely incumbent. — Brownish or yellowish herbs, destitute of green foliage, with much-branched and toothed coral-like root-stocks (probably root-parasitical). Scape simple, furnished with sheaths in place of leaves, bearing small and dull-colored flowers in a spiked raceme. (Name composed of κοράλλιον, *coral*, and ρίζα, *root*.)

1. **C. multiflora**, Nutt. (LARGE CORAL-ROOT.) *Raceme*

many- (10 - 30-) flowered; ovary and pod oblong; lip wedge-oval, 3-lobed, the middle lobe recurved, thrice the length of the lateral ones; spur a manifest protuberance. — Woods, about the roots of trees, common. Aug., Sept. — Plant brownish or purplish, 10' - 18' high, with rather large brownish-yellow flowers: lip whitish, spotted with crimson; the lamellæ long and flexuous. Pods $\frac{3}{4}$ ' long.

2. **C. Wistariàna**, Conrad. (SMALLER CORAL-ROOT.) *Raceme few-* (3 - 12-) flowered; ovary elongated; lip oblong, a little notched at the apex, minutely 2-toothed near the base; the lamellæ thin, rounded at the apex; spur obsolete. — Woods, near Philadelphia, and southward. June, July. — A span high; the flowers nearly as large as in No. 1.

3. **C. innàta**, R. Brown. (EARLY CORAL-ROOT.) *Raceme few-* (5 - 10-) flowered; ovary and pod oblong or club-shaped; lip oblong, 2-toothed near the base; the lamellæ straight; spur obsolete. (C. verna, Nutt.) — Swamps and wet woods, chiefly northward. May, June. — Scape slender, 5' - 8' high, yellowish-green: the small flowers dingy yellowish; lip white, seldom spotted. — Said to be identical with the European species.

4. **C. odontorhiza**, Nutt. (SMALL LATE CORAL-ROOT.) *Raceme several-* (9 - 15-) flowered; ovary and pod globular or roundish-oval; lip roundish, entire, thin, with a crisped or wavy margin, the lamellæ inconspicuous; spur none. — Rich woods, about the roots of trees, not rare. Aug., Sept. — Scape like the last, but stouter; the purplish flowers about the same size: lip whitish, spotted with purple, with 2 oval protuberances on the palate.

4. **APLÉCTRUM**, Nutt. PUTTY-ROOT. ADAM AND EVE.

Sepals and petals much as in the last. Lip with a short claw, free, 3-lobed, the palate 3-ridged; no trace of a spur. Anther slightly below the apex of the cylindrical straightish column: pollen-masses 4. — Scape and raceme as in Corallorhiza, invested below with 3 greenish sheaths, springing in May from the side of a thick globular solid bulb or corm (filled with exceedingly glutinous matter), which also produces from its apex, late in the preceding summer, a large, oval, many-nerved and plaited, petioled, green leaf, lasting through the winter. (Name composed of a privative and *πλήκτρον*, a spur, from the total want of the latter.)

1. **A. hyemàle**, Nutt. — Woods, in rich mould, rare. — Solid bulbs often 1' in diameter, one produced annually on a slender stalk, along with fibrous roots, generally lasting until the third year before it shrivels, so that 2 - 3 or more are found, horizontally connected.

Scape 1° high. Flowers dingy greenish-brown and purple; the lip whitish and speckled, nearly $\frac{1}{2}$ ' long.

5. TIPULÀRIA, Nutt. CRANE-FLY ORCHIS.

Sepals and petals spreading, oblong, the latter rather narrower. Lip 3-lobed, prolonged underneath into a thread-like spur twice or thrice the length of the flower: middle lobe linear, a little wavy, as long as the petals, the side lobes short and triangular. Column narrow and wingless. Anther lid-like, terminal; pollen-masses 2, each 2-parted, connected by a linear stalk with the transverse small gland. — Herb with solid bulbs connected horizontally, producing a single ovate nerved and plaited leaf on a slender petiole, and a long and naked slender scape (10' – 18' high), with 1 or 2 sheaths at the base, bearing a many-flowered raceme of greenish flowers tinged with purple. (So named from a fancied resemblance of the flowers to insects of the genus *Tipula*.)

1. **T. discolor**, Nutt. — Pine woods, Martha's Vineyard, *Oakes*, and Deerfield, Massachusetts, *Prof. Hitchcock*. "Vermont," *Beck*. Parma, Monroe county, New York, *Dr. Bradley*. Otherwise only known in the Southern States. July. — Spur almost 1' long.

6. CALÝPSO, Salisb. CALYPSO.

Sepals and petals nearly similar, ascending, spreading, lanceolate, pointed. Lip larger than the rest of the flower, sac-shaped, inflated, 3-lobed, the middle lobe bearded above. Column erect, broadly winged and petal-like. Anther a little below the apex: pollen-masses 2, each 2-parted, sessile on the membranaceous gland. — A low bog-herb, the solid bulbs producing a single petioled ovate or slightly heart-shaped thin leaf, and a short scape, sheathed below, bearing a large and showy (variegated purple and yellow) flower. (Name from the goddess *Calypso*.)

1. **C. boreàlis**, Salisb. — Cold bogs and wet woods, the bulbs resting in moss, Vermont, *Carey*, Northern New York, *Dr. Wood*, *Mr. Hough*, and N. Michigan; thence northward. May. — A very rare and beautiful plant. Scape 3'–5' high. Lip $\frac{3}{4}$ ' long, somewhat like that of a Lady's Slipper.

7. ÓRCHIS, L. ORCHIS.

Flower ringent; the sepals and petals nearly equal, all of them, or all but the 2 lower sepals, converging upwards and arching

over the column. Lip turned downwards, coalescing with the base of the column, spurred at the base underneath. Anther-cells contiguous and parallel. Pollen cohering in numerous small waxy masses, which are collected on a cobweb-like elastic tissue into 2 large masses (one filling each anther-cell) borne on a slender stalk, the base of which is attached to the 2 glands of the stigma, which glands are contained in a common little pouch or hooded fold. Flowers showy, in a spike. (*Ὀρχίς*, the ancient name.)

1. **O. spectabilis**, L. (SHOWY ORCHIS.) Root of thick fleshy fibres, producing 2 oblong-obovate shining leaves and a few-flowered 5-angled scape (4'–7' high); bracts leaf-like, lanceolate; sepals and petals all vaulted, pink-purple, the ovate undivided lip with the obtuse spur (of the same length) white.—Hills in rich woods, rather common. May. — Leaves 3'–5' long.

S. GYMNADÈNIA, R. BROWN. NAKED-GLAND ORCHIS.

Flower as in Orchis. Anther-cells parallel; the approximate glands naked (whence the name, from *γυμνός*, *naked*, and *ἀδήν*, *gland*).

1. **G. tridentata**, Lindl. Stem slender (6'–12' high), with a single oblong or oblanceolate obtuse leaf towards the base, and 2 or 3 small ones like bracts above; *spike* 6–12-flowered, oblong; *lip* as long as the oblong-ovate sepals and petals, *wedge-oblong, truncate and with 3 short teeth at the apex*; the slender and slightly club-shaped spur curved upwards, longer than the ovary.—Wet woods, rather common. July.—Root of few fleshy fibres. Flowers small, pale yellowish-green.

2. **G. flava**, Lindl. Stem several-leaved (15' high), the 1 or 2 lower leaves elongated, oblong-lanceolate, acute; the others becoming smaller and bract-like; *spike densely many-flowered*, oblong-cylindrical; *lip ovate, a little crenate or wavy-margined*, about the length of the round-ovate sepals and petals, shorter than the awl-shaped depending spur.—Wet pine barrens of New Jersey, and southward. July.—Root of very fleshy fibres, one or two of them tuber-like. Flowers orange-yellow, closely set. (*Orchis flava* and *intègra*, Nutt. *Habenaria Ellióttii*, Beck.)

9. PLATANTHÈRA, Richard. FALSE ORCHIS.

Flower as in Orchis, &c. (lateral sepals spreading); but the anther-cells diverging at the base; the 2 naked glands widely separated (whence the name, from *πλατύς*, *wide*, and *ἀνήρ*, for *anther*).

§ 1. *Scape* 1-leaved at the base: *spur* not exceeding the lip.

1. **P. obtusàta**, Lindl. (DWARF ORCHIS.) *Leaf obovate*, obtuse; spike rather loosely 5-10-flowered; upper sepal broad and rounded; petals bluntly triangular; *lip linear, entire*, bearing 2 small tubercles at the base, about the length of the curving spur. — Cold peat-bogs and high mountains of New Hampshire, Vermont, and N. New York. June. — Root a cluster of thick fibres. Scape 5'-8' high. Flowers $\frac{1}{2}$ ' long.

2. **P. rotundifòlia**, Lindl. (SMALL ROUND-LEAVED ORCHIS.) *Leaf round-ovate or orbicular* (2'-3' wide); spike several-flowered; *lip 3-lobed*, larger than the ovate petals and sepals, the lateral lobes entire, the middle one larger and inversely heart-shaped. — Along the boundary between Maine and New Brunswick, *Mr. Goodrich*. — Scape 8' high. Leaf, and sometimes the white flowers, spotted with purple: lip $\frac{1}{2}$ ' long.

§ 2. *Scape 2-leaved at the base: spur very long: lip entire.*

3. **P. orbiculàta**, Lindl. (LARGE ROUND-LEAVED ORCHIS.) Leaves very large, orbicular, spreading flat on the ground; scape bracted, bearing many flowers in a loose raceme; upper sepal orbicular, the lateral ovate; *lip narrowly linear-spatulate*, drooping, nearly thrice the length of the ovate reflexed petals; *spur curved*, slender, gradually thickened towards the apex, blunt, twice the length of the ovary. — Rich woods, under Hemlocks, &c., rather rare, chiefly northward and along the Alleghanies. July. — Root a few thickened branches. Leaves very smooth, shining above, silvery underneath, 4'-8' wide. Scape 1°-2° high. Flowers pedicelled, spreading, greenish-white: spur $1\frac{1}{2}$ '-2' long.

4. **P. Hookèri**, Lindl. (SMALLER 2-LEAVED ORCHIS.) Leaves orbicular, spreading (3'-4' broad); scape mostly naked, bearing numerous upright sessile flowers in a strict spike; sepals ovate-lanceolate; lip lanceolate, pointed, a little incurved, longer than the linear-lanceolate petals; *spur slender, acute, about the length of the ovary*. — Woods, Rhode Island to Wisconsin. June. — Scape barely 1° high. Flowers 10 to 20, yellowish-green: spur $\frac{3}{4}$ ' long.

§ 3. *Stem leafy: lip entire (or nearly so), nearly equalling or exceeding the spur: root of fleshy branches or fibres.*

5. **P. bracteàta**, Torr. (LARGE-BRACTED GREEN ORCHIS.) Lower leaves obovate, the upper oblong and gradually reduced to lanceolate acute bracts which are 2-3 times the length of the flowers; spike loose; petals linear-lanceolate, erect; *lip oblong-linear or slightly spatulate, truncate and minutely 2-3-toothed at the tip, more than twice the length of the sac-like somewhat 2-lobed spur*. — Damp woods, common northward. June. — Stem 6'-12' high, 6-12-flowered. Flowers small, green.

6. **P. hyperbòrea**, Lindl. (NORTHERN GREEN ORCHIS.)

Stem very leafy; *leaves lanceolate*, erect; spike densely many-flowered; lower bracts lanceolate, longer than the (greenish) flowers; *lip and petals lanceolate, somewhat equal, as long as the obtuse spur.* (*P. Huronensis*, Lindl.) — Peat-bogs and wet cold woods, common northward. June, July. — Stem 6' - 2° high, strict: crowded spike of small flowers 2' - 1° long. Lip as long as the sepals, obtusish, entire, not dilated at the base.

7. ***P. dilatata***, Lindl. (NORTHERN WHITE ORCHIS.) *Leaves lanceolate or linear*, erect; spike wand-like, densely or rather loosely-flowered; bracts linear-lanceolate, mostly shorter than the (white or whitish) flowers; petals linear-lanceolate; *lip linear-lanceolate from a rhomboid-dilated base*, rather obtuse, about the length of the obtuse spur. — Cold peat-bogs, &c., common northward. June, July. — Usually more slender than the last, 10' - 18' high, with a less prolonged spike of pure white, or sometimes greenish, flowers.

8. ***P. flava***, Gray. (YELLOWISH ORCHIS.) *Leaves ovate-oblong or oblong-lanceolate*; the uppermost linear-lanceolate, and pointed, passing into the bracts of the elongated raceme; petals ovate; *lip oblong*, obtuse or barely notched at the apex, furnished *with a tooth on each side near the base and a small protuberance on the palate*, about the length of the sepals, half the length of the club-shaped spur. (*Orchis flava*, L.! *O. virescens*, *fucescens*, *herbiola*, and *bidentata*, of authors.) — Wet places, common. June - Aug. — Stem 10' - 20' high; the spike at first dense, with the bracts longer than the flowers, at length elongated and often loose; the upper bracts shorter than the flowers; which are quite small, dull greenish-yellow, drying brownish.

§ 4. *Stem leafy: lip fringed along the sides, undivided, shorter than the spur: ovary taper-beaked: root of fleshy fibres.*

9. ***P. cristata***, Lindl. (CRESTED ORCHIS.) Lower leaves lanceolate, elongated, the upper gradually reduced to sharp-pointed bracts, nearly the length of the crowded (yellow) flowers; spike oblong or cylindrical; petals rounded, crenate; *lip ovate, with a lacerate-fringed margin, scarcely shorter than the slender obtuse incurved spur*, which is not half the length of the ovary. — Bogs, Penn. (*Pursh*) and southward. — Flowers about one quarter the size of the next.

10. ***P. ciliaris***, Lindl. (YELLOW FRINGED ORCHIS.) Leaves oblong or lanceolate, the upper passing into pointed bracts, which are shorter than the long-beaked ovaries; spike oblong, rather closely many-flowered; *flowers bright orange-yellow*; lateral sepals rounded, reflexed; petals linear, cut-fringed at the apex; *lip oblong, furnished with a very long and copious capillary fringe, about half the length of the spur.* — Bogs and wet places, rare at the North, common southward. July, Aug. — Plant 1½° - 2° high, with a short spike of very showy flowers; the lip ½' long, the conspicuous fringe fully ¼' long on each side.

11. **P. blephariglóttis**, Lindl. (WHITE FRINGED ORCHIS.) Leaves, &c., as in the last; *flowers white*; petals spatulate, slightly cut or toothed at the apex; lip oblong or lanceolate-oblong, with the irregular capillary fringe of the margins usually shorter than the disk, one third the length of the spur. — Var. HOLOPÉTALA (*P. holopetala*, Lindl.) has narrower petals with the tothing obsolete, and the lip less strongly fringed. — Peat-bogs and borders of ponds, with No. 10, or commonly taking its place in the North. July. — A foot high, the flowers beautiful, but rather smaller than in the last.

§ 4. *Stem leafy: lip 3-parted, shorter than the somewhat club-shaped long spur, narrowed at the base into a claw: roots fleshy-thickened.*

* *Flowers white or greenish.*

12. **P. leucophæa**, Nutt. (WESTERN WHITE FRINGED ORCHIS.) Leaves oblong-lanceolate, the bracts similar, rather shorter than the (large dull white) flowers; spike elongated, loose; *petals obovate, minutely cut-toothed; divisions of the lip broadly wedge-shaped or fan-shaped, many-cleft to the middle into a thread-like fringe*; spur longer than the ovary. — Moist meadows, Central Ohio, and westward. July. — Stem 2°–4° high; the spike at length 1° long. Lip $\frac{3}{4}$ ' wide.

13. **P. lácera**, Gray. (RAGGED GREENISH ORCHIS.) Leaves oblong or lanceolate; raceme loosely many-flowered; *petals oblong-linear, entire; divisions of the lip narrow, deeply parted into a few long nearly capillary lobes*; spur about the length of the ovary. (*O. psychodes*, Muhl., &c., not of *L. O. lacera*, Michx.) — Bogs and moist thickets, common. July. — Stem 1°–2° high: bracts shorter or longer than the pale yellowish-green flowers.

* * *Flowers purple.*

14. **P. psychòdes**, Gray. (SMALL PURPLE FRINGED ORCHIS.) Leaves oblong, the uppermost passing into linear-lanceolate bracts; *raceme cylindrical, densely many-flowered; lower sepals round-oval, obtuse; petals wedge-obovate or spatulate, denticulate above*; divisions of the spreading lip broadly wedge-shaped, many-cleft into a *short fringe*. (*O. psychodes*, *L.*! *O. fimbriata*, Pursh, Bigelow. *O. incisa* and *fissa*, Muhl. in Willd.) — Moist meadows and alluvial banks, common. July, Aug. — Stem 2° high. Flowers short-pedicelled, crowded in a spike 4'–7' long, small, but very handsome, fragrant: lip short-stalked, barely $\frac{1}{2}$ ' broad and not so long; the middle lobe broadest and more closely fringed but not so deeply cleft as the lateral ones.

15. **P. fimbriàta**, Lindl. (LARGE PURPLE FRINGED ORCHIS.) Lower leaves oval or oblong, the upper few, passing into lanceolate bracts; *spike or raceme oblong, loosely-flowered; lower sepals ovate, acute; petals oblong, fringe-toothed down the sides*; divisions of the pendent large lip fan-shaped, many-cleft into a *capillary fringe*. (*O. fimbriata*, Ait., Willd., Hook. Exot. Fl., &c. *O. grandiflora*, Bigelow.)

— Wet meadows, &c., New England to Penn., rare, but commoner northward. June. — Stem 2° high. Flowers fewer, paler (or lilac-purple), and 3 or 4 times larger than those of No. 14; the more ample dilated lip $\frac{3}{4}$ ' to 1' broad, with a deeper and nearly capillary crowded fringe, different-shaped and fringe-toothed petals, &c. — Although the flowers of the original *O. fimbriata*, *Ait.*, from Canada and Newfoundland, are not quite so large as in the New England *O. grandiflora*, *Bigel.*, yet it is certain from the detailed description that it belongs here, and not to the preceding species, as I formerly thought, when I deemed the two not specifically distinct.

16. **P. peramòna**, Gray. (FRINGELESS PURPLE ORCHIS.) Lower leaves oblong-ovate, the upper lanceolate; spike oblong or cylindrical, densely flowered; lower sepals round-ovate; petals rounded-obovate, raised on a claw; *divisions of the large lip very broadly wedge-shaped, irregularly eroded-toothed at the broadly dilated summit, the lateral ones truncate; the middle one 2-lobed.* (*P. fissa*, *Lindl.* *O. fissa*, *Pursh*, not of *Muhl.*) — Moist meadows and banks, Penn., Ohio, and southward. Aug. — Stem 2° - 4° high. Flowers large and very showy, violet-purple; the lip paler and very ample, $\frac{3}{4}$ ' long: its divisions minutely and variably toothed, or sparingly cut along the terminal edge, but not at all fringed.

10. ARETHÛSA, Gronov. ARETHUSA.

Flower ringent; the lanceolate sepals and petals nearly alike, united at the base, ascending and arching over the column. Lip dilated and recurved-spreading towards the summit, bearded inside. Column adherent to the lip below, petal-like, dilated at the apex. Anther lid-like, terminal, of 2 approximate cells: pollen-masses granular, 2 in each cell. — A beautiful low herb, consisting of a sheathed scape from a globular solid bulb, terminated by a single large purple and sweet-scented flower. Leaf solitary, linear, nerved, hidden in the sheaths of the scape, protruding from the uppermost after flowering. (Dedicated to the Nymph *Arethusa*.)

1. **A. bulbòsa**, L. — Bogs, rather rare. May. — Flower 1' - 2' long; very handsome.

11. POGÒNIA, Juss. POGONIA.

Flower irregular, the sepals and petals separate and somewhat spreading. Lip crested or 3-lobed. Column free, elongated, club-shaped, wingless. Anther terminal, stalked: pollen-masses 2 (one in each cell), farinaceous. — Stem 1 - 5-leaved. Flowers

purple. (Name from *πώγων*, a beard, from the bearded lip of the original species.)

§ 1. *POGONIA* proper. — *Sepals and petals nearly equal and alike.*

1. **P. ophioglossoides**, Nutt. (ADDER'S-TONGUE *POGONIA*.) Root of thick fibres; stem bearing one clasping oval or lanceolate leaf near the middle, and a smaller similar bract next the solitary flower; lip spatulate, beard-crested and fringed. — Bogs, common. June, July. — Flower handsome, 1' long, pale purple, rarely 2 or 3.

2. **P. péndula**, Lindl. (NODDING *POGONIA*.) Stem low (3'–6' high) from oblong tubers, bearing 3 or 4 alternate ovate-clasping small leaves, and nearly as many drooping flowers on axillary pedicels; lip spatulate, somewhat 3-lobed, roughish or crisped above, but not crested. (*Triphòra*, Nutt.) — Rich damp woods, Vermont and westward, rare. Aug., Sept. — Flowers whitish, tinged with pink, 1' long; the sepals and petals erect.

§ 2. *ODONÉCTIS*, Raf. — *Sepals much longer than the petals.*

3. **P. verticillàta**, Nutt. (WHORLED *POGONIA*.) Root of thick fibres; stem bearing a whorl of 5 oval or oblong-obovate pointed sessile leaves at the summit, 1-flowered; sepals narrowly linear (1'–2' long), twice the length of the oblong petals; lip short, 3-lobed, the middle lobe wavy and crested. — Bogs, rather rare. June. — Flower dingy brownish-green.

12. CALOPÒGON, R. Brown. CALOPOGON.

Flower with the ovary or stalk not twisting, therefore presenting its lip on the upper or inner side! Sepals and petals nearly alike, spreading, distinct. Lip rather spreading, raised on a narrowed base or stalk, dilated at the summit, strongly bearded along the upper side. Column free, winged at the apex. Anther terminal, sessile: pollen-masses 2 (one in each cell). — Scape from a solid bulb, sheathed below by the base of the grass-like leaf, naked above, bearing several flowers. Bracts minute. (Name composed of *καλός*, beautiful, and *πώγων*, beard, from the bearded lip.)

1. **C. pulchéllus**, R. Brown. Leaf linear; scape 2–6-flowered; sepals and petals ovate-lanceolate, acute; lip beautifully bearded towards the dilated summit with white, yellow, and purple club-shaped hairs. — Bogs, common. July. — Stem 1° high. Flowers 1' broad, pink-purple, fragrant.

13. SPIRÁNTHES, Richard. LADIES' TRESSES.

Flower somewhat ringent; the lateral sepals rather oblique at the base and nearly opposite the lip, the upper one cohering with

the petals; all usually erect. Lip oblong, concave and embracing the column below, furnished with 2 callosities next the base, contracted into a short claw below them or sessile, the spreading apex more or less dilated. Column arching, obliquely short-stalked, the ovate stigma usually with a short-pointed and at length 2-cleft beak. Anther dorsal: pollen-masses 2, club-shaped, affixed to a common gland, powdery (the minute grains scarcely held together by the cobwebby threads). — Roots clustered-tuberous. Stems naked or leafy below. Flowers small, white, bent horizontal, in a close usually spirally twisted spike (whence the name, from *σπείρα*, a coil or curl, and *ἄνθος*, blossom).

* *Scape naked, barely bracted below: leaves all next the ground, early disappearing: flowers all one-sided.*

1. **S. grácilis**, Bigelow. Scape very slender (8'–15' high), smooth; spike slender, so twisted as to throw the flowers as they expand all into a single (straight or usually spiral) row; bracts ovate, pointed, not longer than the pods, to which they are closely appressed; lip spatulate-oblong, strongly wavy-cripsed at the rounded summit (not lobed), the callosities at the base conspicuous, incurved; leaves varying from ovate to oblong-lanceolate, petioled. (Also *S. Beckii*, Lindl., as to the Northern plant.) — Hilly woods and sandy plains. July, Aug. — Leaves 1'–2' long, thin. Perianth and lip $\frac{1}{2}$ '– $\frac{1}{4}$ ' long, of a delicate pearly texture: the *calli* at first oval, bearded at the base inside, at length elongating and incurved. — If there are other species allied to this in the Northern States, I have not met with them.

* * *Scape or stem leafy towards the base: flowers not unilateral.*

2. **S. latifolia**, Torr. in Lindl. Low (4'–9' high); leaves oblong-lanceolate, narrowed into a sheathing base; spike oblong, rather dense, more or less twisted; bracts lanceolate, acutish, the lower as long as the flowers; lip oblong, very obtuse, wavy-cripsed at the apex, 5–7-nerved below, and with 2 oblong adnate callosities at the base. (*S. plantaginea*, Torr. in *N. Y. Fl.*, not of Lindl. *S. æstivalis*, Oakes, *Cat.*) — Moist banks, N. New York and New England, not rare. June. — Leaves chiefly towards the base of the stem, 2'–4' long and about $\frac{1}{2}$ ' wide, thickish; above are one or two small leaf-like bracts. Flowers white with the lip yellowish, larger than in No. 1, much smaller than in No. 2; the sepals minutely glandular-pubescent, as well as the axis of the spike. — I find nothing to distinguish it from *S. æstivalis* except that the flowers are a trifle smaller, and the bracts less acute.

3. **S. cernua**, Richard. *Root-leaves linear-lanceolate, elongat-*

ed, those of the stem similar but smaller, passing into bracts; spike dense, minutely pubescent; bracts ovate-lanceolate, pointed, as long as the flowers; lip oblong, furnished with 2 minute callosities at the base, constricted above the middle, rounded at the summit, wavy-crisped. — Wet grassy places, common. Aug. — Oct. — Stem 8' - 2° high; the root leaves 4' - 12' long. Spike thick, 3' - 5' long, seldom twisted. Flowers white or cream-color, fragrant; the perianth about 5' long.

14. GOODYÈRA, R. BROWN. RATTLESNAKE PLANTAIN.

Lateral sepals not oblique at the base. Lip saccate at the base, sessile, without callosities, contracted at the apex into a pointed and channelled recurved termination. Column small, straight. Pollen-masses 2, consisting of angular grains loosely cohering by a manifest web. Otherwise nearly as in *Spiranthes*. — Root of thick fibres from a fleshy somewhat creeping rootstock, bearing a tuft of thickish petioled leaves next the ground. Scape and spike with the greenish-white small flowers usually glandular-downy. (Dedicated to *John Goodyer*, an early English botanist.)

1. **G. rèpens**, R. BROWN. Small (5' - 8' high) and slender; leaves ovate, more or less reticulated with white; *flowers several, in a loose 1-sided spike*; lip inflated, the apex oblong and obtuse; stigma distinctly 2-toothed. — Rich woods, under evergreens, common northward and on mountains. Aug. — Leaves 1' long. — Intermediate forms occur between this and the succeeding.

2. **G. pubescens**, R. BROWN. Leaves ovate, conspicuously reticulated and blotched with white; *flowers numerous in a crowded spike, not 1-sided*; lip inflated with an abrupt ovate apex; stigma rounded at the summit. — Rich woods, common southward. July, Aug. — Leaves 2' long. Scape 8' - 12' high.

15. LISTÈRA, R. BROWN. TWAYBLADE.

Sepals and petals nearly alike, spreading or reflexed. Lip mostly drooping, longer than the sepals, 2-lobed or 2-cleft. Column wingless: stigma with a rounded beak. Anther dorsal, ovate: pollen powdery, in 2 masses, joined to a minute gland. — Roots fibrous. Stem bearing a pair of opposite sessile leaves in the middle, and a spike or raceme of greenish or brownish-purple small flowers. (Dedicated to *Martin Lister*, an early and celebrated British naturalist.)

* *Column very short (sepals ovate, reflexed).*

1. **L. cordata**, R. Brown. Leaves round-ovate, somewhat heart-shaped ($\frac{1}{2}$ ' long); raceme almost smooth; flowers minute, approximated, on pedicels not longer than the ovary; lip linear, twice the length of the sepals, 1-toothed on each side at the base, 2-cleft to the middle. (*Epipactis convallarioides*, Pursh, Bigel., not of Swartz.) — Damp cold woods, northward, not rare. June, July. — Stem 4' - 6' high.

2. **L. austràlis**, Lindl. Leaves ovate ($\frac{1}{2}$ ' long); raceme loose and slender; flowers very small, on minutely glandular-pubescent pedicels twice the length of the ovary; lip linear, slightly arrow-form at the base, 3 - 4 times the length of the sepals, 2-parted, the divisions linear-setaceous. (*L. Ellióttii*, Hook. ined.? *L. convallarioides*, Ell. *L. cordata*, Nutt.) — Damp thickets, New Jersey, Penn., and southward. June.

* * Column longer, arching or straightish.

3. **L. convallarioides**, Hook. Leaves oval (or roundish and somewhat heart-shaped, Swartz), often acute (1' or more long); raceme loose, pubescent; flowers on slender pedicels; lip wedge-oblong, 2-lobed at the dilated apex, and 1-toothed on each side at the base, nearly twice the length of the narrowly lanceolate spreading sepals. (*Epipactis conv.*, Swartz.) — Damp mossy woods, Charleston, Vermont (with Calypso), Carey; and base of the White Mountains, Oakes. June. — Plant 4' - 9' high: lip purplish, nearly $\frac{1}{2}$ ' long.

16. CYPRIPIÈDIUM, L. LADY'S SLIPPER.

Sepals spreading; the 2 anterior distinct, or commonly united into one under the lip. Petals similar but usually narrower, spreading. Lip a large inflated sac, somewhat slipper-shaped. Column short, 3-lobed, the lateral lobes bearing a 2-celled anther under each of them, the middle lobe (sterile stamen) dilated and petal-like, thickish, incurved. Pollen pulpy-granular. Stigma terminal. — Root of many tufted fibres. Leaves large, many-nerved and plaited, sheathing at the base. Flowers solitary or few, large and showy. (Name composed of *Κύπρις*, Venus, and *πόδιον*, a sock or buskin, i. e. *Venus's Slipper*.) Also called *Moccason-flower*.

* Stem leafy, 1 - 3-flowered: sepals and the linear wavy-twisted petals longer than the lip, pointed, greenish shaded with purplish-brown; the 2 anterior sepals united into one quite or nearly to the tip.

1. **C. pubéscens**, Willd. (LARGER YELLOW LADY'S SLIPPER.) Sepals elongated-lanceolate; lip flattened laterally, very convex and gibbous above, pale yellow; sterile stamen (appendage of the col-

umn) triangular.—Bogs and damp low woods, common northward and westward. May, June.—Stem 2° high, pubescent, as are the broadly oval acute leaves. Flower scentless. Lip 1½' - 2' long.

2. **C. parviflorum**, Salisb. (SMALLER YELLOW LADY'S SLIPPER.) *Sepals ovate or ovate-lanceolate; lip flattish above and below, bright yellow; sterile stamen triangular; leaves oval, pointed.*—Rich low woods, rather common. May, June.—Stem 1° or so high. Flower fragrant: perianth more brown-purple than the last: lower sepal often narrower than the upper, frequently cleft at the apex as deeply as in *C. Calcèolus*. Lip ¾' - 1' long.

3. **C. candidum**, Muhl. (SMALL WHITE LADY'S SLIPPER.) *Sepals ovate-lanceolate; lip flattish laterally, convex above, white; sterile stamen lanceolate; leaves lanceolate-oblong, acute.*—Low grounds, Penn. to Wisconsin, rare.—Plant 5' - 10' high, slightly pubescent, 1-flowered. Petals and sepals greenish, nearly equal in length, not much longer than the lip, which is ¾' long.

* * *Stem leafy, 1-3-flowered: sepals and petals flat and rounded, white, not longer than the lip, the 2 anterior sepals perfectly united into one.*

4. **C. spectabile**, Swartz. (SHOWY LADY'S SLIPPER.) *Sepals round-ovate or the upper orbicular, rather longer than the oblong petals; lip much inflated, white tinged with purple in front; sterile stamen heart-ovate.*—Peat-bogs, Maine and W. Massachusetts to Wisconsin, common northward. July.—The most beautiful of the genus, downy, 2° high, stout, very leafy. Leaves ovate, pointed. Lip fully 1½' in diameter, sometimes almost all purple.

* * * *Scape naked, 2-leaved at the base, 1-flowered; sepals and petals greenish, shorter than the lip, the 2 anterior perfectly united into one.*

5. **C. acule**, Ait. (STEMLESS LADY'S SLIPPER.) *Sepals oblong-lanceolate, pointed, nearly as long as the linear petals; lip drooping, obovoid, purple, with a fissure in front; sterile stamen rhomboid, pointed; leaves oblong.*—Dry or moist woods, under evergreens, common. May, June.—Downy: scape 8' - 12' high, with a bract at the top. Lip nearly 2' long, veiny, sometimes pale, or even white.

* * * * *Stem leafy, 1-flowered: the 2 anterior sepals separate.*

6. **C. arietinum**, R. Brown. (RAM'S-HEAD.) *Upper sepal ovate-lanceolate, pointed; the 2 lower and the petals linear and nearly alike, rather longer than the red and white veiny lip, which is prolonged at the apex into a short conical deflexed point; sterile stamen rounded; leaves 3 or 4, elliptical-lanceolate, nearly smooth.* (*Cryosánthes*, Raf. *Arietinum*, Beck.)—Swamps and damp woods, Maine and Vermont to Wisconsin northward, very rare. June.—Stem slender, 6' - 12' high. Perianth greenish-brown: lip small, somewhat conical, hairy at the orifice, ½' long.

ORDER 116. AMARYLLIDACEÆ. (AMARYLLIS FAM.)

Chiefly bulbous and scape-bearing herbs, not scurfy or woolly, with linear flat root-leaves, and regular perfect 6- androus flowers, the tube of the 6-parted perianth coherent with the 3-celled ovary. — Anthers introrse. Style single. Pod 3-celled, loculicidal, many-seeded. Seeds anatropous or nearly so, with a straight embryo in the axis of fleshy albumen.

1. AMARÝLLIS, L. AMARYLLIS.

Perianth with the 6 divisions petal-like and similar; the 6 stamens inserted in its throat: anthers versatile. Pod membranaceous, 3-lobed. — Leaves and scape from a coated bulb. Flowers from a 1-2-leaved spathe. (A poetical name.)

1. **A. Atamásco**, L. (ATAMASCO LILY.) Spathe tubular, 2-cleft, 1-flowered; perianth funnel-shaped, white and pink; stamens and style declined. — Penn. (*Muhl.*) and southward. June. — Flower 3' long, on a scape 6' high.

2. AGÀVE, L. AMERICAN ALOE.

Perianth tubular-funnel-form, persistent, 6-parted; the divisions nearly equal, narrow. Stamens 6, soon exerted: anthers linear. Pod coriaceous. Seeds flattened. — Leaves thick and fleshy, often with cartilaginous or spiny teeth, clustered at the base of the many-flowered scape. (Name altered from *áyavós*, *wonderful*, not inappropriate as applied to *A. Americana*, the *Century-plant*.)

1. **A. Virgínica**, L. (FALSE ALOE.) Herbaceous; scape simple; the flowers scattered in a loose wand-like spike, greenish-yellow, very fragrant. — Dry or rocky banks, Penn. ? and southward. Sept. — Scape 3°-6° high.

3. HYPÓXYS, L. STAR-GRASS.

Perianth persistent, 6-parted, spreading, the 3 outer divisions a little herbaceous outside. Stamens 6: anthers erect. Pod crowned with the withered or closed perianth, not opening by valves. Seeds globular, with a crustaceous coat, ascending, imperfectly anatropous, the raphe not adherent quite down to the micropyle, the seed-stalk thus forming a sort of lateral beak. Radicle inferior!

— Stemless small herbs, with grassy and hairy linear leaves and slender few-flowered scapes from a solid bulb. (Name composed of *ὑπό*, *beneath*, and *ὀξύς*, *sharp*, it is thought because the pod is acute at the base.) — The peculiarity of the seeds, which are not well described by *Lindley* and *Endlicher*, and which result from almost perfectly anatropous ovules, is of no ordinal consequence.

1. **H. erecta**, L. Leaves linear, grass-like, longer than the umbellately 1-4-flowered scape; divisions of the perianth hairy and greenish outside, yellow within. — Meadows and open woods, common. July. — Scape 4' - 6' high.

The SNOWDROP (*GALANTHUS NIVALIS*), the SNOW-FLAKE (*LEUCØJUM VERNUM*), the NARCİSSUS (*N. POËTICUS*), JONQUIL (*N. JONQUİL-LA*), and DAFFODIL (*N. PSEUDO-NARCİSSUS*), are familiar representatives of this order in our gardens.

ORDER 117. HÆMODORÀCEÆ. (BLOODWORT FAM.)

Herbs, with fibrous roots, usually equitant leaves, and perfect 3-6-androus regular flowers, which are woolly or scurfy outside; the tube of the 6-lobed perianth coherent with the whole surface, or with merely the lower part, of the 3-celled ovary. — Anthers introrse. Style single, sometimes 3-partible. Pod crowned or inclosed by the persistent perianth, 3-celled, loculicidal, 3-many-seeded. Embryo small, in hard or fleshy albumen.

* * * The character by which *Endlicher* distinguishes this family from the foregoing, viz., by having the 3 cells of the ovary *opposite the inner divisions of the perianth*, is not true of either of the following genera. Yet, in *Lophiola* and *Aletris*, the 3 stigmas, as well as the 3 divisions into which the style splits at maturity, are indeed thus situated: but they stand over the *partitions!* instead of the cells, and therefore exactly surmount the valves of the loculicidal pod.

Synopsis.

- * Ovary wholly inferior: style filiform: seeds peltate, amphitropous.
 1. LACHNANTHES. Stamens 3, exserted: anthers versatile.
- * * Ovary free all but the base: style 3-partible: seeds anatropous.
 2. LOPHIOLA. Stamens 6, inserted near the base of the woolly 6-cleft perianth.
 3. ALETRIS. Stamens 6, inserted in the throat of the warty-roughened and tubular 6-toothed perianth. Leaves flat.

1. LACHNÁNTHES, Ell. RED-ROOT.

Perianth woolly outside, 6-parted down to the adherent ovary. Stamens 3, opposite the 3 larger or inner divisions: filaments long, exerted: anthers linear. Style thread-like, exerted, declined. Pod globular. Seeds few on each fleshy placenta, flat and rounded, fixed by the middle. — Herb with a red fibrous root, equitant sword-shaped leaves, clustered at the base and scattered on the stem, which is hairy at the top, and terminated by a dense compound cyme of dingy yellow and loosely woolly flowers (whence the name, from *λάχνη*, *wool*, and *άνθος*, *blossom*).

1. **L. tinctoria, Ell.** — Sandy swamps, Rhode Island and N. Jersey, thence southward near the coast. July. ♀.

2. LOPHIOLA, Ker. LOPHIOLA.

Perianth densely woolly, deeply 6-cleft; the divisions nearly equal, spreading, longer than the 6 stamens, which are inserted at their base. Anthers fixed by the base. Pod ovate, free from the perianth except at the base, pointed with the awl-shaped style, which finally splits into 3 divisions, one terminating each valve: cells many-seeded. Seeds oblong, ribbed, anatropous. — A slender herb, with creeping rootstocks and fibrous roots, linear and nearly smooth equitant leaves; the stem leafless and whitened with soft matted wool towards the summit, as well as the crowded or paniced cyme. Perianth dingy yellow inside; the lobes naked only towards the tip, each clothed with a woolly tuft towards the base (whence the name, from *λοφείον*, *a small crest*).

1. **L. aurea, Ker.** (*Conóstylis Americana, Pursh.*) — Bogs of the Pine barrens of New Jersey and southward. July.

3. ALÈTRIS, L. COLIC-ROOT. STAR-GRASS.

Perianth cylindrical, not woolly, but wrinkled and roughened outside by thickly-set frosted points, which look like scurfy mealliness, the tube cohering below with the base only of the ovary, 6-cleft at the summit. Stamens 6, inserted at the base of the lobes: filaments and anthers short, included. Style awl-shaped, 3-cleft at the apex: stigmas minutely 2-lobed. Pod ovate, inclosed in the roughened perianth; the dehiscence, seeds, &c., nearly as in *Lophiola*. — Perennial and smooth stemless herbs, very bit-

ter, with fibrous roots, and a spreading cluster of thin and flat lanceolate leaves; the small flowers in a wand-like spiked raceme, terminating a long and naked slender scape (2° - 3° high). Bracts awl-shaped, minute. (Ἄλετρις, a female slave who grinds corn, the name applied to these plants in allusion to the apparent mealiness dusted over the blossoms.)

1. **A. farinosa**, L. Flowers oblong-tubular, white; lobes lanceolate-oblong. — Grassy or sandy woods, common, especially southward. July, Aug.

2. **A. aurea**, Walt. Flowers bell-shaped, yellow (fewer and shorter); lobes short-ovate. — Barrens, &c., N. Jersey and southward.

ORDER 118. IRIDACEÆ. (IRIS FAMILY.)

Herbs, with equitant 2-ranked leaves, and regular or irregular perfect flowers, the tube of the 6-cleft petal-like perianth coherent with the 3-celled ovary, and 3 distinct or monadelphous stamens with extrorse anthers. — Flowers from a 2-leaved spathe, usually showy and ephemeral. Style single: stigmas 3. Pod 3-celled, loculicidal, many-seeded. Seeds anatropous: embryo straight in fleshy albumen.

1. IRIS, L. FLOWER-DE-LUCE.

Perianth 6-cleft; the 3 outer divisions spreading or reflexed, the 3 inner smaller and erect. Stamens distinct, placed before the outer divisions of the perianth, and under the 3 petal-like stigmas. Pod 3-6-angled. Seeds flattened. — Perennials with creeping, often tuberous (acid) rootstocks, sword-shaped or grassy leaves, and large showy flowers. (Ἴρις, the rainbow deified, anciently applied to this genus on account of the bright and varied colors of the blossoms.)

* *Stems leafy, often branching: rootstocks thick: flowers crestless.*

1. **I. versicolor**, L. (LARGER BLUE FLAG.) Stem stout, angled on one side; leaves sword-shaped ($\frac{3}{4}$ ' wide); ovary obtusely triangular with the sides flat; pod oblong, turgid, with rounded angles. — Wet places, common. May, June. — Stem 2° - 3° high. Flowers blue, variegated with green, yellow and white at the base, and veined with purple.

2. **I. Virginica**, L. (SLENDER BLUE FLAG.) Stem slender,

terete (1°-3° high); leaves narrowly linear ($\frac{1}{4}$ ' wide); ovary 3-angled and each side deeply 2-grooved; pod triangular, acute at both ends. (*I. prismatica*, Pursh. *I. grácilis*, Bigel.) — Marshes near the coast. June. — Perianth narrower and more yellow than in the last.

* * Low, almost stemless: rootstocks slender, creeping.

3. **I. lacústris**, Nutt. (DWARF LAKE IRIS.) Rootstalks tufted; leaves lanceolate; scape very short, from a spathe like the leaves, 1-flowered; perianth funnel-form; the oblong-obovate divisions almost equal, a little longer than the tube, the outer ones with a naked crest; lobes of the stigma shorter than the crest; ovary triangular. — Gravelly shores of Lakes Huron and Michigan. May. — Plant 3' - 4' high in blossom: the flower scarcely exceeding the leaves, paler blue than in *I. cristata*, the divisions larger in proportion and less pointed: crest beardless: tube yellow.

I. CRISTATA, Ait., a dwarf species, is to be sought in the mountains of S. Pennsylvania. — *I. PUMILA*, and two or three other exotic species, are commonly cultivated in gardens.

2. SISYRÍNCHIUM, L. BLUE-EYED GRASS.

Perianth 6-parted; the divisions alike, spreading. Stamens monadelphous. Stigmas involute-thread-like. Pod globular-3-angled. Seeds globular. — Low slender perennials, with fibrous roots, grassy or lanceolate leaves, mostly branching 2-edged or winged stems, and fugacious umbelled-clustered small flowers from a 2-leaved spathe. (Name composed of *σῦς*, a hog, and *ρύγχος*, snout, from a fancy that the hogs are fond of rooting it up.)

1. **S. Bermudiàna**, L. Scape winged, naked or 1-2-leaved; leaves narrow and grass-like; spathe umbellately few-flowered; divisions of the perianth obovate, more or less notched at the end, and bristle-pointed from the notch. (Leaves of the spathe almost equal, shorter than the flowers.) — Var. 1. *ANCEPS* (*S. anceps*, Cav.) has a broadly winged scape, and the outer leaf of the very unequal spathe longer than the flowers. — Var. 2. *MUCRONATUM* (*S. mucronatum*, Michx.) has a slender and narrowly winged scape, very narrow leaves, those of the spathe sharp-pointed, unequal, one of them usually longer than the flowers. But there are various intermediate forms. — Moist meadows, &c., among grass, common. June - Aug. — Flowers small, delicate blue, changing to purplish, 4-6 opening in succession; the spathe often purplish.

The CRÒCUS, the CORN-FLAG (*GLADIOLUS*), the BLACK-BERRY LILY (*PARDÁNTHUS CHINÉNSIS*), and the TIGER-FLOWER (*TIGRÍDIA PAVÓNIA*), are common cultivated plants of the family.

ORDER 119. **DIOSCOREACEÆ.** (YAM FAMILY.)

Plants with twining stems from large tuberous roots or knotted rootstocks, and ribbed and netted-veined petioled leaves, small diœcious 6-androus and regular flowers, with the 6-cleft calyx-like perianth adherent in the fertile plant to the 3-celled ovary. Styles 3, distinct. — Ovules 1 or 2 in each cell, anatropous. Fruit usually a membranaceous 3-angled or winged pod. Seeds with a minute embryo in hard albumen. — Represented chiefly by the genus

1. DIOSCORÈA, Plumier. YAM.

Flowers very small, in axillary panicles or racemes. Stamens 6, at the base of the divisions of the 6-parted perianth. Pod 3-celled, 3-winged, loculicidally 3-valved by splitting through the winged angles. Seeds 1 or 2 in each cell, flat, with a membranaceous wing. (Dedicated to the Greek naturalist *Dioscorides*.)

1. D. villòsa, L. (WILD YAM-ROOT.) Herbaceous; leaves mostly alternate, sometimes nearly opposite or in fours, more or less downy underneath, heart-shaped, conspicuously pointed, 9–11-ribbed; flowers pale greenish-yellow, the sterile in drooping panicles, the fertile in drooping simple racemes. — Thickets, New England to Wisconsin, common southward. July. — A slender vine, twining over bushes. Pods $\frac{3}{4}$ long.

ORDER 120. **SMILACEÆ.** (SMILAX FAMILY.)

Herbs, or climbing shrubby plants, with ribbed and conspicuously netted-veiny leaves, regular 6–10-androus flowers with the 6–10-leaved perianth free from the 3–5-celled ovary; the styles or sessile stigmas as many and distinct. Anthers introrse. Fruit a few–many-seeded berry. Embryo minute, in hard albumen. — Comprises two marked suborders, viz.

Suborder I. **TRUE SMILACEÆ.** THE SMILAX FAM. PROP.

Flowers diœcious or perfect, axillary, the perianth uniform. Styles nearly wanting. Seeds orthotropous or amphitropous, 1–2 in each cell. Chiefly shrubby: leaves alternate.

1. SMILAX. Flowers diœcious or polygamous. Perianth greenish, deciduous.

Suborder II. TRILLIACEÆ. THE TRILLIUM FAMILY.

Flowers perfect, terminal: the sepals and petals usually different in color. Styles manifest. Seeds anatropous, several in each cell. Herbs: leaves whorled.

2. TRILLIUM. Sepals 3, green, persistent. Petals 3. Flower single.
3. MEDEOLA. Sepals and petals 3, colored alike, deciduous. Flowers umbelled.

1. SMILAX, Tourn. GREENBRIER. CATBRIER.

Flowers diœcious or polygamous. Perianth of 6 equal spreading sepals (greenish or yellowish), deciduous. Stamens as many at their base: filaments short: anthers fixed by the base, linear. Stigmas 3, thick and spreading, almost sessile. Berry globular, 1-3-celled, 1-3-seeded. Seeds orthotropous, suspended, globular. Albumen horny. — Shrubs, or rarely perennial herbs, often evergreen and prickly, climbing by tendrils on the petioles, with yellowish-green stems, heart-shaped or ovate leaves, and small flowers in axillary peduncled umbels. (The ancient Greek name, of obscure meaning.)

§ 1. SMILAX proper. — *Stems woody, often prickly: ovules solitary.*

* *Leaves broad, thickish, some of them frequently persistent.*

1. **S. rotundifolia**, L. (COMMON GREENBRIER.) Stem armed with stout scattered prickles, as well as the terete branches; branchlets more or less 4-angular; *leaves round-ovate, often broader than long, slightly heart-shaped, abruptly short-pointed, 5-nerved; peduncles scarcely longer than the petioles and pedicels.* (*S. caduca*, L.) — Moist thickets, very common, especially southward. June. — Stems often climbing 20° - 40°, stout. Leaves, as in the next, paler beneath, but scarcely ever glaucous. Berries, as in the others, bluish-black, with a bloom.

2. **S. quadrangulàris**, Muhl. in Willd. (SQUARE-STEMMED GREENBRIER.) *Branches and branchlets square, armed with stout scattered prickles; leaves ovate or ovate-lanceolate, taper-pointed, rounded or sometimes heart-shaped at the base, 3-5-nerved; peduncles about the length of the petioles and pedicels.* — Penn. and southward. — Leaves about 4' long by 2' broad, thinnish, sometimes minutely rough-ciliate on the margin.

3. **S. tannoïdes**, L. Branches and the angular branchlets armed with scattered prickles; *leaves* varying from round-heart-shap-

ed to somewhat fiddle-shaped or rounded-halbert-shaped, *dilated at the base, green and shining both sides*, with 3 distinct and several obscurer lateral nerves; *peduncles longer than the slender petioles* and the pedicels. (*S. panduratus*, Pursh.) — Thickets in sterile or sandy soil, New Jersey and southward.

4. **S. glauca**, Walt. Branches terete or nearly so, sparingly prickly; *leaves glaucous underneath*, ovate, sometimes heart-shaped, mucronate, 3-5-nerved; *peduncles 2-3 times the length of the petioles* and pedicels. (*S. Sarsaparilla*, Willd. *S. spinulosa*, Torr.?) — Long Island? New Jersey, and southward. Branchlets and upper face of the leaves often glaucous also when young.

5. **S. Pseudo-China**, L. Stems and branches terete, *unarmed*; *leaves (large) ovate-oblong*, the lower heart-shaped, pointed, strongly 5-nerved, *green both sides*, rough on the margins; *peduncles flat, thrice the length of the petioles*. — New Jersey (Pursh.) and southward.

* * *Leaves broad, thin, entirely deciduous: prickles bristle-like.*

6. **S. hispida**, Muhl. Stem terete, *densely beset below with shining-brown weak and slender prickles*; the flowering branches often naked; leaves ovate, mostly heart-shaped, pointed, bright green both sides, strongly 5-nerved; *peduncles 2-3 times the length of the petioles*, 6-10-flowered. (*Torr. Fl. N. Y.*) — Moist thickets, W. New York to Michigan, common. June. — Stem climbing high, thick as the thumb at the base. Leaves 3' - 5' long, minutely rough on the margins: peduncles 1½' - 2' long.

* * * *Leaves narrow, very thick and evergreen.*

7. **S. laurifolia**, L. Stem prickly near the base; leaves lanceolate or oblong, shining, 3-nerved; peduncles not longer than the pedicels. — Pine barrens of New Jersey and southward. August.

§ 2. COPROSMANTHUS, Torr. — *Stem herbaceous, not prickly: ovules in pairs in each cell: leaves long-petioled, thin.*

8. **S. herbacea**, L. (CARRION-FLOWER.) Stem erect and recurving, or climbing; *leaves ovate-oblong or rounded, mostly heart-shaped*, 7-9-nerved, mucronate or pointed, smooth; tendrils sometimes wanting; peduncles elongated (3' - 4' long, or often 6' - 8' and much longer than the leaves), 20-40-flowered. — Var. PULVERULENTA (*S. pulverulenta*, Michx. *S. pedunculàris*, Muhl.) has the leaves more or less soft-downy underneath. — Moist meadows and river-banks, common. June. — Stem 3° - 6° long. Leaves very variable: petioles 1' - 3' long. Flowers exhaling the stench of carrion.

9. **S. tannifolia**, Michx. Stem upright or climbing; *leaves heart-halbert-shaped*, 5-nerved, mucronate, smooth; peduncles longer than the petioles. (*S. tamnoides*, Pursh., not of L.) — Pine barrens, New Jersey and southward. — Leaves abruptly narrowed above the dilated heart-shaped base, tapering to the apex.

2. TRILLIUM, L. THREE-LEAVED NIGHTSHADE.

Flower perfect. Sepals 3, lanceolate, spreading, herbaceous, persistent. Petals 3, larger, withering in age. Stamens 6: anthers linear, adnate, on short filaments. Styles (or rather stigmas) awl-shaped or slender, spreading or recurved above, persistent, stigmatic down the inner side. Berry 3-sided, ovate, 3-celled (purple). Seeds horizontal, several in each cell. — Low perennial herbs, with a stout simple stem rising from a short and abrupt tuberous rootstock, bearing at the summit a whorl of 3 ample broadly ovate leaves, and a terminal large flower. (Name from *trilix*, triple; all the parts being in threes.)

* *Flower peduncled, recurved under the leaves.*

1. **T. cœrnum**, L. (NODDING TRILLIUM. WAKE-ROBIN.) Leaves broadly rhomboid, pointed, nearly sessile; *petals white, oblong-ovate, pointed, recurved*, a little wavy, rather longer than the sepals. — Moist woods, New England to Penn., common eastward and southward. May, June. — Petals $\frac{3}{4}$ ' long.

* * *Flower on an upright or reclining peduncle.*

+ *Leaves sessile.*

2. **T. erectum**, L. (PURPLE TRILLIUM. BIRTH-ROOT.) Leaves broadly rhomboid, abruptly sharp-pointed; *petals dark dull purple, ovate, somewhat pointed, flat*, spreading, slightly longer than the sepals. — Var.? **ALBUM** (*T. pendulum*, Willd. Hort. Ber.) is smaller, with the *petals greenish-white*, or rarely yellowish. — Rich woods, common, especially westward. May. — Peduncle soon reclining, 2' long. Ovary brown-purple. Petals 1' - 1½' long.

3. **T. grandiflorum**, Salisb. (LARGE WHITE TRILLIUM.) Leaves obovate-rhomboid, pointed, barely sessile; *petals obovate*, spreading from an erect base, longer and much broader than the sepals, *white, changing with age to rose-color*. — Rich woods, Vermont to Wisconsin. June. — Flower on a peduncle 2' - 3' long, very handsome: petals 2½' long.

+ + *Leaves petioled, rounded at the base.*

4. **T. nivale**, Riddell. (DWARF WHITE TRILLIUM.) Small (2' - 3' high); *leaves oval or ovate, obtuse*; *petals oval-lanceolate, obtuse*, rather wavy, *white*, as long as the peduncle, longer than the sepals. — Rich woods, Ohio to Wisconsin. April. — Leaves 1' - 2', and petals 1', long. Styles long and thread-like.

5. **T. erythrocarpum**, Michx. (PAINTED TRILLIUM.) *Leaves ovate, taper-pointed*; *petals ovate or oval-lanceolate, pointed*, wavy, widely spreading, *white painted with purple stripes at the base*, almost twice the length of the sepals, shorter than the peduncle. (T.

picum, *Pursh.*) — Cold damp woods, common northward. May, June. — Petals 1' long. Berry ovoid, red. — At Brunswick, Maine, Mr. Sparrow finds many specimens with the calyx changed to leaves, and the petals often increased in number: in cultivation the floral organs become entirely abortive. Similar monstrosities are sometimes seen in *T. grandiflorum*; as well as an increased number of stamens and styles.

* * * *Flower closely sessile, erect: petals nearly persistent.*

6. **T. séssile**, L. Leaves ovate or oblong, sessile or nearly so; petals dark dull purple, lanceolate, erect, rather longer but not broader than the sepals. — Rich woods, Penn. and westward. April, May. — Stem 6' - 8' high. Petals 1' long.

3. MEDÈOLA, Gronov. INDIAN CUCUMBER-ROOT.

Flowers perfect. Perianth revolute, of 3 sepals and 3 petals which are oblong and alike (pale greenish-yellow), deciduous. Stamens 6: filaments thread-like, longer than the linear-oblong anthers, which are attached by their back near the base. Styles 3, recurved-diverging, long and thread-form (stigmatic along the upper side), deciduous. Berry spherical (dark purple), 3-celled, few-seeded. — A perennial herb with a simple slender stem (clothed with flocculent deciduous wool) rising from a horizontal and tuberous white rootstock (which has the taste of the cucumber), bearing a whorl of 5-9 obovate-lanceolate and pointed sessile leaves near the middle, and another of 3 smaller ovate ones at the top, subtending a sessile umbel of small recurved flowers. (Named after the sorceress *Medea*, from the altogether imaginary notion that it possessed great medicinal virtues.)

1. **M. Virgínica**, L. (*Gyròmia*, *Nutt.*) — Rich damp woods. June. Stem 1° - 3° high.

ORDER 121. LILIÀCEÆ. (LILY FAMILY.)

Herbs, with parallel-nerved sessile or sheathing leaves, regular perfect 6- (rarely 4-) androus flowers with the petal-like consimilar 6-merous perianth free from the 2-3-celled ovary, introrse anthers attached by a point, and the style single. — Stigmas 3, or combined into one. Fruit a 3-valved loculicidal pod or a berry, many-few-seeded. Embryo slender or minute, in fleshy albumen.

Synopsis.

Tribe 1. ASPARAGÆÆ. — Fruit a few-seeded berry, 2-3-celled. Seeds amphitropous, orthotropous, or rarely anatropous. Not bulbous: rootstocks creeping or tuberous.

* Stems branching, very leafy. Seeds amphitropous.

1. ASPARAGUS. Perianth 6-parted. Leaves thread-like or bristle-form. Pedicels of the axillary flowers jointed in the middle.

* * Stem simple, leafy. Seeds orthotropous.

2. POLYGONATUM. Perianth tubular, 6-cleft, bearing the stamens above the middle. Flowers axillary.

3. SMILACINA. Perianth 4-6-parted, spreading, the stamens borne at the base. Flowers in a raceme.

* * * Scape naked. Seeds anatropous.

4. CLINTONIA. Perianth 6-sepalled. Stamens hypogynous. Flowers umbelled.

Tribe 2. ASPHODELEÆÆ. — Fruit a few-many-seeded pod, 3-celled, loculicidal. Seeds anatropous or amphitropous.

* Not bulbous. Perianth united in a tube below.

5. HEMEROCALLIS. Perianth funnel-form. Stamens declined.

* * Bulbous: scape simple. Perianth 6-sepalled or 6-parted.

6. ORNITHOGALUM. Flowers corymbed. Style 3-sided.

7. SCILLA. Flowers racemed. Style thread-like.

8. ALLIUM. Flowers umbelled, from a spathe. Sepals 1-nerved.

Tribe 3. TULIPACEÆÆ. — Fruit a many-seeded 3-celled loculicidal pod. Seeds anatropous. Perianth 6-leaved. Bulbous.

9. LILIUM. Stem leafy. Pod oblong. Seeds vertically flattened.

10. ERYTHRONIUM. Scape naked, 1-flowered. Pod obovate-triangular: seeds ovoid.

Tribe I. ASPARAGÆÆ. THE ASPARAGUS TRIBE.

1. ASPÁRAGUS, L. ASPARAGUS.

Perianth 6-parted, spreading above: the 6 stamens at their base. Style short: stigma 3-lobed. Berry spherical, 3-celled; the cells 2-seeded. — Perennials, with much-branched stems from thick and matted rootstocks, narrow leaves in clusters, and small greenish-yellow axillary flowers. (The ancient Greek name.)

1. *A. officinàlis*. (GARDEN ASPARAGUS.) Herbaceous; bushy-branched; leaves thread-like. — Escaped from gardens, naturalized on the coast in the vicinity of salt water, near New York. June.

2. POLYGONÀTUM, Tourn. SOLOMON'S SEAL.

Perianth tubular, 6-lobed at the summit; the 6 stamens inserted on or above the middle of the tube, included. Ovary 3-celled, with 2-6 orthotropous ovules in each cell: style slender: stigma capitate or triangular. Berry globular, black or blue; the cells 1-2-seeded. — Perennial herbs, with simple erect or curving stems from creeping thick and knotted rootstocks, chiefly alternate and sessile or half-clasping nerved leaves, and axillary nodding greenish flowers. (The ancient name, from *πολύς*, *many*, and *γόνυ*, *knee*, alluding to the many joints of the rootstocks and stems.)

1. **P. canaliculatum**, Pursh. (GREAT SOLOMON'S SEAL.) Stem stout, angled or channelled (3° - 5° high); leaves oblong-ovate, obtusely pointed, partly clasping, *smooth and green both sides, almost equally many-nerved*; peduncles 2-6-flowered, smooth; filaments smooth, shorter than the anthers, inserted on the middle of the tube of the cylindrical-oblong perianth. (*P. latifolium*, Pursh. *Convallaria canaliculatum*, Muhl.) — Rich river-banks and copses. June. — Nearer *P. vulgare* than any other, but far larger, the flowers shorter.

2. **P. pubescens**, Pursh. (SMALLER SOLOMON'S SEAL.) Stem terete or barely grooved on one side (1° - 2° high); leaves ovate-oblong or elliptical-lanceolate, *minutely downy and glaucous underneath, with 3-5 principal nerves*, sessile; peduncles 1-2-flowered, smooth; filaments *minutely glandular-puberulent*, inserted towards the summit of the cylindrical-oblong perianth. (*P. pubesc.*, *angustifolium*, and *multiflorum?* Pursh. *Conv. pubescens*, Muhl. in Willd.!) — Woods and rocky banks, common. May, June. — Perianth $\frac{1}{2}$ ' long, greenish. Ovules often 6 in each cell (as also in *P. vulgare*). — *P. MULTIFLORUM*, Desf., which has a slender and somewhat funnel-form more colored perianth, and downy filaments, I have not yet seen in this country.

3. SMILACINA, Desf. FALSE SOLOMON'S SEAL.

Perianth 4-6-parted, spreading, deciduous (white), with as many stamens inserted at the base of the divisions. Filaments slender: anthers short. Ovary 2-3-celled, with 2 orthotropous ovules in each cell: style short and thick: stigma obscurely 2-3-lobed. Berry globular, 1-2-seeded. — Perennial herbs, with simple stems from creeping or thickish rootstocks, alternate nerved leaves, and white often fragrant flowers in a terminal simple or compound raceme. (Name a diminutive of *Smilax*, to which, however, these plants are quite unlike.)

§ 1. SMILACINA, Desf. — *Divisions of the perianth and stamens 6.*

1. **S. racemosa**, Desf. (FALSE SPIKENARD.) Minutely downy; *leaves numerous*, oblong or oval-lanceolate, taper-pointed, ciliate, *abruptly short-petioled*; *raceme compound*, paniced; ovary 3-celled. — Moist copses. June. — Stem 2° high from a thickish rootstock, zigzag. Berries pale red, speckled with purple, aromatic.

2. **S. stellata**, Desf. (STAR-FLOWERED SOLOMON'S SEAL.) Smooth or nearly so; *leaves 7-11*, oblong-lanceolate, acute, minutely ciliate, *slightly clasping*, thickish; *raceme simple*, few-flowered; ovary 2-celled. — Moist banks, common northward. May, June. — About 1° high. Berries blackish.

3. **S. trifolia**, Desf. (THREE-LEAVED SOLOMON'S SEAL.) Smooth, dwarf; *leaves 3*, sometimes 2 or 4, oblong or oval-lanceolate, short-pointed, *narrowed into a sheathing base*; *raceme simple*; ovary 2-3-celled. — Cold bogs, from Massachusetts (Fresh Pond, Cambridge) and W. New York northward. May. — Stem 3'-6' high. Anthers brownish. Berries red.

§ 2. MAIÁNTHENUM, Desf. — *Divisions of the perianth and stamens 4.*

4. **S. bifolia**, Ker. (TWO-LEAVED SOLOMON'S SEAL.) Smooth or nearly so; stems low (3'-5' high), mostly 2-leaved; *leaves heart-shaped*, petioled or sessile; *raceme simple*, crowded. (S. Canadensis, *Pursh.*) — Moist woods, common. May. — The American plant has less petioled leaves and larger flowers than the European. Berries reddish, speckled.

4. CLINTÓNIA, Raf. CLINTONIA.

Perianth of 6 separate sepals, bell-shaped, lily-like, deciduous; the 6 stamens inserted at their base. Filaments long and thread-like: anthers linear-oblong. Ovary ovoid-oblong, 2-celled: ovules anatropous: style long, columnar-thread-like: stigma depressed. Berry ovoid, blue, few - many-seeded. — Stemless perennials, with slender creeping rootstocks, producing a naked scape sheathed at the base by 2-4 large oblong or oval ciliate leaves. Flowers rather large, umbelled, rarely single, somewhat downy outside. (Dedicated to *De Witt Clinton.*)

1. **C. borealis**, Raf. *Umbel few- (2-7-) flowered*; ovary with 10 or 12 ovules in each cell. (*Dracæna borealis*, *Ait.*) — Cold moist woods, Massachusetts to Wisconsin, common northward. June. — Scape and leaves 5'-8' long. Perianth over ½' long, greenish-yellow.

2. **C. umbellata**, Torr. *Umbel many- (12-30-) flowered*; cells of the ovary 2-ovuled. (*C. multiflora*, *Beck.* *Convallaria umbellulata*, *Michx.*) — Rich woods, S. W. New York, through the Alle-

ghanies of Penn., and southward. June. — Flowers half as large as in the last, nearly white speckled with purple.

CONVALLÀRIA MAJÀLIS, L., the well-known LILY OF THE VALLEY, is wild in the Alleghanies of Virginia, and is to be sought in those of Pennsylvania.

Tribe II. ASPHODÈLEÆ. THE ASPHODEL TRIBE.

5. HEMEROCÁLLIS, L. DAY LILY.

Perianth funnel-form, lily-like; the short tube inclosing the ovary, the spreading limb 6-parted; the 6 stamens inserted on its throat. Filaments and style long and thread-like, declined and ascending: stigma simple. Pod rather fleshy, 3-angled, 3-valved, with several black spherical seeds in each cell. — Showy perennials, with fleshy-fibrous roots, the long and linear keeled leaves 2-ranked at the base of the tall scapes which bear at the summit several bracted large yellow flowers: these collapse and decay after expanding for a single day (whence the name, from *ἡμέρα*, a day, and *κάλλος*, beauty).

1. *H. fúlva*, L. (COMMON DAY LILY.) Inner divisions (petals) of the tawny orange perianth wavy and obtuse. — Escaped from gardens, where it is common, and sparingly naturalized in damp grounds, Penn., &c. July.

H. FLÀVA, L., the YELLOW DAY LILY, is commonly cultivated. The White and the Blue Day Lilies of the gardens are species of *Funkia*, a very different genus.

6. ORNITHÓGALUM, Tourn. STAR-OF-BETHLEHEM.

Perianth of 6 colored (white) spreading sepals, several-nerved. Filaments 6, flattened-awl-shaped. Style 3-sided: stigma 3-angled. Pod membranous, roundish-angular, with few dark and roundish seeds in each cell. — Scape and linear channelled leaves from a coated bulb. Flowers corymbed, bracted. (An ancient whimsical name from *ὄρνις*, a bird, and *γάλα*, milk.)

1. *O. umbellàtum*, L. Flowers 5–8, on long and spreading pedicels; sepals green in the middle outside. — Moist meadows, naturalized near the coast. June. — Scape 5'–7' high.

7. SCÍLLA, L. SQUILL.

Perianth of 6 colored (blue or purple) spreading sepals, mostly deciduous; the 6 awl-shaped filaments at their base. Style thread-

like. Pod 3-angled, 3-valved, with several black roundish seeds in each cell. — Scape and linear leaves from a coated bulb: the flowers in a simple raceme, mostly bracted. (The ancient name.)

1. **S. esculénta**, Ker. (EASTERN QUAMASH. WILD HYACINTH.) Leaves long and linear, keeled; raceme elongated; bracts solitary, longer than the pedicels; stigma minutely 3-cleft; pod triangular, the cells several-seeded. (*Phalángium*, Nutt.) — Moist prairies and river-banks, Ohio to Wisconsin and westward. May. — Bulb onion-like, eaten by the Indians. Scape 1° high. Sepals widely spreading, pale blue, 3-nerved, $\frac{1}{2}$ long.

S. ÁLLIUM, L. ONION. GARLIC.

Perianth of 6 entirely colored sepals, which are distinct or united at the very base, 1-nerved, becoming dry and more or less persistent: the 6 filaments awl-shaped or dilated at their base. Style thread-like: stigma simple. Pod lobed, 3-valved, with 1 or 2 ovoid-kidney-shaped campylotropous black seeds in each cell. — Strong-scented and pungent stemless herbs; the leaves and scape from a coated bulb: flowers in a simple umbel, some of them frequently changed to bulblets; spathe 1-2-valved. (The ancient Latin name of the Garlic.)

* *Umbel often densely bulb-bearing, with or without flowers.*

1. **A. vineále**, L. (FIELD GARLIC.) Scape slender, clothed with the sheathing bases of the leaves below the middle (1°-3° high); *leaves terete, hollow*, slender, channelled above; *filaments much dilated, the alternate ones 3-cleft*, the middle division anther-bearing. — Moist meadows and fields, naturalized and troublesome near the coast. June. — Flowers rose-color and green.

2. **A. Canadéuse**, Kalm. (WILD MEADOW GARLIC.) Scape leafy only at the base (1° high); *leaves narrowly linear, flattish*; umbel few-flowered; *filaments simple*, dilated below. — Moist meadows, &c. May, June. — Flowers pale rose-color, pedicelled; or a head of bulbs.

* * *Umbel bearing only flowers.*

3. **A. cérruum**, Roth. (WILD ONION.) Scape naked, angular (1°-2° high), often nodding at the apex, bearing a loose or drooping many-flowered umbel; *leaves linear, elongated, sharply keeled*; sepals oblong-ovate, acute (rose-color), much shorter than the simple slender filaments; ovary 6-toothed at the summit. — Steep banks, W. New York to Wisconsin and southward. Aug.

4. **A. tricóccum**, Ait. (WILD LEEK.) Scape naked (9' high), bearing an erect many-flowered umbel; *leaves lance-oblong or*

elliptical, flat, appearing in early spring and decaying before flowering; sepals oblong, obtuse (white), about the length of the simple filaments; pod strongly 3-lobed. — Rich cool woods, common northward. July. — Bulbs clustered, pointed, 2' long.

5. **A. triflorum**, Raf. (MOUNTAIN LEEK.) "Scape naked, terete, shorter than the lanceolate nerved leaves; umbel few-flowered. — Shady woods, high mountains of Penn. May, June." *Pursh*.

A. SATIVUM, the GARDEN GARLIC, A. SCHÆNOPRÆSUM, the CHIVE, A. PÓRRUM, the LEEK, and A. CÆPA, the ONION, are well-known cultivated species.

Tribe III. TULIPÆCÆ. THE TULIP OR TRUE LILY TRIBE.

9. LÍLIUM, L. LILY.

Perianth funnel-form or bell-shaped, colored, of 6 distinct sepals, spreading or recurved above, with a honey-bearing furrow at the base, deciduous; the 6 stamens somewhat adhering to their bases. Anthers linear, versatile. Style elongated, somewhat club-shaped: stigma 3-lobed. Pod oblong, containing numerous flat soft-coated seeds densely packed in 2 rows in each cell. — Bulbs scaly, producing simple stems, with numerous alternate-scattered or whorled short and sessile leaves, and one to several large and showy flowers. (The classical Latin name, from the Greek *λείριον*.)

* *Flowers erect, bell-shaped, the sepals narrowed below into claws.*

1. **L. Philadélficum**, L. (WILD ORANGE-RED LILY.) *Leaves linear-lanceolate; the upper chiefly in whorls of 5 to 8; flowers 1-3, open-bell-shaped, reddish-orange spotted with purplish inside; the lanceolate sepals not recurved at the summit. — Open copses, rather common. June, July. — Stem 2°-3° high: the flower 2½' long.*

2. **L. Catesbæi**, Walt. (SOUTHERN RED LILY.) *Leaves linear-lanceolate, scattered; flower solitary, open-bell-shaped, the long-clawed sepals wavy on the margin and recurved at the summit, scarlet, spotted with dark purple and yellow inside. — Low sandy soil, Pennsylvania? and southward.*

* * *Flowers nodding, bell-shaped, the sessile sepals revolute.*

3. **L. Canadense**, L. (WILD YELLOW LILY.) *Leaves remotely whorled, lanceolate, strongly 3-nerved, the margins and nerves rough, flowers few, long-peduncled, oblong-bell-shaped, the sepals recurved-spreading above the middle, yellow, spotted inside with purple. — Moist meadows and bogs. June, July. — Stem 2°-3° high. Flower 2' - 3' long.*

4. **L. supèrbum**, L. (TURK'S-CAP LILY.) *Lower leaves whorled, lanceolate, pointed, 3-nerved, smooth; flowers often many*

(3 - 20 or 40) in a pyramidal raceme; *sepals strongly revolute*, bright orange, with numerous dark purple spots inside.— Rich low grounds. July, Aug.— Stem 3° - 7° high: sepals 3' long.

L. CÂNDIDUM, the WHITE LILY, and L. BULBÍFERUM, the ORANGE BULB-BEARING LILY, are most common in gardens.

10. ERYTHRÓNÍUM, L. DOG'S-TOOTH VIOLET.

Perianth lily-like, of 6 distinct lanceolate sepals, recurved or spreading above, deciduous, the 3 inner usually with a callous tooth on each side of the erect base and a groove in the middle. Filaments 6, awl-shaped: anthers oblong-linear. Style elongated. Pod obovate, contracted at the base, 3-valved. Seeds rather numerous, ovoid, with a loose membranaceous tip.— Nearly stemless herbs, with 2 smooth and shining flat leaves tapering into petioles and sheathing the base of the 1-flowered scape, rising from a deep solid-scaly bulb. Flower nodding, vernal. (Name from *έρυθρός*, *red*, which is inappropriate as respects the Amer. species.)

1. **E. Americànum**, Smith. (YELLOW ADDER'S-TONGUE.) Leaves elliptical-lanceolate, pale green spotted with purplish and dotted; *perianth pale yellow*, spotted near the base; style club-shaped; *stigmas united*.— Low copses, &c., common. May.— Scape 6' - 9' high: flower 1' or more long.— E. BRACTEÁTUM, Boott, from the Camel's Rump Mountain, Vermont, is probably only a form of this species with the leaves very unequal (which is often the case), and with an accidental bract on the scape.

2. **E. álbídum**, Nutt. (WHITE DOG'S-TOOTH VIOLET.) Leaves elliptical-lanceolate, spotted, not dotted; *perianth white or bluish-white*; sepals narrowly lanceolate, the inner without lateral teeth; style thread-like and club-shaped; *stigma 3-cleft*.— Low thickets from Albany, New York, and W. Pennsylvania to Wisconsin; common westward. April, May.

The TULIP, the CROWN IMPERIAL, the HYACINTH, and the TUBEROSE (POLIÁNTHES TUBERÒSA) are common cultivated representatives of this Family.

ORDER 122. MELANTHÁCEÆ. (COLCHICUM FAM.)

Herbs, with perfect or polygamous and regular 6-merous and 6-androus flowers, the consimilar perianth free from the 3-celled ovary, extrorse anthers, and 3 more or less

distinct styles. (Anthers introrse in *Tofieldia*. Styles sometimes perfectly united in *Uvulariæ*.) Seeds anatropous, with a soft or membranous seed-coat, and a small embryo in copious albumen. — If we include the Bellworts, which form a group ambiguous between this order, *Trilliaceæ*, and *Liliaceæ*, we shall have 2 strongly marked suborders, viz.

Suborder I. UVULARIÆ. THE BELLWORT FAMILY.

Perianth early deciduous, the sepals distinct, petal-like. Styles united into one at the base or throughout! Fruit a 3-celled few-seeded berry or loculicidal pod. — Stems from small perennial rootstocks and fibrous roots, forking, bearing ovate or lanceolate membranaceous sessile or clasping leaves like those of *Solomon's Seal*, and perfect flowers: peduncles solitary or 1-flowered.

1. *UVULARIA*. Pod 3-angular or 3-lobed. Anthers linear, adnate, on short filaments.
2. *PROSARTES*. Berry ovoid. Anthers linear-oblong, pointless, fixed near the base to the long filament. Flowers terminal.
3. *STREPTOPUS*. Berry oblong. Anthers arrow-shaped, 1-2-pointed, longer than the filament. Flowers axillary.

Suborder II. MELANTHIEÆ. THE TRUE COLCHICUM FAM.

Perianth mostly persistent or withering away; the sepals distinct or rarely their claws united. Styles 3, separate. Fruit a 3-celled 3-partible or septicidal, rarely loculicidal, pod. — Herbs with acrid poisonous properties; the simple or rarely paniced stems springing from solid bulbs or corms, or sometimes from creeping rootstocks. Flowers sometimes polygamous or diœcious.

- * Anthers heart-shaped or kidney-shaped, confluent 1-celled, shield-shaped after opening: pod 3-horned, septicidal: seeds flat, membranaceous-margined.

+ Sepals each with 2 separate or confluent glands.

4. *ZYGADENUS*. Flowers perfect. Filaments free from the sessile sepals.

5. *MELANTHIUM*. Flowers polygamous. Filaments on the claws.

+ + Sepals without glands, sessile.

6. *VERATRUM*. Flowers polygamous, paniced. Perianth free from the ovary: sepals obovate or oblong, longer than the stamens.

7. *STENANTHIUM*. Flowers polygamous, in compound racemes. Perianth united with the base of the ovary: sepals lanceolate, pointed, longer than the stamens.

8. **AMIANTHIUM.** Flowers perfect, racemed. Perianth free from the ovary, shorter than the stamens.
- * * Anthers 2-celled: pod loculicidal: flowers racemed or spiked.
9. **XEROPHYLLUM.** Flowers perfect. Cells of the globose-3-lobed pod 2-seeded. Leaves rush-like, rigid.
10. **HELONIAS.** Flowers perfect. Cells of the globose-3-lobed pod many-seeded. Leaves lanceolate. Scape naked.
11. **CHAMÆLIRIUM.** Flowers diœcious. Pod oblong, many-seeded.
- * * * Anthers 2-celled, innate or introrse: pod septicidal.
12. **TOFIELDIA.** Flowers perfect: spike racemed. Leaves equitant.

Suborder I. **UVULARIÈÆ.** THE BELLWORT FAMILY.

1. UVULÀRIA, L. BELLWORT.

Perianth nearly bell-shaped, lily-like; the sepals spatulate-lanceolate, with a honey-bearing groove or pit at the erect contracted base, much longer than the stamens, which barely adhere to their base. Anthers long and linear, adnate: filaments short. Style deeply 3-cleft; the divisions stigmatic along the inner side. Pod triangular or 3-lobed, 3-valved from the top. Seeds few in each cell, obovoid, with a tumid or fungous raphe. — Rootstock creeping. Flowers pale yellow, nodding, solitary or rarely in pairs, on terminal peduncles which become lateral by the growth of the branches. (Name “from the flowers hanging like the *uvula*, or palate.”)

* *Leaves clasping-perfoliate: sepals acute: pod obovate-truncate, divergently 3-lobed at the top.*

1. U. grandiflora, Smith. (LARGE-FLOWERED BELLWORT.) Leaves oblong or elliptical-ovate, pale and obscurely pubescent underneath; *sepals smooth within; anthers nearly pointless*; lobes of the pod with convex sides. — Rich woods, Vermont to Wisconsin and northward. May, June. — Flowers pale greenish-yellow, $1\frac{1}{2}'$ long.

2. U. perfoliata, L. (SMALLER BELLWORT.) Leaves ovate or oblong-lanceolate, smooth, glaucous underneath; *sepals granular-roughened inside; anthers pointed*; lobes of the pod with concave sides. — Moist copses, common eastward and southward. May. — Smaller than No. 1: flowers pale yellow, $\frac{3}{4}'$ to $1'$ long.

* * *Leaves sessile: sepals rather obtuse: pod ovoid-triangular, with sharp and wing-like angles.*

3. U. sessilifolia, L. (SESSILE-LEAVED BELLWORT.) Low, smooth; leaves oval or lanceolate-oblong, pale, glaucous underneath;

styles united to the middle, exceeding the pointless anthers; pod triangular-obovate, narrowed into a stalk at the base.—Low woods, common. May.—Stem 6'–9' high when in flower: the cream-colored flower $\frac{3}{4}$ ' long.

U. PUBÉRULA, Michx., which has the shining green leaves minutely puberulent as well as the branches, the less united styles not longer than the short-pointed anthers, and an ovate sessile pod, should be sought in S. Pennsylvania. It is common in the mountains of Virginia and southward.

2. PROSÁRTEs, Don. PROSARTES.

Perianth bell-shaped, much as in *Uvularia*. Filaments thread-like, much longer than the linear-oblong blunt anthers, which are fixed near the base. Ovary with 2 ovules suspended from the summit of each cell: styles united into one: stigmas short, recurved-spreading. Berry ovoid, pointed, 3–6-seeded, red.—Downy low herbs, widely branched above, with closely sessile ovate and membranaceous leaves, and greenish-yellow drooping flowers on slender terminal peduncles, solitary or few in an umbel. (Name from *προσαρτάω*, to hang from, in allusion to the pendent ovules or flowers.)

1. **P. lanuginòsa**, Don. Leaves ovate-oblong, taper-pointed, rounded or slightly heart-shaped at the base, closely sessile, downy underneath; flowers solitary or in pairs; sepals linear-lanceolate, taper-pointed, soon spreading, twice the length of the stamens; style smooth. (*Stréptopus lanuginosus*, Michx.)—Rich woods, rare in Western New York, but abundant southward along the Alleghanies. May.—Plant 1° high, several times forked above. Sepals $\frac{1}{2}$ ' long, greenish, marked with conspicuous cross veinlets like the leaves.

3. STRÉPTOPUS, Michx. TWISTED-STALK.

Perianth recurved-spreading from a bell-shaped base; the sepals lanceolate-acute, the 3 inner keeled. Anthers arrow-shaped, fixed near the base to the very short flattened filaments, tapering above to a slender entire or 2-cleft point. Ovary with many ovules in each cell: styles and even the stigmas united into one! Berry red, roundish-ovoid, with several seeds in each cell.—Herbs with rather stout stems, divergently spreading branches, ovate and taper-pointed rounded-clasping membranaceous leaves, and small mostly solitary (extra-)axillary flowers on slender

thread-like peduncles, which are abruptly bent or contorted near the middle (whence the name, from *στρεπτός*, *twisted*, and *πούς*, *foot*, or *stalk*.)

1. **S. amplexifolius**, DC. *Leaves* like the branches *very smooth, glaucous underneath*, very strongly clasping; *flower greenish-white* on a long peduncle abruptly bent above the middle; anthers tapering to a slender entire point; stigma entire, truncate. (S. distortus, Michx. *Uvularia amplexifolia*, L.) — Low cold woods, Northern New England, New York, and Penn., northward. June. — Stem 2° - 3° high, rough at the base, otherwise very smooth. Sepals $\frac{1}{2}$ ' long. — In this, as in the next, the peduncles are *opposite the leaves*, rather than truly axillary, and are bent round the clasping base underneath them: they are rarely 2-flowered.

2. **S. roseus**, Michx. *Leaves green both sides*, the margins finely *ciliate*, and the branches sparingly beset with short bristly hairs; *flower rose-purple*, more than half the length of the slightly bent peduncle; anthers 2-horned; stigma minutely 3-cleft. — Cold damp woods, common northward and on mountain-sides. May. — Smaller than the foregoing.

Suborder II. MELANTHIÆ. THE TRUE COLCHICUM FAM.

4. ZYGADENUS, Michx. ZYGADENUS.

Flowers perfect. Perianth withering-persistent, spreading; the petal-like sessile oblong or ovate sepals marked with 2 contiguous or frequently confluent glands above the more or less narrowed base, united at the very base and coherent with that of the ovary. Stamens free from the sepals and about their length. Styles and pod nearly as in *Melanthium*. Seeds margined or slightly winged. — Very smooth or glaucous perennials, with simple stems from creeping rootstocks or coated bulbs, linear grass-like leaves, and pretty large racemed-panicled greenish-white flowers. (Name composed of *ζυγός*, *a yoke*, and *ἀδήν*, *a gland*.)

1. **Z. glaucus**, Nutt. Stem naked above, slender (1° high), from a coated bulb; panicle simple, few-flowered; glands of the obtuse sepals united into one which is inversely heart-shaped. — Gravelly calcareous banks of the St. Lawrence, also at Niagara and west to Wisconsin northward: rare. July.

5. MELANTHIUM, Gronov., L. MELANTHIUM.

Flowers monœciously polygamous. Perianth of 6 separate and widely spreading somewhat heart-shaped sepals raised on slender

claws, marked with 2 approximate glands, cream-colored, turning greenish-brown and persistent. Filaments shorter than the perianth, adhering to the claws, persistent. Styles awl-shaped, diverging, tipped with simple stigmas. Pod ovoid-conical, 3-lobed, of 3 inflated membranaceous carpels united in the axis, separating when ripe and splitting down the inner edge, several-seeded. Seeds flat, broadly winged. — Tall perennials, with simple stems from a somewhat bulbous base, roughish-downy above, as well as the open and ample pyramidal panicle (composed chiefly of simple racemes). Leaves lanceolate-linear, grass-like, those from the root broader. (Name composed of *μέλας*, *black*, and *ἄνθος*, *flower*, from the dark color which the persistent perianth assumes after blossoming.) (*Leimanthium*, *Willd.*; *Gray*, *Melanth.* See *Sill. Jour.* 42, p. 27.)

1. **M. Virgínicum**, L. *Sepals ovate-halbert-shaped, becoming oblong, flat, the glands distinct*; filaments cohering with the claws beyond the middle. — Wet meadows, Southern New York to Ohio, rare, and common southward. July. — Stem 3°–4° high: flowers about $\frac{3}{4}$ broad.

2. **M. híbridum**, Walt. *Sepals round-rhombic or broadly ovate, wavy, the glands contiguous*; filaments involved in the lower part of the involute claws. — Low grounds, Orange county, New York, and westward, common southward. July–Sept. — Flowers rather smaller and greener than in No. 1.

6. VERÀTRUM, Tourn. FALSE HELLEBORE.

Flowers polygamous. Perianth of 6 spreading and separate obovate-oblong (greenish or brownish) sepals, more or less contracted at the base, not gland-bearing. Filaments free from the sepals and shorter than they, recurving. Pistils, fruit, &c., nearly as in *Melanthium*. — Somewhat pubescent perennials, with simple stems from a thickened base producing coarse fibrous roots, plaited 3-ranked leaves, and racemed-panicled dull or dark flowers. (Name compounded of *vere*, truly, and *ater*, black.)

1. **V. vírìde**, Ait. (AMERICAN WHITE HELLEBORE. INDIAN POKE.) Stem stout, very leafy to the top (2°–4° high); leaves broadly oval, pointed, sheath-clasping, strongly plaited; panicle pyramidal, the dense spike-like racemes spreading, perianth yellowish-green, moderately spreading. — Swamps and low grounds, common. June. — Root very poisonous.

7. STENÁNTHIUM, Gray (under Veratrum).

Flowers polygamous or perfect. Perianth spreading; the sepals narrowly lanceolate, tapering to a point from the broader base, where they are united and coherent with the base of the ovary, not gland-bearing, persistent, much longer than the short stamens. Pods, &c., nearly as in Veratrum. Seeds nearly wingless. — Smooth, with a wand-like leafy stem from a somewhat bulbous base, racemed-panicled flowers, and long and grass-like conduplicate-keeled leaves. (Name composed of στενός, *narrow*, and άνθος, *flower*, from the slender sepals and panicles.)

1. **S. angustifolium**, Gray. Leaves linear, elongated, rather rigid; flowers small ($\frac{1}{4}$ long), white, very short-pedicelled, in slender racemes forming a narrow wand-like panicle; the prolonged terminal raceme, and often some of the lateral ones, fertile. (Veratrum angustifolium, Pursh. Helónias graminea, Bot. Mag.) — Grassy prairies and low meadows, Ohio and southward toward the mountains. July. — Stem slender, 2°–6° high.

8. AMIÁNTHIUM, Gray. FLY-POISON.

Flowers perfect. Perianth widely spreading; the distinct petal-like (white) sepals oval or obovate, sessile, not gland-bearing. Filaments capillary, equalling or exceeding the perianth. Anthers (as in all the foregoing) kidney-shaped or heart-shaped, becoming 1-celled, and shield-shaped after opening. Styles thread-like. Pods, &c., nearly as in Melanthium. Seeds wingless, oblong or linear, with a loose coat, 1–4 in each cell. — Stems simple from a bulbous base or coated bulb, scape-like, few-leaved, terminated by a simple, or rarely compound, dense raceme of handsome flowers, turning greenish with age. Leaves linear, keeled, grass-like. (Name from άμίαντος, *pure*, and άνθος, *flower*, alluding to the unspotted glandless perianth.)

1. **A. muscætóxicum**, Gray. (FLY-POISON.) Leaves broadly linear, elongated, obtuse ($\frac{1}{2}$ ' to 1' wide), as long as the scape; raceme simple, oblong or cylindrical; pod abruptly 3-horned; seeds oblong, with a fleshy red coat. (Helónias erythrospërma, Michx.) — Low copses, New Jersey, Penn., and southward. June.

2. **A. leimanthoides**, Gray. Leaves narrowly linear, shorter than the stem; racemes panicled; seeds lanceolate, with a membranaceous loose coat, narrowly margined. — Swamps, Pine barrens of N. Jersey, Durand, Knieskern, and in the S. States. July.

9. XEROPHYLLUM, Michx. XEROPHYLLUM.

Flowers perfect. Perianth widely spreading; sepals petal-like (white), oval, distinct, sessile, not glandular, at length withering, about the length of the awl-shaped filaments. Anthers 2-celled, short. Styles thread-like, stigmatic down the inner side. Pod globular-3-lobed, obtuse (small), loculicidal, the valves bearing the partitions. Seeds 2 in each cell, collateral, 3-angled, not margined. — Stem simple, from a somewhat bulbous base, bearing a simple dense raceme of showy white flowers, thickly beset with needle-shaped leaves, the upper reduced to bristle-like bracts; those from the root very many in a dense tuft, reclined, 1° or more long, 1" wide below, rough on the margin, remarkably dry and rigid (whence the name, from *ξηρός*, *arid*, and *φύλλον*, *leaf*).

1. **X. asphodeloides**, Nutt. Bracts none, except for the lower flowers; bractlets 1 or 2 on the slender pedicels. (*X. setifolium*, Michx. *Helonias asph.*, L.) — Pine barrens of New Jersey. June. — A singular plant, like an *Asphodel*, 1°–4° high.

10. HELONIAS, L. HELONIAS.

Flowers perfect. Perianth of 6 spatulate-oblong (greenish-white) sepals, persistent, shorter than the thread-like filaments. Anthers 2-celled, roundish-oval, blue. Styles revolute, stigmatic down the inner side. Pod obcordately 3-lobed, loculicidally 3-valved, the valves deeply and divergently 2-lobed. Seeds many in each cell, linear, with a tapering appendage at both ends. — A smooth perennial, with many inversely lanceolate or oblong-spatulate flat leaves, from a tuberous rootstock, producing in early spring a hollow naked scape (1°–2° high), sheathed with broad bracts at the base, and terminated by a simple and short dense raceme. Bracts obsolete: pedicels shorter than the flowers. (Name doubtless from *ἔλος*, *a swamp*; the place of growth.)

1. **H. bullata**, L. (*H. latifolia*, Michx.) — New Jersey and Pennsylvania; rare. May.

11. CHAMÆLIRIUM, Willd. DEVIL'S-BIT.

Flowers diœcious. Perianth of 6 spatulate-linear (yellowish-white) spreading sepals, withering-persistent. Filaments and (yellow) anthers as in *Helonias*: fertile flowers with rudimentary

stamens. Styles linear-club-shaped, stigmatic along the inner side. Pod ovoid-oblong, not lobed, paper-like, loculicidally 3-valved from the apex, many-seeded. Seeds linear-oblong, conspicuously winged at each end. — A smooth herb with a wand-like stem from a (bitter) thick and abrupt tuberous rootstock, terminated by a long and wand-like spiked raceme of small (yellowish) bractless flowers: the fertile stems most leafy. Leaves flat, lanceolate, the lowest spatulate, tapering into a petiole. (Name composed of *χαμαί*, on the ground, and *λείριον*, lily; of no obvious application.)

1. **C. luteum.** (BLAZING-STAR.) (*Veràtrum luteum*, L. *Hellònias lutea*, Ait. *H. dioica*, Pursh.) — Low grounds. June. — Spike at length 6'–10' long.

12. TOFIÉLDIA, Hudson. FALSE ASPHODEL.

Flowers perfect, usually with a little 3-bracted involucre underneath. Perianth more or less spreading; the sepals (white or greenish) concave, oblong or obovate, sessile. Filaments awl-shaped: anthers short, innate or somewhat introrse, 2-celled. Styles awl-shaped: stigmas terminal. Pod 3-angular, 3-partible or septicidal; the cells many-seeded. Seeds oblong. — Slender perennials, mostly tufted, with fibrous roots, simple scape-like stems leafy only at the base, bearing small flowers in a close raceme or spike. Leaves 2-ranked, equitant, linear. (Named after *Tofield*, an English botanist of the last century.) — The following compose the subgenus **TRIÁNTHA**, Nutt.: pedicels mostly in threes; the flowering proceeding from the apex downwards; seeds tail-pointed at both ends.

1. **T. glutinòsa**, Willd. Stem and pedicels very glutinous with blackish glands; leaves broadly linear, short. — Moist grounds, Maine (*Robbins*), Michigan, and Wisconsin (*Lapham*); common northward. June. — Stem 1^o high: flowers greenish-white.

2. **T. pùbens**, Ait. Stem and pedicels roughened with minute glands; leaves longer and narrower. — New Jersey, *Knieskern*, and southward.

ORDER 123. **JUNCÀCEÆ.** (RUSH FAMILY.)

Grass-like or sedge-like herbs, with jointed stems and a regular persistent perianth of 6 similar glumaceous sepals, 6, or rarely 3, stamens with introrse anthers, and a 1–3-

celled ovary, forming a 3-valved 3-many-seeded pod. Style single. Seeds anatropous, with a minute embryo inclosed at the base of the albumen. — Rushes, with the flowers liliaceous in structure, but grass-like in aspect and texture (excepting the ambiguous *Narthecium*, which would stand directly next to *Tofieldia* were not the styles perfectly united).

Synopsis.

* Stigma entire. Perianth partly colored.

1. *NARTHECIUM*. Filaments woolly. Seeds long-tailed at both ends.

* * Stigmas 3, thread-like, hairy. Sepals glume-like.

2. *LUZULA*. Pod 1-celled, 3-seeded. Leaves mostly hairy.

3. *JUNCUS*. Pod 3-celled (sometimes imperfectly), many-seeded.

1. *NARTHÈCIUM*, Moehring. BOG-ASPHODEL.

Sepals linear-lanceolate (yellowish). Filaments 6, woolly; anthers linear. Pod cylindrical-oblong, pointed with the undivided style terminated by a single stigma, 3-celled, loculicidal, many-seeded. Seeds appendaged with a bristle-form tail at each end of great length. — Rootstock creeping, bearing linear equitant leaves and a simple stem or scape, terminated by a simple raceme. (Name from *ναρθήκιον*, a rod, or box for fragrant ointments; application uncertain.)

1. *N. Americànum*, Ker. Pedicels of the dense raceme bearing a bractlet below the middle. — Bogs, Pine barrens of New Jersey. June. — Scape (almost naked) and the narrow leaves 6'–12' high.

2. *LUZULA*, DC. WOOD-RUSH.

Stamens 6. Stigmas 3. Pod 1-celled, 3-seeded. — Perennials, with flat and soft usually hairy leaves and spiked-crowded or umbelled flowers. (Name said to be altered from the Italian *lucciola*, a glowworm.)

* *Flowers loosely long-peduncled, umbelled or corymbed.*

1. *L. pilòsa*, Willd. Leaves lanceolate-linear, hairy; peduncles umbelled, simple, chiefly 1-flowered; sepals pointed, shorter than the obtuse pod; seeds tipped with a curved appendage. — Woods and banks. May. — Plant 6'–9' high.

2. *L. parviflòra*, Desvaux. Nearly smooth; leaves broadly

linear; *corymb* decomposed, loose; *pedicels* drooping; sepals pointed, about the length of the minutely pointed pod. (*L. melanocárpa*, Desvaux.) — Mountains, Maine to N. New York. July. — Stems 1°–3° high, scattered. Flowers and pod straw-color or brown.

* * *Flowers in spikes or close clusters.*

3. **L. campéstris**, DC. *Leaves flat, linear; spikes 4–12, somewhat umbelled, ovoid, straw-color, some of them long-peduncled, others nearly sessile; sepals bristle-pointed, longer than the obtuse pods; seeds with a conical appendage at the base.* — Dry fields and woods. May.

4. **L. arcuàta**, Meyer. *Leaves channelled, linear; spikes 3–5, on unequal often recurved peduncles, ovoid, chestnut-brown; bracts ciliate-fringed; sepals taper-pointed, longer than the obtuse pod; seeds not appendaged.* — Alpine summits of the White Mountains, New Hampshire, Oakes, Tuckerman.

5. **L. spicàta**, Desvaux. *Leaves channelled, narrowly linear; flowers in sessile clusters, forming a nodding interrupted spiked panicle, brown; sepals bristle-pointed, scarcely as long as the abruptly short-pointed pod; seeds not appendaged.* — White Mountains of New Hampshire, alpine.

3. JÚNCUS, L. RUSH. BOG RUSH.

Stamens 6, or sometimes 3. Stigmas 3. Pod 3-celled (often imperfectly so at maturity), loculicidal, many-seeded. — Chiefly perennials, with pithy stems, and cymose, paniced, or clustered small (greenish or brownish) flowers. (The classical name, from *jungo*, to join, alluding to their use for bands.)

* *Scapes naked and simple from matted running rootstocks, many of them barren, furnished with short leafless sheaths at the base: flowers in a sessile cymose panicle from the side of the scape above the middle, 6-androus (except in No. 1): seeds not appendaged.*

1. **J. effùsus**, L. (COMMON or SOFT RUSH.) *Scape soft and pliant (2°–4° high), finely striated; panicle diffusely much-branched (sometimes closely crowded), many-flowered; sepals green, lanceolate, very acute, as long as the obovate very obtuse and pointless pod; stamens usually 3.* — Marshy ground, very abundant. June.

2. **J. filifórmis**, L. *Scape slender (10'–20' high), pliant; panicle few-flowered, simple; sepals green, lanceolate, acute, rather longer than the very obtuse but short-pointed pod.* (*J. setàceus*, Torr. Fl.) — Mountains of New England, and banks of lakes, N. New York and westward. July.

3. **J. Bálticus**, Willd. *Scape rigid (2°–4° high); panicle ascending, loose, dark chestnut-colored; sepals ovate-lanceolate, the 3*

outer sharp-pointed, as long as the elliptical rather triangular pod. — Sandy shores of New England and the Great Lakes. July. — Rootstocks strong, extensively creeping.

* * *Scapes, &c., as in the preceding, but some of the sheaths at the base leaf-bearing; the leaves terete, knotless, like the continuation of the scape above the panicle: stamens 6.*

4. **J. setàceus**, Rostk. *Scape slender* (2° – 3° high); *panicle loose, rather simple, turning light chestnut-color; sepals lanceolate, sharp-pointed, especially the 3 exterior, longer than the obovate mucronate-pointed pod.* — Penn. and southward. June.

5. **J. marítimus**, Lam. (SOUTHERN BLACK RUSH.) *Scape stout and rigid* (2° – 5° high), *the apex pungent; panicle compound, erect, loose; the flowers clustered in small heads; sepals lanceolate, the outer acute, as long as the elliptical short-pointed pod.* (*J. acútus*, Muhl., &c.) — Brackish marshes, New Jersey (*Pursh*): not rare farther southward.

* * * *Stems leaf-bearing: leaves terete, or flattened laterally (equitant), knotted by cross partitions internally: cyme or panicle terminal: flowers in heads or small clusters (very liable to a monstrosity, as if viviparous, from the bite of insects): pod more or less 1-celled.*

→ *Stamens 3.*

6. **J. scirpòides**, Lam. *Stem stout* (1° – 3° high) and *terete, as are the leaves; panicle rather simple, bearing several (5–18) pale green densely many-flowered spherical heads; sepals rigid, awl-shaped and bristly-pointed, especially the outer, as long as the oblong triangular taper-pointed pod; seeds barely pointed at each end, tailless.* (*J. polycéphalus*, Michx. (excl. var. *a*?). *J. echinàtus*, Muhl. *J. nodòsus*, var. *multiflorus*, Torr.) — Wet borders of streams, &c., New England to Michigan and southward, rather common. July, Aug. — Rootstock thickish, creeping. Remarkable for its burr-like green heads, usually $\frac{1}{2}$ ' in diameter.

7. **J. paradóxus**, E. Meyer. *Stem rather stout* (1° – $2\frac{1}{2}^{\circ}$ high), *terete; leaves terete or somewhat flattened; panicle decom-pound; the numerous greenish heads globular, many- (8–15-) flowered; sepals lanceolate, somewhat awl-pointed, rigid, shorter than the oblong-triangular abruptly short-pointed pod; seeds conspicuously tail-ed at both ends!* (*J. polycéphalus*, Darlingt., Torr. *Fl. N. Y.* excl. var. 3, & syn. *J. fraternus*, Kunth. *J. sylvàticus*, Pursh.) — Wet places, common. July, Aug. — Heads less dense, fewer-flowered, and sometimes smaller than in the foregoing. Remarkable for the loose white seed-coat prolonged at both ends into a tail longer than the oblong body of the seed.

8. **J. débilis**. *Stems weak and slender* (1° – 2° long), *flattened, as are the slender leaves; panicle decom-pound, loose, widely spread-*

ing; the numerous pale green heads 4-8-flowered; sepals lanceolate, acute, herbaceous, shorter than the oblong pod; seeds tailless, minutely and barely pointed at each end. (*J. subverticillatus*, *Muhl.*, not of *Wulf.* *J. pallescens*, *Meyer*, as to N. American plant. *J. polycéphalus*, var. ? *depauperatus*, *Torr. Fl. N. Y.*)—Wet swamps, common southward and westward. Aug.—Roots fibrous. Stems often decumbent or floating and rooting: branches of the cymose panicle slender and diverging. Heads 2" long. Pods pale, sometimes twice the length of the calyx when ripe. This, which is pretty clearly the *J. acuminatus* of *Kunth*, is perhaps the plant of *Michaux*; but the next is taken for that by American authors.

9. ***J. acuminatus***, *Michx.* Stem erect (10'-15' high), terete; leaves slender, nearly terete; panicle with rather slightly spreading branches, bearing few or many 3-8-flowered chestnut-colored heads; sepals lanceolate or linear-lanceolate, very acute, one third or one half the length of the prismatic triangular and abruptly acute pod; seeds tail-pointed at both ends. (*J. sylvaticus*, *Muhl.* *J. Canadensis*, *Gay.*)—Peat-bogs, and borders of ponds. July, Aug.—Pods turning deep chestnut-brown. Tails shorter than the body of the seed.

++ Stamens 6. (Heads chestnut-purplish.)

10. ***J. pelocarpus***, *E. Meyer.* Stem erect (10'-18' high), terete; leaves 1-2, slender, nearly terete; panicle spreading; heads 2-7-flowered; sepals oblong, obtuse, scarious, rather shorter than the triangular-ovate minutely short-pointed (brown) pod; seeds tailless, acute at each end.—Bogs, New York (head of Seneca Lake!), Massachusetts, and northward. June, July.—Aspect of No. 10, and of *J. acutiflorus*.

11. ***J. militaris***, *Bigel.* Stem stout (2° high), bearing a solitary cylindrical bayonet-like leaf below or near the middle, which overtops the crowded panicle; heads numerous, 5-10-flowered; sepals lanceolate, sharp-pointed, as long as the ovate taper-pointed pod; seeds oval, not appendaged.—Bogs, Tewksbury and Plymouth, Massachusetts, and Pine barrens, New Jersey. July, Aug.—Rootstock thick, creeping. Leaf stout, 1°-2° long. Heads 2"-3" wide, brown.

12. ***J. nodosus***, *L.!* Stem erect, slender (6'-15' high), 3-5-leaved; leaves terete, short; heads 1-2, or several and clustered, globose, many- (10-20-) flowered; sepals lanceolate, awl-pointed, nearly as long as the slender 3-angular taper-pointed pod; seeds oval, minutely short-pointed at both ends. (*J. Rostkövii*, *E. Meyer.*)—Var. **MEGACÉPHALUS**, *Torr.*: heads rather numerous and larger, 50-60-flowered, crowded in a dense cluster at the summit of the stout and rigid stem (2° high).—Gravelly borders of streams, &c., common northward; the var. on the sandy shore of Lake Ontario at Sackett's Harbour. Aug.—Rootstock slender.—Quite distinct from No. 6 and No. 7, with which it has been confounded.

13. **J. Conrãdi**, Tuckerm. Stems slender (6'–10' high), leafy, branching above into a compound diffusely spreading *cymose panicle*, bearing chiefly solitary scattered flowers in the forks and along the branches; leaves thread-form, the upper slightly knotted; *sepals oblong, acutish*, shorter than the oblong taper-beaked pod; seed not appendaged. (*J. viviparus*, Conrad, from a common condition, in which most of the flowers develop into a tuft of rudimentary or manifest leaves. *J. No. 15*, Muhl. *Gram.*? and therefore *J. Muhlenbergii*, Spreng.?) — Wet sandy places, New Jersey to Massachusetts. (White Mountains, Tuckerman.) July. — Root fibrous, but apparently ♀. Flowers very numerous, minute.

* * * * *Leaves knotless: inflorescence terminal.*

+ Heads *cymose-panicled: leaves flat and open: stamens 3.*

14. **J. marginatus**, Rostk. Stem leafy, erect, flattened (1°–3° high); leaves linear, grass-like, nerved; heads globose, 3–8-flowered; sepals oblong, the 3 outer with the bracts slightly awned, the inner obtuse and pointless, as long as the globular pod; seeds minutely pointed at both ends. (*J. aristulatus*, Michx.) — Moist sandy places, common from S. New England southward. July. — Panicle simple or compound. Sepals soft, chestnut-purplish, with a green keel.

+ + Head mostly single: leaves channelled above: stamens 6.

15. **J. Stýgius**, L. Stem slender, erect (6'–10' high), 1–3-leaved below, naked above; leaves thread-like; head solitary or sometimes two, 3–4-flowered, about the length of the sheathing scarious awl-pointed bract; sepals oblong and lanceolate, scarcely more than half the length of the oblong acute pod; seeds oblong, with a very loose coat prolonged at both ends. — Peat-bog bordering Perch Lake, Jefferson county, New York.

16. **J. trifidus**, L. Stems densely tufted from matted creeping rootstocks, erect (5'–10' high), thread-like, sheathed at the base, leafless below, about 3-leaved at the summit; the 1 or 2 upper thread-like leaves subtending the sessile head of 2–4 flowers; sepals ovate or oblong, acute, rather shorter than the globose-ovate beak-pointed pod; seeds roundish, angled. — Alpine summits of Mount Katahdin, Maine (Young, Thurber), White Mountains, New Hampshire, and Mount Marcy, New York. — Flowers and pod deep brown.

+ + + Flowers *cymose-panicled, separate: leaves channelled or involute, thread-form or almost setaceous: stamens 6.*

17. **J. ténuis**, Willd. Stems slender, wiry (9'–18' high), simple, leafy only near the base; cyme shorter than the involucreal leaves, small, the flowers mostly one-sided, almost sessile; sepals lanceolate, very acute, one third longer than the globose-ovoid obtuse pod. — Low grounds and fields, very common. — Flowers green, shining.

18. **J. Greénii**, Oakes & Tuckerm. Stems rigid (1°–2° high), simple, naked, 1–2-leaved at the base; cyme much shorter than

the principal erect involucre leaf, dense, the numerous crowded flowers one-sided; sepals lanceolate, acute, greenish, shorter than the ovoid-oblong obtuse pod. — Sandy coast of New England and Long Island, occasionally on river-banks in the interior.

19. **J. Gerárdi**, Loisel. (BLACK GRASS.) Stems simple, flat-tish, leafy, rigid ($1\frac{1}{2}$ ° high); paniced cyme longer than the involucre leaves, rather crowded; sepals ovate-oblong, obtuse (the outer deep chestnut-brown, with a green keel), nearly the length of the obovoid obtuse pod. (*J. bulbosus*, Pursh, &c.) — Salt marshes, common along the coast, forming large patches, with deep green foliage and dark fruit. July.

20. **J. bufónius**, L. Annual; stems low and slender (3' - 9' high), leafy, often branched at the base; panicle forking, spreading, the flowers remote (greenish); sepals lanceolate, awl-pointed, much longer than the oblong obtuse pod. — Low grounds and road-sides, very common. June - August.

ORDER 124. PONTEDERIÀCEÆ. (PICKEREL-WEED FAM.)

Aquatic herbs, with perfect more or less irregular flowers from a spathe; the petal-like 6-merous perianth free from the 3-celled ovary; the 3 or 6 mostly unequal or dissimilar stamens inserted in its throat. — Perianth with the 6 divisions colored alike, imbricated in 2 rows in the bud, the whole together sometimes revolute-coiled after flowering, withering away, or the base thickened-persistent and inclosing the fruit. Anthers introrse. Ovules anatropous. Style 1: stigma 3-lobed or 6-toothed. Fruit a perfectly or incompletely 3-celled many-seeded pod, or a 1-celled 1-seeded utricle. Embryo slender, in floury albumen.

Synopsis.

1. PONTEDERIA. Perianth 2-lipped, the fleshy base inclosing the 1-seeded utricle. Stamens 6.
2. HETERANTHERA. Perianth salver-shaped, withering-fugacious. Pod many-seeded. Stamens 3, unequal, of 2 forms.
3. SCHOLLERA. Perianth salver-shaped, regular. Stamens 3, alike.

1. PONTEDÈRIA, L. PICKEREL-WEED.

Perianth funnel-form, 2-lipped, the 3 upper divisions united to form the 3-lobed upper lip, the 3 lower spreading, and their claws, which form the lower part of the curving tube, more or less sepa-

rate or separable down to the base: after flowering the tube is revolute-coiled from the apex downwards, and its fleshy-thickened persistent base incloses the fruit. Stamens 6, the 3 lower exerted with elongated filaments; the 3 upper (often sterile or imperfect) with very short filaments, unequally inserted lower down: anthers oval, blue. Ovary 3-celled; two of the cells empty, the other containing a single suspended ovule. Utricle 1-celled, filled with the single seed. — Stout herbs, growing in shallow water, with thick creeping rootstocks, producing erect long-petioled mostly heart-shaped leaves, and a 1-leaved scape, terminated by a spike of violet-blue ephemeral flowers. Root-leaves with a sheathing stipule within the petiole. (Dedicated to *Pontedera*, Professor at Padua at the beginning of the last century.)

1. ***P. cordata***, L. Leaves arrow-heart-shaped, blunt; spike very dense, from a spathe-like bract. — Var. **ANGUSTIFOLIA** (*P. angustifolia*, Pursh) has triangular-elongated and tapering leaves scarcely heart-shaped at the base. — Common. July – Sept. — Calyx-tube in fruit crested with 6 toothed ridges. Upper lobe of the perianth marked with a pair of small yellow spots.

2. HETERANTHÈRA, Ruiz & Pav. MUD PLANTAIN.

Perianth salver-form with a slender tube, the spreading limb somewhat equally 6-parted, ephemeral, soon withering or decaying. Stamens 3: the 2 upper with the filaments thickened in the middle and bearing ovate (yellow) anthers, the other with a longer filament bearing a larger oblong or arrow-shaped (greenish) anther. Pod incompletely 3-celled, many-seeded. — Creeping or floating low herbs, with chiefly rounded long-petioled leaves, and a 1 – few-flowered spathe bursting from the sheathing side or base of a petiole. Flowers blue or white. (Name from *ἐρέπα*, *different*, and *ἀνήρ*, for *anther*.)

1. ***H. reniformis***, Ruiz & Pav. Leaves round-kidney-shaped; spathe 3 – 5-flowered; flowers white. — Muddy margins of streams, S. New York to Ohio and southward. Aug.

3. SCHOLLÈRA, Schreber (1789). WATER STAR-GRASS.

Perianth salver-form, with 6 nearly equal lance-linear spreading divisions on a very long thread-like tube. Stamens 3, with simi-

lar oblong-arrow-shaped anthers (or rarely a fourth which is abortive): filaments nearly equal, awl-shaped. Pod oblong, invested by the withered perianth, 1-celled with 3 projecting parietal placenta, many-seeded. — A grass-like herb, like a Pondweed, growing wholly under water, only the (small pale yellow) flowers expanding on the surface, with slender branching stems, clothed with linear translucent sessile leaves, and terminal 1-flowered spathes. (Named after one *Scholler*, a German botanist.)

1. **S. graminea**, Willd. (*Leptánthus*, *Michx.* *Heteranthera*, *Vahl.*) — In streams, common. July–Sept. Stems $\frac{1}{2}$ °–2° long.

ORDER 125. COMMELYNÀCEÆ. (SPIDERWORT FAM.)

Herbs, with fibrous or sometimes thickened roots, jointed often branching leafy stems, and chiefly perfect and 6-androus, often irregular, flowers with the perianth free from the 2–3-celled ovary, and consisting of a distinct calyx and corolla, viz.: Sepals 3, persistent, commonly herbaceous. Petals 3, ephemeral, decaying or deciduous. Stamens hypogynous, some of them often sterile: anthers with 2 separated cells. Style 1: stigma undivided. Pod 2–3-celled, 2–3-valved, loculicidal, 3–several-seeded. Seeds orthotropous. Embryo small, pulley-shaped, partly sunk in a shallow depression at the apex of the albumen. Leaves ovate, lanceolate or linear, flat, sheathed at the base; the uppermost often dissimilar and forming a kind of spathe.

1. COMMELÝNA, Dill. DAY-FLOWER.

Flowers irregular. Sepals somewhat colored, unequal, the 2 lateral partly united by their contiguous margins. Two lateral petals rounded or kidney-shaped, on long claws, the odd one smaller. Stamens unequal, 3 of them fertile, one of which is bent inward: 3 of them sterile and smaller, with imperfect cross-shaped anthers: filaments naked. Pod 3-celled, two of the cells 2-seeded, the other 1-seeded or abortive. — Stems branching, often procumbent and rooting at the joints. Leaves contracted at the base into sheathing petioles; the floral one heart-shaped and clasping, folded together or hooded and forming a kind of spathe

inclosing the flowers, which expand for a single morning and are recurved on their pedicel before and afterwards. Petals blue. (Dedicated to the early Dutch botanists *J. and G. Commelyn.*)

1. **C. angustifolia**, Michx. Stems usually reclining and rooting at the joints; leaves lanceolate or linear-lanceolate; spathe heart-shaped, folded together; peduncle usually divided, the smaller branch 1-flowered or sterile; *odd petal inconspicuous and colorless, ovate-lanceolate, nearly sessile*, about the length of the lateral sepals; pod 2-celled. ♀ — Damp rich woods and banks, S. New York to Michigan and southward. July — Oct. — Hairy or nearly smooth: sheaths bearded or beardless at the throat.

2. **C. Virgínica**, L. Stems upright, smooth; leaves lanceolate-oblong, taper-pointed, the upper surface and margins rough backwards; sheaths fringed with rusty bristles; spathes crowded and nearly sessile, broadly dilated; peduncle several-flowered; *odd petal blue like the others, but shorter, round-ovate*, raised on a claw; pod 3-celled. — Alluvial shaded river-banks, Penn., Ohio, and southward. ♀ — Leaves 5' — 7' long, 1' — 2' wide.

2. TRADESCÁNTIA, L. SPIDERWORT.

Flowers regular. Sepals herbaceous. Petals all alike, ovate, sessile. Stamens all fertile: filaments bearded. Pod 2 — 3-celled, the cells 1 — 2-seeded. — Perennials. Stems mucilaginous, mostly upright, nearly simple, leafy. Leaves keeled. Flowers ephemeral, in umbelled clusters, axillary and terminal; the floral leaves nearly like the others. (Named for *Tradescant*, gardener to Charles the First.)

* *Umbels sessile, clustered, usually involucrate by 2 leaves.*

1. **T. Virgínica**, L. (COMMON SPIDERWORT.) *Leaves lanceolate-linear, elongated*, tapering from the sheathing base to the point, ciliate, more or less open; *umbels terminal*, many-flowered. — Moist woods, from W. New York westward and southward: commonly cultivated. May — Aug. — Plant either smooth or hairy; the large flowers blue, in gardens often purplish or white.

2. **T. pilòsa**, Lehm. *Leaves broadly lanceolate* from a narrowed base, pointed, downy-hairy both sides, minutely ciliate; *umbels* many-flowered, in very dense *terminal and axillary* clusters; pedicels and calyx glandular-hairy. (*T. flexuòsa*, Raf.) — Ohio and southward. June — Sept. — Stem stout, smooth below, 2° — 3° high, often branched, zigzag above, at length with a close cluster of small ($\frac{3}{4}$ broad) lilac-blue flowers in all the upper axils.

* * *Umbels long-peduncled, naked.*

3. **T. ròsea**, Vent. Small and slender (6'–10' high), smooth; leaves linear, grass-like, ciliate at the base; umbel simple, or sometimes a pair; flowers very small ($\frac{1}{2}$ ' wide), rose-color.—Sandy woods, Penn. (?) and southward.

ORDER 126. **XYRIDACEÆ**. (YELLOW-EYED GRASS FAM.)

Rush-like herbs, with equitant leaves sheathing the base of a naked scape, which is terminated by a head of perfect 3-androus flowers, with extrorse anthers, a glumaceous calyx, and a regular corolla; the fruit a 3-valved pod containing many orthotropous seeds;— chiefly represented by the genus

1. **XÝRIS**, L. YELLOW-EYED GRASS.

Flowers single in the axils of coriaceous scale-like bracts, densely imbricated in a head. Sepals 3; the 2 lateral glume-like, boat-shaped or keeled and persistent; the anterior one larger and membranaceous, inwrapping the corolla in the bud and deciduous with it. Petals 3, with claws, which cohere more or less. Fertile stamens 3, with linear anthers, inserted on the claws of the petals, alternating with 3 sterile filaments which are cleft and plume-bearing at their apex. Style 3-cleft. Pod oblong, free, 1-celled with 3 parietal more or less projecting placenta, 3-valved. Seeds with a minute embryo at the apex of the albumen.—Flowers yellow. (*Ξυρίς*, an ancient name of some plant with 2-edged leaves, from *ξυρόν*, a razor.)

1. **X. bulbòsa**, Kunth. Scape slender, from a more or less bulbous base, somewhat 3-angled, flattish at the summit, very smooth, much longer than the narrowly linear leaves, both commonly twisted with age; head roundish-ovoid (4''–5'' long); lateral sepals oblong-lanceolate, finely ciliate-scabrous on the narrow wingless keel, and usually with a minute bearded tuft at the very apex. (*X. Jupàcai*, *Michx.* in part. *X. Índica*, *Pursh.* *X. flexuòsa*, *Muhl. Cat.* *X. brevifolia*, of Northern authors, not of *Michx.*)—Sandy or peaty bogs, New Jersey and southward to New Hampshire and Ohio, rare except near the coast. July–Sept.—Leaves $1\frac{1}{2}$ '–8', the scape 3'–14', high. Petals minutely toothed at the summit.—This species should have borne Muhlenberg's name of *X. flexuosa*, but Elliott appears to have applied that name rather to the following species.

2. **X. Caroliniàna**, Walt. Scape flattish, 1-angled below,

2-edged at the summit, smooth; leaves linear-sword-shaped, flat; head globular-ovoid (5'-7' long); *lateral sepals obscurely lacerate-fringed above on the winged keel*, rather shorter than the bract. (*X. Jupacai*, partly, *Michx.* *X. anceps*, *Muhl.*) — Sandy swamps, &c., from the Pine barrens of New Jersey and southward to S. New England (Rhode Island, *Olney*). Aug. — Scape 1° - 2° high: leaves 1" - 4" wide. Petals pretty large, the claws turning brownish.

3. *X. fimbriata*, Ell. Scape somewhat angled, rather longer than the linear-sword-shaped leaves; head oblong ($\frac{2}{3}$ ' long); *lateral sepals lanceolate-linear, nearly twice the length of the bract, above conspicuously fringed on the wing-margined keel, and even plumose at the summit.* — Pine barrens of New Jersey, rare, and southward. Scape 2° high.

ORDER 127. ERIOCAULONACEÆ. (PIPEWORT FAM.)

Aquatic or marsh plants, usually stemless, with a tuft of fibrous roots, and a cluster of linear often loosely cellular leaves, naked scapes sheathed at the base, and bearing dense heads of monœcious or diœcious minute flowers in the axils of imbricated bracts, with a double persistent perianth, introrse anthers, and a 2-3-celled 2-3-seeded pod (seeds and embryo as in the preceding order); — principally represented by the genus

1. ERIOCAULON, GRONOV. PIPEWORT.

Flowers chiefly monœcious; the central ones of the head sterile, bearing 4 or 6 stamens, the exterior fertile. Sepals 2 or 3, the lateral boat-shaped. Corolla tubular and 2-3-lobed in the sterile fl.; of 2-3 sepals in the fertile, each bearing a black gland. Style 2-3 parted. Pod loculicidal. — Leaves smooth, often pellucid. Scape simple, bearing a single head. Bracts and perianth whitened at the summit by a clothing of dense fine wool: outer bracts scarious, oftener empty and forming a kind of involucre. (Name compounded of *ἔριον*, *wool*, and *καυλός*, *a stalk*, from the woolly scapes of many species: but in the following they are perfectly smooth; and the stamens uniformly 4, the sepals, petals, stigmas, and cells of the pod 2.)

1. *E. septangulære*, Withering. *Leaves awl-pointed, tapering from a broadish flattened base, conspicuously cellular, pellucid,*

shorter than the about 7-angled scape; *outer bracts obovate, rounded.* (*E. pellucidum*, *Michx.*) — In ponds or their swampy borders, not rare northward. Aug. — Scape 2' - 6" long, according to the depth of the water. Head lead-color, hemispherical, $\frac{1}{2}$ ' - $\frac{1}{4}$ ' broad.

2. **E. decangulàre**, L. *Leaves linear-sword-shaped, taper-pointed, opaque*; scape 10 - 12-grooved (1° - 3° high); *outer bracts ovate, acute.* — Pine-barren swamps, New Jersey and southward. Head $\frac{1}{2}$ ' or more broad.

ORDER 128. CYPERÀCEÆ. (SEDE FAMILY.)

Grass-like or rush-like herbs, with fibrous roots and solid stems (culms), closed sheaths, and spiked chiefly 3-androus flowers, one in the axil of each of the glume-like imbricated bracts (scales, glumes), destitute of any perianth, or with hypogynous bristles or scales in its place, and a 1-celled ovary with a single erect anatropous ovule, in fruit forming an achenium. Style 2-cleft when the fruit is flattened or lenticular, or 3-cleft when it is 3-angular. Embryo minute at the base of the somewhat floury albumen.

Synopsis.

Tribe 1. CYPERÈÆ. — Flowers perfect, 2-ranked (distichous).

1. CYPERUS. Spikes few-many-flowered. Perianth none.
2. KYLLINGIA. Spikes 1-flowered, in a sessile head. Perianth none.
3. DULICHIMUM. Spikes 6-10-flowered. Perianth of bristles. Achenium beaked.

Tribe 2. FUIRÈNEÆ. — Flowers perfect; the scales many-ranked (regularly imbricated on all sides), each covering a naked flower. Perianth chiefly double, viz. of 3 ovate scale-like sepals on claws, alternating with 3 small bristles.

4. FUIRENA. Scales awned on the back. Stamens 3. Style 3-cleft.

Tribe 3. HYPOLÝTREÆ. — Flowers perfect; the scales many-ranked, each covering a flower provided with its own (1-4) proper scale-like bractlets. True perianth none.

5. HEMICARPHA. Inner scale 1. Stamen 1. Style 2-cleft.

Tribe 4. SCÍRPEÆ. — Flowers perfect; the scales regularly several-ranked, all, or all but the lowest, covering a naked flower. Perianth of bristles or hairs, or none.

- * Perianth of hypogynous bristles or hairs (rarely obsolete).

6. **ELEOCHARIS.** Achenium crowned with a tubercle jointed with its apex, consisting of the bulbous persistent base of the style. Head solitary, terminating the leafless bractless culm.
7. **SCIRPUS.** Achenium naked at the apex, or pointed with the continuous simple base of the style. Perianth of 3-6 bristles. Heads mostly more than one and lateral or bracted. Culms leafy at the base.
8. **ERIOPHORUM.** Achenium, &c., as in *Scirpus*. Perianth of 6-many long and tufted woolly hairs.
* * Perianth (bristles) none.
9. **FIMBRISTYLIS.** Style bulbous at the base, deciduous, with (or rarely without) the jointed bulb, from the achenium.

Tribe 5. **RHYNCHOSPORÈÆ.** — Flowers perfect or polygamous. Scales of the few-flowered spikes irregularly several-ranked, many of the lower empty, and often the upper sterile. Perianth of bristles or none. Stems leafy.

- * Achenium beaked with the dilated persistent style or its base.
+ Perianth none: style 2-cleft: achenium wrinkled transversely.
10. **PSILOCARYA.** Spikes many-flowered, ovoid, cymose, naked.
11. **DICHROMENA.** Spikes few-flowered, flattened, capitate.
+ + Perianth of about 6 bristles.
12. **CERATOSCHÆNUS.** Style simple, all persistent in the awned beak.
13. **RHYNCHOSPORA.** Style 2-cleft, the broad base only persistent.
* * Achenium without a beak; the style deciduous.
14. **CLADIUM.** Achenium globular: no tubercle. Style 2-3-cleft.

Tribe 6. **SCLERIÈÆ.** — Flowers monœcious: the fertile spikes 1-flowered, the staminate several-flowered. Achenium nut-like, globular.

15. **SCLERIA.** Achenium bony-crustaceous, resting in a shallow 3-lobed and cup-shaped disk.

Tribe 7. **CARÍCEÆ.** — Flowers monœcious in the same (androgynous) or separate spikes, sometimes diœcious. Proper perianth none. Achenium inclosed in a sac (composed of two united inner scales, *perigynium*), lenticular or triangular.

16. **CAREX.** Fertile flowers without a bristle-form hooked appendage.

1. **CYPÈRUS, L.** GALINGALE.

Spikes many - few-flowered, variously aggregated in heads which are disposed in a simple or compound terminal umbel. Scales 2-ranked (their decurrent base usually forming margins or wings to the joint of the axis next below), deciduous with age.

Stamens (1, 2, or mostly) 3. Perianth none. Style 2-3-cleft, deciduous. Achenium lenticular or triangular, naked at the apex. — Culms triangular, simple, leafy at the base, and with 1 to several leaves at the summit forming an involucre to the umbel. Peduncles unequal, sheathed at the base. (Κύπερος, the ancient name.)

§ 1. PYCRÈUS, Beauv. — *Style 2-cleft: achenium flattened: otherwise as § 2.*

1. **C. flavescens**, L. *Stamens 3*; spike linear, rather obtuse, 14-30-flowered, clustered at the end of the 2-4 very short rays (peduncles); *scales obtuse, straw-yellow; achenium shining*, minutely wrinkled transversely, orbicular. ♀ — Low grounds near the coast. Aug. — Culms 4'-10' high: spikelets 5'-8' long. Involucre 3-leaved, very unequal.

2. **C. diándrus**, Torr. *Stamens 2*; spikes lance-oblong, rather acute, 14-24-flowered, scattered or clustered on the 2-5 very short or unequal rays; *scales oblong, rather obtuse, brown-margined; achenium dull*, oblong-obovate. — Var. **CASTANEUS**, Torr. (*C. castaneus*, Bigel.): *scales oblong-lanceolate, shining, close, chestnut-brown; achenium round-obovate, minutely wrinkled; stamens sometimes 3* in the upper flowers. — Low grounds near the coast; the var. common through the interior. Aug., Sept. — Resembles No. 1.

3. **C. Nuttállii**, Torr. *Stamens 2*; spikes lanceolate-linear, acute, very flat (1' long), many-flowered; crowded on the few very short (or some of them distinct) rays; *scales oblong-lanceolate, acute, yellowish-brown*, rather loose; achenium oblong-obovate, very blunt, dull. ♀? — Salt marshes, from Massachusetts southward. Aug. — Culms 4'-12' high.

4. **C. Cleavèri**, Torr. *Stamen 1*; *culm bristle-form* (4' high) *terminated by a single and similar erect involucreal leaf and a solitary lance-linear 10-12-flowered spike* ($\frac{1}{2}$ ' long); *scales linear-oblong, rather acute, 3-nerved; achenium oblong-obovate, much compressed, minutely dotted.* ①? (*C. tenellus?* Torr. *Cyp.*, not of L. *C. minimus?* Nutt., not of L.) — Monmouth county, New Jersey, *Dr. Cleaver* (only).

§ 2. CYPERUS proper. — *Style 3-cleft: achenium triangular: spikes many-flowered, only the lowest scale empty, the joints of the axis narrowly wing-margined or naked.*

* *Stamen 1: umbel contracted or sessile.*

5. **C. inflexus**, Muhl. Dwarf (2'-5' high), in tufts; spikes oblong-linear, about 8-flowered, collected in 2-3 ovate heads either sessile and clustered or short-peduncled; scales oblong, tapering into a long recurved point; involucre 3-leaved, very long. ① — Sandy

shores of lakes and rivers, not rare. Aug. — Plant sweet-scented, like Melilot, in drying.

* * *Stamens 3: culm triangular.*

+ *Without creeping rootstocks.*

6. **C. Michauxianus**, Schultes. Culm stout (1° high); umbel compound, many-rayed; *rays short; spikes* very numerous and crowded, *linear, 6-8-flowered, terete when mature*; the joints of its axis very broad with winged scaly margins, which partly embrace the ovate achenium; scales ovate, obtusish. (C. erythrorhizos, Torr. Fl., &c., not of Muhl.) — Salt marshes, common on the coast: rare along the Great Lakes. Aug. — Spikes yellowish-brown.

7. **C. strigòsus**, L. Culm mostly stout, tuberous at the base (1°-3° high); umbel simple or compound, many-rayed; *rays elongated*, their sheaths 2-bristled; *spikes linear-lanceolate, flat, 8-10-flowered*, very numerous, reflexed with age, the joints of the axis slender, narrowly wing-margined; scales oblong-lanceolate, strongly nerved, acutish; achenium linear-oblong. — Low and cultivated grounds, very common. August. — Spikes crowded in ovate heads, straw-color.

+ + *Rootstocks creeping, commonly tuber-bearing at the extremity.*

8. **C. rèpens**, Ell. Culm rather stout (1°-2° high); umbel mostly simple, several-rayed; *spikes 10-20 on each ray, loosely spreading*, the lower sometimes compound, *linear, compressed, 12-30-flowered*; scales oblong, blunt, straw-color; achenium oblong. (C. tuberosus, Pursh. C. phymatodes, Muhl.) — Moist sandy banks, Vermont to Michigan, common southward. Aug. — Multiplies rapidly by the little tubers on the creeping rootstocks, like the *Nut-grass* (C. Hydra) which is so troublesome at the South.

9. **C. dentatus**, Torr. Culm slender (6'-12' high); umbel 4-7-rayed, compound; *spikes 3-6 on each partial ray, clustered, ovate-lanceolate or oblong, flat, 6-30-flowered*; scales strongly keeled, with very acute slightly spreading tips, reddish-brown on the sides, green on the back; joints of the axis naked; achenium obovate, minute. — Sandy swamps, Massachusetts to Penn. and southward. Aug.

10. **C. Schweinitzii**, Torr. Culm rough on the angles (1°-2° high); umbel simple, 4-8-rayed; *spikes few or many, crowded at the upper part of the mostly elongated rays, erect, linear-lanceolate*, rather loosely 6-9-flowered, a bristly bract at the base of each; scales ovate, many-nerved, awl-pointed, yellowish-green, scarcely longer than the ovate nut; joints of the axis narrowly winged. — Dry sandy shores, Lake Ontario to Wisconsin. Aug. — Spikes $\frac{1}{4}$ ' - $\frac{1}{2}$ ' long.

11. **C. Gràyii**, Torr. Culm thread-form, wiry, tuberous at the base (8'-12' high); *leaves nearly bristle-shaped, channelled*; umbel simple, 4-6-rayed, rather erect; *spikes 5-10 in a loose head, spread-*

ing, linear-lanceolate, flattened, 5-7-flowered, the joints of the axis winged; scales ovate, rather obtuse, loosely imbricated, greenish-chestnut-color; achenium obovate, minutely pointed. (C. Mariscoides, var. setifolius, Gray.) — Barren sandy soil, Rhode Island to New Jersey, near the coast. August.

12. **C. filicúlmis**, Vahl. Culm slender, wiry, often reclined (1° high); *leaves linear (1''-2'' wide); spikes numerous and clustered in a single sessile dense head, or in 1-3 additional looser heads on spreading rays, linear-lanceolate, rather convex, 6-10-flowered; joints of the axis naked; scales ovate, blunt, loose, greenish; achenium obovate, short-pointed. (C. Mariscoides, Ell.) — Dry sterile soil, common, especially southward. Aug. — Heads 1' or less in diameter.*

§ 3. **MARISCUS**, Vahl. — *Style 3-cleft: the achenium triangular: stamens 3: spikes 1-few-flowered, scarcely flattened, the 2 lower scales short and empty: otherwise as in § 2.*

13. **C. ovulàris**, Torr. *Smooth; culm sharply triangular (6'-12' high); umbel 1-6-rayed; spikes in globular dense heads 2-4-flowered, short and thick; joints of the axis winged; scales ovate, blunt, greenish; achenium obovoid. † (Kyllíngia, Michx.) — Sandy soil, S. New York and southward. Aug. - Oct. — Heads barely $\frac{1}{2}$ ' in diameter, of 50-100 spikes.*

14. **C. retrofráctus**, Torr. Culm minutely downy like the leaves, rough on the obtusish angles (1° - 3° high); umbel many-rayed; *spikes slender, awl-shaped, very numerous in obovate or oblong heads terminating the elongated rays, soon bent down, 1-2-flowered in the middle; scales usually 4 or 5, the two lowest ovate and empty, the fertile lanceolate, the uppermost involute-awl-shaped; achenium linear. † (Scirpus retrofractus, L.) — Sandy fields, New Jersey and southward. Aug. — Spikes $\frac{1}{2}$ ' long, 50-100 in a head, greenish.*

§ 4. **PAPYRUS**, Thouars. — *Style 3-cleft: achenium triangular: stamens 3: spikes many-flowered: joints of the axis margined by a pair of more or less free scale-like appendages, which remain after the proper scale falls away: otherwise as in § 2.*

15. **C. erythrorhizos**, Muhl. Culm obtusely triangular (2° - 3° high); umbel compound, many-rayed; involucre 4-5-leaved, very long; involucels bristle-form; spikes very numerous, crowded in oblong-cylindrical nearly sessile heads, spreading horizontally, linear, flattish ($\frac{1}{2}$ ' long), 10-18-flowered, bright chestnut-colored; scales lanceolate, mucronate. ① — Wet alluvial banks, Penn. and southward. August. — Root fibrous, red.

2. KYLLÍNGIA, L. KYLLINGIA.

Spikes of 3-4 two-ranked scales, 1- $1\frac{1}{2}$ -flowered; the 2 lower scales minute and empty, as in in *Cyperus* § *Mariscus*; otherwise

as in *Cyperus* § *Pycreus* (viz. style 2-cleft: achenium lenticular), but the numerous spikes densely aggregated in solitary or triple sessile heads. Involucre about 3-leaved. (Named after *Kylling*, a Danish botanist.)

1. **K. pùmila**, Michx. Head globular or 3-lobed; spikes strictly 1-flowered; upper scales ovate, pointed, rough on the keel; stamens 2; leaves linear. — Low grounds, Ohio and southward. Aug. — Culms 2' - 9' high: heads whitish-green, $\frac{1}{2}$ ' broad.

3. DULÍCHIUM, Richard. DULICHIMUM.

Spikes many- (6 - 10-) flowered, linear, flattened, sessile in 2 ranks on axillary solitary peduncles emerging from the sheaths of the leaves. Scales 2-ranked, lanceolate. Perianth of 6 - 9 downwardly barbed bristles. Stamens 3. Style 2-cleft above. Achenium flattened, linear-oblong, beaked with the long persistent style. — Culm terete, simple (1° - 2° high), jointed and leafy to the summit; the leaves short and flat, linear, 3-ranked. (Derivation unexplained.)

1. **D. spathàceum**, Pers. (Schœnus, L.) ♀ — Borders of ponds, &c., common. July - Sept. — Spikes $\frac{3}{4}$ ' long, brownish.

4. FUIRÈNA, Rottböll. FUIRENA.

Spikes many-flowered, clustered or solitary, axillary and terminal. Scales imbricated in many ranks, awned below the apex. Perianth of 3 ovate or heart-shaped petaloid scales, mostly on claws, and usually with as many alternate small bristles. Stamens 3. Style 3-cleft. Achenium triangular, pointed with the persistent base of the style. — Culms obtusely angular. (Named for *G. Fuiren*, a Danish botanist.)

1. **F. squarròsa**, Michx. Leaves and sheaths ciliate and hairy; spikes ovoid-oblong, in capitate clusters, bristly with the spreading awns; perianth-scales ovate, awn-pointed, the interposed bristles minute. — Var. *pùmila*, Torr. (*F. pumila*, *Spreng.* *F. Torreyana*, *Beck.*), has the perianth-scales ovate-lanceolate, narrowed at the base; spikes 2 - 6. ♀ — Sandy bogs, Massachusetts to New Jersey near the coast, and southward; also in Michigan: the variety chiefly at the North. Aug. — Culm 1°, the var. 3' - 6', high.

5. HEMICÁRPHA, Nees. HEMICARPHA.

Spikes many-flowered, ovoid, one or few in a lateral cluster, sessile. Scales imbricated in many ranks, ovate or obovate. In-

ner scale single behind the flower, very thin, finally often adhering to or wrapped around the oblong and flattish naked achenium. Perianth none. Stamen 1. Style 2-cleft. — Low tufted annuals; the naked culms with bristle-like leaves at the base. (Name from ἡμι, *half*, and κάρφος, *straw* or *chaff*, in allusion to the single inner scalelet on one side of the flower.)

1. **H. subsquarròsa**, Nees. Dwarf (1'–4' high); involucre 1-leaved, as if a continuation of the bristle-like culm, and usually with another minute leaf; spikes 2–3 (2" long); scales tipped with a short recurved point; inner scale small and narrow, finally adhering to the achenium. (*Scirpus subsquarrosus*, *Muhl.*) — Sandy borders of ponds and rivers, not rare, often growing with *Cyperus inflexus*. July.

6. ELEÓCHARIS, R. BROWN. SPIKE-RUSH.

Spike single, terminating the naked culm, many–several-flowered. Scales imbricated all round in many, rarely 2–3, ranks. Perianth of 3–12 (commonly 6) bristles, usually rough or barbed downwards, rarely obsolete. Stamens 3. Style 2–3-cleft, its bulbous base persistent as a tubercle, jointed with the apex of the lenticular or mostly obtusely triangular achenium. — Leafless, chiefly perennial, with tufted culms sheathed at the base, some of them often sterile, from matted or creeping rootstocks. (Name from ἔλος, *a marsh*, and χαίρω, *to delight in*, being marsh plants.)

§ 1. **LIMNÓCHLOA**, Nees. — Scales of the dense and terete many-flowered spike papery-coriaceous and rounded, with a scarious margin, pale: style 3-cleft: achenium doubly convex, about equalling the 6 bristles. (*Eleocharis*, §§ 1, 2, 4, 5, *Torr. Cyp.*)

* Culms large and stout, often thicker than the cylindrical spike: scales faintly many-striate, and densely imbricated so as usually to form (five) distinct spiral rows: sheaths at the base often nearly leaf-bearing. (*Limnochloa* proper.)

1. **E. equisetoides**, Torr. Culm terete, knotted as if jointed by many cross partitions (2° high, thick as a goose quill); achenium smooth, crowned with a conical-beaked tubercle. — Shallow water, Rhodé Island, *Olney*. Michigan, *Houghton*. Also from Delaware southward. Aug. — Spike 1' or more long.

2. **E. quadrangulàta**, R. Brown. Culm even, sharply 4-angled, 3 of the sides concave, the fourth wider and flat (2°–4° high); achenium finely reticulated, crowned with a conical flattened distinct tubercle. — Penn. and southward. Michigan, *Dr. Crave*. August.

* * Culms slender: spike ovate or oblong: scales with a midrib.

3. **E. tuberculòsa**, R. Brown. Culms striate (8'–12' high);

bristles strongly barbed downward; *achenium triangular*, ribbed and minutely reticulated, surmounted by a flattish cap-shaped tubercle as large as itself. — Wet sandy places, Massachusetts to New Jersey and southward along the coast. August.

§ 2. *ELEÓCHARIS* proper. — Scales of the terete several — many-flowered spike membranaceous, with a midrib or nerve, imbricated in more than three ranks.

* *Achenium lenticular* (smooth): style 2-cleft, in No. 4 commonly 3-cleft: spike dense, many-flowered: culms rather slender, spongy. (*Eleógenus*, *Nees*.)

4. **E. obtusa**, Schultes. Culms nearly terete, tufted (8' - 14' high); spike globose-ovoid and with age oblong, obtuse (dull brown); the scales very obtuse and numerous (80 - 130), densely crowded in many ranks; style 3- (rarely 2-) cleft; achenium obovate, shining, tumid-margined, about half the length of the 6 bristles, crowned with a short and very broad flattened tubercle. (*Scirpus capitatus*, *Pursh*, &c.) — Muddy places, everywhere common. July. — Roots fibrous: rootstocks few and short, or none.

5. **E. olivacea**, Torr. Culms flattish, grooved, diffusely tufted on slender matted rootstocks (2' - 4' high); spike ovate, acutish, 20 - 30-flowered; scales ovate, obtuse, rather loosely imbricated in many ranks (purple with a green midrib and slightly scarious margins); achenium obovate, dull, abruptly beaked with a narrow tubercle, about half the length of the 6-8 bristles. — Inundated sandy soil, Massachusetts to New Jersey near the coast. August.

6. **E. palustris**, R. Brown. Culms nearly terete, striate, rising (1^o - 2^o high) from running rootstocks; spike oblong-lanceolate, pointed, many-flowered; scales ovate-oblong, loosely imbricated in several ranks, reddish-brown with a broad and translucent whitish margin and greenish keel, the upper acutish, the lowest rounded and often enlarged; achenium obovate, somewhat shining, crowned with a short ovate or ovate-triangular flattened tubercle, shorter than the usually 4 bristles. — Var. 1. *GLAUCÉSCENS* (*S. glaucescens*, *Willd.*!): culms slender or filiform; tubercle narrower and acute, beak-like, sometimes half the length of the achenium. — Var. 2. *CÁLVA* (*E. calva*, *Torr.*): bristles wanting; tubercle short, nearly as in the true *E. palustris*, but rather narrower. — Very common, in water, when it is pretty stout and tall, or in low grassy grounds, when it is slender and lower. Var. 3, Watertown, New York, *Dr. Crawe*. (A variety without bristles is known in Europe.) June - Aug. — Some forms well accord with the European plant, but they commonly run more or less into the var. 1.

* * *Achenium triangular*: style 3-cleft: bristles sometimes few and fragile or wanting. (*Scirpidium*, *Nees*, nearly.)

— Spike ovate or cylindrical-oblong, much broader than the filiform or

slender culm: scales imbricated in several ranks, brownish or dark purple with scarious whitish margins, 1-nerved.

++ Bristles 4-6, longer than the achenium, stout and bearded downward.

7. **E. rostellata**, Torr. Culms flattened and striate-grooved, wiry, erect (1°-2° high), the sheath transversely truncate; spike ovoid-lanceolate, acute, 12-20-flowered; scales ovate, obtuse, rather rigid (light brown); achenium smooth, obovate-triangular, narrowed into the confluent pyramidal tubercle, which is overtopped by the 4-6 bristles. — Marshes, Penn Yan, New York, Sartwell, and Michigan. Rhode Island, Olney. Aug. — Allied to *S. multicaulis*.

8. **E. intermedia**, Schultes. Culms capillary, wiry, striate-grooved, densely tufted from fibrous roots, diffusely spreading or reclining (6'-12' long); spike oblong-ovate, acutish, loosely 10-18-flowered; scales oblong, obtuse, green-keeled, the sides purplish-brown; achenium smooth, obovoid with a narrowed base, beaked with a slender conical-awl-shaped distinct tubercle, which nearly equals the 6 bristles. (*E. reclinata*, Kunth!) — Wet slopes, common. July. — Spike 2''-3'' long.

++ ++ Bristles 2-4, shorter than the achenium, fragile, or none.

9. **E. tenuis**, Schultes. Culms almost capillary, erect, sharply 4-angular (1° high), the sides concave; spike elliptical, acutish, 20-30-flowered; scales ovate, obtuse, chestnut-purple with a broad scarious margin and green keel; achenium obovate, roughened with close and fine projecting dots, crowned with a small depressed tubercle; bristles 2-3, half the length of the achenium, or wanting. (*E. elliptica*, Kunth!) — Wet meadows and bogs, common. July. — Spike 3'' long.

10. **E. compressa**, Sullivant. Culms flat, strongly striate, slender, erect (1½° high); spike ovate-oblong, 20-30-flowered; scales lanceolate-ovate, acute, dark purple with broad white pellucid margins and summit, the latter 2-cleft; achenium obovate-pear-shaped, obtusely 3-angled, obscurely wrinkled-pitted, crowned with a small globular-conical tubercle; bristles none (rarely a single rudiment). — Wet places, Darby Plains, Central Ohio, Sullivant. — Culms tufted on running rootstocks, ½'' broad, strikingly flat, spirally twisted in drying: spike 4'' long.

11. **E. melanocarpa**, Torr. Culms flattened, grooved, wiry, erect (9'-18' high); spike cylindrical-ovoid or oblong, thick, obtuse, densely many-flowered; scales roundish-ovate, very obtuse, brownish with broad scarious margins; achenium smooth, obovate-top-shaped, obtusely triangular, the broad summit entirely covered like a lid by the flatly depressed tubercle, which is raised in the centre into a short abrupt triangular point; bristles 3 or 4, shorter than the nut, fragile, often obsolete. — Wet sand, Plymouth, Massachusetts, Rhode Island and Long Island. July. — Spike ¼' to ½' long, the scales closely many-ranked, as in § 2*. Achenium turning black.

12. **E. tricostata**, Torr. Culms flattish, thread-like (1° - 2° high); spike cylindrical-oblong, densely many-flowered; scales ovate, very obtuse, rusty brown with broad scarious margins; achenium obovate with 3 prominent thickened angles, minutely rough-wrinkled, crowned with a short-conical acute tubercle; bristles none. — Quaker Bridge, New Jersey, Knieskern, ex Torr. MSS. — Spike $\frac{1}{2}$ ' to $\frac{3}{4}$ ' long, $1\frac{1}{2}$ " broad, somewhat pointed.

+ + Spike lanceolate-linear, scarcely broader than the sharply triangular culm: scales few-ranked, greenish, finely several-nerved on the keeled back.

13. **E. Robbinsii**, Oakes. Flower-bearing culms exactly triangular, rather stout, erect ($8'$ - 2° high), also producing tufts of capillary abortive stems, like fine leaves, which float in the water; sheath obliquely truncate; scales of the pointed spike 3-9, convolute-clasping, lanceolate, obtuse, with scarious margins; achenium oblong-obovate, 3-angular, minutely reticulated, about half the length of the 6 downwardly-barbed strong bristles, tipped with a flattened awl-shaped tubercle. — Shallow water, from Pondicherry Pond, New Hampshire (Robbins), to Rhode Island, Thurber, &c. Aug. — The spike of this singularly distinct species varies from $\frac{1}{3}$ ' to $1'$ long, by $1''$ wide; the long scales being rather remote and sheath-like.

§ 3. CHÆTOCYPÉRUS, Nees. — Scales of the compressed few-several-flowered spike membranaceous, 2-3-ranked: bristles 3-6, fragile or fugacious: style 3-cleft: achenium triangular or somewhat terete: culms small and capillary. (Chætocyperus, Cyperoscirpus, and a part of Scirpidium, Torr. Cyp.)

* Achenium obscurely triangular, many-ribbed on the sides.

14. **E. aciculàris**, R. Brown. Culms finely capillary ($2'$ - $8'$ long), 4-angular; spike 3-8-flowered; scales ovate-oblong, rather obtuse (greenish with purple sides); achenium obovate-oblong, rather acute at each end, tumid, with 3 ribbed angles and 2-3 times as many smaller intermediate ribs, also transversely striate, longer than the 3-4 very fugacious bristles; tubercle conical-triangular. (S. trichòdes, Muhl., &c.) — Muddy places, and margins of brooks, common. June-August.

* * Achenium triangular, with plain smooth sides.

15. **E. pygmæa**, Torr. Culms bristle-like, flattened and grooved ($1'$ - $2'$ high); spike ovate, 3-8-flowered; scales ovate (greenish), the upper rather acute; achenium ovoid, acutely triangular, smooth and shining, tipped with a minute tubercle; bristles mostly longer than the fruit, sometimes wanting. (S. pusillus, Vahl. ? Chætocyperus polymórphus, Nees ?) — Brackish marshes and river-banks, as far as salt water reaches. Aug., Sept.

16. **E. microcárpa**, var. ? FILICÚLMIS, Torr. "Culms capillary or thread-like, wiry, 4-angular ($3'$ - $4'$ high); spikes oblong, often

proliferous, 15-25-flowered; bristles nearly as long as the obovate-oblong (obtusely triangular) nut without the tubercle; scales dark chestnut-color.—Wet places, in the Pine barrens of New Jersey, *Torrey*.

7. SCÍRPUS, L. BULRUSH. CLUB-RUSH.

Spikes many-several-flowered, terete, mostly clustered and subtended by one or more involueral leaves, sometimes single, often appearing lateral from the extension of the involueral leaf like a continuation of the culm. Scales regularly imbricated all round in several ranks. Perianth of 3-6 bristles. Stamens 3. Style 2-3-cleft, simple, not bulbous at the base, wholly deciduous, or leaving a persistent jointless base as a continuous tip or point to the lenticular or triangular achenium.—Culms sheathed at the base, the sheaths usually leaf-bearing. Chiefly perennial. (The Latin name of the Bulrush.

§ 1. SCÍRPUS proper. — *Bristles rigid, mostly barbed downwards.*

* *Spike single, terminal, with the lowest empty scale or a distinct bract equalling or overtopping it: culms slender, jointless, leaf-bearing only at the base (style 3-cleft: achenium triangular, smooth).*

1. **S. cæspitòsus**, L. (ALPINE CLUB-RUSH.) *Culms terete, wiry, densely sheathed at the base, in compact turfy tufts (3'-10' high); the upper sheath prolonged into a short awl-shaped leaf; spike ovoid, 3-8-flowered, rusty-color, the 2 lower scales bract-like, callous-pointed, and as long as the spike; bristles 6, smooth, capillary, longer than the abruptly short-pointed achenium.*—Alpine tops of mountains of Maine (*Young, Thurber*), New Hampshire, and N. New York.

2. **S. planifolius**, Muhl. *Culms triangular, loosely tufted (5'-10' high), leafy at the base; leaves linear, flat, as long as the culm, rough on the edges and keel, as is the culm; spike ovate or oblong, 5-7-flowered, rusty-color; scales ovate, with a strong green keel prolonged into an awned tip, the lowest about as long as the spike; bristles 4-6, upwardly hairy, as long as the blunt achenium.*—Dry or moist woods, not rare eastward. June.

3. **S. subterminàlis**, Torr. *Culms (1°-3° long) and slender terete leaves immersed and cellular; spike overtopped by a green bract, which appears like a prolongation of the culm, oblong, several-flowered; scales scarcely pointed; bristles 6, bearded downwards, rather shorter than the abruptly-pointed achenium.*—Slow streams and ponds, New England to Michigan: the apex only of the culm projecting above the water. Aug.

* * *Spikes clustered (rarely reduced to one), appearing lateral by the ex-*

- tension of the 1-leaved involucre exactly like a continuation of the naked culm.

→ Culm 3-angular, stout, chiefly from running rootstocks: spikes many-flowered, rusty brown, closely sessile in one cluster: sheaths at base more or less leaf-bearing.

4. **S. púngens**, Vahl. Culm sharply 3-angled throughout (1° – 4° high), with concave sides; leaves 1–3, elongated (4'–10' long), keeled and channelled; spikes 1–6, capitate, ovoid, long overtopped by the pointed involucre leaf; scales ovate, sparingly ciliate, 2-cleft at the apex and awl-pointed from between the acute lobes; anthers tipped with an awl-shaped minutely fringed appendage; style 2-cleft; bristles 2–6, shorter than the obovate plano-convex and mucronate smooth achenium. (S. triqueter, Michx., not of L. S. Americanus, Pers.) — Borders of salt and fresh ponds and streams. July, Aug. — This is the species used for making rush-bottom chairs.

5. **S. Olnèyi**, Gray. Culm 3-wing-angled, with deeply excavated sides, stout (2° – 7° high), the upper sheath bearing a short 3-angular leaf or none; spikes 6–12, closely capitate, ovoid, obtuse, overtopped by the short involucre leaf; scales orbicular, smooth, the inconspicuous mucronate point shorter than the scarious apex; anthers with a very short and blunt minutely bearded tip; style 2-cleft; bristles 6, scarcely equalling the obovate plano-convex mucronate achenium. — Salt marshes, Martha's Vineyard, Oakes, Rhode Island, Olney, and New Jersey, Knieskern. July. — Cross section of the stem strongly 3-rayed, with the sides parallel. — Much nearer than the last to the European *S. triqueter*, which has similar anthers and an abbreviated or almost abortive leaf; but its culm is wingless, and the cluster of spikes compound, some of them umbellate-stalked.

6. **S. Torrèyi**, Olney. Culm 3-angled, with concave sides, rather slender (2° high), leafy at the base; leaves 2–3, more than half the length of the culm, triangular-channelled, slender; spikes 1–4, ovate-oblong, acute, distinct, sessile, long overtopped by the slender erect involucre leaf; scales ovate, smooth, entire, barely mucronate; style 3-cleft; bristles longer than the unequally triangular obovate very smooth and long-pointed achenium. (S. mucronatus, Pursh? Torr. Fl. N. Y.) — Borders of ponds, brackish and fresh, New England to Michigan. July, Aug. — *S. mucronatus*, L., should it ever be found in the country, will be known by its leafless sheaths, conglomerate head of many spikes, stout involucre leaf bent to one side, &c., &c.

→ → Culm terete, naked.

7. **S. lacustris**, L. (BULRUSH.) Culm large, cylindrical, gradually tapering at the apex (3° – 8° high), the sheath bearing a small linear-awl-shaped leaf or none; spikes ovate-oblong, numerous in a compound umbel-like panicle, turned to one side, rusty brown; scales ovate, mucronate; bristles 4–6; achenium obovate, mucronate,

plano-convex.—Our plant appears constantly to have a 2-cleft style, and the scales often a little downy on the back, and is *S. vâlidus*, *Vahl.*, *S. acûtus*, *Muhl.*—Fresh-water ponds and lakes. July.—Culm as thick as the finger at the base, tipped with an erect pointed involucre leaf, which is shorter or longer than the panicle.

8. ***S. débilis***, *Pursh.* Culms slender (6'-12' high), striate, tufted, from fibrous (annual?) roots, leafless, sometimes 1-leaved at the base; *spikes ovate, few (1-8) in a sessile cluster, appearing deeply lateral* by the prolongation of the 1-leaved involucre; scales round-ovate (greenish-yellow); style 2-3-cleft; achenium obovate, plano-convex or lenticular, shining, minutely dotted, shorter than the 4-6 bristles.—Low grounds, and banks of streams, not rare. August.

* * * *Spikes clustered and mostly umbelled, manifestly terminal, many-flowered: involucre leafy: culm leafy, triangular, with closed joints below (style 3-cleft).*

+ *Scales of the large spikes awn-pointed, lacerate-3-cleft at the apex.*

9. ***S. marítimus***, *L.* (SEA CLUB-RUSH.) Leaves flat, linear, as long as the stout culm (1°-3° high), those of the involucre 1-4, very unequal; spikes few—several in a sessile cluster, and often also with 1-4 unequal rays bearing 1-3 ovate or oblong-cylindrical (rusty brown) spikes; *achenium obovate-orbicular, much compressed, flat on one side, convex or obtuse-angled on the other, minutely pointed, shining, longer than the 1-6 unequal and deciduous (sometimes obsolete) bristles.*—Var. *MACROSTÁCHYOS*, *Michx.* (*S. robústus*, *Pursh*), is a larger form, with very thick oblong or cylindrical heads, becoming 1' to 1½' long, and the longer leaf of the involucre often 1° long.—Salt marshes, common on the coast. Salt springs, Salina, New York. Aug.—Heads beset with the spreading and finally recurved short awns which abruptly tip the scales.

10. ***S. fluviátilis***. (GREAT RIVER CLUB-RUSH.) Leaves flat, broadly linear (½' or more wide), tapering gradually to a point, the upper and those of the very long involucre very much exceeding the compound umbel; rays 5-9, elongated, recurved-spreading, bearing 1-5 ovate or oblong-cylindrical acute heads; *achenium obovate, sharply and exactly triangular, conspicuously pointed, opaque, scarcely equaling the 6 rigid bristles.* (*S. marit.*, var. ? *fluviatilis*, *Torr.*, excl. syn. *Ell.*)—Borders of lakes and large streams, W. New York to Michigan. July, Aug.—Culm very stout, sharply triangular, 3°-4° high. Leaves roughish on the margin, like the last; those of the umbel 3-7, the largest 1°-2° long. Principal rays of the umbel 3'-4' long, sheathed at the base. Heads ¾' to 1¼' long, paler and duller than in No. 9, the scales less lacerate and the awns less recurved; the fruit larger and very different.

+ + *Scales of the small compound-umbelled and clustered heads awnless.*

11. ***S. atróvirens***, *Muhl.* Culm rigid, obtusely triangular, very

leafy (2°–6° high); leaves broadly linear, flat, rough-margined; umbel cymose-decompound, irregular, the numerous *spikes clustered 15–20 together in dense heads, ovoid, dark lead-colored or olive-green turning brownish; bristles 6, scarcely exceeding the obovoid compressed triangular achenium.*—Low grassy grounds, very common northward. July.—Involucre of 3 principal leaves, like those of the culm (dark green), but shorter. Heads 2''–3'' long: scales mucronate.

12. **S. polyphýllus**, Vahl. Culm rigid, sharply triangular above, very leafy (2°–6° high); umbel cymose-decompound, the *spikes clustered in heads of 3–8, ovoid, cylindrical with age, yellowish-brown; bristles 6, pubescent downwards, somewhat crisped, nearly twice the length of the achenium.* (*S. exaltatus*, Pursh. *S. brúnneus*, Muhl.)—Swamps and shady borders of ponds, W. New England to Ohio and southward, rare. July.—Resembles the last: leaves, &c., similar, but pale: involucre about 5-leaved.

§ 2. **TRICHÓPHORUM**, Richard.—*Bristles capillary, tortuous and entangled, not barbed, much longer than the (triangular) achenium, when old projecting beyond the rusty-colored scales (leaves, involucre, &c., as in the preceding species).*

13. **S. lineàtus**, Michx. Culm triangular, leafy (1°–3° high); leaves linear, flat, rather broad, rough on the margins; umbels terminal and axillary, loosely cymose-panicled, drooping, the terminal with a 1–3-leaved *involucre much shorter than the long and slender rays; spikes oblong, becoming cylindrical, on thread-like pedicels; bristles at maturity scarcely exceeding the ovate green-keeled and pointed scales; achenium sharp-pointed.*—Low grounds, W. New England to Michigan, chiefly southward. July.

14. **S. Erióphorum**, Michx. (WOOL-GRASS.) Culm nearly terete, very leafy (2°–5° high); leaves narrowly linear, long, rigid, those of the *involucre 3–5, longer than the decompound cymose-panicled umbel; spikes ovate, clustered, or the lateral pedicelled, woolly at maturity; the rusty-colored bristles much longer than the pointless scales; achenium short-pointed.* (*Erióphorum cyperinum*, L.)—Wet meadows, &c., common. July, Aug.—There are several marked varieties, some with a very large and loose umbel, others with the spikes clustered in small heads, at least when young; and northward are slender, less leafy forms, with much smaller umbels, and greenish-brown scattered small heads.—Longer involucreal leaves often 1° long.

S. ERIÓPHORUM, L. COTTON-GRASS.

Spikes many-flowered. Scales imbricated all round in several ranks. Perianth woolly, of numerous (rarely 6) flat hairs, much longer than the scales, persistent and forming a silky or cotton-

like usually white tuft in fruit. Stamens chiefly 3. Style (3-cleft) and achenium as in Scirpus. Perennials. (Name from ἔριον, *wool* or *cotton*, and φορά, *bearing*.)

* *Bristles or hairs of the perianth only 6, crisped: spike single.*

1. **E. alpinum**, L. Culms slender, many in a row from a running rootstock (6'–10' high), scabrous, naked, terminated by a single small ovate spike; sheaths at the base tipped with a short awl-shaped leaf. — Cold peat-bogs, N. New England, New York, and far northward. May, June.

* * *Bristles of the perianth very numerous and long, not crisped, forming dense cotton-like heads in fruit.*

+ *Culm bearing a single spike: involucre none.*

2. **E. vaginatum**, L. Culms in close tufts (1° high), leafy only at the base, furnished with 2 inflated leafless sheaths; root-leaves long and thread-form, triangular-channelled; scales of the ovate spike long-pointed, lead-color at maturity. — Cold and high peat-bogs, N. England to Wisconsin northward, rare. June. — Wool silvery-white, 1' long.

+ + *Culm leafy, bearing several umbellate-clustered heads, involucrate.*

3. **E. Virginicum**, L. Culm rigid (2°–4° high); leaves narrowly linear, elongated, flat; spikes crowded in a dense cluster or head; wool rusty-color, only thrice the length of the scale; stamen 1. — Bogs and low meadows, common. July, Aug. — All the others bear bright white wool.

4. **E. polystachyon**, L. Culm rigid (1°–2° high), obscurely triangular; leaves linear, flat, or barely channelled below, triangular at the point; involucre 2–3-leaved; spikes several (4–12), on nodding peduncles, some of them elongated in fruit; achenium obovate (wool straight, 1' long or more). — Var. 1. **ANGUSTIFOLIUM** (*E. angustifolium*, *Roth*, and European botanists, not of American, and the original *E. polystach.* of *L.*) has *smooth peduncles*. — Var. 2. **LATIFOLIUM** (*E. latifolium*, *Hoppe*. *E. polystach.*, *Torr.*, &c.) has rough peduncles, and sometimes broader and flatter leaves. — Both are common in bogs throughout the Northern States, and often with the peduncles obscurely scabrous, indicating that the species should be left as Linnæus founded it. June, ripe in August.

5. **E. gracile**, Koch. Culm slender (1°–2° high), rather triangular; leaves slender, channelled-triangular, rough on the angles; involucre short and scale-like, mostly 1-leaved; peduncles rough or roughish-pubescent; achenium elliptical-linear. (*E. triquetrum*, *Hoppe*. *E. angustifolium*, *Torr.*, not of *Roth*, &c. — Cold bogs, New England to Wisconsin, common northward. July, Aug. — Spikes 3–7, small, when mature the copious white wool $\frac{1}{2}$ ' to $\frac{3}{4}$ ' long.

9. FIMBRÍSTYLIS, Vahl. (Species of *SCIRPUS*, L.)

Spikes several-many-flowered; the scales regularly imbricated in several ranks. Perianth (bristles) entirely wanting. Stamens 1-3. Style 2-3-cleft, with a thickened or bulb-like base, deciduous from the apex of the naked lenticular or triangular achenium (or in No. 4 usually left behind).—Leafy culms, involucre, cymose-umbelled spikes, &c., as in *Scirpus*. (Name composed of *fimbria*, a fringe, and *stylus*, the style, which is ciliate or fringed in the genuine species.)

§ 1. *FIMBRISTYLIS* proper. — Style 2-cleft, mostly flat and ciliate on the margin, falling away with the bulbous base from the lenticular achenium: scales of the many-flowered spike very closely imbricated.

1. **F. spadicea**, Vahl. Culms strong and rigid (1°-2° high), naked above; leaves chiefly from the base, rigid, channelled-convolute and thread-form, smooth; umbel simple or compound, small, the rays very unequal; involucre of 2-3 awl-shaped leaves; spikes ovate-oblong, becoming cylindrical (2" thick, dark chestnut-color); stamens 3; achenium minutely striate and impressed-dotted. ♀ (*F. cylindrica*, Vahl.)—Salt marshes, New York and southward along the coast. August, September.

2. **F. laxa**, Vahl. Culms grooved and flattish, slender (2'-12' high); leaves chiefly from the base, narrowly linear, flat, channelled, ciliate-denticulate, glaucous, sometimes hairy, as long as the culm; umbel simple or compound; involucre about 3-leaved; spikes ovate, acute; stamen single; achenium 6-8-ridged on each side and with finer transverse lines. ♂ (*F. Baldwiniana*, Torr. *F. brizoides*, Nees.)—Low clayey soil, Pennsylvania and southward. July, Aug.—Spikes 3" long.

§ 2. *TRICHELÓSTYLIS*, Lestib. — Style 3-cleft, separating with the bulbous base from the triangular achenium.

3. **F. autumnalis**, Rœm. & Schultes. Low, tufted (5'-9' high); culms flat, often diffusely spreading; leaves flat, very acute; involucre 2-leaved; umbel usually decomposed; the oblong acute spikes (1"-2" long) single or 2-3 together at the end of the rays; scales ovate-lanceolate, mucronate; stamens 2-3; achenium obovate-triangular, often minutely warted. (*Scirpus autumnalis*, L. *Trichelostylis mucronulatus*, Torr.)—Muddy grounds, common from Massachusetts southward, especially towards the coast. Aug.-Oct.

§ 3. *ONCÓSTYLIS*, Martius. — Style 3-cleft, slender, the small bulb at the base more or less persistent on the apex of the triangular achenium.

4. **F. capillaris**. Low, densely tufted; culms capillary (3'-8' high), much longer than the chiefly radical bristle-form leaves; sheaths hairy at the throat; involucre 2-3-leaved; umbel compound

or cymose-panicled; spikes ovoid-oblong (2" long); stamens 2; achenium minutely corrugated, very obtuse, tipped with the minute bulb which is more persistent than the rest of the style. ① (*Scirpus capillaris*, L. *Isólepis*, R. & S.) — Sandy fields, common, especially southward. August.

10. PSILOCÀRYA, Torr. BALD-RUSH.

Spikes ovoid, terete, many-flowered; the flowers all perfect. Scales imbricated in several ranks. Perianth none. Stamens usually 2. Style 2-cleft. Achenium doubly convex, more or less wrinkled transversely, crowned with the persistent tubercle or dilated base of the style. — Perennials, with leafy culms; the spikes in terminal and axillary cymes. (Name from *ψιλός*, *bare*, and *καρύα*, *nut*, alluding to the absence of bristles.)

1. **P. scirpoides**, Torr. Spikes 20–30-flowered; scales oblong-ovate, acute, chestnut-colored; achenium obscurely wrinkled, beaked with the sword-shaped persistent style, and somewhat margined by its decurrent dilated base. — Inundated places, Rhode Island to Plymouth, Massachusetts. Culm 4'–9' high: leaves flat.

11. DICHRÓMENA, Richard. DICHROMENA.

Spikes terete, flattened, aggregated in a terminal involucrate head, many-flowered, some of the flowers imperfect. Perianth none. Stamens 3. Style 2-cleft. Achenium lenticular, wrinkled transversely, crowned with the broad tubercled base of the style. — Culms leafy, from creeping rootstocks; the leaves of the involucre mostly white at the base (whence the name, from *δῖς*, *double*, and *χρῶμα*, *color*).

1. **D. leucocéphala**, Michx. Culm triangular; leaves narrow; involucre 5–7-leaved; achenium truncate, crowned with a conical acute tubercle, not margined. — Damp Pine barrens of New Jersey, rare, and southward. August.

12. CERATOSCHËNUS, Nees. HORNED RUSH.

Spikes spindle-shaped, producing one perfect and 1 to 4 staminate flowers. Scales few and loosely imbricated, the lower empty. Perianth of 5–6 rigid or cartilaginous flattened bristles which are somewhat dilated or united at the base. Stamens 3. Style simple, entirely hardening in fruit into a long and slender awl-shaped upwardly roughened beak with a narrow base, much ex-

sented, and several times longer than the flat and smooth obovate achenium. — Perennials, with triangular leafy culms, and large spikes clustered in simple or compound terminal and axillary cymes. (Name composed of *κέρας*, a horn, and *σχοῖνος*, a rush.)

1. **C. corniculàta**, Nees. *Cymes decomposed, diffuse; bristles awl-shaped, stout, unequal, shorter than the achenium.* — Wet places, Ohio, Penn.? and southward. August. — Culm 3°–6° high. Leaves $\frac{1}{2}$ ' wide. Fruit with the taper beak 1' long.

2. **C. macrostàchia**, Gray. *Cymes somewhat simple, small, the spikes closely clustered; bristles capillary, twice the length of the achenium.* — Borders of ponds, E. Massachusetts, Rhode Island, and New Jersey: rare.

13. RHYNCHÓSPORA, Vahl. BEAK-RUSH.

Spikes ovate, few – several-flowered; the lower of the loosely imbricated scales empty, the uppermost usually with imperfect flowers. Perianth of 6 (or rarely more) bristles. Stamens mostly 3. Style 2-cleft. Achenium lenticular or globular, crowned with the dilated and persistent base of the style (tubercle). — Perennials, with more or less triangular and leafy culms; the small spikes in terminal and axillary clusters, cymes, or heads. (Name composed of *ρύγχος*, a snout, and *σπορά*, a seed, from the beaked achenium.)

* *Achenium wrinkled across, lenticular: bristles upwardly denticulate.*

1. **R. cymòsa**, Nutt. *Culm triangular; leaves linear, flat ($\frac{1}{4}$ ' wide); cymes corymbose; spikes crowded and clustered; achenium round-obovate, twice the length of the bristles, four times the length of the depressed-conical tubercle.* — Low grounds, New Jersey and southward. July, August.

2. **R. Torreyàna**, Gray. *Culm nearly terete, slender; leaves bristle-form; cymes paniced, somewhat loose, the spikes mostly pedicelled; achenium oblong-obovate, evenly wrinkled, longer than the bristles, thrice the length of the broad compressed-conical tubercle.* — Swamps, Pine barrens of New Jersey. Aug. — Culm 2°–3° high.

* * *Achenium smooth, lenticular.*

— *Bristles denticulate or barbed upwards.*

3. **R. fúsca**, Rœm. & Schultes. *Leaves bristle-form, channelled; spikes ovate-oblong, few, clustered in 1–3 loose heads (dark chestnut-color); achenium obovate, half the length of the bristles, about the length of the triangular-sword-shaped flat and acute tubercle, which is wide at the base and rough-serrulate on the margins.* — Low grounds, N. England to N. Jersey, rare. July. — Culm 6'–12' high.

4. **R. gracilenta**, Gray. *Leaves narrowly linear; spikes ovoid, crowded in 2-4 small clusters, the lateral long-peduncled; achenium ovoid, rather shorter than the bristles, about the length of the flattened awl-shaped tubercle.*—Low grounds, S. New York and New Jersey. Aug.—Culm very slender, 1°-2° high.

+ + *Bristles denticulate or barbed downwards (in No. 9 both ways).*

5. **R. álba**, Vahl. *Leaves almost bristle-form; spikes (whitish) several, corymbed-clustered, lanceolate; achenium ovoid, narrowed at the base, shorter than the 9-11 bristles, a little longer than the slender beak-like tubercle; stamens usually 2.*—Bogs, common. July, Aug.—Culm slender, 12'-20' high.

6. **R. capillàcea**, Torr. *Leaves bristle-form; spikes 3-6 in a terminal cluster, and mostly 1 or 2 on a remote axillary peduncle, oblong-lanceolate (pale chestnut-color, $\frac{1}{3}$ ' long); achenium oblong-ovoid, stipitate, about half the length of the 6 stout bristles, and twice the length of the lanceolate-beaked tubercle.*—Bogs and rocky river-banks, New York to Michigan. July.—Culm 6'-9' high, slender. Achenium very obscurely wrinkled.

7. **R. Knieskérnii**, Carey. *Leaves narrowly linear, short; spikes numerous, crowded in 4-6 distant clusters, oblong-ovate (chestnut-color, scarcely 1" long); achenium obovate, narrowed at the base, equalling the 6 bristles, twice the length of the triangular flattened tubercle.*—Pine barrens of New Jersey on bog iron-ore banks exclusively, *Knieskern*. Aug.—Culms tufted, 6'-18' high, slender: leaves short.

8. **R. glomeràta**, Vahl. *Leaves linear, flat; spikes numerous in distant clusters or heads (which are often in pairs from the same sheath), ovoid-oblong (brown); achenium obovate, margined, narrowed at the base, as long as the lance-awl-shaped flattened tubercle, which equals the (always) downwardly barbed bristles.*—Low grounds, common, especially southward. Aug.—Culm 1°-2° high.

9. **R. cephalántha**, Torr. *Leaves narrowly linear, flat, keeled; spikes very numerous, crowded in 2-3 or more dense globular heads which are distant (and often in pairs), oblong-lanceolate, dark brown; achenium orbicular-obovate, margined, narrowed at the base, about as long as the awl-shaped beak, half the length of the stout bristles, which are barbed either downwards or upwards.*—Sandy swamps, Long Island to New Jersey. Aug.—Culm stout, 2°-3° high: fruit, &c., larger than in the last.

14. CLADIUM, P. Browne. TWIG-RUSH.

Spikes ovoid or oblong, of several loosely imbricated scales; the lower ones empty, one or two above bearing a staminate or imperfect flower, the terminal one perfect and fertile. Perianth none.

Stamens 2. Style 2-3-cleft, deciduous. Achenium ovoid or globular, somewhat corky at the summit, or pointed, without any proper tubercle. — Perennials, with the aspect of Rhynchospora. (Name from κλάδος, *a twig or branch*, perhaps on account of the branching styles of some species.)

1. **C. mariscoïdes**, Torr. Culm obscurely triangular (2^o high), leaves channelled; cymes small, compound; the spikes clustered in heads of 3-8 together on 2-4 peduncles; style 3-cleft, the lobes entire. (Schœnus, *Muhl.*) — Bogs, New England to Wisconsin, not rare. July.

15. SCLÈRIA, L. NUT-RUSH.

Flowers monœcious; the fertile spikes 1-flowered, usually intermixed with clusters of few-flowered staminate spikes. Scales loosely imbricated, the lower empty. Stamens 1-3. Style 3-cleft. Achenium globular, stony, bony, or enamel-like in texture, seated in a shallow or saucer-shaped disk. — Perennials, with triangular leafy culms. (Name σκληρία, *hardness*, from the bony or crustaceous fruit.)

§ 1. SCLERIA proper. — *Perianth lobed or a ring, often obscure.*

* *Achenium smooth and polished: perianth a vesicular ring.*

1. **S. triglomerata**, Michx. Culm (2^o-3^o high) and broadly linear leaves roughish; fascicles of spikes few, terminal and axillary, in triple clusters, the lower peduncled; stamens 3; achenium ovoid-globular, slightly pointed (2'' broad). — Low grounds, Vermont to Michigan, common southward. July.

* * *Achenium reticulated: perianth of 3 conspicuous and ovate-lanceolate entire scale-like lobes: stamens 2.*

2. **S. reticulâris**, Michx. Culms slender (1^o high); leaves narrowly linear; clusters loose, axillary and terminal, sessile or short-peduncled; achenium globular, deeply pitted between the regular reticulations, not hairy. — Sandy swamps, E. Massachusetts to New Jersey, rare. August.

3. **S. laxa**, Torr. Culms slender and weak (1^o-2^o high); leaves linear; clusters loose, the lower mostly long-peduncled and drooping; achenium globular, pitted and somewhat spirally marked with minutely hairy wrinkles. — Sandy swamps, Long Island and N. Jersey, also southward. August.

* * * *Achenium warty-wrinkled: perianth a ring supporting 6 rounded tubercles: stamens 3.*

4. **S. pauciflora**, Muhl. Somewhat downy or smoothish;

culms slender (9'–18' high); leaves narrowly linear; clusters few-flowered, the lower lateral when present peduncled; bracts ciliate; tubercles of the perianth approximated in 3 pairs at the base of the shining warty-roughened achenium. — Swamps and hills, S. Pennsylvania and southward: also Monroe county, New York, *Dr. Bradley*, New Hampshire, *Carey*, and Uxbridge, Massachusetts, *Robbins*. July.

§ 2. *HYPÓPORUM*, Nees. — *Perianth wanting: achenium often punctured at the base: stamens 1–2.*

5. *S. verticillata*, Muhl. Smooth; culms simple and slender (6'–10' high), terminated by an interrupted spike of 4–6 rather distant sessile clusters; bracts minute; leaves linear; achenium globular, rough-wrinkled, short-pointed, the triangular naked base without pores. — Swamps, Pennsylvania, *Muhlenberg*, Yates county, New York, *Sartwell*. June.

16. *CAREX*, L. SEDGE.*

Staminate and pistillate flowers separated (*monœcious*), either borne together in the same spike (*androgynous*), or in separate spikes on the same stem, very rarely on distinct plants (*diœcious*).

* Contributed by JOHN CAREY, Esq., who has also communicated the subjoined explanatory note.

“In arranging the *Carices* for your work, I have had constantly in view the species comprehended within your geographical range, and have framed the sections and subsections with especial reference to these, without regard to other excluded species belonging, in many cases, to the same groups, but exhibiting peculiarities which would require the combining characters to be modified or changed. Indeed, most of my subsections would, in a monograph of the genus, require to stand as distinct sections, with appropriate subdivisions. I have thought it an assistance to the student to give a leading name to the principal groups, and in some cases have adopted those already suggested by different authors; but as I am uncertain whether the characters on which I rely are in accordance with their views, I have cited no authorities under such subsections. I have endeavoured to bring the allied groups (as I understand them) as nearly together as I could; but this, of course, is not always practicable in any lineal arrangement. It might, however, have been done with much greater satisfaction on a larger and more comprehensive scale. I have retained the small *artificial* group *Psylophoræ*, from its manifest convenience, but should not have done so in a more philosophical work. Upon the whole, I am inclined to hope that the present will at least possess this one advantage over the hitherto more artificial arrangement in general use, — that a student, when acquainted with one species of a group, will be enabled to recognize the co-species for himself, whilst a merely artificial enumeration must at times place very incongruous forms in juxtaposition. Any increased difficulty, if such there be, in commencing the study of this vast and intricate genus upon principles of *natural* classification, will be amply repaid by the more accurate knowledge of structure thus obtained, than by a mere reliance on the loose external characters derived from the number and position of the spikes. — I shall be well satisfied if my attempt shall be an assistance to others in doing far better, hereafter.”

Scales of the spikes 1-flowered, equally imbricated around the axis. Stamens 3, rarely 2. Ovary inclosed in an inflated sac (composed of two inner scales (bractlets) united at their margins), forming a rounded or angular bladderly fruit (*perigynium*), contracted towards the apex, inclosing the lenticular, plano-convex, or triangular achenium, which is crowned with more or less of the persistent (rarely jointed) base of the style. Stigmas 2-3, long, projecting from the orifice of the perigynium.—Perennial herbs, chiefly flowering in April or May, frequently growing in watery places, often in dense tufts. Culms triangular, bearing the spikes in the axils of green and leaf-like or scale-like bracts; commonly with thin membranaceous sheaths at the base which inclose more or less of the stalks of the spikes. Leaves grassy, usually rough on the margins and keel. (A classical name, of obscure signification; derived by some from *careo*, to want, the upper spikes being most frequently sterile; and by others from *κείρω*, to cut, on account of the sharp leaves.)

ABRIDGED SYNOPSIS OF THE SECTIONS.

- A. Spike solitary, simple, diœcious or androgynous: bracts small, colored and scale-like. — *PSYLLOPHORÆ*, Loisel.*
- § 1. Spike diœcious, or with a few staminate flowers at the base. — Nos. 1-3.
2. Spike androgynous, staminate at the summit. — Nos. 4-6.
- B. Spike solitary, single, androgynous, staminate at the summit: bracts and scales of the fertile flowers green and leaf-like. Stigmas 3. — *PHYLLOSTACHYS*, Torr. & Gr. — Nos. 7-9.
- C. Spikes several or numerous, androgynous (occasionally diœcious in Nos. 10 and 33), sessile, forming compact, or more or less interrupted, sometimes paniculate, compound or decompound spikes. Stigmas 2. — *VIGNEA*, Beauv.
- § 1. Spikes approximate, with staminate and pistillate flowers variously situated. — Nos. 10-12.
2. Spikes pistillate below, staminate at the summit. — Nos. 13-28.
3. Spikes pistillate above, staminate at the base. — Nos. 29-41.
- D. Staminate and pistillate flowers borne in separate (commonly more or less stalked) simple spikes on the same culm; the one or more staminate (sterile) spikes constantly uppermost, having occasionally more or less fertile flowers intermixed; the lower spikes all pistillate (fertile) or sometimes with staminate flowers at the base or apex. Stigmas 3 (or only 2 in Nos. 42-49 and No. 56). — *CAREX* proper.
- * Perigynia with merely a minute or short point, not prolonged into a beak.
- § 1. Perigynia not inflated (slightly in No. 49), smooth, nerved or nerveless, with a minute straight point; glaucous-green, becoming whitish, or more or less spotted or tinged with purple. Scales blackish-purple or brown. Staminate

* This division, retained for the convenience of students, is merely artificial, and combines species having no real natural affinity.

- spikes 1-3, or the terminal spike androgynous and staminate at the base, the rest all fertile. — Nos. 42-55.
- § 2. Perigynia slightly inflated, smooth, nerved, obtuse and pointless or with a straight or oblique point. Scales brown, becoming tawny or white. Staminate spike solitary (except sometimes in No. 60) or androgynous and pistillate above, the rest all fertile. — Nos. 56-63.
3. Perigynia slightly inflated, hairy (in No. 70 smooth at maturity), nerved, with a minute straight point. Terminal spike androgynous, pistillate at the apex, the rest all fertile. — Nos. 69, 70.
4. Perigynia not inflated, smooth, regularly striate, with a short, entire, obliquely bent or recurved point, remaining green at maturity. Staminate spike solitary. Bracts green and leaf-like (except in No. 71). — Nos. 71-78.
5. Perigynia not inflated, smooth or downy, not striate, with a minute, obliquely-bent white and membranaceous point, reddish-brown or olive-colored at maturity. Terminal spike all staminate, or with 2-3 fertile flowers at the base; the rest all fertile, or with a few sterile flowers at the apex. Bracts reduced to colored sheaths, or with a short green prolongation. — Nos. 79, 80.
- * * Perigynia with a distinct beak, either short and abrupt, or more or less prolonged.
- § 6. Perigynia not inflated, hairy, with a rather abrupt beak, terminating in a membranaceous notched or 2-toothed orifice. Bracts short: culms mostly low and slender; leaves all radical, long and narrow. Staminate spike solitary. — Nos. 81-86.
7. Perigynia slightly inflated, hairy or smooth, with a short beak terminating in an entire or slightly notched orifice. Bracts long and leaf-like: culms tall and leafy. Staminate spike solitary (in No. 87 pistillate at the summit): fertile spikes erect (except in No. 87). — Nos. 87-89.
8. Perigynia slightly inflated, smooth and shining, green, few-nerved or nerveless, with a straight tapering beak terminating in 2 small membranaceous teeth. Staminate spike solitary: fertile spikes all on slender, pendulous stalks. — Nos. 90-93.
9. Perigynia slightly inflated, smooth, nerved, with a tapering somewhat serrulate beak, terminating in 2 distinct membranaceous teeth; becoming tawny or yellow at maturity. Staminate spike solitary. — Nos. 94-97.
10. Perigynia slightly inflated, rough or woolly, with an abrupt straight beak. Staminate spikes usually 2 or more. — Nos. 98-101.
11. Perigynia moderately inflated, smooth (except No. 105), conspicuously many-nerved, with a straight beak terminating in 2 rigid more or less spreading teeth. Staminate spikes 1-5. — Nos. 102-107.
12. Perigynia much inflated, smooth, conspicuously many-nerved, with a long tapering 2-toothed beak. Staminate spike solitary. — Nos. 108-115.
13. Perigynia much inflated, obovoid or obconic, smooth, few-nerved, with an extremely abrupt, very long, 2-toothed beak, tawny or straw-colored at maturity, horizontally spreading or deflexed. Terminal spike staminate, or androgynous and fertile at the apex. — Nos. 116, 117.
14. Perigynia much inflated, smooth, nerved (except No. 126), shining and straw-colored at maturity, with a tapering, more or less elongated, 2-toothed beak. Staminate spikes 2-3. — Nos. 118-126.

A. *Spike solitary, simple, diœcious or androgynous: bracts small, colored and scale-like.* — PSYLLÓPHORÆ, Loisel.

§ 1. *Spike diœcious, or with a few staminate flowers at the base.*

* *Stigmas 2: leaves all radical, bristle-form.*

1. **C. dioica**, L. *Culm and leaves smooth, or minutely rough at the top; barren spike linear; fertile spike ovoid, loosely flowered;*

perigynia oblong-ovoid, with a short nearly entire white and membranaceous point, strongly nerved throughout, smooth, spreading horizontally at maturity, longer than the rather obtuse scale. — Swamps, Wayne county, New York (Sartwell), to Michigan, northward.

2. **C. exilis**, Dew. *Culm rough; spike rarely all staminate and filiform, but commonly fertile with a few staminate flowers at the base, densely flowered, occasionally with 1-2 very small additional fertile spikes below the sterile flowers; perigynia spreading, ovate-lanceolate, plano-convex, with a few fine nerves only on the convex side, distinctly serrulate on the margin, 2-toothed at the apex, rather longer than the acute scales.* — Swamps, Massachusetts and Rhode Island to New Jersey, near the coast: also borders of mountain lakes, Essex county, New York.

* * *Stigmas 3: leaves flat.*

3. **C. scirpoïdea**, Michx. *Spike narrowly cylindrical; perigynia ovoid, with a minute point, densely hairy, dark purple at maturity, about the length of the pointed ciliate scale.* (C. Wormskjoldiana, Hornem. C. Michauxii, Schreb.) — Alpine summits of the White Mountains, N. Hampshire, Oakes, &c., Drummond's Island, Michigan.

§ 2. *Spike androgynous, staminate at the summit.*

* *Stigmas 2: leaves bristle-form.*

4. **C. capitata**, L. *Spike small, roundish-ovoid; perigynia broadly elliptic with a notched membranaceous point, compressed, smooth, spreading, longer than the rather obtuse scale; staminate flowers imbricated.* — Summits of the White Mountains, New Hampshire, Robbins, Oakes.

* * *Stigmas 3: leaves very narrow, shorter than the culm.*

5. **C. pauciflora**, Lightfoot. *Spike few-flowered; sterile flowers 1-2, commonly single; perigynia awl-shaped, reflexed, straw-colored; scales deciduous.* (C. leucoglóchin, Ehrh.) — Peat-bogs, New England and W. New York, northward.

6. **C. polytrichoides**, Muhl. *Culm slender; spike very small, few-flowered; perigynia erect, alternate, oblong, compressed-triangular, obtuse, slightly nerved, entire at the apex, green, twice the length of the ovate scale.* (C. leptalèa, Wahl. C. microstachya, Michx.) — Low grounds and bogs, common.

B. *Spike solitary, simple, androgynous, staminate at the summit; bracts and scales of the pistillate flowers green and leaf-like, tapering from a broad base, the lowest much longer than the spike, the uppermost equalling the slightly inflated perigynia: style jointed at the base: stigmas 3.* (Leaves numerous, long and grassy, much exceeding the short, almost radical culms.) — PHYLLOSTACHYS, Torr. & Gr.

7. **C. Willdenovii**, Schk. *Sterile flowers 4-8, closely imbricated; perigynia 6-9, somewhat alternate, oblong, rough on the*

angles and tapering beak; achenium oblong, triangular, finely dotted; *stigma* downy. — Copses, W. New York and westward.

8. **C. Steudèlii**, Kunth. *Sterile flowers* 10–15, rather loosely imbricated into a linear (apparently distinct) spike; *perigynia* 2–3, *roundish-obovoid*, smooth, with a long and abrupt rough beak; achenium roundish, obscurely triangular, very minutely dotted; *stigma*s downy. (C. Jamèsii, Schw. Anal. Tab.) — Woody hill-sides, N. New York to Ohio.

9. **C. Báckii**, Boott. *Sterile flowers* 3, inconspicuous; *perigynia* 2–4, loose, *globose-ovoid* with a conical beak, smooth throughout; achenium globose-pyriform, scarcely dotted; *stigma*s smooth. — Rocky hills, N. New York to Ohio and northward. — Culms generally shorter, and the leafy scales broader and more conspicuous, than in the two last.

C. *Spikes several or numerous, androgynous* (occasionally diœcious in Nos. 10 and 33), *sessile*, forming a compact or more or less interrupted sometimes paniculate-compound or decompound inflorescence: *stigma*s 2: achenium *lenticular*. — VIGNÈA, Beauv.

§ 1. Spikes approximated, with the *staminate and pistillate flowers variously situated*; *perigynia* plano-convex, nerved, with a rough slightly toothed beak: bracts light brown, resembling the scales, or with a prolonged point, shorter than the (at maturity) brown and chaffy-looking spikes. — SICCATÆ.

10. **C. bromoides**, Schk. *Spikes* 4–6, *alternate, oblong-lanceolate*, some of the central ones wholly fertile; *perigynia* erect, narrow-lanceolate with a tapering point, solid and spongy at the base, longer than the lanceolate scale; style jointed at the base. — Swamps, &c., common. — A slender species, occasionally diœcious.

11. **C. siccata**, Dew. *Spikes* 4–8, *ellipsoid*, the uppermost, and commonly 1–3 of the lowest, fertile below, the intermediate ones frequently all staminate; *perigynia* ovate-lanceolate, compressed, with a long rather abrupt beak, about the length of the scale; style minutely hairy. (C. pallida, C. A. Meyer.) — Sandy plains, New England to W. New York and westward.

12. **C. Sartwèllii**, Dew. *Spikes* numerous, short and ovoid, the upper chiefly staminate, the lower principally or entirely fertile; *perigynia* ovate-lanceolate, the margins not united to the top, leaving a deep cleft on the outer side; scale ovate, pointed, about the length of the perigynium. — Seneca county, New York (Sartwell), to Michigan and westward.

§ 2. *Spikes pistillate below, staminate at the summit.*

* *Perigynia* of a thick and corky texture, with a short 2-toothed roughly-margined beak, nerved towards the base, dark chestnut-brown and polished at maturity: spikes decompound, paniculate: scales

light brown, with white membranaceous margins; the bracts resembling them at the base, and with a short bristly prolongation.—
PANICULATÆ.

13. **C. teretiúscula**, Good. Spikes with very short appressed branches, forming a slender crowded spiked panicle; *perigynia* ovate, *unequally biconvex*, short-stalked, with 3–5 short nerves on the outer side near the broad somewhat heart-shaped base; scale acute, rather shorter than the perigynium; *achenium* obovoid-pyriform, *obtusely triangular*. (*C. paniculata*, var. *teretiúscula*, *Wahl.*) — Swamps, New England to Michigan.

14. **C. paniculàta**, L., var. *MINOR*. Lower branches of the panicle (consisting of 6–8 small spikes) slightly spreading; *perigynia* ovate-lanceolate from a broad base, *plano-convex*, with a tapering beak, short-stalked, nerves rather obscure especially on the inner side; scale ovate, about the length of the perigynium; *achenium* oblong, *plano-convex*. (*C. prairèa*, *Dew.*) — Peat-bogs, New England to Michigan. — Smaller and less branched than the ordinary European form, but not differing in any important character.

15. **C. decompósita**, Muhl. Panicle large, with very numerous densely-crowded spikes on the rather short spreading branches; *perigynia* obovate, *unequally biconvex*, *sessile*, with a short very abrupt beak, *conspicuously nerved* on each side, about the length of the ovate pointed scale. (*C. paniculata*, var. *decomposita*, *Dew.*) — Swamps, Yates county, New York (*Sartwell*), and westward.

* * *Perigynia* small, compressed, 2–3 nerved, membranaceous, with a short 2-toothed rough beak, yellow or brown at maturity: *spikes* decomposed, with numerous small very densely-flowered heads: scales of the fertile spikes tawny, with the green keel prolonged into a rough point: bracts short and resembling them at the base, or often becoming green and bristle-shaped and much exceeding the culm.
— MULTIFLORÆ.

16. **C. vulpinoídea**, Michx. Spike oblong and dense, or more or less interrupted, of 8–10 crowded clusters; *perigynia* ovate from a broad base, with a more or less abrupt beak, diverging at maturity. (*C. multiflòra*, *Muhl.* *C. bracteòsa* and *C. polymórpha*, *Schw.* *C. microspérma*, *Wahl.*) — Varies with the perigynium narrower, and the beak tapering and more strongly serrulate. (*C. setàcea*, *Dew.*) — Low meadows, very common. — This species varies exceedingly in the size and shape of the perigynium and beak. The spikes are from 1½' to 2½' in length.

* * * *Perigynia* on short stalks, *plano-convex*, without a margin, membranaceous, with a thick and spongy base and a long tapering 2-toothed rough beak, *distinctly nerved* (only obscurely in Nos. 20 and 21), widely spreading and yellow at maturity: spikes dense, more or less aggregated, sometimes decomposed: scales of the fer-

tile spikes tawny, with a sharp point: bracts bristle-shaped, shorter than the thick and triangular culms. — VULPINÆ.

17. **C. crus-córvì**, Shuttleworth. Spike very large, decom-
pound, the lower branches long and distinct, the upper shorter and
aggregated; *bracts 2-toothed at the base; perigynia attenuated from an
ovate dilated and truncate base into a very long slightly-winged beak,
much exceeding the scale; style tumid at the base.* (*C. sicæfórmis*,
Boott. *C. Halèi*, *Dew.*) — Swamps, Ohio and southwestward. — A
conspicuous, very large species, with spikes 4' – 9' long, often some-
what paniculate, and glaucous leaves $\frac{1}{2}$ ' wide.

18. **C. stipàta**, Muhl. Spikes 10 – 15 aggregated, or the low-
er ones distinct and sometimes compound; *perigynia lanceolate, with
a long beak tapering from a truncate base, much exceeding the scale;
style not tumid at the base.* (*C. vulpinoidea*, *Torr. Cyp.*, not of *Michx.*)
— Swamps and low grounds, common.

19. **C. vulpìna**, L. Spikes numerous, aggregated into a cy-
lindrical and dense, or at times elongated and somewhat interrupted,
compound spike; *perigynia compressed, tapering from a broadly-ovate
base into a beak not much longer than the scale; achenium oval; style
tumid at the base.* — Ohio, *Sullivant* (Illinois, *Engelmann*). — A tall,
robust species, 3° – 4° high, with wide leaves and a remarkably thick
rough culm. It is very like the last, from which it chiefly differs in
the more compressed and wider base and shorter beaks of the peri-
gynia. — The forms with interrupted spikes have also a general
resemblance to No. 22; but that species is readily distinguished by
the *marginèd and nerveless perigynia.*

20. **C. alopecoidea**, Tuckerman. Head of 8 – 10 aggregated
spikes, oblong, dense; *perigynia compressed, very obscurely nerved,
ovate from a broad truncate or somewhat heart-shaped base, a little
longer than the scale; achenium pyriform; base of the style not tumid.*
(*C. cephalóphora*, var. *máxima*, *Dew.*) — Woods, W. New York,
Sartwell. — Much resembling the last, but a smaller plant with short-
er, more compact spikes, and easily distinguished by the *nearly nerve-
less perigynia*, and different achenium and style.

21. **C. muricàta**, L. Spikes 4 – 6, ovoid, approximate but
distinct, the lowermost sometimes a little remote; *perigynia ovate-
lanceolate, somewhat compressed, nerveless, or very obscurely nerved
towards the base, rather longer than the scale; achenium ovate, base of
the style not tumid.* — Fields, Massachusetts (introduced?) and north-
ward, not common. — Spikes much looser than in the last, the peri-
gynia narrower, with a longer and more tapering beak.

* * * * *Perigynia sessile, plano-convex, compressed, more or less
marginèd, membranaceous, with a rather short rough (smooth in
No. 26) 2-toothed beak, spreading and green at maturity: scales of*

the fertile spikes tawny or white: bracts bristle-shaped, commonly shorter than the culm. — MUHLENBERGIANÆ.

22. **C. sparganioides**, Muhl. Spikes 6–10, ovoid; the upper ones aggregated, the lower distinct and more or less distant; perigynia broadly-ovate, nerveless, rough on the narrow margin about twice the length of the ovate-pointed scale; achenium roundish-ovate; style short, tumid at the base. — Var. CEPHALOIDEA has 4–6 rather smaller spikes, closely aggregated into an oblong head. (C. cephalophora, var. cephaloidea, and C. cephaloidea, Dew.) — Low grounds, New England to Wisconsin; the var. in fields and hedges. — A robust species, with rather wide pale-green leaves; occurring sometimes with 1–2 short branches of a few spikes each, at the base of the compound spike, in which state it is probably the C. divulsa, Pursh, not of Goodenough. The var. cephaloidea differs in no important character from the larger form, of which it seems to be a reduced state, approaching closely to the next in general appearance.

23. **C. cephalophora**, Muhl. Spikes 5–6, small, and densely aggregated into a short ovoid head; perigynia broadly ovate, with 3–4 indistinct nerves on the outer side, scarcely longer than the ovate roughly-pointed scale; achenium and style as in the last. — Woods and fields, very common. — C. Leavenworthii, as characterized by Prof. Dewey, differs only from this species in the smooth fruit; but an authentic specimen (in herb. Olney) has the margin and beak minutely, but distinctly serrulate, and thus appears to be only a small form of C. cephalophora.

24. **C. Muhlenbergii**, Schk. Spikes 5–7, closely approximate, forming an oblong head; perigynia orbicular-ovate, with a very short beak, prominently nerved on both sides, about the length of the ovate roughly-pointed scale; achenium orbicular, with a very short bulbous style. — Fields, New England to Michigan and westward. — Plant 12'–18' high, pale green, commonly with a bract at the base of each spike.

25. **C. rosea**, Schk. Spikes 4–6, the 2 uppermost approximate, the others all distinct and the lowest often remote; perigynia oblong (about 8–10 in each spike), narrow at the base, widely diverging at maturity, twice as long as the broadly-ovate obtuse scale. — Varies with weak slender culms, and small 3–4-flowered spikes. (Var. RADIATA, Dew. C. neglecta, Tuckerman. C. disperma, Kunze, not of Dew.) — Moist woods and meadows, common.

26. **C. retrofléxa**, Muhl. Spikes 4–5, all approximate, the 1–2 lowest distinct but not remote; perigynia (about 5–7 in each spike) ovate, or ovate-lanceolate, smooth on the margin and beak, not much exceeding the ovate-lanceolate pointed scale, widely spreading or reflexed at maturity. (C. rosea, var. retroflexa, Torr. Cyp.) — Copses and moist meadows; less common than the last, from which it is dis-

tinguished by the smaller approximate spikes, longer and sharper scales, and especially, from every species in this subsection, by the smooth margin and beak of the perigynium.

* * * * * *Perigynia* plano-convex, without a beak, of a thick and leathery texture, prominently nerved, smooth (except on the angles), with a minute and entire or slightly notched white membranaceous point: achenium conformed to the perigynium, crowned with the short thick style: bracts like the scales (brown), the lowest with a prolonged point: rootstock creeping. — CHORDORHIZÆ. (Though externally dissimilar, the species in this subsection exhibit important points of affinity, and are nearly allied to each other, and more remotely to the next subsection.)

27. **C. chordorhiza**, Ehrh. *Culms branching from the long creeping rootstock, smooth and naked above, clothed at the base with short appressed leaves; spikes aggregated into an ovoid head; perigynia ovate, a little longer than the scale.* — Peat-bogs, N. and W. New York to Wisconsin and northward.

28. **C. gracilis**, Ehrh. *Spikes 2-4, very small, remote, with commonly 2 fertile flowers; perigynia ovate, twice as long as the scale.* (*C. tenella*, Schk. *C. loliacea*, Schk. *Supp.*, not of L. *C. dispérma*, Dew., &c.) — Cold swamps, N. New England to Wisconsin. — A slender species, 6' - 12' high, with long grassy leaves, growing in tufts. (Vide Gray in *Sill. Jour.* 2 Ser. 4, p. 20.)

§ 3. *Spikes pistillate above, staminate at the base.*

* *Spikes roundish-ovoid, rather small, more or less distant on the zig-zag axis (closely aggregated in No. 30): perigynia plano-convex, smooth, pale green, becoming whitish or silvery: scales white and membranaceous; the bracts resembling them, or prolonged and bristle-shaped.* — CANESCÉNTES.

+ *Perigynia somewhat thickened and leathery, distinctly nerved, with a smooth or very minutely serrulate short point, entire or slightly notched at the apex.*

29. **C. trispérma**, Dew. *Spikes 2-3, very small, with about 3 fertile flowers, remote, the lowest with a long bract; perigynia oblong, with numerous slender nerves, longer than the scale.* — Cold swamps and woods, especially on mountains, New England to Michigan. — Resembling the last, but taller, with larger spikes and fruit, and weak spreading culms.

30. **C. tenuiflora**, Wahl. *Spikes 3, few-flowered, closely approximated; perigynia ovate-oblong, about the length of the broadly-ovate scale.* — Cold swamps, N. New England and New York, northward.

31. **C. canescens**, L. (in part). *Spikes 5-7 (about 12-20-flowered), the 2-3 upper approximated, the rest all distinct and the lowermost remote; perigynia ovate, about the length of the pointed*

scale. (*C. curta*, Good. *C. Richárdi*, Michx.) Var. 1. *ALPÍCOLA* has smaller roundish and less distant spikes (6–10-flowered); the perigynia with rather longer points, spreading and tawny at maturity. (*C. canescens*, var. *alpicola*, Wahl. *C. curta*, var. *brunnéscens*, Pers. *C. Gebliárdi*, Hoppe. — Var. 2. *SPHÆROSTACHYA* differs in the fewer, rather smaller spikes, with somewhat narrower and more tapering perigynia, not becoming tawny. (*C. canescens*, var. *sphærostachya*, Tuckerman. *C. sphærostachya*, Dew.) — Wet meadows and marshes, N. New England to Wisconsin. — The varieties are frequent on high mountains, and differ chiefly in the smaller spikes, and slender culm and leaves: the peculiarity in var. 2 is probably attributable to closer shade.

→ → *Perigynia thickened only at the base, obscurely nerved on the outer side, tapering into a rough 2-toothed beak.*

32. *C. Deweyàna*, Schw. Spikes about 4, the 2 uppermost approximate, the others distinct, the lowest with a long bract; *perigynia oblong-lanceolate*, rather longer than the sharply pointed or awned scale. — Copses, N. New England to Wisconsin.

* * *Spikes ovoid or obovoid, more or less clustered; perigynia concavo-convex, compressed, margined or winged, nerved, with a rough 2-toothed beak, often tawny at maturity: scales tawny or white, awnless: bracts bristle-shaped, usually falling before the maturity of the spikes (in No. 34 persistent, very long and leaf-like).*

→ *Spikes small; perigynia thick and spongy at the base, with a rigid margin, not dilated.* — *STELLULÀTÆ.*

33. *C. stellulàta*, Good. Spikes 3–5, distinct, obovoid or roundish at maturity; perigynia ovate from a broad somewhat heart-shaped base, widely spreading at maturity, longer than the ovate acute scale; achenium ovate, abruptly contracted into a minute stalk; style slightly tumid at the base. — Var. 1. *SCIRPOIDES* has smaller more approximate spikes; the perigynia ovate from a rounded or truncate base, narrower and less acute scales, and a very short style. (*C. scirpoides*, Schk.) — Var. 2. *STÉRILIS* has the spikes occasionally diœcious, or the staminate ones with but few fertile flowers, and the pistillate nearly destitute of barren ones; culms stouter and rigidly erect; and with the leaves generally glaucous; achenium rounder, with a more tapering base, and the style scarcely tumid at the base. (*C. sterilis*, Schk.) — Var. 3. *ANGUSTÀTA* has about 4 aggregated spikes, with narrowly-lanceolate perigynia tapering into a long slightly rough beak, more than twice the length of the blunt scale; achenium oblong. — Swamps and wet meadows, common. — There appear to be no sufficiently constant characters for distinguishing these varieties, of which the last, from the prolonged narrow fruit, is the most remarkable, and differs from *C. scirpoides*, Schk., in that respect.

→ → *Spikes rather large: perigynia thickened and spongy on the angles,*

with a more or less dilated membranaceous margin or wing.—

OVÀLES.

34. **C. sychnocéphala**, Carey. Spikes densely clustered, forming a short compound spiked head subtended by 3 very long unequal leafy bracts; perigynia tapering from an abruptly contracted ovate base into a long slender beak, somewhat exceeding the lanceolate abruptly mucronate scale. (C. cyperoides, Dew., not of L.) — Jefferson county (Vasey & Knieskern) and Little Falls, New York, Dr. Vasey. — Different in habit from all the rest of this section, and recognized at once by the ovoid compound spike, seated at the base of the long leafy bracts, by which the lower spikes are partly concealed.

35. **C. árida**, Schw. & Torr. Spikes 8–10, approximate ($\frac{3}{4}$ ' long), oblong-cylindrical, contracted at each end; perigynia narrowly lanceolate (4–5 lines in length), tapering into a long beak more than twice the length of the ovate-lanceolate scale; achenium sessile, narrowly oblong. — Wet meadows, Ohio and westward. — In its characters scarcely distinguished from No. 37, but it is strikingly different in appearance, and is a much larger plant, with long, dry, and chaffy-looking spikes.

36. **C. Liddòni**, Boott. Spikes 6, elliptical, approximate, without bracts; perigynia lanceolate, pointed, the margin rough, without wings, scarcely longer than the pointed lanceolate chestnut-colored scale; achenium oblong-obovate, nearly sessile. — Michigan and westward; rare.

37. **C. scopària**, Schk. Spikes 5–8, club-shaped, at length ovate, more or less approximate, sometimes forming a dense head; perigynia narrowly lanceolate, tapering into a long slender beak, longer than the lanceolate pointed scale; achenium distinctly stalked, exactly oval. — Low meadows, very common. — Spikes brownish or straw-colored when ripe.

38. **C. lagopodioides**, Schk. Spikes 10–15, approximate; perigynia ovate-lanceolate, nearly twice the length of the ovate-oblong rather obtuse scale; achenium narrowly oval, on a short stalk. — Var. CRISTÀTA has the spikes closely aggregated, with the perigynia spreading. (C. cristata, Schw. & Torr.) — Wet fields, equally common with the last, from which it is only distinguished by the more numerous shorter spikes, and shorter and less tapering perigynia and scales. The var. has the spikes crowded into an ovate head, to which the diverging points of the fruit give a squarrose appearance.

39. **C. festucàcea**, Schk. Spikes 6–8, obovoid or club-shaped, the lower distinct; perigynia ovate, narrowly winged, with a short beak, longer than the ovate-lanceolate scale; achenium sessile, broadly oval. — Var. 1. TÉNERA has (3–5) smaller spikes, which are more distant on the slender, flexuose, sometimes nodding stem. (C. tenera, Dew.) — Var. 2. MIRÁBILIS has (6–8) rounder approximate spikes, with fewer staminate flowers, and the perigynia somewhat spreading.

(*C. mirabilis*, Dew.)—About fields and fences, New England to Michigan. — A stiff and rigid species, often of a pale-green appearance, except var. 1, which has commonly brownish heads, and a weak stem.

40. **C. fœnea**, Muhl. Spikes 4–10, ovoid, approximate, the lower rarely compound, of a glaucous-green color; perigynia ovate, winged, with a short beak, scarcely longer than the oblong and bluntish white scale; achenium on a short stalk, oval. — Salt marshes, on the sea-coast, Rhode Island (*Olney*) to New Jersey, and southward. — Much resembling the last, from which it differs principally in the color of the spikes, and in the constantly erect and more broadly-margined perigynia. The culm is smooth and remarkably stout.

41. **C. straminea**, Schk. Spikes (about 6), roundish-ovoid, approximate; perigynia orbicular-ovate, much compressed, broadly and membranaceously winged, with a short abrupt beak a little longer than the lanceolate scale; achenium sessile, oval. — Borders of woods and in fields, New England to Michigan. — The larger forms have a remarkably wide wing, often brown on the margin, giving a variegated appearance to the soft and flaccid spikes. In the smaller forms, the heads are fewer (3–4) and more rigid in texture, owing to the narrower wings of the perigynia.

D. *Staminate and pistillate flowers borne in separate (commonly more or less stalked) simple spikes on the same culm; the 1 or more staminate (sterile) spikes constantly uppermost, having occasionally more or less fertile flowers intermixed; the lower spikes all pistillate (fertile) or sometimes with staminate flowers at the base or apex: stigmas 3: achenium sharply triangular (only 2 stigmas and the achenium lenticular in Nos. 42 to 49, and No. 56).* — CAREX proper.

§ 1. *Perigynia without a beak, smooth, not inflated (slightly in No. 49), terminating in a minute, straight, entire or notched point; glaucous-green when young, becoming whitish, often spotted or tinged with purple, or occasionally nearly black at maturity: pistillate scales blackish-purple (brown in Nos. 49 and 55), giving a dark appearance to the spikes.*

* *Staminate spikes 1–3, stalked, often with more or less fertile flowers: pistillate spikes 3–5, frequently with sterile flowers at the apex: bract of the lowest spike leaf-like, with dark-colored expansions (auricles) at the base, and very minute sheaths, or none. (Culm and leaves more or less glaucous.)*

→ *Stigmas 2 (in No. 42 sometimes 3): perigynium lenticular.* — ACUTE.

42. **C. rigida**, Good. Sterile spike solitary; the fertile 2–4, cylindrical, erect, rather loosely flowered, the lower on short peduncles; lowest bract about the length of the culm, with rounded auricles; stigmas 2–3, mostly 2; perigynia elliptical, with an entire scarcely pointed apex, nerveless, or very obscurely nerved, about as long as the obtuse scale; culm rigid, nearly smooth except towards the top, about

the length of the firm, erect leaves. (*C. SAXÁTILIS*, *Fl. Dan. and of American authors*, not of *L.*) — Var. *BIGELÓVII* has 3–5 longer fertile spikes, the lowest on a long stalk, spreading and sometimes remote. (*C. Bigelowii*, *Torr.* *C. Washingtonia*, *Dew.* *C. nigra*, *Schw. & Torr.*, not of *All.*) — Summits of the White Mountains and Great Haystack, New Hampshire; Mansfield and Camel's Rump, Vermont; Mount Katahdin, Maine; and Mount Marcy, New York.

43. *C. tórta*, Boott, Mss. Sterile spikes 1–2, commonly 1; fertile 3–4, elongated, narrowly-cylindrical or slightly club-shaped, loosely few-flowered at the base, occasionally more or less staminate at the apex, the lower on smooth slender stalks, at first erect, finally spreading or drooping; bracts with oblong auricles or very slightly sheathing, the lowest about the length of the culm, the rest bristle-shaped, shorter than their respective spikes; perigynia elliptical, short-stalked, tapering to a distinct point, with a minutely notched or jagged membranaceous orifice, very smooth, nerveless, or with 2–3 indistinct short nerves, the tips spreading or obliquely recurved at maturity, scarcely exceeding the narrow obtuse scale; achenium broadly obovate, much shorter than the perigynium; culm very smooth, leaves slightly rough on the margin only. (*C. acuta*, var. *sparsiflora*, *Dew.*?) — Rills and wet banks, N. New England and W. New York. — Culm rather slender, 15'–2° high, usually with 3 slender and nodding fertile spikes. It is well distinguished by the spreading (empty) tips of the perigynia.

44. *C. vulgàris*, Fries. Sterile spike 1, rarely 2; the fertile 2–4, approximated, oblong, erect, densely-flowered, occasionally staminate at the apex, the lowest on a very short stalk; lowest bract about the length of the culm, with small blackish rounded auricles; perigynia ovate-elliptic, stalked, nerved especially towards the base, with a very short abrupt entire or minutely notched point, longer than the obtuse appressed black scale; culm slender, nearly smooth, except at the top. (*C. cæspitosa*, *Good. and of American authors*, not of *L.* *C. Goodenóvii*, *Gay.*) — Banks of streams, N. New England and New York, northward. — Grows in small patches (not in dense tufts like No. 46) and varies in height from 3' to 18', with narrow leaves shorter than the culm. From the last it differs in the short thick spikes, and erect perigynia, and in the auricles of the bracts; and from the next, in the shape and nerves of the perigynium, and in the shorter, black, appressed scale.

45. *C. apérta*, Boott. Staminate spikes 1–2, oblong-cylindrical, acute; fertile 2–4, oblong, erect, the uppermost approximate and sessile, the lower distant and short-stalked, staminate at the apex, or often entirely fertile; lowest bract about the length of the culm, with oblong brown auricles, or very slightly sheathing, the upper bristle-shaped, shorter than the spikes; perigynia roundish-ovate, stalked,

without nerves, covered with very minute transparent dots, and sometimes very slightly rough at the apex, *with an abrupt, very short, notched orifice*, broader and *much shorter than the lanceolate pointed brown scale*; culm sharply triangular, smooth below, exceeding the rough sharp-pointed leaves. (*C. acuta*, var. *erecta*, *Dew.?*) — Wet meadows, Rhode Island (*Olney*) and westward. — Culm 1° - 2° high, with commonly 2 fertile spikes $\frac{3}{4}$ ' - 1 $\frac{1}{2}$ ' in length, of a somewhat bristly appearance from the long and spreading scale. This species differs from the next chiefly in the rounder perigynium and nearly smooth culm.

46. **C. stricta**, Lam. Staminate spikes 1-3; the *fertile 2-4, cylindrical, slender, usually barren at the summit*, sessile, or the lower on a short stalk; lower bract with rounded or oblong brown auricles, seldom exceeding the culm; *perigynia ovate-acuminate or elliptical, nerveless* or very obscurely few-nerved, *often minutely rough on the short, entire, or slightly notched point*, usually shorter and broader than the narrow reddish-brown scale; *culm slender, sharply triangular, rough*, longer than the narrow and rigid rough and glaucous leaves. (*C. acuta*, *Muhl. and American authors*, not of *L.* *C. Virginiana*, *Smith in Rees Cycl. fide Boott.* *C. angustata*, *Boott.*) — Var. **STRICTIOR** has shorter and more densely flowered fertile spikes, and perigynia equalling or somewhat exceeding the scale. (*C. strictior*, *Dew.*) — Wet meadows and swamps, common. Grows in large, thick tufts, 2° - 2 $\frac{1}{2}$ ° high. The scales of the fertile spikes are very variable; the lower commonly acute, the upper narrower and obtuse. This species and the last have been referred to *C. acuta*, *L.*, which is probably not found in North America.

47. **C. aquatilis**, Wahl. Sterile spikes commonly 2-3; the *fertile 3-5, club-shaped, erect, densely flowered, sessile*, or the lower on very short stalks; *bracts long, 1-2 of the lowest exceeding the culm*; *perigynia obovate-elliptical, stalked, nerveless*, with a very short entire point about the length of the lanceolate scale; culm sharply triangular, rough towards the top, not much exceeding the pale-green glaucous leaves. — Margins of lakes and rivers, N. New England to Michigan. — A rather robust species 2° - 2 $\frac{1}{2}$ ° high, with thick fertile spikes, 1' - 2' long.

48. **C. salina**, Wahl. Sterile spikes 2-3; the *fertile 2-4, cylindrical, erect*, often sterile at the apex, on more or less included stalks; bracts long, with rounded auricles, the two lowest commonly exceeding the culm; *perigynia ovate-elliptical*, with a minute entire point, nerveless, *rather shorter than the roughly-awned dark-brown scale*; culm rough at the top, rather exceeding the leaves. — Massachusetts (near Chelsea? *B. D. Greene*), and Arctic America. — Distinguished from all others of this group, except the next, by the awned scales, and from that species by the shorter *erect* spikes and dark scales.

49. **C. crinita**, Lam. Sterile spikes 1-2, often with fertile flowers variously intermixed; the fertile 3-5, long-cylindrical, densely flowered, on exserted nodding stalks; bracts very long, exceeding the culm; perigynia roundish-obovate, slightly inflated, obscurely nerved, with a short entire point, shorter than the oblong roughly-awned light-brown scale; culm tall, rough and sharply angled, leafy below. — Varieties, 1. with the awns of the scales very long (*C. paleacea*, Wahl.); 2. with awns not much longer than the scales (*C. gynandra*, Schw. Anal. Tab.). — Wet meadows and borders of rills, very common. — Culm 2°-4° high, with pale leaves, 3-4 lines wide: a somewhat variable species, but easily recognized by the numerous long and drooping spikes.

← ← *Stigmas* 3: perigynium obtusely triangular, indistinctly few-nerved, more or less compressed: pistillate spikes on exserted filiform drooping stalks. — LIMOSÆ.

50. **C. flacca**, Schreb. Sterile spikes 1-2; the fertile about 3, cylindrical, on exserted drooping stalks, commonly staminate at the top; lower bract usually shorter than the culm; sheaths obsolete or minute; perigynia roundish-ovoid, notched at the point, smooth or slightly roughened on the angles, about the length of the obtuse or pointed black scale; culm sharply triangular, rough, taller than the glaucous rigid leaves. (*C. glauca*, Scop. *C. recurva*, Huds. *C. Barrattii*, Schw. & Torr.) — Marshes of New Jersey, near the coast, Collins, Knieskern. — A very variable species, uncertain in many of its characters, whence it has obtained in Europe, where it is widely diffused, a dozen or more names in addition to those here given.

51. **C. limosa**, L. Staminate spike solitary; the fertile 1-2, oblong, 10-20-flowered, occasionally with staminate flowers at the apex; bracts very narrow, the lowest shorter than the culm; perigynia ovate, with a minute entire point, about equal to the ovate mucronate scale. — Peat-bogs, New England to Michigan and northward. — Culm 6' - 12' high, erect, longer than the sharp and rigid leaves.

52. **C. irrigua**, Smith. Staminate spike solitary; the fertile 2-4, ovoid or oblong, occasionally staminate at the apex, or rarely with a few sterile flowers at the base; lowest bract as wide as the leaves, longer than the culm; perigynia roundish-ovate, with an entire orifice, much shorter than the tapering pointed scale. (*C. limosa*, var. *irrigua*, Wahl. *C. paupercula*, Michx. *C. lenticularis*, Dew., not of Michx.) — Peat-bogs, N. New England to Michigan and northward. — Taller than the last, growing in clumps, with weaker nodding stems, often exceeded by the leaves.

* * Uppermost spike club-shaped, pistillate above and staminate at the base; the rest all fertile or with a few sterile flowers below: lowest bract leaf-like, scarcely equalling the culm, with minute light-brown auricles, without sheaths: culm and leaves of a pale glaucous-green — ATRATÆ.

53. **C. Buxbaumii**, Wahl. *Spikes 3-4, obovoid or oblong, the uppermost short-stalked (rarely altogether staminate), the others nearly sessile, the lowest somewhat remote; perigynia elliptical, obtusely triangular, compressed, obscurely nerved, with a distinctly notched orifice scarcely equalling the ovate sharp-pointed or short-awned scale. (C. canescens, L., in part, and Boott in Hook. Fl. Bor.-Am.) — Peat-bogs, Massachusetts to Wisconsin.*

54. **C. atrata**, L. *Spikes 3-4, oblong-ovoid, approximate, all on short filiform stalks, at length drooping; perigynia ovoid, with a short notched point, about the length of the ovate acute scale. — Alpine summits of the White Mountains, N. Hampshire. — About 12' - 15' high, with rather rigid leaves, nearly equalling the culm. Fruit at first straw-color, often becoming dark purple or nearly black.*

55. **C. Shortiana**, Dew. *Spikes about 5, cylindrical, erect, more or less distant, and the lowest rather remote, all androgynous and densely flowered; the terminal one about half staminate, the rest with only a few barren flowers at the base, the 2-3 lower on short stalks; perigynia broadly obovate, abruptly contracted at the base into a short stalk, with an extremely minute, entire point, but little longer than the short-pointed somewhat obovate scale. — Marshes, S. Pennsylvania, Ohio, and westward.*

§ 2. *Perigynia without a beak, smooth, slightly inflated, bluntly triangular, nerved, with an obtuse and pointless orifice, or short (and straight or oblique) entire or notched point: bracts leaf-like, sheathing: staminate spike solitary (except sometimes in No. 60), or androgynous and pistillate above; the rest all fertile.*

* *Staminate spike on an elevated stalk (short-stalked or sessile in Nos. 61, 62, in No. 60 occasionally with 1-2 small ones at its base): pistillate spikes 1-6, erect, the upper on very short, the lower on more or less elongated exserted stalks (short and included in No. 62): bracts shorter than the culm (except in Nos. 56 and 61): perigynia with an entire and straight or obliquely-bent point, glaucous-green when young, becoming cream-colored or yellow at maturity, sometimes spotted with purple (stigmas only 2 in No. 56): pistillate scales dark-brown with white margins, fading to tawny. (Leaves mostly radical, more or less glaucous.) — PANICEÆ.*

56. **C. aurea**, Nutt. *Fertile spikes 3-4, oblong, loosely flowered, the lowest often very remote; perigynia obovate or pear-shaped, obtuse, longer than the ovate acute scale; stigmas 2; achenium lenticular. (C. pyriformis, Schw.) — Wet grassy banks, especially on limestone; New England to Michigan. — A slender, delicate species, with long grassy leaves, and bracts exceeding the culm. The staminate spike often bears fertile flowers at the apex.*

57. **C. livida**, Willd. *Fertile spikes 1-2, 10-15-flowered, rarely with a third near the base of the culm; perigynia ovoid-oblong, with*

faint pellucid nerves, terminating in a straight obtuse point, rather longer than the ovate scale. (*C. limosa*, var. *livida*, *Wahl.* *C. Grayana*, *Dew.*) — Peat-bogs, Oriskany, New York, and Pine barrens, New Jersey. — Occurs rarely with a single (sterile) spike, or with an additional fertile one on an erect stalk 6'–9' long, arising from the base of the culm. The whole plant is very glaucous, and the leaves rigid and finely tapering.

58. **C. panicea**, L. *Fertile spikes 1–3, commonly 2, ovoid, oblong, or cylindrical, closely flowered, remote; perigynia when young oblong, and contracted at each end, at maturity roundish-obovoid, scarcely inflated, with more obscure nerves, and a slightly-bent point, longer than the ovate pointed or awned scale; achenium triquetrous, flattened at the top, contracted towards the base, distinctly dotted under a lens.* (*C. Meádii*, *Dew.*) — Wet meadows and margins of streams, New England to Ohio and westward. — Very variable in the length and thickness of the fertile spikes, the slender forms approaching closely to the next; in both the shape of the fruit varies greatly with age.

59. **C. tetánica**, Schk. *Fertile spikes 1–3, commonly 2, oblong-cylindrical, loosely flowered, remote; perigynia when young pointed at each end, at maturity obovoid, scarcely inflated, with a slightly-bent point, longer than the ovate pointed or awned scale; achenium ovoid-triangular, indistinctly dotted under a lens.* (*C. conoidea*, *Gray*, *Gram. & Cyp.*, not of *Schk.* *C. Woodii*, *Dew.*) — Margins of lakes and rivers, N. New York to Michigan.

60. **C. Cráwei**, *Dew.* *Staminate spike usually solitary, or with 1 (rarely 2) short additional ones at its base, the principal sometimes fertile at the apex; fertile spikes 3–6, remote, and the lowest near the root, oblong or cylindrical, densely flowered, and sometimes slightly compound at the base; perigynia ovoid-oblong, obscurely nerved, with a short slightly-bent point, longer than the rather obtuse scale.* (*C. heterostachya*, *Dew.*) — Clefts of rocks, Jefferson county, New York (*Crawe*), Lake Ontario (*Vasey*), and N. Michigan (*Bull.*) — A very variable species, rigidly erect, 4'–12' high, in some of its forms much resembling the next, but the perigynium is less round, with fewer and more indistinct nerves, the bracts do not exceed the culm, and the staminate spike is long-peduncled.

61. **C. granulàris**, *Muhl.* *Staminate spike sessile, or short-stalked, occasionally bearing a few fertile flowers; pistillate spikes 3–4, cylindrical, densely flowered, the lowest sometimes very remote, or near the base of the culm; perigynia roundish-ovoid, prominently nerved, with a minute slightly-bent point, longer than the acute scale; bracts long, exceeding the culm.* — Wet meadows, very common.

62. **C. Torrèyi**, *Tuckerman.* *Staminate spike short-stalked; fertile spikes 2–3, ovoid, closely approximate, all on included stalks;*

perigynia roundish-obovoid, obtuse, with conspicuous elevated nerves, and a distinct abrupt point, longer than the ovate pointed scale; *culm*, *leaves*, and *short bracts* downy. — This species was collected at Carlton House by Dr. Richardson, and is here introduced only because Mr. Tuckerman described it from a specimen in Sir W. J. Hooker's Herbarium, which purported to have been sent from New York by Dr. Torrey, though probably from some misplacement of tickets. It has a great external resemblance to the next, but is very distinct.

* * *Staminate spike sessile, or short-stalked* (except in No. 64): pistillate spikes 2-5, erect, all on more or less exserted stalks: *bracts longer than the culm* (except in No. 64): *perigynia very obtuse*, with an abrupt and minute (or almost obsolete) point, *green and somewhat pellucid at maturity*: pistillate scales tawny, fading to white. — PALLESCÉNTES.

63. **C. palléscens**, L. *Fertile spikes 2-3, ovoid, densely flowered, approximate; perigynia obovoid-oblong, obscurely nerved*, about the length of the scale. — Var. *UNDULATA* has the lower bract indented at the base with transverse waved lines. (*C. undulata*, Kunze.) — Meadows, New England to W. New York. — Plant 8'-18' high, with slightly pubescent culm and leaves.

64. **C. conoidea**, Schk. *Staminate spike on a long stalk; fertile 2-3, oblong, closely flowered*, the lower distant; *perigynia oblong-conic, with impressed nerves*, slightly oblique at the summit, rather longer (or sometimes shorter) than the sharply pointed or awned scale; *bracts not exceeding the culm*. (*C. tetánica*, Schw. & Torr., not of Schk.) — Moist meadows, New England to Michigan.

65. **C. grisea**, Wahl. *Fertile spikes 3-5, oblong, loosely flowered*, remote, and the lowest distant; *perigynia ovoid-oblong*, rather longer than the ovate awned scale. (*C. laxiflora*, Schk., not of Lam.) — Var. *MÛTICA* has longer cylindrical spikes, short-awned scales, and the leaves and bracts pale-green and glaucous. (*C. laxiflora?* var. *mùtica*, Torr. & Gr. *C. flaccospërma*, Dew.) — Moist woods and meadows, not uncommon. The variety, with spikes 1' - 1½' long, in New Jersey (*Knieskern*) and in the South.

* * * *Uppermost spike more or less pistillate at the apex* (rarely all staminate); *pistillate spikes 3-5, oblong or cylindrical, loosely flowered, distant, all on exserted filiform, mostly drooping stalks*: bracts equalling or often exceeding the culm: *perigynia oblong*, with a short abrupt notched point (obsolete in No. 68), green and membranaceous at maturity: pistillate scales tawny or white. — GRACÍLLIMÆ.

66. **C. Davisii**, Schw. & Torr. *Fertile spikes oblong-cylindrical, rather thick; perigynia somewhat contracted at each end, scarcely longer than the conspicuously awned scale*. (*C. aristàta*, Dew., not of R. Br. *C. Torreyàna*, Dew.) — Wet meadows, Massachusetts to

Ohio. — Very like the next, but a taller and stouter plant, with thicker and longer spikes.

67. **C. formosa**, Dew. *Fertile spikes oblong, short, commonly with 2-3 barren flowers or empty scales at the base; perigynia somewhat contracted at each end, nearly twice as long as the pointed or cuspidate scale.* — Wet meadows, Massachusetts to W. New York.

68. **C. gracillima**, Schw. *Fertile spikes linear, slender; perigynia obtuse and slightly oblique at the orifice, longer than the oblong awned scale.* (*C. digitalis*, Schw. & Torr., not of Willd.) — Wet meadows, N. New England to Michigan. — When this species occurs with the uppermost spike altogether staminate, it much resembles No. 90; but is readily distinguished by the obtuse, beakless and sessile perigynium.

§ 3. *Perigynia without a beak, hairy* (in No. 70 becoming smooth at maturity), *slightly inflated*, bluntly 3-angled, obtuse, conspicuously nerved, with a minute abrupt straight point: bracts narrow, with very short or obsolete sheaths, the lowest exceeding the culm: pistillate scales tawny or white: *spikes 2-4, erect, the uppermost androgynous, pistillate at the apex and club-shaped; the rest all fertile.*
— VIRESCÉNTES.

69. **C. viréscens**, Muhl. *Spikes oblong or cylindrical, on short stalks; perigynia ovoid, nearly entire at the orifice, rather longer than the ovate awned scale; leaves and sheaths hairy.* (*C. costata*, Schw.) — Rocky woods and hill-sides, New England to Michigan. — Culms rough and slender, 1°-2° high, very numerous from the tufted roots: fertile spikes $\frac{1}{2}$ ' - 1' long.

70. **C. triceps**, Michx. *Spikes ovoid, nearly sessile, closely approximate; perigynia broadly obovoid, entire at the orifice, downy when young, smooth at maturity, rather longer than the pointed scale; sheaths very hairy, leaves more or less so.* (*C. hirsuta*, Willd. *C. viridula*, Schw. & Torr., not of Michx.) — Varies with the spikes rather longer and on stalks, and the leaves nearly smooth. (*C. hirsuta*, var. *pedunculata*, Schw. & Torr.) — Woods and meadows, New England to Michigan. — Culm 12' - 18' high, occurring in the South with the leaves nearly smooth except upon the sheaths. Spikes $\frac{1}{2}$ ' - $\frac{2}{3}$ ' long.

§ 4. *Perigynia without a beak, smooth, not inflated, 3-angled, regularly striate, terminating in a short entire rather obliquely-bent or recurved point, remaining green at maturity:* pistillate scales membranaceous, mostly with a rough point or awn, brown or spotted, fading to white: *staminate spike 1: pistillate spikes 2-5, few-flowered, more or less remote, the lowest often near the base of the culm.*

* Sterile spike club-shaped: *fertile spikes* (erect, the uppermost commonly near the base of the sterile) *all on stalks principally included* (except sometimes the lowest) *within sheathing bracts, shorter than the spikes, or not much exceeding them: perigynia ovoid-triquetrous,*

narrowed at each end: culms numerous, diffuse and at length quite prostrate: *leaves all radical, very broad, finely and closely nerved throughout, with 3 distinct ribs.* — PLANTAGÍNEÆ.

71. **C. plantagínea**, Lam. *Fertile spikes commonly 4, oblong, about 5-8-flowered; bracts very short, dark purple, or the lowest greenish at the apex. (C. latifolia, Schk.)* — Shady woods, mostly on hill-sides in rich soil, New England to Penn. and northward.

72. **C. Careyàna**, Dew. *Fertile spikes 2-3, ovoid or oblong, about 3-5-flowered, bracts green, the upper about equal to the spikes, the lower somewhat exceeding them; perigynia large (2-2½' in length); leaves dark green.* — In similar situations with the last, Auburn, and in Jefferson county, New York: also in Ohio.

73. **C. platyphýlla**, Carey. *Fertile spikes 3, filiform, loosely 3-4-flowered; bracts as in the last; perigynia small; culms slender; leaves pale or whitish-green.* — Found in similar situations with No. 71, and with the same range.

* * Sterile spike short, club-shaped, pedunculate: *fertile spikes 2-4, all on filiform exserted stalks, with long sheathing bracts resembling the leaves, the uppermost, as well as the leaves, exceeding the slender and at length prostrate culms: perigynia as in the last subsection.* — DIGITÀLES.

74. **C. retrocúrva**, Dew. *Fertile spikes ovoid or oblong, compactly 3-8-flowered, on long drooping stalks: leaves glaucous, 3-4 lines wide, with 3 prominent nerves.* — Copses and hill-sides, New England to W. New York. — Very closely approaching, and perhaps only a variety of, the next.

75. **C. digitàlis**, Willd. *Fertile spikes linear-oblong, loosely 6-9-flowered, on long stalks, the lowest sometimes drooping; leaves and bracts narrow, dark green; perigynia smaller than in the last. (C. oligocárpa, Schw. & Torr., not of Schk. C. Vanvléckii, Schw.)* — Copses and hill-sides, New England to Michigan. — A low species, 6'-12' high, growing in tufts, with numerous culms and long grassy leaves.

* * * Sterile spike short, linear; *fertile spikes 2-4, erect, the 1-2 uppermost commonly near the base of the sterile, on an included stalk, the rest on exserted stalks, with long sheathing bracts resembling the leaves, the uppermost exceeding the erect culm: perigynia with obtuse angles, about the length of the scale.* — OLIGOCÁRPÆ.

76. **C. ánceps**, Willd. *Fertile spikes slender, loosely flowered on a zigzag rachis; perigynia ovoid, narrowed at each end.* — Var. 1. STRIÁTULA has the *spikes oblong, more densely flowered, and the perigynia obovoid with a shorter point. (C. striátula, Michx. C. conoídea, Muhl., not of Schk. C. blánda, Dew.)* — Var. 2. PATULIFÒLIA, Dew., has the *radical leaves very broad (1'-1¼')*, many-nerved, with a rather longer point. (C. plantagínea, Schk., not of Lam.) — Open

woods and copses, common. — A very variable species, as to the breadth of the leaves and length of the spikes; the culms are usually flattened or 2-edged above. A further variety occurs with the broad leaves and slender spikes of var. 2, but having the obovoid shortly-pointed fruit of var. 1, differing in the latter respect from the plant figured as *C. plantaginea* by Schkuhr.

77. **C. oligocárpa**, Schk. Fertile spikes small, 3-8-flowered; the point of the perigynium slightly oblique, not recurved; style very short, thickened towards the base; leaves rough only on the edge, sheaths smooth. (*C. Sartwelliana*, Gay.) — Woods, W. New York to Ohio. — Culm slender, 8'-12' long, fertile spikes $\frac{1}{4}$ ' - $\frac{1}{2}$ ' in length. (Vide Gray, in *Sill. Jour.* 42, p. 14.)

78. **C. Hitchcockiana**, Dew. Fertile spikes very loosely 3-4-flowered; sheaths and upper side of the leaves roughly pubescent. — Woods, New England to N. and W. New York. — Culm 1°-2° high, stouter than the last, with very scabrous sheaths. The fruit is also larger (2½" long), but in other respects the plants are extremely similar.

§ 5. *Perigynia without a beak, smooth or downy, not inflated, obovoid-triangular, with a minute obliquely-bent white and membranaceous point, reddish-brown or olive-colored at maturity: bracts reduced to colored sheaths, or with a short green prolongation: leaves all radical, narrow or bristle-shaped.* — DIGITATÆ.

79. **C. ebúrnea**, Boott. Sterile spike solitary; the fertile 3-4, erect, about 5-flowered, approximated and elevated on long stalks above the staminate spike; the lowest sometimes a little remote; perigynia obscurely nerved, smooth and shining, rather longer than the broad and obtuse membranaceous whitish scale. (*C. álba*, var. *setifolia*, Dew. *C. paupércula*, Torr., not of Michx.) — Limestone rocks, N. New England to Michigan and northward. — A delicate species, 4'-10' high, with bristle-shaped leaves, forming dense tufts. The fertile spikes do not exceed 2'' - 3'' in length, and are about 1'' broad.

80. **C. pedunculâta**, Muhl. Spikes 3-5, commonly 4, the uppermost sterile with 2-3 fertile flowers at the base, the rest fertile with a few staminate flowers at the apex, all on long stalks, remote, 1-2 of the lowest near the base of the culm; sheaths with green tips much shorter than the stalks; perigynia with a long attenuated base and a minutely notched orifice, somewhat downy, especially on the angles, about the length of the broadly-obovate abruptly awned or pointed dark-purple scale. — Dry woods and rocky hill-sides, N. New England to Penn., not common. — Culms 4' - 10' high, prostrate at maturity, growing in tufts partly concealed by the very long and narrow grassy leaves.

§ 6. *Perigynia with a straight or slightly bent more or less abrupt beak, hairy, not inflated, terminating in a membranaceous notched or 2-*

toothed orifice : bracts short, either green and slightly sheathing or auriculate at the base, or small and resembling the scales : scales dark brown or purple with white margins, fading lighter or sometimes turning nearly white : staminate spike solitary ; the fertile 2-3, erect, nearly sessile. (*Culms mostly low and slender : leaves all radical, long and narrow.*) — MONTANÆ.

81. **C. umbellata**, Schk. *Culms very short ; staminate spike sometimes with a few pistillate flowers ; fertile spikes 4-5, ovoid, few-flowered ; the uppermost close to the sterile spike and sessile, the rest on stalks arising from the base of the stem and of about equal height, appearing somewhat like a small corymb nearly concealed by the long grassy leaves ; perigynia ovoid, 3-angled, with a rather long abrupt beak, about the length of the ovate pointed scale.* — Rocky hill-sides, New England to Penn. Growing in dense grassy tufts, with culms not exceeding 6', and oftener not above half that height.

82. **C. Novæ-Angliæ**, Schw. Sterile spike on a short stalk ; the fertile 2-3, ovoid, nearly sessile, 3-5-flowered, more or less distinct, the lowest with a green and bristle-shaped or colored and scale-like awned bract ; perigynia obovoid, 3-angled, attenuated at the base into a short stalk, minutely hairy, principally above, indistinctly nerved, with a somewhat elongated 2-toothed beak deeply cleft on the inner side, a little longer than the ovate pointed scale. (*C. collcta, Dew. C. varia, var. minor, Boott (including var. Emmonsii). C. lucorum, Kunze, not of Willd. ?*) — Var. **EMMONSII** has the fertile spikes 5-10-flowered, aggregated, the uppermost close to the base of the staminate ; or varying occasionally with the lowest on a long stalk near the base of the culm, concealed by the long grassy leaves. (*C. alpestris, Schw. & Torr., not of Allioni. C. Davisii, Dew., not of Schw. & Torr. C. Emmonsii, Dew.*) — Woody hills and mountains, N. New England to Michigan. — Grows in grassy tufts, with numerous very slender, often prostrate culms, varying from 4' - 15' in length. The var. is the prevailing form, but intermediate ones continually occur, differing in respect to the contiguity and size of the fertile spikes, and in the proximity of the uppermost to the base of the sterile one. The form of the perigynium varies with age ; the mature ones in Kunze's figure of *C. lucorum* have the elongated beak of *C. nigro-marginata*, Schw. (possibly the *C. lucorum* of Willd.), whilst the plant delineated is clearly *C. Novæ-Angliæ*.

83. **C. Pennsylvanica**, Lam. Sterile spike commonly on a short stalk ; fertile 1-3, usually 2, approximate, nearly sessile, ovoid, 4-6-flowered, the lowest commonly with a colored, scale-like, long-awned bract ; perigynia roundish-ovoid, with a short and abrupt minutely-toothed beak about the length of the ovate pointed chestnut-colored scale. (*C. marginata, Muhl.*) — Dry woods and hill-sides, New England to Michigan.

84. **C. varia**, Muhl. Sterile spike sessile; fertile 2-3, mostly 3, distinct, on very short stalks, ovoid, 6-10-flowered; the lowest, and sometimes the 2 lower, with green leaf-like bracts; perigynia obovoid, with an abrupt distinctly toothed beak about the length of the ovate pointed light-brown scale. (*C. Pennsylvànica*, var. *Muhlenbergii*, Gray, *Gram. & Cyp.*) — In similar situations with the last, which it closely resembles; but has wider, shorter, and more rigid glaucous leaves.

85. **C. præcox**, Jacq. Sterile spike club-shaped; fertile 2-3, oblong-ovoid, aggregated near the base of the sterile spike, sessile, or the lowest sometimes on a very short stalk, with a leaf-like bract scarcely exceeding the spike; perigynia ovoid-triangular, attenuated at the base, with a short beak and nearly entire orifice, about equal to the ovate pointed dark-brown scale; achenium obovoid with a prominent ring at the apex surrounding the base of the style. (*C. verna*, Villars, *Dew.*, not of Schk.) — Rocky hills, Salem and Ipswich, Massachusetts: introduced. Plant 3'-6' high, with short, rather rigid leaves.

86. **C. pubescens**, Muhl. Sterile spike usually sessile; fertile 3-4, oblong or cylindrical, loosely flowered, somewhat approximated, or the lowest a little remote, on a short stalk, with a narrow leaf-like bract about the height of the culm; fruit ovoid-triangular, downy, attenuated at the base, with an abrupt slender beak nearly entire at the orifice, a little longer than the ovate abruptly pointed white scale; culm and leaves clothed with soft hairs. — Moist woods and meadows, New England to Ohio. — Though related to the other species of this section, the present differs from them in its greater size and in aspect, and especially in the sharply angled perigynium.

§ 7. Perigynia slightly inflated, with a short beak, terminating in an entire or slightly notched orifice: staminate spike solitary, stalked (in No. 87 usually pistillate at the summit): culms tall and leafy. —

ANÓMALÆ.*

87. **C. miliàcea**, Muhl. Staminate spike commonly fertile at the summit; fertile spikes 3, cylindrical, rather slender, loosely flowered at the base, on filiform nodding stalks; bracts exceeding the culm, with short or nearly obsolete sheaths; perigynia ovoid-triangular, very smooth and thin, with an entire or very minutely notched orifice, longer than the ovate shortly-awned white scale. (*C. prasina*, Wahl.) — Rills and wet meadows, N. New England to Penn. and southward. — In aspect this species somewhat resembles the smaller short-awned forms of No. 49, with which it has points of affinity, though differing materially in the 3 stigmas and triangular fruit.

* The species here combined, merely to avoid the multiplication of small sections, do not constitute a natural group, but present certain points of affinity with several others.

88. **C. scabràta**, Schw. *Fertile spikes* 4–5, cylindrical, erect, rather distant, *densely flowered*, the lower on long stalks; *bracts without sheaths*, exceeding the culm; *perigynia ovoid*, contracted at the base, *prominently few-nerved, rough*, spreading at maturity, with an obliquely notched beak, longer than the ovate slightly ciliate brown scale; *culm, leaves, and bracts very rough*. — Wet meadows and swamps, New England to Michigan.

89. **C. Sullivantii**, Boott. *Fertile spikes* 3–5, commonly 4, *narrowly cylindrical*, erect, *loosely flowered*, the upper approximate, the lowest often remote, tapering towards the base and slightly compound, *all on rough stalks*; bracts sheathing, not exceeding the *hairy culm*; *perigynia elliptical, hairy*, slightly stalked, with an entire or notched orifice, a little longer than the ovate, *hairy-fringed, rough-awned, white scale*. — Woods, Columbus, Ohio, *Sullivant*. — About 2° high, with hairy leaves and bracts, and slender fertile spikes 1'–1½' long. Resembles the next, but is at once distinguished by the erect spikes, hairy, nerveless fruit, and hairy leaves.

§ 8. *Perigynia slightly inflated, 3-angled, smooth and shining, green, with a straight tapering beak* terminating in 2 small membranaceous teeth (nearly obsolete in No. 92): lower bracts green and sheathing: pistillate scales tawny, becoming white: staminate spike solitary, stalked: *pistillate spikes* 3–4, *loosely flowered, all on long and filiform nodding stalks*.

* *Fertile spikes long and slender, remote: perigynia few-nerved: bracts equalling or exceeding the culm*. — DÉBILES.

90. **C. arctàta**, Boott. *Fertile spikes few-flowered and narrowed towards the base; perigynia ovoid-elliptical, triangular, short-stalked, rather blunt at the base*, the beak very short, longer than the pointed scale. (*C. sylvatica*, Dew., not of Hudson. *C. Knieskérnii*, Dew.) — Woods and meadows, N. New England to W. New York.

91. **C. débilis**, Michx. Staminate spike occasionally fertile at the apex; *fertile spikes with loose alternate flowers, on a somewhat zig-zag rachis; perigynia oblong, tapering at each end*, twice as long as the ovate-lanceolate awned scale. (*C. tenuis*, Rudge. *C. flexuosa*, Muhl.) — Moist meadows, New England to Penn. and southwestward.

* * *Fertile spikes short: perigynia nerveless, or very obscurely nerved* in No. 93: bracts erect, shorter than the culm. — FLÉXILES.

92. **C. capillàris**, L. *Fertile spikes commonly 3, minute, with about 6 alternate flowers; perigynia oblong-ovoid, contracted at the base, tapering into a long slightly serrulate beak*, with an oblique nearly entire orifice, longer than the ovate scale. — Point de Tour, Lake Michigan, and alpine summits of the White Mountains, New Hampshire. — An extremely delicate species, 4'–6' high, with spikes ¼'–½' long, and a line or less in width.

93. **C. fléxilis**, Rudge. *Sterile spike short and club-shaped;*

fertile spikes oblong, or sometimes with a few staminate flowers at the base and becoming club-shaped; the upper bracts short and scale-like, the lower bristle-shaped, very slightly sheathing; perigynia ovoid, obscurely nerved, tapering into a beak about the length of the ovate *hairy-fringed scale*; leaves pale green and glaucous, and with the bracts fringed with delicate hairs. (*C. blepharóphora*, Gray.) — Moist, shady places, W. New York and northward.

§ 9. *Perigynia slightly inflated, obtusely 3-angled, nerved, smooth, tapering into a rather rough beak*, with 2 distinct membranaceous teeth (obscure in No. 97), *becoming tawny or yellow at maturity* (or in No. 94 more or less spotted with purple): achenium obovate-triquetrous, contracted at the base: staminate spike solitary, stalked (sessile in No. 97). — FLÀVÆ.

* *Perigynia erect: bracts with long sheaths, not exceeding the culm.*

94. **C. lævigàta**, Smith. *Fertile spikes 3, cylindrical, remote, on exserted nodding stalks*; perigynia ovoid, tapering into a 2-cleft beak, rather longer than the light-brown *pointed and arched scale*; culm smooth. (*C. binérvis*, Dew., not of Smith.) — Massachusetts (Tewksbury? *B. D. Greene*): probably introduced.

95. **C. fúlva**, Good. *Fertile spikes 2-3, oblong or ovoid, erect, remote, the lowest on an exserted stalk*; perigynia ovoid, not much exceeding the dark-brown *scarcely pointed awnless scale*; culm rough. (*C. Greeniàna*, Dew.) — Pond at Tewksbury, Massachusetts, *B. D. Greene*.

* * *Perigynia spreading or reflexed, longer than the scale: bracts with short sheaths, much exceeding the smooth culm.* (Staminate spike often pistillate at the apex, or towards the centre; fertile spikes erect.)

96. **C. flàva**, L. *Fertile spikes 2-4, roundish-ovoid, compactly flowered, the upper approximated, the lowest remote on a short exserted stalk; bracts spreading or reflexed; perigynia tapering from an ovoid contracted base into a narrow curved beak, widely spreading or reflexed at maturity.* — Wet meadows, New England to Michigan. — Whole plant of a yellowish hue, 6' - 15' high, with spikes $\frac{1}{2}$ ' to $\frac{3}{4}$ ' in length. Specimens, appearing to be merely small forms of this species, have been referred by Prof. Dewey to *C. lepidocárpa*, Tausch; but they by no means accord (nor does his character), either with the description, or with authentic specimens of Kunze.

97. **C. Ædèri**, Ehrh. *Sterile spike commonly sessile; fertile 2-4, oblong-ovoid, closely aggregated, or the lowest rather remote, on very short stalks, densely flowered, sometimes staminate at the apex; leaves and bracts rigidly erect; perigynia ovoid, with a short and rather abrupt minutely notched beak, spreading horizontally at maturity.* (*C. virídula*, Michx., not of Schw. & Torr. *C. irregularis*, Schw.) — Wet rocks, especially on limestone, New England to Ohio. — Resem-

bles the last; but the fertile spikes and perigynia are much smaller, and the beak of the latter is more abrupt, shorter, and straight.

§ 10. *Perigynia slightly inflated*, obtusely 3-angled, nerved, *rough or woolly*, with an abrupt straight beak: bracts leaf-like, with short sheaths: scales dark-purple or brown.

* *Perigynia of a thick or somewhat leathery texture, with 2 short and diverging membranaceous teeth: bracts much exceeding the nearly smooth culm: staminate spikes 2-3, the uppermost stalked, the lower short and sessile: fertile spikes 1-2, usually 2, erect, remote, sessile or on very short stalks.* — LANUGINOSÆ.

98. **C. filifórmis**, L. *Fertile spikes ovoid or oblong, the upper often staminate at the apex; perigynia ovoid, densely woolly, obscurely nerved, the orifice scarcely prolonged into a beak terminating in 2 slightly hairy teeth; leaves and bracts narrow and involute; culm very slender.* — Peat-bogs, N. New England to Michigan.

99. **C. lanuginòsa**, Michx. *Fertile spikes oblong or cylindrical; perigynia ovoid, roughly hairy, conspicuously nerved, with a short but distinct beak terminating in 2 very hairy sharp teeth; leaves and bracts flat.* (C. pellita, Muhl.) — Swamps and wet meadows, New England to Michigan. — Extremely like the last, from which it differs in the commonly longer fertile spikes, stouter culm, and flat leaves; but especially in the distinct flattish and hairy beak of the perigynium, with longer and sharper teeth. This species has often the fruit in a diseased state, when it becomes more inflated, of an orange color, and has an abortive achenium.

* * *Perigynia thin, downy, or roughly dotted, the beak terminating in a thin and scarious oblique orifice, either entire or slightly notched: bracts rigidly erect, shorter than the sharply triangular rough culm.* — SCARIOSE.

100. **C. vestita**, Willd. *Sterile spikes 1-2, the uppermost cylindrical, shortly stalked; fertile 1-2, approximate, sessile, ovoid or oblong, sometimes staminate at the apex; perigynia ovoid, downy, with a slightly oblique beak terminated by a thin membranaceous notched orifice, a little longer than the ovate pointed scale; leaves flat, shorter than the stout and rigid culm.* — Sandy soils, growing in tufts, New England to New York and southward, rather rare. — Resembling the 2 last in external appearance, but readily distinguished by the membranaceous beak of the fruit, which is red at the base and white and transparent at the orifice; and the style is twisted within the perigynium.

101. **C. Halseyàna**, Dew. *Sterile spikes 1-4, the uppermost on a long stalk; the lower short, often with a few fertile flowers at the base; fertile spike solitary, or rarely 2, remote, oblong-cylindrical, sometimes staminate at the apex, erect, on partly exerted*

stalks; *perigynia* oblong-ovoid, 8-10-nerved, very minutely roughened with granular dots, the slightly-bent beak tapering to the entire (reddish) orifice, longer than the ovate scarcely-pointed purple scale. (*C. polymórpha*, Muhl. in part. *C. striàta*, Torr. N. Y. St. Fl., not of Michx.)—Varies, with the fertile spikes filiform, and the flowers alternate and very distant on the rachis. — Upland meadows, W. New York, Rhode Island, and Massachusetts. — Culm rather slender, much taller (12'-18') than the rigid leaves. Though a somewhat variable plant, it is readily distinguished from the next, with which it has been confounded, by the characters here given, especially by the entire, membranaceous orifice of the fruit.

§ 11. *Perigynia* moderately inflated, conspicuously many-nerved, smooth (except No. 105), with a straight beak terminating in 2 rigid more or less spreading teeth: bracts long and leaf-like, with very short sheathing bases, much exceeding the culm (about equal to it in No. 102): staminate spikes 1-5.

* *Perigynia* with a very short thick beak, and short and thick slightly-spreading teeth. — LACÚSTRES.

102. **C. polymórpha**, Muhl. Sterile spikes 2-3, the uppermost stalked; fertile spikes 1-2, oblong, erect, remote, on very short stalks; *perigynia* ovoid, abruptly contracted into a slightly serrulate beak, longer than the pointed purple scale. — New Jersey and southward.

103. **C. lacústris**, Willd. Sterile spikes 2-5, the uppermost stalked; fertile spikes 2-3, oblong-cylindrical, stout, erect, remote, nearly sessile, or the lowest on a short stalk; *perigynia* oblong, but little exceeding the lanceolate awned scale; culm sharply triangular, rough; sheaths very short, smooth. (*C. ripària*, Muhl., not of Curtis.) — Swamps and borders of lakes and rivers, N. New England to Michigan. — A robust species, 3°-5° high, with leaves ¼'-¾' wide.

* * *Perigynia* with an elongated tapering beak, and long, widely-spreading or recurved, sharp and spine-like teeth. — ARISTÀTÆ.

+ Staminate spikes 2-5, one or more of them occasionally bearing a few fertile flowers.

104. **C. aristàta**, R. Brown. Fertile spikes 2-4, cylindrical, erect, remote, the lower on partly exerted short stalks; *perigynia* tapering from an ovoid base into a deeply 2-forked beak, longer than the ovate-lanceolate awned scale; culm smooth; sheaths and under surface of the leaves pubescent. (*C. atheròdes*, Spreng.) — Lake shores, N. New York to Michigan and northward. — Culm 2°-3° high: leaves 2''-3'' wide. Fertile spikes 2'-3' long, often rather loosely flowered towards the base.

105. **C. striàta**, Michx. Fertile spikes 2-3, oblong-cylindrical, erect, remote, one of them sometimes staminate at the apex, the lower on exerted stalks, rather loosely flowered towards the base; *perigy-*

nia very hairy, shaped as the last, longer than the ovate taper-pointed light-brown scale; culm sharply triangular, smooth except near the top, *sheaths and under surface of the leaves smooth*. (*C. trichocarpa*, Muhl.) — Marshes and lakes, New England to Michigan, northward.

→ → *Staminate spike solitary*, with a filiform bract, occasionally bearing a few fertile flowers towards the apex or base: fertile spikes 3–5, cylindrical, densely flowered, on long exserted at length drooping stalks: perigynia widely spreading, reflexed at maturity.

106. **C. comosa**, Boott. Fertile spikes large ($1\frac{3}{4}'$ – $2\frac{3}{4}'$ long and $\frac{1}{2}'$ – $\frac{3}{8}'$ wide), the lowest sometimes very remote; *perigynia tapering from a stalked ovoid-triangular base into a long deeply 2-forked beak, the sharp elongated teeth widely spreading* or somewhat recurved; scales lanceolate with a long bristle-shaped awn shorter than the mature fruit; culm rough and triquetrous. (*C. furcata*, Ell., not of Lapeyrouse. *C. Pseudo-Cyperus*, Schw. & Torr., Dew., &c., in part, not of L.) — Borders of lakes and streams, N. New England to Michigan. — A robust species 2°–3° high, formerly confounded with the next, which it greatly resembles, but differs from it especially in the larger fertile spikes, longer beak of the fruit, and the longer, smooth and widely-spreading teeth, giving to the spikes a comose or bristly appearance.

107. **C. Pseudo-Cypèrus**, L. Fertile spikes ($1\frac{1}{2}'$ – $2\frac{1}{4}'$ long, and about $\frac{3}{8}'$ wide) sometimes slightly compound at the base; *perigynia* shaped as the last, but *with a shorter beak, and shorter less spreading teeth*; scale like the last, about the length of the mature fruit. — Lakes and marshes, W. New York and northward. — Somewhat smaller than the last in all its parts.

§ 12. *Perigynia much inflated, conspicuously many-nerved, smooth, with a long tapering 2-toothed beak*: bracts leaf-like, much exceeding the culm: scales tawny or white: *staminate spike stalked, always solitary*. — LUPULINÆ.

* *Bracts with very short or obsolete sheaths.*

108. **C. hystriena**, Willd. Sterile spike often bearing a few fertile flowers at the base or apex; *fertile spikes 2–4, oblong-cylindrical, densely flowered, the uppermost on a very short stalk, the others on long stalks and at length nodding*, the lowest often very remote; perigynia spreading, tapering from an ovoid base into a long slender beak with sharp smooth teeth, longer than the awned scale. — Varies, with shorter ovoid spikes, the lowest very remote on a filiform stalk, 4'–6' long, with rather smaller perigynia not much longer than the awn. (*C. Coolèyi*, Dew.) — Wet meadows, New England to Michigan. — Plant pale or yellowish green, with fertile spikes $\frac{3}{4}'$ to $1\frac{1}{2}'$ long: closely approaching the last, from which it is distinguished by the more inflated, less diverging fruit, the beak longer and the teeth shorter; and from the next, which it also resembles, by the smaller

nodding spikes, many-nerved perigynium, and the longer and smooth teeth of the beak. The var. appears to be a depauperate (probably summer) form, differing in no essential character.

109. **C. tentaculàta**, Muhl. *Fertile spikes 2-3, ovoid, oblong, or cylindrical, densely flowered, approximate and diverging horizontally, the uppermost sessile, the lower on short exerted stalks; perigynia spreading, tapering from an ovoid few- (about 10-) nerved base into a long slender beak with short minutely serrulate teeth, much longer than the lanceolate awned scale. (C. rostràta, Muhl., not of Michx.)* — Wet meadows, very common.

110. **C. intumescens**, Rudge. *Fertile spikes 1-2, ovoid, loosely few- (5-8-) flowered, closely approximated, sessile, or the lower on a very shortly exerted peduncle; perigynia erect-spreading, tapering from an ovoid 15-20-nerved base into a long beak, slightly rough towards the apex. (C. folliculàta, Schk., Michx., not of L.)* — Wet meadows and swamps, very common. — Culm slender, about 18' high, with 1-3 fertile spikes crowded together so as to be scarcely distinguishable: perigynia 6-7 lines long.

111. **C. Gráyii**, Carey. *Fertile spikes 2 (sometimes single), globose, densely (25-30-) flowered, separate and distinct, on short exerted peduncles; perigynia spreading and deflexed, tapering from an ovoid 25-30-nerved base into a long smooth and shining beak.* — Low meadows on the banks of the Mohawk and Wood Creek, New York. Also Columbus, Ohio, *Sullivant*. — Culm robust, 3° high: perigynia $\frac{3}{4}$ ' in length. — Flowers a month later than the last.

* * *Bracts conspicuously sheathing.*

112. **C. folliculàta**, L. *Staminate spike small, short-stalked, or often sessile; fertile spikes 3-4, ovoid, very remote, the lower on exerted peduncles; perigynia erect-spreading, tapering from an oblong base, rather exceeding the ovate white long-awned scale. (C. xanthophÿsa, Wahl.)* — Peat-bogs, New England and southward. — A robust plant, 2°-4° high, of yellowish appearance, with long foliaceous bracts, and leaves $\frac{1}{2}$ ' wide.

113. **C. rostràta**, Michx. *Staminate spike small, nearly sessile; fertile spikes 1-3, commonly 2, roundish-ovoid, the lower rather distant on a short exerted peduncle; perigynia erect, or somewhat spreading, tapering from an oblong slightly inflated base into a long slender beak twice the length of the blunt light-brown scale. (C. xanthophÿsa, var. nàna and minor, Dew.)* — Mountains of N. New York, and White Mountains, New Hampshire. — Resembles the last in color and general appearance; but smaller in all its parts, rigidly erect, with narrow leaves.

114. **C. subulàta**, Michx. *Fertile spikes 3-5, very remote, on included peduncles loosely few- (4-8-) flowered, commonly with a*

few staminate flowers at the apex; *perigynia awl-shaped, strongly reflexed at maturity*; the orifice of the long slender *beak furnished with 2 sharp and rigidly deflexed teeth*. (*C. Collinsii*, Nutt. *C. Michauxii*, Dew.) — Cedar swamps, Long Island, New Jersey, and southward.

115. **C. lupulina**, Muhl. *Fertile spikes 2-3, oblong-ovoid, erect, the upper approximate, the lower on more or less exserted stalks; perigynia erect, tapering from the ovoid very inflated base into a conical slightly serrulate beak, much longer than the lanceolate awned scale*. — Var. *POLYSTACHYA*, Schw. & Torr., has 4-5 longer *cylindrical* fertile spikes, the lowest remote on a long peduncle; and the perigynia more distinctly serrulate on the angles of the beak. — Swamps and wet meadows, common — A coarse robust species, with very thick spikes 2'-3' in length; the leaves and long leafy bracts 3-4 lines wide, very rough on the margin.

§ 13. *Perigynia much inflated, obovoid or obconic, few-nerved, smooth, with an extremely abrupt and very long slightly roughened beak, terminated by 2 distinct rather short membranaceous teeth, tawny-brown or straw-colored at maturity, spreading horizontally, or the lower deflexed: bracts leaf-like, much exceeding the culm*. — SQUARRÒSÆ.

* *Spikes 1-3, mostly solitary, very rarely 4-5, all of them principally pistillate, with more or less staminate flowers at the base: sheaths of the upper bracts obsolete*.

116. **C. squarròsa**, L. *Fertile spikes ovoid or oblong, obtuse and very thick, rigidly erect on short stalks; perigynia longer than the lanceolate pointed scales, which are nearly concealed by the densely-crowded bases of the mature fruit*. (*C. typhina*, Michx.) — Low meadows and copses, New England to Michigan. — Remarkable for its densely-flowered thick spikes, about 1' long, to which the spreading beaks of the perigynia give a bristly appearance.

* * *Spikes 4-7, the terminal one entirely staminate, small and linear, or with more or less fertile flowers at the apex, the rest all pistillate: bracts very long, sheathing*.

117. **C. stenólepis**, Torr. *Fertile spikes cylindrical, obtuse, the upper approximated, nearly sessile on the zigzag stem, the lower remote on exserted stalks, all erect, very densely flowered; perigynia shorter than the long awn-like scales*. (*C. Fránkii*, Kunth. *C. Shórtii*, Steud., not of Torr.) — Marshes, Ohio and southwestward. — Resembling the last; but the spikes are narrower and more numerous, and of a still more bristly appearance from the projecting points of the scales. Occasionally the spikes are all fertile, the uppermost having no staminate flowers.

§ 14. *Perigynia much inflated, nerved (nerveless in No. 126), smooth and shining, becoming straw-colored at maturity, with a tapering*

more or less elongated 2-toothed beak: bracts leaf-like, with very short or obsolete sheaths (conspicuously sheathing in No. 118), much exceeding the culm (except No. 126): scales brown or tawny: *staminate spikes 2-3, stalked.* — VESICÀRIÆ.

118. **C. retrórsa**, Schw. Sterile spikes 1-3, the uppermost occasionally with a few fertile flowers, the rest more or less pistillate at the base; *fertile spikes 4-5, oblong-cylindrical, erect, the upper approximate and clustered*, on short or included stalks, *the lowest remote* on a long exerted stalk, and with one or more of the others often bearing 1-2 short branches at the base; *perigynia crowded, spreading and at length reflexed*, strongly (few-) nerved, tapering from an ovoid contracted base into a *conspicuously toothed beak much longer than the lanceolate scale.* (*C. reversa*, Spreng.) — Marshy borders of streams, N. England to Wisconsin. — Culm nearly smooth: leaves and bracts 3''-4'' wide, much exceeding the spikes, which are 1'-1½' long.

119. **C. Schweinítzii**, Dew. Sterile spikes commonly 2, the lower often pistillate at the base; *fertile spikes 3-4, cylindrical, somewhat drooping, densely flowered, often staminate at the apex*, and occasionally the lower rather compound at the base, on smooth nearly included stalks; *perigynia erect, oblong-ovoid, few-nerved, tapering into a long and smooth short-toothed beak, a little longer than the lanceolate long-awned scale.* — Wet swamps, N. New England to New Jersey. — Culm 10'-15' high, smooth: bracts and leaves 2''-3'' wide, smooth except on the margin, much exceeding the culm: fertile spikes 1½' to 2½' long, rather narrow, and with the whole plant turning straw-color.

120. **C. vesicària**, L. Staminate spikes 2-3; *fertile spikes mostly 2, rarely 3 or solitary, oblong or cylindrical, stout, approximate*, the upper sessile, the lower on a short rough stalk; *perigynia oblong-ovoid, 17-nerved at base, 10-nerved above*, with a short tapering beak longer and broader than the pointed or long-tapering *unawned scale*; culm sharply angled and rough; leaves and bracts green, equalling or rather longer than the culm. — Arctic America, and probably in N. New England. — Distinguished from the next by the shorter fertile spikes, on rough stalks, and by the more oblong perigynium, many-nerved at the base.

121. **C. monile**, Tuckerman. Staminate spikes 3, rarely 2 or 4; *fertile spikes mostly 2, rarely 3 or solitary, long-cylindrical, remote, on smooth stalks*, the lowest often nodding and *loosely flowered*; *perigynia roundish-ovoid, about 10-nerved*, with a short tapering beak terminating in an oblique orifice, much longer and broader than the taper-pointed *awnless scale*; *culm slender, sharply angled and rough*; leaves and bracts green, longer than the culm. (*C. bullàta*, var. *cylindràcea*, Dew., and *C. vesicària*, var. *cylindràcea*, Dew.) — Bogs, New England and Ohio. — Less robust than the last.

122. **C. ampullacea**, Good. Staminate and fertile *spikes* 2-3, most frequently 2 of each, oblong or long-cylindrical, remote, sessile, or the lower on short and smooth sometimes nodding stalks, the lowest loosely flowered at the base; *perigynia* roundish-ovoid, about 17-nerved at the base and 10-nerved at the apex, abruptly contracted into a short cylindrical beak; *scales* lanceolate, awnless, or the upper with a rough awn shorter than the *perigynium*; culm slender, obtusely angled, smooth; leaves and bracts glaucous, often involute, longer than the culm. — Var. **UTRICULATA**. Staminate spikes 3-4; fertile usually 3; *perigynia* oblong-elliptical, tapering; *scales* lanceolate, tapering, terminated (especially the lowest) by a long rough awn; culm stout, spongy at the base, smooth or rough towards the summit; leaves and bracts glaucous, wide and much longer than the culm. (*C. utriculata*, *Boott.*) — Common northward, and from Arctic America to the Pacific. — Differs from the 2 last in the smooth obtuse-angled culm, glaucous leaves, and particularly by the awned scale. The var. is the prevailing form in the United States, and is a larger and stouter plant; but the characters derived from the more elliptical fruit, and awned lower scale, do not appear sufficiently constant to separate it from *C. ampullacea*, into which it insensibly passes, as Dr. Boott has himself remarked in his elaborate exposition of this and the allied species.

123. **C. cylindrica**, Schw. Staminate spikes about 2; fertile spikes 2-3, commonly 3, oblong or cylindrical, stout, somewhat approximate, on rough stalks, the lowest often nodding; *perigynia* thin and transparent, much inflated, oblong-ovoid, obliquely erect, tapering into a rather abrupt long-cylindrical smooth beak, much longer and broader than the ovate pointed or rough-awned scale; bracts very long and, like the narrow leaves, rough and exceeding the rough culm. (*C. bullata* of American authors generally, not of *Schk.* *C. Tuckermáni*, *Dew.*, *Boott.*) — Swamps, W. New York and westward. — Differs from the next principally in the more numerous and longer fertile spikes, larger, more inflated and membranaceous ascending fruit, with smooth beaks.

124. **C. bullata**, Schk. Staminate spikes 2-3; fertile spikes 1-2, most frequently 1, approximated, oblong or cylindrical, stout, sessile or on short smooth stalks; *perigynia* spreading, ovoid, tapering into a long-cylindrical rough beak, much wider and longer than the obtusely-pointed lanceolate awnless scale; bracts and leaves narrow, about the length of the smooth or roughish culm. (*C. cylindrica*, *Tuckerman*, *Torr. N. Y. St. Fl.* (excl. syn.), not of *Schw.*) — Wet meadows, New England, New York, and Penn. — Well distinguished from the last by the short and stout, commonly solitary fertile spike, which has a squarrose appearance at maturity from the widely-spreading fruit, of which the beak is minutely, but distinctly, serrulate.

125. **C. oligospérma**, Michx. Staminate spikes 1-2, slender; *fertile spikes* 1-2, *short, ovoid, few-flowered*, the lower on a very short stalk; perigynia ovoid, tapering into a short minutely-toothed beak, not much longer than the ovate awnless scale; culm very slender; *leaves and bracts linear, at length involute*. (C. Oakesiàna, Dew.) — Borders of lakes and ponds, especially on mountains, New England to Michigan northward.

126. **C. longiróstris**, Torr. Sterile spikes usually 3, at the summit of a long slender stalk; the lower often with a few fertile flowers; *fertile spikes* 2-3, *cylindrical, more or less distant, on long filiform at length drooping stalks; loosely flowered; perigynia globose-ovoid, smooth and shining, with an abrupt very long and narrow beak, rough on the margin, oblique and 2-cleft at the membranaceous orifice, a little longer than the lanceolate light-colored or white scale*. (C. Sprengèlii, Dew.) — Shady rocks, N. New England to Michigan. — Though agreeing with the species of this section in the numerous staminate spikes and the long-beaked fruit, this plant is perhaps as nearly allied to No. 93.

ORDER 129. GRAMINEÆ. (GRASS FAMILY.)

Grasses, with usually hollow stems (culms) closed at the joints, alternate 2-ranked leaves, their sheaths split or open on the side opposite the blade; the hypogynous flowers imbricated with 2-ranked glumes or bracts: the outer pair (glumes proper, calyx, L.) subtending the spikelet of one or several flowers; the inner pair (paleæ; outer perianth, R. Br.) inclosing each particular flower, which is usually furnished with 2 or 3 minute hypogynous scales (squamulæ, Juss.; corolla, Micheli, lodiculæ, Beauv.). Stamens 1-6, commonly 3: anthers versatile, 2-celled, the cells distinct. Styles mostly 2 or 2-parted: stigmas hairy or feathery. Ovary 1-celled, 1-ovuled, forming a seed-like grain (caryopsis) in fruit. Embryo at the base and on the outside of the floury albumen. — Roots fibrous. Sheath of the leaves usually more or less extended above the base of the blade into a scarios appendage (ligule). Spikelets panicled or spiked. Inner (and upper) palea usually 2-nerved, and inferred to consist of 2 united.

Synopsis.

I. POACEÆ, R. Br. (Homoclinae, Nees.) Spikelets 1 – many-flowered, homogamous; the flowers all alike and perfect, or the *uppermost* abortive or rudimentary.

Tribe 1. ORYZEÆ.— Spikelets 1-flowered; the flowers often monœcious, in branched panicles. Glumes frequently wanting! Inner palea 3-nerved! Squamulæ 2. Stamens 1–6.

1. LEERSIA. Flowers perfect, flattened, awnless. Glumes none.
2. ZIZANIA. Flowers monœcious, awned. Glumes obsolete or none.

Tribe 2. AGROSTIDEÆ.— Spikelets 1-flowered, perfect, sometimes with the abortive pedicel or rudiment of a second flower above, paniced, or the panicle sometimes contracted into a dense cylindrical spike or head. Stamens no more than 3.

* (PHLEOIDEÆ.) Glumes equal, strongly keeled, boat-shaped and membranaceo-herbaceous, as well as the paleæ. Squamulæ 2. Grain free. Inflorescence densely spiked.

3. ALOPECURUS. Glumes united at the base. Lower palea awned on the back, the upper one wanting.

4. PHLEUM. Glumes distinct. Paleæ 2, the lower truncate.

* * (TRUE AGROSTIDEÆ.) Glumes equal, or often unequal, concave or keeled, membranaceous. Paleæ membranaceous or nearly so. Squamulæ 2. Grain free. Inflorescence paniced, open, or often contracted, but not strictly spiked.

+ Glumes and paleæ neither awned, bristle-bearing, nor mucronate, naked. Flower sessile in the glumes, naked at the base: lower palea 1-nerved. Fruit deciduous.

5. VILFA. Seed adherent to the closely investing pericarp, forming a caryopsis, or true grain, as in most Grasses. Panicle spiked.

6. SPOROBOLUS. Seed loose in the obovoid or globular pericarp (utricle). Panicle spiked or diffuse.

+ + Glumes or the (3–5-nerved) lower palea awned, bristle-pointed, or mucronate (except in some sp. of *Agrostis*). Flower raised on a more or less evident stalk (callus) in the glumes, naked, or barely hairy, at the base.

7. AGROSTIS. Glumes equal, or the lower rather longer, pointless, exceeding the very thin blunt paleæ. Lower palea pointless, commonly awned on the back; the upper sometimes wanting. Panicle open.

8. CINNA. Glumes acute, the lower somewhat smaller, shorter than the paleæ and similar in shape. Paleæ raised on a distinct naked stalk, smooth and beardless; the lower short-awned below the tip. Stamen 1. Upper palea 1-nerved!

9. *MUHLENBERGIA*. Lower glume smaller. Paleæ chiefly hairy-bearded at the base, the tip of the lower one mucronate-pointed or produced into a slender bristle or awn. Stamens 3.
10. *BRACHYELYTRUM*. Lower glume nearly obsolete, the upper minute. Lower palea long-awned from the tip; the upper grooved on the back and bearing a long and slender naked pedicel of an abortive second flower. Stamens 2.
- + + + Glumes and paleæ not bristle-pointed. Flower surrounded by a conspicuous tuft of downy hairs at the base.
11. *CALAMAGROSTIS*. Lower palea mostly awned on the back.
- * * * (*STIPEÆ*.) Paleæ coriaceous, or indurated in fruit, commonly shorter than the membranaceous glumes, on an obconical rigid callus; the lower involute, closely inclosing the upper and the grain, 1-3-awned at the apex. Squamulæ mostly 3. Inflorescence racemose or paniced: spikelets usually large.
12. *ORYZOPSIS*. Awn simple, jointed with the tip of the elliptical lower palea, deciduous, not twisted.
13. *STIPA*. Awn simple, twisted near the base: paleæ cylindrical.
14. *ARISTIDA*. Awn triple. Upper palea very short.

* * * Nos. 50-52, though awnless, would apparently belong here.

Tribe 3. *CHLORÍDEÆ*. — Spikelets (rarely 1-flowered, usually several-flowered, with the upper flowers imperfect, disposed in one-sided spikes! Glumes persistent, the upper one looking outward. Rachis (axis) jointless. Spikes usually racemed or digitate. Stamens 2 or 3.

* Spikelets strictly 1-flowered.

15. *SPARTINA*. Spikelets imbricated, 2-ranked, flat: spikes alternate.
- * * Spikelets $1\frac{1}{2}$ -flowered, viz., with one perfect and one imperfect neutral flower.
16. *BOUTELOUA*. Lower palea 3-pointed or 3-awned at the apex.
17. *GYMNOPOGON*. Lower palea and the rudiment 1-awned.
18. *CYNODON*. Flower and rudiment awnless: spikes slender, digitate.
- * * * Spikelets several-flowered. (Pericarp more or less loose.)
19. *ELEUSINE*. Spikes digitate: spikelets imbricate-crowded, awnless.
20. *LEPTOCHLOA*. Spikes racemed, slender. Lower palea pointless or awned.

Tribe 4. *FESTUCÍNEÆ*. Spikelets several- (few-many-) flowered, paniced; the uppermost flower often imperfect or abortive. Paleæ pointless, or the lower sometimes tipped with a straight (not twisted nor deeply dorsal) awn or bristle. Stamens 1-3. Squamulæ 2.

* Paleæ free from the smooth grain. (Lower flowers perfect.)

+ Lower palea 2-3-cleft and pointed, or awned at the apex.

21. **TRICUSPIS.** Spikelets 3-many-flowered. Lower palea strongly hairy-fringed on the 3 nerves (the lateral nerves marginal or nearly so), 1-3-awned or pointed between the clefts or teeth.
 -- Lower palea 1-pointed or mucronate.
22. **DIARRHENA.** Glumes and rigid-pointed lower palea coriaceous, convex-boat-shaped. Stamens 2. Pericarp cartilaginous, large: seed loose. Panicle loosely few-flowered.
23. **DACTYLIS.** Lower glume and lower palea awn-pointed, herbaceous, compressed-keeled, bristly-fringed on the keel. Panicle contracted in one-sided clusters.
24. **KÆLERIA.** Glumes and lower palea membranaceous, keeled, acute, or the latter more or less bristle-pointed. Panicle contracted, spike-like.
 --- Lower palea pointless (except one *Glyceria*).
 ++ Glumes very dissimilar, 2- (or 1-3-) flowered.
25. **REBOULEA.** Lower glume linear: upper one obovate, rather shorter than the flowers.
 ++ Glumes nearly similar, although often unequal, 3-many-flowered: lower palea rounded or convex on the back, not keeled.
26. **MELICA.** Lower palea many-nerved, flattish-convex, hardening on the loose grain. Flowers at most 5; the 2 or 3 upper much smaller, sterile, involving each other.
27. **BRIZA.** Lower palea faintly many-nerved, heart-shaped, flattened (as also the grain) parallel with the glumes, ventricose-rounded on the back; the upper very much smaller, flat.
28. **GLYCERIA.** Lower palea strongly 7-nerved, ovate or oblong, rounded or involute, the upper frequently as long. Flowers early and separately deciduous by the breaking up of the rachis into joints.
29. **SCLEROCILOA.** Lower palea faintly 5-nerved, obtuse: otherwise very much as in No. 28.
30. **BRIZOPYRUM.** Lower palea faintly striate with many (9 or more) nerves, rather coriaceous, laterally compressed, acute. Spikelets flat, spiked.
 ++ ++ Glumes much alike, 2-many-flowered: lower palea compressed-keeled: panicle usually loose or open.
31. **POA.** Lower palea 5-nerved; the upper deciduous at maturity with it. Spikelets 2-6-flowered.
32. **ERAGROSTIS.** Lower palea 3-nerved; the upper persistent on the rachis for some time after the rest of the flower has fallen. Spikelets 2-70-flowered.
- * * Grain adherent to the upper palea, downy or hairy at the apex: lower palea membranaceous-chartaceous or coriaceous.
33. **FESTUCA.** Lower palea acute, pointed, or bristle-bearing from the entire apex: lateral nerves obscure.

34. **BROMUS.** Lower palea convex or somewhat keeled, awned or pointed below the 2-toothed tip or in the cleft.
 * * * Grain free, smooth: lowest flowers of the spikelet imperfect!
35. **UNIOLA.** Spikelets very flat. Flowers strongly compressed and keeled, coriaceous, the lowest of a single empty palea. (Stamen 1.)
36. **PHRAGMITES.** Spikelets strongly silky-bearded on the rachis. Flowers membranaceous, the lowest neutral or monandrous.

Tribe 5. **HORDEÍNEÆ.** — Spikelets several- (rarely 1-) flowered, sessile on opposite sides of a zigzag channelled and toothed sometimes jointed rachis, forming a solitary spike. Glumes horizontal, often side by side in the same plane, sometimes deficient. — Otherwise as in Tribe 4.

- * Spikelets single at each joint of the rachis, several-flowered.
37. **TRITICUM.** Spikelets parallel with the rachis: glumes transverse.
38. **LOLIUM.** Spikelets edgewise on the rachis: glume 1, external.
 * * Spikelets 2-4 at each joint: glumes side by side, or none.
39. **ELYMUS.** Spikelets 2-7-flowered; all fertile.
40. **HORDEUM.** Spikelets 1-flowered and a stalk-like rudiment, 3 at each joint; the lateral commonly imperfect.

Tribe 6. **AVÈNEÆ.** — Spikelets 2- several-flowered, paniced, the terminal flower mostly imperfect. Glumes and paleæ thin and membranaceous or chartaceous; the lower palea bearing a twisted or bent awn on the back. Stamens 3. Squamulæ 2.

- * Lower palea 3-5-nerved, thin or membranaceous.
41. **AIRA.** Flowers 2: awn below the middle of the rounded back.
42. **TRISETUM.** Flowers 2-several: lower palea compressed-keeled, awned above the middle or near the 2-pointed apex.
 * * Lower palea 7-many-nerved, firmer in texture.
43. **DANTHONIA.** Awn, or bristle-point, between the 2 teeth of the lower palea, composed of 3 confluent nerves.
44. **AVENA.** Awn from the back, formed of the mid-nerve only.

II. **PHALARÍDEÆ,** Trin. (not of *Kunth.*) Spikelets 3-flowered, the *middle flower* only perfect; either the *two lower* or lateral flowers staminate, or neutral and often abortive, or the *lower and the terminal one* imperfect (in *Holcus* the former usually obsolete). Flowers paniced.

- * Intermediate flower perfect.
45. **ARRENATHERUM.** Lower flower staminate and like the fertile 3-androus, awned on the back below the middle; the terminal one rudimentary.

46. *HOLCUS*. Lower flower a small neutral palea, often obsolete; the perfect one 3-androus and awnless; the terminal 3-androus, with the lower palea awned above the middle.

* * Terminal flower perfect and awnless.

47. *HIEROCHLOA*. Lateral flowers each of 2 paleæ, mostly awned, 3-androus; the perfect one 2-androus.

48. *ANTHOXANTHUM*. Lateral flowers each of one awned palea, neutral; the perfect one 2-androus. Panicle spiked-contracted.

49. *PHALARIS*. Lateral flowers each of one neutral and awnless rudiment; the perfect one 3-androus.

III. *PANÍCEÆ*, R. Brown. — Spikelets 2-flowered, the lower flower always imperfect, either staminate or neutral, when it is usually reduced to a single empty valve (placed next the lower glume, if that be present); the upper flower (placed next the upper or inner glume) only fertile. Grain grooved on the outer side! (next the lower valve of the fertile flower), if at all; the embryo at the bottom of the groove. (Flowers polygamous, or hemigamous (when the lower flower is neutral), or sometimes seemingly simple and perfect, from the suppression of the lower glume and of the upper palea of the neutral flower, or else monœcious, or rarely dicœcious. Rarely both glumes are wanting.)

Tribe 7. *PANÍCEÆ* proper. — Glumes and sterile paleæ herbaceous or membranaceous: paleæ of the fertile flower of firmer texture, coriaceous or chartaceous, awnless, not keeled, flattened parallel with the glumes.

* Spikelets appearing as if simply 1-flowered from the suppression of the lower glume; the single neutral palea of the sterile flower apparently occupying its place. (Awnless.)

50. *MILIUM*. Spikelets not jointed with their pedicels, all alike in a terminal open panicle.

51. *AMPHICARPUM*. Spikelets jointed with their pedicels, of 2 sorts; one in a terminal panicle; the other on radical peduncles.

52. *PASPALUM*. Spikelets jointed with their short pedicels, all alike, plano-convex, in one-sided spikes or spiked racemes.

* * Spikelets manifestly $1\frac{1}{2}$ -2-flowered (polygamous, the lower staminate or often neutral), the lower glume being present.

53. *PANICUM*. Spikelets not involucrate, naked. Lower glume small or minute. Sterile flower staminate or neutral.

54. **SETARIA.** Spikelets spiked-panicled, the peduncles bearing lateral bristles: otherwise as No. 53.

55. **CENCHRUS.** Spikelets inclosed 1-5 together in a hard and spiny globular involucre, like a burr.

Tribe 8. **SACCHÀREÆ.** — Fertile paleæ membranaceous or scarios, always of thinner and more delicate texture than the (often indurated) glumes, frequently awned from the tip. Spikelets usually in pairs or threes, panicled or spiked, some of them entirely sterile (heterogamous).

* Spikelets monœcious, imbedded in the separable joints of the spike.

56. **TRIPSACUM.** Staminate spikelets above, in pairs at each joint: pistillate single in each joint: glumes indurated.

* * Fertile spikelets with one perfect and one sterile (staminate or mostly neutral) flower: lower palea of the perf. fl. awned.

57. **ERIANTHUS.** Both spikelets at each joint of the rachis alike fertile, involucrate with a silky tuft: otherwise as No. 58.

58. **ANDROPOGON.** Spikelets 2 at each joint of the plumose-hairy spikes, one of them sessile and fertile; the other pedicelled and sterile or rudimentary.

59. **SORGHUM.** Spikelets in open panicles, 2-3 together, the lateral ones sterile or reduced to mere pedicels.

1. **LEÉRSIA**, Solander. FALSE RICE. WHITE GRASS.

Spikelets 1-flowered, perfect, flat, disposed in one sided panicled racemes, jointed with the short pedicels. Glumes wanting. Paleæ chartaceous, compressed-boat-shaped, awnless, bristly-ciliate on the keels, closed, nearly equal in length, but the lower much broader, inclosing the flat grain. Stamens 1-6. Stigmas feathery, the hairs branching. — Perennial marsh grasses: the flat leaves, sheaths, &c., rough upwards, being clothed with very minute hooked prickles. (Named after *Leers*, a German botanist.)

1. **L. oryzoides**, Swartz. (RICE CUT-GRASS.) *Panicle diffusely branched*, often sheathed at the base; *flowers 3-androus*, elliptical; paleæ strongly bristly-ciliate (whitish). — Wet places, common.

2. **L. Virginica**, Willd. (WHITE GRASS.) *Panicle simple; the flowers closely appressed* and somewhat imbricated on the slender branches around which they are partly curved, oblong, 2-androus (a third stamen imperfect or wanting); paleæ sparingly ciliate (greenish-white, $1\frac{1}{2}$ " long, smaller than in the last). — Wet woods, &c. Aug.

2. **ZIZÁNIA**, Gronov. WATER OR INDIAN RICE.

Flowers monœcious, the staminate and pistillate in 1-flowered

spikelets in the same panicle. Glumes wanting, or rudimentary and forming a little cup. Paleæ herbaceo-membranaceous, convex, awnless in the sterile, the lower tipped with a straight awn in the fertile, flowers. Stamens 6. Stigmas pencil-form. Large and often reed-like water-grasses. Spikelets jointed with the club-shaped pedicels, very deciduous. (Adopted from Ζιζάνιον, the ancient name of some wild grain.)

1. **Z. aquática**, L. (INDIAN RICE. WATER OATS.) *Lower branches of the ample pyramidal panicle staminate, spreading; the upper erect, pistillate; pedicels strongly club-shaped; lower palea long-awned, rough; styles distinct; grain linear, slender.* ①? (*Z. clavulosa*, Michx.)—Swampy borders of streams and in shallow water, common, especially westward. Aug.—Culms 3°–9° high. Leaves flat, 2°–3° long, linear-lanceolate. Grain ½' long; gathered largely for food by the Northwestern Indians.

2. **Z. miliacea**, Michx. Panicle diffuse, ample, the *staminate and pistillate flowers intermixed; awns short; styles united; grain ovate.* †—Penn.? Ohio, and southward. Aug.—Leaves involute.

Z. FLÛITANS, Michx., a Southern plant, was erroneously said to come from Lake Champlain, as the Michauxian herbarium shows, in which that locality is recorded for *Z. clavulosa* alone.

3. **ALOPECÛRUS**, L. FOXTAIL GRASS.

Spikelets 1-flowered. Glumes boat-shaped, strongly compressed-keeled, nearly equal, united at the base, equalling or exceeding the lower palea, which is awned on the back below the middle: upper palea wanting! Stamens 3. Styles mostly united. Stigmas long and feathered.—Panicle contracted into a cylindrical soft spike. (Name from ἀλώπηξ, *fox*, and οὐρά, *tail*, the popular appellation, from the shape of the spike.)

1. **A. pratensis**, L. (MEADOW FOXTAIL.) Culm upright, smooth (2° high); *palea equalling the acute glumes, which are united below the middle; awn exerted more than half its length, twisted; upper leaf half the length of its somewhat inflated sheath.* †—Introduced, common in meadows and pastures of New England. May.

2. **A. geniculatus**, L. (FLOATING FOXTAIL.) Culm ascending, bent at the lower joints; *palea rather shorter than the obtuse glumes, the awn from near its base and projecting half its length beyond it; anthers linear; upper leaf as long as its sheath.* †—Moist meadows, rare, introduced? July, August.

3. **A. aristulatus**, Michx. (WILD WATER-FOXTAIL.) Glau-

cous; culm decumbent below, at length bent and ascending; *palea* rather longer than the obtuse glumes, scarcely exceeded by the awn which rises from just below its middle; anthers oblong. ♃ (*A. subaristatus*, *Pers.*)—In water and wet meadows, common. June—August. Spike more slender and paler than in No. 2.

4. PHLËUM, L. CAT'S-TAIL GRASS.

Paleæ both present, shorter than the mucronate or awned glumes; the lower truncate and usually awnless; the upper 2-keeled. Styles distinct. Otherwise much as in *Alopecurus*.—Spike very dense, harsh. (An ancient Greek name, probably of the Cat-tail.)

1. **P. pratense**, L. (TIMOTHY. HERD'S-GRASS in New England and New York.) Spike cylindrical, elongated; glumes ciliate on the back, truncate, tipped with a bristle less than half their length. ♃—Meadows, &c., naturalized; esteemed very valuable for hay. Anthers purplish.

2. **P. alpinum**, L. Spike ovate-oblong; glumes strongly ciliate-fringed on the back, truncate, tipped with a rough or barbed awn-like bristle about their own length. ♃—Summits of the White Mountains, New Hampshire.

5. VILFA, Adans., Beauv. RUSH-GRASS.

Spikelets 1-flowered, in a contracted or spiked panicle. Glumes 1-nerved or nerveless, not awned or pointed, the lower smaller. Flower nearly sessile in the glumes. Paleæ 2, much alike, of the same texture as the glumes (membranaceo-chartaceous) and usually longer than they, naked, neither awned nor mucronate; the lower 1-nerved (rarely somewhat 3-nerved). Stamens chiefly 3. Stigmas simply feathery. Grain (caryopsis) oblong or cylindrical, deciduous.—Culms wiry or rigid. Leaves involute, usually bearded at the throat; their sheaths often inclosing the lateral panicles.

1. **V. áspera**, Beauv. Root perennial; culms tufted (2°–4° high); lowest leaves very long, rigid, rough on the edges, tapering to a long involute and thread-like point; the upper short, involute; sheaths partly inclosing the contracted panicle; *palea* much longer than the unequal glumes; grain oval or oblong. (*Agróstis áspera*, *Michx.* *A. clandestina* and *A. involuta*, *Muhl.* *A. longifolia*, *Torr.*) Sandy fields and dry hills, not rare. Sept.—Spikelets 2''–3'' long. Paleæ rough above, smooth or hairy below, of greatly varying propor-

tions; the upper one tapering upwards, acute, and one half to twice longer than the lower, or else obtuse and equalled or even considerably exceeded by the lower!

2. **V. vaginæflora**, Torr. *Root annual; culms slender (6' - 12' high), ascending; leaves involute-awl-shaped (1' - 4' long); panicles simple and spiked, the lateral and often the terminal concealed in the sheaths; paleæ somewhat equal, about the length of the nearly equal glumes; only one third longer than the linear grain. (Agrostis Virgínica, Muhl., not of L.)* — Barren and sandy dry fields, New England to Ohio, common southward. September.

6. SPORÓBOLUS, R. BROWN. DROP-SEED GRASS.

Spikelets 1- (rarely 2-) flowered, in a contracted or open panicle. Flowers nearly as in *Vilfa*; the paleæ longer than the unequal glumes. Stamens 2 - 3. Grain a globular utricle (hyaline or rarely coriaceous), containing a loose seed, deciduous (whence the name, from *σπορά*, *seed*, and *βάλλω*, *to cast forth*).

* *Glumes very unequal: panicle pyramidal, open.*

1. **S. júnceus**, Kunth. *Leaves involute, narrow, rigid, the lowest elongated; culm (1° - 2° high) naked above, bearing a narrow loose panicle; glumes ovate, rather obtuse, the lower one half as long as, the upper equalling, the nearly equal paleæ.* † (*Agrostis juncea, Michx. Vilfa juncea, Trin.*) — Dry soil, Penn. and southward. Aug. — Spikelets 1" - 2" long, shining.

2. **S. heterólepis**. *Leaves involute-thread-form, rigid, the lowest as long as the culm (1° - 2°), which is naked above; panicle very loose; glumes very unequal; the lower awl-shaped (or bristle-pointed from a broad base) and somewhat shorter, the upper ovate-oblong and taper-pointed and longer, than the equal paleæ.* † (*Vilfa heterolepis, Gray.*) — Dry soil, New Haven, Connecticut; Watertown, New York; and Columbus, Ohio. Aug. — Plant exhaling an unpleasant scent (*Sullivant*), stouter than the last, the spikelets thrice larger. Utricle spherical (1" in diameter), shining, thick and coriaceous!

3. **S. cryptándrus**. *Leaves flat, pale (2" wide); the pyramidal panicle bursting from the upper sheath which usually incloses its base, its spreading branches hairy in the axils; upper glume lanceolate, acute, twice the length of the lower one, as long as the nearly equal paleæ; sheaths strongly bearded at the throat.* † (*Agr. and Vilfa cryptandra, Torr.*) — Sandy soil, Buffalo, New York, and westward. Ipswich, Massachusetts, *Oakes*. Aug. — Culm 2° - 3° high. Panicle lead-color: spikelets small.

* * *Glumes almost equal, shorter than the broad paleæ: panicle racemose-elongated, open, the pedicels capillary: sheaths naked at the throat: spikelets not unfrequently 2-flowered. (Colpodium?)*

4. **S. compréssus**, Kunth. Very smooth, leafy to the top; culms tufted, stout, very flat; sheaths flattened, much longer than the internodes; leaves erect, narrow, conduplicate-channelled; glumes acutish, about one third shorter than the obtuse paleæ. ♁ (Agrostis compressa, Torr. Vilfa, Trin.) — Bogs in the Pine barrens of New Jersey. Sept. — Forming strong tussocks, 1° - 2° high. Panicle 8' - 12' long: spikelets 1" long, purplish.

5. **S. serótinus**. Smooth; culms very slender, flattish (8' - 15' high), few-leaved; leaves very slender, channelled; panicle soon much exserted, the diffuse capillary branches scattered; glumes ovate, obtuse, about half the length of the paleæ. Ⓢ? (Agr. and Vilfa serotina, Torr. V. téniera, Trin. Poa? uniflora, Muhl. P. modesta, Tuckerm.) — Sandy wet places, E. New England to New Jersey: also in Michigan. Sept. — A very delicate grass; the spikelets, &c., smaller than in the last.

7. AGRÓSTIS, L. BENT-GRASS.

Spikelets 1-flowered, in an open panicle. Glumes somewhat equal, or the lower rather longer, usually longer than the paleæ, pointless. Paleæ very thin, pointless, naked; the lower 3 - 5-nerved and frequently awned on the back, the upper often minute or wanting. Stamens chiefly 3. Grain (caryopsis) free. — Culms usually tufted, slender. (Name from ἀγρός, a field, the place of growth.)

§ 1. TRICHODIUM, Michx. — Upper palea none, or obsolete.

1. **A. elàta**, Trin. (TALLER THIN-GRASS.) Culms firm or stout (2° - 3° high); leaves flat (1" - 2" wide); upper ligules elongated (2" - 3" long); spikelets crowded on the branches of the spreading panicle above the middle (1½" long); lower palea awnless, slightly shorter than the rather unequal glumes; the upper wanting. ♁ (A. Schweinitzii, Trin.? A. altissima, Tuckerm., excl. var. laxa. Trich. elatum, Pursh.) — Swamps, N. Jersey and southward. October.

2. **A. perénnans**. (THIN-GRASS.) Culms slender, erect from a decumbent base (1° - 2° high); leaves flat (the upper 4' - 6' long, 1" - 2" wide); panicle at length diffusely spreading, pale green, the branches short, divided and flower-bearing from or below the middle; lower palea awnless (rarely short-awned), shorter than the unequal glumes; the upper minute or obsolete. ♁ (Cornucopiæ perennans, Walt. Trich. perennans, Ell. T. decumbens, Michx. T. scàbrum, Muhl., not Agr. scabra, Willd. Agr. anomala, Willd.) — Damp shaded places. July, Aug. — Spikelets, &c., as in No. 3, into which it appears to vary.

3. **A. scàbra**, Willd. (HAIR-GRASS.) Culms very slender, erect (1° - 2° high); leaves short and narrow, the lower soon involute

(the upper 1"–3" long, less than 1" wide); *panicle very loose and divergent, purplish, the long capillary branches flower-bearing at and near the apex; lower palea awnless or occasionally short-awned on the back, shorter than the rather unequal very acute glumes; the upper minute or obsolete.* ♀ ②? (*A. laxiflora*, *Richard.* *A. Michauxii*, *Trin.*, partly. *Trich. laxiflorum*, *Michx.* *T. montanum*, *Torr.*) — Exsiccated places, common. June, July. — Remarkable for the long and divergent capillary branches of the extremely loose panicle; these are whorled, rough with very minute bristles (under a lens), as also the keel of the glumes. Spikelets 1" long. — A variety? from about the White Mountains, &c. (var. *montana*, *Tuckerm.*), has a more or less exerted awn, thus differing from the *T. montanum*, *Torr.* (*A. oreóphila*, *Trin.*), which is a dwarfed form, growing in tufts in hollows of rocks, &c.

4. **A. canina**, L. (BROWN BENT-GRASS.) Culms slender (1°–2° high); root-leaves involute-bristle-form, those of the culm flat and broader, linear; branches of the short and loose erect-spreading panicle slender, branching above the middle; *lower palea a little shorter than the almost equal glumes, bearing a long (at length bent or somewhat twisted) awn on the back a little below the middle, the upper one minute and inconspicuous (only half the length of the ovary); spikelets greenish turning brown or purplish, about 1" long.* ♀ — Var. *ALPINA*, Oakes, is a lower, often contracted mountain form, with spikelets often 1½" long. (*A. canina*, var.? *tenella*, *Torr.* *A. canina*, var. (*A. rubra*, *L. ed. 1.*), *Trin.* *A. Pickeringii* and *A. concinna*, *Tuckerm.*) — Naturalized in E. New England (but awned varieties of No. 5 and No. 6 are sometimes mistaken for it): the variety grows on grassy mountain-tops, Maine to New York, &c. July, Aug.

§ 2. AGROSTIS proper. — *Upper palea manifest.*

5. **A. vulgàris**, With. (RED-TOP. HERD'S-GRASS of Penn., &c.) Rootstocks creeping; culm mostly upright (1°–2° high); *panicle oblong, with spreading slightly rough short branches (purple); leaves linear; ligule very short, truncate; lower palea nearly equaling the glumes, chiefly awnless, 3-nerved; the upper about one half its length.* ♀ (*A. polymórpha*, *Huds.* partly.) — Varies with a rougher panicle (*A. hispida*, *Willd.*), and rarely with the flower awned (*A. pùmila*, *L.*) — Low meadows, introduced, also native in N. New York. A valuable grass. July.

6. **A. álba**, L. (WHITE BENT-GRASS.) Culm ascending, rooting at the lower joints (1°–2° high); *panicle narrow, contracted after flowering (greenish-white or barely tinged with purple), the branches rough; ligule oblong or linear; lower palea rather shorter than the glumes, 5-nerved, awnless, or rarely short-awned on the back; otherwise as in the last.* ♀ — Varies with the panicle more contracted (*A. stolonífera*, *L.*, *Fiorin Grass*); and var. *ARISTÀTA*, with the low-

er *palea long-awned* from near its base. (*A. stricta*, Willd.)—Moist meadows and fields, introduced; also native northward. A valuable grass. July.

8. CÍNNA, L. WOOD REED-GRASS.

Spikelets 1-flowered, flattened, crowded in an open flaccid panicle. Glumes lanceolate, acute, strongly keeled, hispid-serrulate on the keel; the lower rather smaller. Flower manifestly stalked in the glumes, smooth and naked; the paleæ much like the glumes; the lower longer than the upper, short-awned on the back below the pointless apex. Stamen one, opposite the 1-nerved upper palea! Grain linear-oblong, free.—Perennial, rather sweet-scented grasses, with simple and upright somewhat reed-like culms (2°–7° high), bearing a large compound terminal panicle, its branches in fours or fives, linear-lanceolate flat leaves ($\frac{1}{2}$ – $\frac{1}{2}$ ' wide), and conspicuous ligules. (Name unexplained.)

1. **C. arundinàcea**, L. *Panicle spreading*, mostly contracted in fruit; *lower glume and the upper palea about $\frac{1}{4}$ shorter than the lower palea*, which the upper glume barely equals.—Moist woods and shaded swamps. Aug.—Spikelets green, rarely purplish, $\frac{1}{2}$ ' long; the inconspicuous awn more or less exceeding the tip of the palea.

2. **C. péndula**, Trin. Branches of the very loose *panicle* long and capillary, *drooping*; *glumes slightly unequal, the lower nearly as long as the lower palea*; upper palea little shorter. (*C. suavèolens*, Blytt. *Muhlenbergia pendula*, Bongard.)—Deep damp woods, common northward: confounded with the last; from which it further differs in its rough pedicels and spikelets about half the size.

9. MUHLENBÉRGIA, Schreber. DROP-SEED GRASS.

Spikelets 1-flowered, in contracted or rarely open panicles. Glumes mostly acute or bristle-pointed, persistent; the lower rather smaller or minute. Flower very short-stalked or sessile in the glumes; the paleæ usually hairy-bearded at the base, herbaceous, deciduous with the inclosed grain, often equal; the lower 3-nerved, mucronate or awned at the apex. Stamens 3.—Chiefly perennials, with branched and often diffuse rigid culms from creeping rootstocks, and short narrow leaves. (Dedicated to the *Rev. Dr. Muhlenberg*, a distinguished American botanist.)

§ 1. MUHLENBERGIA proper.—*Panicles contracted or glomerate, terminal and axillary.*

* *Lower palea barely mucronate or sharp-pointed.* (Cinna, sp., Kunth.)

1. **M. sobolifera.** Culms ascending (1°–2° high), sparingly branched; the *simple contracted panicle very slender* or filiform; *glumes barely pointed, almost equal, ½ shorter than the equal paleæ*; lower palea abruptly short-mucronate. (Agrostis, Muhl.) — Open rocky woods, from Vermont southward. Aug. — Spikelets less than 1" long.

2. **M. glomerata,** Trin. Culms upright (1°–2° high), sparingly branched or simple; *panicle oblong-linear, contracted into an interrupted glomerate spike,* long-peduncled, the branches sessile; *glumes awned,* nearly equal, and (with the bristle-like awn) about twice the length of the unequal very acute paleæ. (Agr. racemosa, Michx. A. setosa, Muhl. Polypogon racemosus, Nutt.) — Bogs, &c., common northward. Aug. — Panicle 2'–3' long.

3. **M. Mexicana,** Trin. Culms ascending, much branched (2°–3° high); *panicles lateral and terminal, often included at the base, contracted, the branches densely spiked-clustered,* linear (green and purplish); *glumes awnless, sharp-pointed,* unequal, the upper about the length of the very acute lower palea. (Agr. Mexicana, L. A. lateriflora, Michx.) — Varies with more slender panicles (A. filiformis, Muhl.) — Low grounds, common. August.

* * *Lower palea bristle-awned from the tip: flowers short-pedicelled.*

4. **M. sylvatica,** Torr. & Gr. Culms ascending, much branched and diffusely spreading (2°–4° long); *contracted panicles densely many-flowered; glumes almost equal, bristle-pointed, nearly as long as the lower palea,* which bears an awn twice or thrice the length of the spikelet. (Agr. diffusa, Muhl.) — Low or rocky woods, common. Sept. — Aspect between No. 3 and No. 5.

5. **M. Willdenovii,** Trin. Culms upright (3° high), slender, simple or sparingly branched; *contracted panicle slender, loosely flowered; glumes slightly unequal, short-pointed, half the length of the lower palea,* which bears an awn 3–4 times the length of the spikelet. (Agr. tenuiflora, Willd.) — Rocky woods, rather common. Aug.

6. **M. diffusa,** Schreber. (DROP-SEED. NIMBLE WILL.) Culms diffusely much branched (8'–18' high); *contracted panicles slender, rather loosely many-flowered, terminal and lateral; glumes extremely minute, the lower obsolete, the upper truncate; awn once or twice longer than the palea.* (Dilepÿrum minutiflorum, Michx.) — Dry hills and woods, from S. New England to Wisconsin. Aug., Sept. — Spikelets much smaller than in the foregoing, 1" long.

§ 2. TRICHÒCHLOA, DC. — *Panicle very loose and open, the long branches and pedicels capillary.*

7. **M. capillaris,** Kunth. (AWNED HAIR-GRASS.) Culm simple, upright (2° high); *panicle capillary, expanding (6'–20' long;*

purple); glumes unequal, $\frac{1}{3}$ to $\frac{1}{2}$ the length of the long-awned paleæ, the lower mostly pointless, the upper more or less bristle-pointed; leaves convolute-bristle-form.—Sandy soil, W. New England (Connecticut, *Dana*) to New Jersey, rare, thence southward and westward. Aug.—Pedicels 1'–2' long, scarcely thicker than the awns, which are about 1' long.

10. BRACHYÉLYTRUM, Beauv. BRACHYELYTRUM.

Spikelets 1-flowered, with a conspicuous filiform pedicel of an abortive second flower about half its length, few, in a simple appressed racemed panicle. Lower glume obsolete; the upper minute, pointless, persistent, shorter than the thick stalk of the flower. Paleæ chartaceo-herbaceous, involute, inclosing the linear-oblong grain, somewhat equal, rough with scattered short bristles; the lower 5-nerved, contracted at the apex into a long straight awn; the upper 2-pointed; the awn-like sterile pedicel partly lodged in the groove on its back. Stamens 2: the linear anthers and stigmas very long.—A perennial grass, with simple culms (1°–3° high) from creeping rootstocks, rather downy sheaths, broad and flat lanceolate pointed leaves, and large spikelets $\frac{1}{2}$ ' long without the awn. (Name composed of *βραχύς*, *short*, and *ἔλυτρον*, *husk*, from the very short glumes.)

1. **B. aristatum**, Beauv. (*Muhlenbergia erecta*, *Schreb.* *Dilopyrum aristosum*, *Michx.*)—Rocky woods, common. June.

11. CALAMAGRÓSTIS, Adans. REED BENT-GRASS.

Spikelets 1-flowered, and often with a rudimentary pedicel of a second abortive flower, in an open, contracted, or spiked panicle. Glumes keeled or boat-shaped, often acute, commonly nearly equal, and exceeding the flower, which is surrounded at the base by a copious tuft of white bristly hairs. Lower palea bearing a slender awn on the back or below the tip, rarely awnless; the upper mostly shorter. Stamens 3. Grain free.—Perennials, with running rootstocks, and mostly tall and simple rigid culms. (Name compounded of *κάλαμος*, *a reed*, and *ἀγρόστις*, *a grass*.)

§ 1. CALAMAGROSTIS proper. — *Flower, &c., nearly as in Agrostis, except the hairy tuft: the boat-shaped glumes and the palea membranaceous; the former equal or the lower one rather longer: lower palea 3–5-nerved, awned on the back: panicle open.* (All the following have a rudimentary plumose pedicel.)

1. **C. Canadensis**, Beauv. Panicle oblong, loose (often purplish); *lower palea* nearly as long as the lanceolate acute glumes, *not exceeding the very fine hairs, bearing an extremely delicate awn below the middle* scarcely equalling or exceeding the hairs; rudimentary pedicel minute. (*Arundo Canadensis*, Michx. *C. Mexicana*, Nutt.) — Wet grounds, common northward. July. — Rather glaucous, 3°–5° high: leaves flat. Glumes rough, 1½" long.

2. **C. confinis**, Nutt. Panicle elongated, narrow (5'–8' long), the branches appressed after flowering, pale; *lower palea nearly equaling the oblong-lanceolate acute glumes, ½ longer than the hairs* (excepting those of the conspicuous rudiment), *bearing between the middle and the base a rather stout and slightly exerted awn*. (*Ar. confinis*, Willd.! *C. inexpansa*, Gray.) — Swamps, N. and W. New York (especially Penn Yan, Sartwell) and Pennsylvania. July. — Spikelets rather larger than in the last; upper glume more or less shorter.

3. **C. coarctata**, Torr. Panicle contracted, dense (3'–6' long); *lower palea shorter than the taper-pointed tips of the lanceolate glumes, almost twice the length of the hairs* (excepting the strong tuft borne by the conspicuous rudiment), bearing a rigid and exerted short awn above the middle. (*C. Canadensis*, Nutt.) — Wet grounds, chiefly southward. Aug. — Culm 3°–5° high. Glumes 4" long. Grain hairy, crowned with a bearded tuft.

4. **C. sylvatica**, DC., var. **BREVISËTA**. Panicle dense and narrow (3'–5' long, purplish); paleæ nearly equal, rather shorter than the ovate-lanceolate acute glumes; *awn inserted between the middle and the base, stout, bent, not exceeding the glumes; hairs very short and scanty, ½ the length of the paleæ, half as long as the small rudiment*. (*Arundo sylvatica* β. Wahl.) — Alpine tops of the White Mountains, New Hampshire. Sept. — Culms 1° high: leaves short and flat. Spikelets larger than in *C. stricta*, smaller than in *C. purpurascens*, which has much longer hairs and rudiment, a long awn, &c.

§ 2. **CALAMOVÍLFA**. *Glumes and equal paleæ rather chartaceous, compressed-keeled; the lower glume shorter than the upper and shorter than the paleæ, of which the lower is 1-nerved and entirely awnless; the upper strongly 2-keeled: rudiment wanting: panicle open and loose.*

5. **C. brevipilis**. Branches of the diffuse pyramidal panicle capillary (purplish); *glumes ovate, mucronate; the upper a little shorter, the lower nearly one half shorter, than the paleæ, which are above twice the length of the hairs and bristly-bearded along the keels*. (*Arundo brevipilis*, Torr.) — Sandy swamps, Pine barrens of New Jersey, rare. Sept. — Culm slender, 3°–4° high: leaves nearly flat.

6. **C. longifolia**, Hook. Culm (1°–4° high) stout, from thick running rootstocks; *leaves rigid, elongated, involute above and taper-*

ing into a long thread-like point; branches of the pyramidal panicle smooth; *glumes lanceolate*, the upper as long as the similar paleæ, the lower $\frac{1}{4}$ shorter; the *copious hairs more than half the length of the naked paleæ*. — Sandy coast of N. Michigan, and northward. — Spikelets $\frac{1}{2}$ ' long. Sheaths clothed with deciduous wool.

§ 3. *ΑΜΜÓΦΙΛΑ*, Host. — *Glumes nearly equal and rather longer than the equal similar paleæ, scarious-chartaceous, lanceolate, compressed-keeled: lower palea 5-nerved, slightly mucronate or obscurely awned near the tip; the upper 2-keeled: rudiment plumose above: squamulæ lanceolate, much longer than the ovary: panicle spiked-contracted: spikelets large ($\frac{1}{2}$ ' long).*

7. *C. arenària*, Trin. (SEA SAND-REED.) Culm rigid (2°–3° high) from stout running rootstocks; leaves long, soon involute; panicle contracted into a dense cylindrical spike (5'–9' long); hairs only $\frac{1}{2}$ the length of the paleæ. (*Arundo*, L. *Psámma*, Beauv.) — Sandy sea-beach, common. August.

12. ORYZÓPSIS, Michx. MOUNTAIN RICE.

Spikelets 1-flowered. Glumes herbaceo-membranaceous, several-nerved, nearly equal, commonly rather longer than the elliptical flower, which is deciduous at maturity with a very short bearded callus. Lower palea coriaceous, at length involute so as closely to inclose the upper (of the same length) and the oblong grain; a simple untwisted and deciduous awn jointed on its apex. Stamens 3. Squamulæ mostly 2, conspicuous. Styles sometimes united: stigmas plumose. — Perennials, with rigid leaves and a narrow or racemed panicle. Spikelets greenish, rather large. (Name composed of *ὄρυζα*, *Rice*, and *ὄψις*, *likeness*, from the resemblance to that grain.)

* *Styles united below, slender: culms tufted, naked.*

1. *O. asperifolia*, Michx. Culms (9'–18' high) clothed with sheaths bearing a mere rudimentary blade, overtopped by the long and rigid linear leaf from the base; panicle very simple and raceme-like, few-flowered; awn 2–3 times the length of the rather hairy whitish paleæ. (*Uráchne*, Trin.) — Hill-sides, &c., in rich woods, common northward. May. — Leaves concave, keelless, rough-edged, pale underneath, lasting through the winter. Squamulæ lanceolate, almost as long as the inner palea!

2. *O. Canadénsis*, Torr. Culms slender (6'–15' high), the lowest sheaths leaf-bearing; leaves involute-thread-shaped, rigid; panicle contracted (1'–2' long), the branches usually in pairs; paleæ hairy-bearded, whitish; awn short and very deciduous, or wanting.

(*O. parviflora*, Nutt. *Stipa Canadensis*, Poir. *Milium pungens*, Torr.) — Rocky hills and dry plains, W. New England to Wisconsin and northward, rare. May. — Glumes 1"–2" long, sometimes purplish.

* * *Styles distinct, short: culm leafy to the summit.*

3. **O. melanocarpa**, Muhl. Leaves lanceolate, taper-pointed, flat; sheaths bearded in the throat; panicle simple or sparingly branched, the spikelets loosely racemed; *awn thrice the length of the blackish palea* (nearly 1' long). (*Milium racemòsum*, Smith. *Pip-tathèrum nigrum*, Torr.) — Rocky woods, common northward. Aug. — Culm 2°–3° high.

13. STIPA, L. FEATHER-GRASS.

Spikelets 1-flowered: the flower falling away at maturity with the conspicuous obconical bearded stalk (callus) from the membranaceous equal glumes. Lower palea coriaceous, cylindrical-involute, closely embracing the smaller upper one and the cylindrical grain, bearing a long and twisted simple awn jointed with its apex. Stamens mostly 3. Stigmas plumose. — Perennials, with narrow involute leaves and a loose panicle. (Name from *στύπη*, *tow*, in allusion to the flaxen appearance of the feathery awns of the original species.)

1. **S. avenàcea**, L. (BLACK OAT-GRASS.) Culm slender, leafy chiefly at the base (1°–2° high); leaves almost bristle-form; palea blackish, nearly as long as the pointed glumes; awn naked, bent above, twisted below (2'–3' long). — Dry or sandy woods, chiefly southward. July.

14. ARÍSTIDA, L. TRIPLE-AWNED GRASS.

Glumes unequal, often bristle-pointed. Lower palea tipped with a triple awn; the upper palea much smaller. Otherwise chiefly as in *Stipa*. — Culms branching: leaves narrow, often involute. Panicle racemed. (An ancient Latin name of an awned grass, from *arista*, a beard or awn.) All grow in sterile, dry soil.

* *Awns separate to the base, without a joint, naked.*

1. **A. dichótoma**, Michx. (POVERTY-GRASS.) Culms in tufts, much fork-branched (5'–15' high); spikelets in short contracted racemes; flower rather shorter than the glumes; *lateral awns minute, the middle one not longer than the palea*, bent down ($\frac{1}{4}$ ' long). ①? — Common, especially southward. September.

2. **A. grácilis**, Ell. Culms branched at the base, slender, naked above (6'–18' high); panicle spiked, slender (3'–6' long);

flower as long as the glumes; *lateral awns as long as the palea, erect, the middle one over twice that length*, bent horizontally ($\frac{1}{2}$ ' long). ① — Sand, E. Massachusetts to New Jersey and southward. August.

3. **A. purpuráscens**, Poir. Culms mostly simple (2° high), clothed with long smooth leaves below; panicle spiked, densely flowered (1° long); *awns nearly equal, 3-4 times the length of the palea*, at length spreading, the middle one rather longest ($1'$ long). † (A. racemosa, Muhl.) — S. Massachusetts to Michigan southward. Sept.

* * *Awns united below, jointed with the apex of the palea, naked.*

4. **A. tuberculosa**, Nutt. Culm branched below ($6'$ - $18'$ high), tumid at the joints; panicles rather simple, rigid, loosely-flowered; the branches in pairs, one of them short and about 2-flowered, the other elongated and several-flowered; glumes bristle-awned, longer than the palea; which is tipped with the common stalk (about its own length) of the 3 equal divergently-bent awns ($1\frac{1}{2}'$ long) twisting together at the base. ① — Sandy soil, Plum Island (*Oakes*), Connecticut (*Robbins*), New Jersey, and southward. Also in Illinois. September.

A. OLIGÁNTHA, Michx., which resembles the last, but has a more contracted racemed panicle, longer *jointless* awns, &c., is to be sought along our southern and western borders.

15. SPARTINA, Schreber. CORD OR MARSH GRASS.

Spikelets 1-flowered, without a rudiment, very flat, closely imbricate-spiked in 2 ranks on the outer side of a triangular rachis. Glumes strongly compressed-keeled, acute, or bristle-pointed, mostly rough-bristly on the keel; the upper one larger and exceeding the pointless and awnless paleæ, of which the upper is longest. Squamulæ none. Stamens 3. Styles long. — Perennials, with simple and rigid reed-like culms, from extensively creeping scaly rootstocks, racemed spikes, very smooth sheaths, and long and tough leaves (whence the name, from *σπάρτινη*, a cord, such as were made from the bark of the *Spartium*, or Broom).

* *Styles united to near the summit: spikes short-peduncled.*

1. **S. cynosuroides**, Willd. (FRESH-WATER CORD-GRASS.) *Culm rather slender* (2° - 4° high); *leaves long and narrow* ($\frac{1}{2}'$ or less wide below), tapering to a very slender point, keeled, flat, but quickly involute in drying, smooth except the margins; *spikes 5-10*, scattered, spreading; *glumes awn-pointed*, especially the upper, *the lower equalling the lower palea*, whose strong rough-hispid midrib abruptly terminates below the membranous apex. (*Trachynòtia cynosuroides*, Michx. *Limnètis cynos.*, *Pers.*) — Banks of rivers and lakes through

the interior. Aug. — Leaves 2° – 4° long. Spikes 2' – 3' long, straw-color. Glumes strongly serrulate-hispid on the keel; the awn of the upper one about ¼' long. Paleæ somewhat unequal. — Certainly distinct from the next, to which, in strictness, the Linnæan name belongs.

2. **S. polystàchya**, Willd., Muhl. (GREAT SALT REED-GRASS.) *Culm tall and stout* (4° – 9° high, often 1' in diameter near the base); *leaves broad* (½' to 1'), *roughish underneath*, as well as the margins; *spikes 20 – 50, in a dense oblong raceme* (purplish); *glumes barely mucronate, the lower half the length of the equal paleæ*, of which the rough-hispid midrib of the lower one reaches to the apex. (*Trachynotia polystachya*, Michx. *Dáctylis cynosuroides*, L.! excl. syn. *Gronov.*, &c.) — Salt or brackish marshes, within tide-water. Aug.

* * *Styles nearly separate: leaves, rachis, &c., very smooth.*

3. **S. júncea**, Willd. (LOW RUSH SALT-GRASS.) *Culms low* (1° – 2° high) and slender; *leaves narrow and rush-like, strongly involute*; *spikes 1 – 5, short-peduncled*, at least the lower; glumes acute, rough-serrulate on the back; the lower scarcely ½ the length of the upper, not half the length of the lower palea. (*Dáctylis pàtens*, Ait.) — Salt marshes and sandy sea-beach, common. August.

4. **S. glàbra**, Muhl. (SMOOTH SALT-MARSH GRASS.) *Culms thickish and rather succulent* (3° – 5° high); *leaves elongated, flat* (3'' – 4' wide at the base), but *soon involute towards the long-tapering point*, perfectly smooth on the edges, the uppermost overtopping the 4 – 13 *erect sessile spikes*; glumes pointless, very minutely bristly-ciliate on the keel; the upper ½ to ½ longer than the lower, slightly exceeding the almost equal paleæ. (*S. lævigàta*, Willd. — I do not adopt the name of *S. alterniflòra*, Loisel., not being certain that it is our plant, since Trinius says the leaves are “*margine hispidula*.”) — Muddy salt and brackish marshes, common on the coast. Aug. — Odor strong and rancid. Spikes 2' – 3' long; the spikelets either close or rather remote.

16. BOUTELOÛA, Lagasca (1805). ATHEROPÒGON, Muhl.

Spikelets of one, or rarely 2 – 3, perfect flowers, and a neutral terminal rudimentary one, crowded and closely sessile in a short spike on one side of a flattened rachis: the spikes in a simple spiked raceme. Glumes concave-keeled, the lower one shorter. Lower palea 3-nerved, 3-toothed at the apex, the upper 2-nerved and 2-toothed; the nerves projecting into mucronate points, or in the short-pedicelled abortive flower into bristles or awns. Stamens 3. (Probably named after some Spaniard.)

1. **B. racemòsa**, Lag. *Culms erect, in tufts* (1° – 3° high); sheaths commonly hairy; leaves narrow, taper-pointed; spikes lin-

ear-oblong ($\frac{1}{2}$ ' long), almost sessile, horizontal, numerous and rather remote, forming a strict raceme (8' - 12' long); rachis tipped with a slender naked point; lower palea smooth, 3-pointed, that of the abortive flower bearing a slender terminal, and 2 shorter lateral, bristle-like awns; anthers vermilion-color. ♀ (*Chloris curtipendula*, Michx. *Atheropogon apludoides*, Muhl.) — Dry rocky places, S. New York to Michigan and southward, rare. August.

17. GYMNOPOGON, Beauv. NAKED-BEARD GRASS.

Spikelets of one perfect flower, and an awn-like pedicel of a second bearing a naked bristle, sessile and remotely alternate on the long and filiform rays (rachis) of a crowded naked raceme. Glumes lance-awl-shaped, keeled, almost equal, rather longer than the somewhat equal membranaceous paleæ; of which the lower is cylindrical-involute, with the midrib produced from just below the 2-cleft apex into a straight and slender bristle-like awn! the upper with the abortive flower at its base. Stamens 3. Stigmas pencil-form, purple. — Leaves short and flat. (Name composed of *γυμνός*, *naked*, and *πώγων*, *a beard*, alluding to the reduction of the abortive flower to a bare awn.)

1. **G. racemòsus**, Beauv. Culms clustered from a short rootstock (1° high), wiry, leafy; leaves oblong-lanceolate, pale, thickish (2' - 3' long); awn of the abortive flower shorter than its stalk, not exceeding the pointed glumes. (*Anthopogon lepturoides*, Nutt.) — Pine barrens of New Jersey and southward, in dry sand. Aug., Sept. — Branches of the raceme 6' or more in length, very slender, soon widely spreading.

18. CYNODON, Richard. BERMUDA GRASS.

Spikelets 1-flowered, with a mere naked short-pedicelled rudiment of a second flower, imbricate-spiked on one side of a flattish rachis, the spikes usually digitate at the naked summit of the flowering culms. Glumes keeled, pointless, rather unequal. Paleæ pointless and awnless, the lower larger, boat-shaped. Stamens 3. — Low diffusely-branched and creeping perennials, with short flattish leaves. (Name composed of *κύων*, *a dog*, and *ὄδους*, *a tooth*.)

1. **C. Dáctylon**, Pers. Digitate spikes 3-5; paleæ smooth, longer than the blunt rudiment. — Sandy waste places, Penn. and southward: introduced.

19. ELEUSINE, Gærtner. CRAB-GRASS. YARD-GRASS.

Spikelets 2–6-flowered, with a terminal naked rudiment, closely imbricate-spiked on one side of a flattish rachis; the spikes digitate or clustered. Glumes membranaceous, pointless, shorter than the flowers. Paleæ membranaceous, awnless and pointless; the lower ovate, keeled, larger than the upper. Stamens 3. Pericarp (utricle) free from the oval wrinkled seed. — Low annuals, with flat leaves, and flowers much as in a *Poa*. (Name from Ἐλευσίη, the town where Ceres, the goddess of harvests, was worshipped.)

1. **E. Índica**, Gærtner. (DOG'S-TAIL OR WIRE GRASS.) Culms branched at the base, ascending, flattened; spikes 2–5 (2' long, greenish); spikelets about 5-flowered. — Yards, &c., introduced.

20. LEPTÓCHLOA, Beauv. (OXYDÈNIA, Nutt.)

Spikelets 3–many-flowered (the uppermost flower imperfect), loosely spiked on one side of a long filiform rachis: the spikes racemed. Glumes membranaceous, keeled, often awl-pointed, the upper one somewhat larger. Lower palea 3-nerved, the lateral nerves next the ciliate or hairy margins awnless, or bristle-awned at the entire or 2-toothed tip, larger than the upper. Stamens 2–3. Seed sometimes loose in the pericarp. — Leaves flat. (Name composed of λεπτός, *slender*, and χλόα, *grass*, from the long attenuated spikes.)

§ 1. LEPTOCHLOA proper. — *Lower palea awnless or simply awned.*

1. **L. mucronàta**, Kunth. Sheaths hairy; spikes numerous (20–40, 2'–4' in length), in a long panicle-like raceme; spikelets small; glumes more or less mucronate, nearly equalling or exceeding the 3–4 awnless flowers. ① — Fields, S. Ohio and southward. August.

§ 2. DIPLÁCHNE, Beauv. — *Lower palea bristle-awned from the 2-toothed apex; the marginal nerves often excurrent into lateral teeth or points.*

2. **L. fasciculàris**. Smooth; leaves longer than the geniculate-decumbent branching culms; the upper sheathing the base of the crowded panicle-like raceme, which is composed of many strict spikes (3'–5' long); spikelets slightly pedicelled, 7–11-flowered, much longer than the lanceolate glumes; paleæ hairy-margined towards the base; the lower one with 2 small lateral teeth and a short awn in the cleft of the apex. ① (*Festuca fascicularis*, Lam. F. polystachya, Michx. *Diplachne fasc.*, Beauv., Torr.) — Brackish meadows,

from Rhode Island southward along the coast. Aug. — Makes a direct transition to the next genus.

21. TRICÚSPIS, Beauv. (URÁLEPIS & WINDSÒRIA, Nutt.)

Spikelets 3 – 12-flowered, somewhat terete; the terminal flower abortive. Glumes unequal. Rachis of the spikelet bearded below each flower. Paleæ membranaceous or rather chartaceous; the lower much larger than the 2-toothed upper one, convex, 2 – 3-toothed or cleft at the apex, conspicuously hairy-bearded or villous on the 3 strong nerves, of which the lateral are marginal or nearly so and usually excurrent, as is the mid-nerve especially, into a short cusp or awn. Stamens 3. Stigmas dark purple, plumose. Grain oblong, mostly gibbous. — Leaves taper-pointed: sheaths bearded at the throat. Panicle simple or compound; the spikelets often racemose, purplish. (Name from the Latin *tricuspis*, three-pointed, alluding to the lower palea.)

§ 1. *TRICUSPIS* proper. (Windsòria, Nutt.) — *Glumes shorter than the crowded flowers: lower palea 3-cuspidate by the projection of the nerves, and usually with 2 intermediate membranaceous teeth; the upper one naked.*

1. **T. seslerioides**, Torr. (TALL RED-TOP.) Culm upright (3° – 5° high), very smooth, as are the flat leaves; panicle large and compound, the rigid capillary branches spreading, naked below; spikelets very numerous, 5 – 7-flowered, shining, purple ($\frac{1}{3}$ ' long), the flowers hairy toward the base. † (*Poa flava*, L.! *P. seslerioides*, Michx. *P. quinquéfida*, Pursh. *Windsoria poæfórmis*, Nutt.) — Dry or sandy fields, S. New York and southward. Aug. — A showy grass, with the spreading panicle sometimes 1° wide. Points of the lower palea almost equal, scarcely exceeding the intermediate teeth, thus appearing 5-toothed.

§ 2. *TRIPLÀSIS*, Beauv. (Diplòcea, Raf. *Urálepis*, Nutt.) — *Glumes much shorter than the somewhat remote flowers: both paleæ strongly fringe-bearded; the lower 2-cleft at the summit, the mid-nerve produced into an awn between the truncate or awn-pointed divisions.*

2. **T. purpùrea**. (SAND GRASS.) Culms many in a tuft from the same root, ascending (6' – 12' high), with numerous bearded joints; leaves involute-awl-shaped, mostly short; panicles very simple, bearing few 2 – 5-flowered spikelets, the terminal one usually exerted, the axillary ones included in the commonly hairy sheaths; *awn much shorter than the palea, frequently not exceeding its eroded-truncate or obtuse lateral lobes.* ①? (*Aíra purpurea*, Walt. *Diplòcea barbàta*, Raf. *Urálepis purpurea* and *aristolàta*, Nutt.) — In sand, from Con-

necticut and Long Island southward, near the coast. Aug., Sept. — Plant acid to the taste.

T. CORNÛTA (*Uralespis cornuta*, *Ell.*) is *Triplasis Americana*, *Beauv.*!

22. DIARRHËNA, Raf. DIARRHENA.

Spikelets several-flowered, smooth and shining, one or two of the uppermost flowers sterile. Glumes ovate, much shorter than the flowers, coriaceous, the lower much smaller. Lower palea ovate, convex on the back, rigidly coriaceous, 3-nerved above, sharp-pointed. Squamulæ ovate, ciliate. Stamens 2. Grain very large, obliquely ovoid, pointed, rather longer than the paleæ, the cartilaginous shining pericarp not adherent to the seed. — A nearly smooth perennial, with running rootstocks, producing simple culms with long and broadly linear flat leaves towards the base, naked above, bearing a few short-pedicelled spikelets ($\frac{1}{2}$ ' long) in a very simple panicle. (Name composed of *δῖς*, *two*, and *ἄρρηγν*, *man*, from the 2 stamens.)

1. **D. Americana**, *Beauv.* (*Festuca diandra*, *Michx.*) — Shaded river-banks and woods, Ohio and westward. August.

23. DÁCTYLIS, L. COCK'S-FOOT, or ORCHARD GRASS.

Spikelets several-flowered, crowded in one-sided clusters, forming a branching dense panicle. Glumes and lower paleæ herbaceous, keeled, awn-pointed, rough-ciliate on the keel; the latter 5-nerved; the former somewhat unequal-sided, the upper one commonly smaller and thinner. Stamens 3. Grain lance-oblong, acute. — Perennials: leaves keeled. (Name apparently from *δακτυλῖς*, *a finger's breadth*, in allusion to the size of the clusters.)

1. **D. glomeràta**, *L.* Rough and rather glaucous (3' high); leaves broadly linear; branches of the panicle naked at the base; spikelets 3-4-flowered. — Fields and yards, especially in shade: introduced. June. — Good for hay.

24. KÆLÈRIA, Pers. KÆLERIA.

Spikelets 3-7-flowered, crowded in a dense and narrow spike-like panicle. Glumes and lower palea membranaceous, compressed-keeled, barely acute, or the latter often mucronate or more or less bristle-pointed just below the tip. Stamens 3. — Tufted Grasses (allied to *Dactylis* and *Poa*), with simple upright culms;

the sheaths often downy. (Named for *Prof. Köhler*, an early writer on Grasses.)

1. **K. cristata**, Pers. Panicle narrowly spiked, interrupted at the base; spikelets 2-4-flowered; lower palea acute, often mucronate-pointed; leaves flat, the lower sparingly hairy or ciliate. — Dry grounds or hills, Penn. to Michigan, and westward: nearly the var. *GRACILIS*, with a long and narrow spike, the flowers usually barely acute. (*K. nitida*, Nutt.) — Sheaths smooth or downy.

25. REBOÛLEA, Kunth. (KÆLERIA, sp., Torr.)

Spikelets usually 2-flowered, and with an abortive rudiment or pedicel, in a contracted slender panicle. Glumes somewhat equal in length, but very dissimilar, rather shorter than the flowers; the lower narrowly linear, keeled, 1-nerved; the upper obovate, rather boat-shaped, 3-nerved on the back. Lower palea oblong, obtuse, boat-shaped, naked, chartaceous, minutely roughened at least when old; the upper very thin and hyaline. Stamens 3. Grain linear-oblong, grooveless. — Perennial, slender grasses, with simple and tufted culms, and often sparsely downy sheaths, and flat lower leaves; the small greenish spikelets looking somewhat like those of *Cinna* or *Poa*.

1. **R. Pennsylvanica**. Panicle long and slender, rather loose, the racemose branches somewhat elongated; upper glume obovate, barely obtuse (often slightly mucronate); the 2 (rarely 3) flowers lanceolate. (*Kæleria Pennsylvanica*, DC. *Aira mollis*, Muhl.) — Varies, with a larger and fuller panicle, 6' - 8' long, with the aspect of *Cinna* (var. *major*, Torr.); and, rarely, with the lower palea minutely mucronate-pointed! — Moist woods and meadows, common. June, July.

2. **R. obtusata**. Panicle dense and contracted, somewhat interrupted, the spikelets much crowded on the short erect branches; upper glume rounded-obovate, truncate-obtuse, rough on the back, the flowers lanceolate-oblong. (*R. gracilis*, Kunth, in part. *Aira obtusata*, Michx. *A. truncata*, Muhl. *Kæleria truncata*, Torr.) — Dry soil, not rare westward and southward. June.

26. MÉLICA, L. MELIC-GRASS.

Spikelets 2-5-flowered; the 1-3 upper flowers imperfect and dissimilar, convolute around each other. Glumes usually large, chartaceous-membranaceous, scarious-margined, convex, obtuse, the upper 7-9-nerved. Paleæ of the same texture as the glumes;

the lower 7-nerved, and often with intermediate nerves, flattish-convolute or convex, obtuse, entire. Stamens 3. Stigmas branched-plumose. — Leaves flat and soft. Panicle simple or sparingly branched; the pretty large spikelets racemose-one-sided. (An old name, from μέλι, *honey*.)

1. **M. speciòsa**, Muhl. Spikelets few on each branch of the loose panicle, smooth ($\frac{1}{2}$ ' long), with 2 perfect flowers and a stalked rudiment composed of 3 abortive ones; glumes and paleæ very obtuse. ♃ — Rich soil, W. Penn. and Ohio. June. — Culm 3° - 4° high.

27. BRIZA, L. QUAKING GRASS.

Spikelets many-flowered, ovate or heart-shaped, flattish-tumid; the flowers closely imbricated, at length deciduous. Glumes roundish, unequal (purple). Lower palea roundish and entire, flattened parallel with the glumes, ventricose on the back, heart-shaped at the base, chartaceo-membranaceous, scarious-margined, many-nerved, the nerves somewhat obscure, the lateral ones clustered; the upper very much smaller, ovate, flat. Stamens 3. Stigmas branched-plumose. Grain flattened parallel with the paleæ. — Leaves flat. Panicle loose, diffuse, with the pretty large and showy spikelets often drooping on delicate pedicels (whence the name, an ancient Greek appellation for some kind of grain, from βρίζω, *to slumber* (Linn.), or βρίθω, *to bend downwards*.)

1. **B. mèdia**, L. Panicle erect, the branches spreading; spikelets 5 - 9-flowered, heart-shaped when old (3'' long). ♃ — Pastures, naturalized in E. Massachusetts and in Penn. June. — The annual **B. MÁXIMA** is sometimes cultivated for ornament.

28. GLYCÈRIA, R. Brown. MANNA-GRASS.

Spikelets mostly terete, several-flowered, the oblong or somewhat cylindrical flowers sessile, early deciduous by the separation of the rachis into joints, leaving the short and rather unequal (chiefly 1-nerved) membranaceous glumes behind. Paleæ nearly equal, naked, somewhat chartaceous; the lower rounded on the back, usually membranaceous at the tip, strongly 7-nerved (very rarely 5-nerved). Stamens 3 or 2. Stigmas decomposed. Grain oblong. — Perennial, smooth marsh-grasses, with simple culms from running rootstocks, flat leaves, and nearly *entire* sheaths,

much as in Sedges: the panicle loose and open. (Name from *γλυκερός*, *sweet*, alluding to the sweet-tasted grain.)

* *Spikelets ovate: upper palea very obtuse and entire: stamens 2.*

1. **G. Canadensis**, Trin. (RATTLESNAKE-GRASS.) *Panicle oblong-pyramidal, at length spreading, and the tumid oblong-ovate 6-8-flowered spikelets drooping; lower palea ovate, acutish, longer than the rounded upper one; leaves long, roughish.* (*Briza Canadensis, Michx. Poa Can., Beauv., &c.*) — Boggy places, common northward. July. — A handsome, stout, upright grass, 2°-3° high. *Spikelets 2'' long, becoming very broad: glumes purplish.*

2. **G. obtusa**, Trin. *Panicle narrowly oblong, dense (3' long); the 6-7-flowered tumid-ovate spikelets erect, short-pedicelled; lower palea ovate, obtuse, the upper as long when old.* (*Poa obtusa, Muhl.*) — Bogs, E. Massachusetts to Penn., rare. Aug. — Culm stout, 1°-2° high, very leafy: leaves long, smooth. *Spikelets 3'' long, pale: nerves inconspicuous.*

3. **G. elongata**, Trin. *Panicle narrowly racemose, elongated (1° long), somewhat one-sided, recurving; the branches appressed, bearing the 3-4-flowered erect spikelets nearly to the base; lower palea oblong-ovate, obtuse, rather longer than the upper; leaves very (1° or more) long, rough.* (*Poa elongata, Torr.*) — Wet woods, common northward. July. — *Spikelets pale, 1''-1½'' long: the flowers short-pedicelled!*

* * *Spikelets oblong, diffusely paniced: upper palea 2-toothed: stam. 3.*

4. **G. nervata**, Trin. *Branches of the broad and open panicle capillary, at length drooping, the very numerous small spikelets ovate-oblong, 3-7-flowered; palea oval, obtuse, nearly equal in length; leaves rather long.* (*P. nervata, Willd. P. striata, Michx. P. parviflora, Pursh.*) — Moist meadows, very common. June. — Culm erect, 1°-3° high. *Spikelets seldom 2'' long, commonly purplish.*

5. **G. pallida**, Trin. *Branches of the rather simple panicle capillary, erect-spreading, rough; the spikelets usually few, somewhat appressed, oblong-linear, 5-7-flowered (pale, ¼' long); palea nearly equal; the lower oblong, minutely 5-toothed at the scarious truncate-obtuse apex, the upper lanceolate, conspicuously 2-toothed; leaves short, sharp-pointed, pale.* (*Windsoria pallida, Torr. Poa dentata, Torr.*) — Shallow water, common, especially northward. July. — Culms slender, 1°-3° long, ascending from a creeping base.

6. **G. aquatica**, Smith. *Panicle much branched, ample (8'-15' long), the numerous branches ascending, spreading with age; spikelets oblong or linear-oblong, 5-9-flowered (usually purplish, 2''-3'' long); lower palea oval, truncate-obtuse, the upper rather shorter; leaves large (1°-2° long, ¼' to ½' wide).* — Wet meadows, &c., common northward. July. — Culm stout, upright, 3°-5° high.

* * * *Spikelets linear* ($\frac{1}{2}$ ' - 1' long), pale, appressed on the branches of the racemose-elongated panicle: *paleæ minutely roughish*; the upper 2-toothed: *stamens 3*: *ligule long*: *culm flattened, ascending from a rooting base*.

7. **G. fluitans**, R. Brown. Spikelets 7-13-flowered; *lower palea oblong, obtuse*, slightly eroded at the apex, usually rather longer than the blunt upper one. — Shallow water, common. June. — Culin thickish, 2° - 5° long. Leaves short and rather broad, very smooth. Panicle 1° long: the simple branches appressed, finally spreading below.

8. **G. acutiflora**, Torr. Spikelets 5-12-flowered, few and scattered on the nearly simple panicle; *lower palea oblong-lanceolate, acute, shorter than the long tapering point of the upper one*. — Wet places, rather rare. June. — Resembles the last; but the erect leaves smaller, the separate flowers twice the length ($\frac{1}{3}$ ' long) and less distinctly nerved.

29. SCLERÓCHLOA, Beauv. SCLEROCHLOA.

Spikelets, flowers, &c., much as in *Glyceria*, but the convex lower palea with 5 faint though distinct parallel nerves, chartaceous below, scarious at the obtuse (sometimes denticulate or mucronulate) tip: *Stamens 3*. — Sea-side or salt-marsh grasses, with the almost cylindrical spikelets appressed to the branches of the contracted or expanding panicle. (Name composed of *σκληρός*, rigid, and *χλόα*, grass, from their general rigidity.)

1. **S. arenaria**, Nees. (SEA SPEAR-GRASS.) Spikelets short-pedicelled, or almost sessile along the branches of the somewhat simple open panicle, 3-8-flowered, linear or oblong-linear; flowers minutely bearded at the base. ♀ (*Poa arenaria*, Retz, Trin.) — Var. 1. MARÍTIMA has branches of the panicle spreading when young but appressed-contracted in fruit, spikelets $\frac{1}{4}$ ' to $\frac{2}{5}$ ' long, and the pale rigid leaves involute; rootstock somewhat creeping. (*P. maritima*, Huds.) — Var. 2. FASCICULÀTA, ex Trin. (*P. fasciculata*, Torr.), is a state with smaller spikelets, panicle of clustered branches, flat leaves, and fibrous roots. — Salt marshes along the coast. June - Aug. — Usually purplish-glaucous in flower, 1° - 2° high. — Distinguished from *Festuca* by the free grain, &c.

30. BRIZOPÝRUM, Link. SPIKED QUAKING-GRASS.

Spikelets and numerous flowers compressed, crowded in a densely spiked or capitate panicle. Glumes herbaceous or membranaceous, the lower several-nerved. Lower palea chartaceo-

coriaceous, somewhat boat-shaped, but not keeled, indistinctly many-nerved, acute. Ovary stalked. Flowers often polygamodiceous, pretty large. Leaves crowded on the culms, involute, mostly rigid. Otherwise essentially as in *Poa*. (Name compounded of *Briza* (No. 27), and *πυρός*, *Wheat*).

1. **B. spicatum**, Hook. Culms tufted, from creeping root-stocks (9'–18' high), rigid, very leafy upward; spike oblong, flattened (1' long); spikelets ovate or oblong, 5–10-flowered; glumes keeled; flowers smooth and naked; lower palea about 9-nerved; grain pointed. (*Uniola spicata*, L. *Poa Michauxii*, Kunth.)—Salt marshes and shores. Aug. — Certainly diceous; the pistillate flowers more rigid and almost keeled, with very long plumose stigmas; the sterile smaller, somewhat rounded on the back.

31. PÒA, L. MEADOW-GRASS. SPEAR-GRASS.

Spikelets ovate or oblong, compressed, few-flowered, in an open panicle. Glumes mostly shorter than the flowers, the lower smaller. Lower palea membranaceo-herbaceous, with a scarios margin, compressed-keeled, pointless, 5-nerved (the intermediate nerves more obscure or obsolete), the principal nerves commonly clothed at and towards the base with soft and matted or cobweb-like hairs; upper palea membranaceous, rather smaller, 2-toothed, falling with the lower at maturity. Stamens 2–3. Stigmas simply plumose. Grain oblong. — Culms tufted. Leaves smooth, usually flat and soft. (An ancient Greek name for grass.) (Root perennial, except in No. 1.)

* *Branches of the panicle 1–2 together, or rarely 3 from the lower joints.*
+ *Short, and very smooth.*

1. **P. ánnua**, L. (LOW SPEAR-GRASS.) Culms spreading or decumbent (3'–8' long), flattish; leaves short; panicle short and broad, often one-sided, at length spreading; *spikelets crowded, very short-pedicelled*, 3–7-flowered; the flowers elliptical-ovate, minutely downy above. — Cultivated and waste grounds, everywhere. April–October.

2. **P. láxa**, Hænke. (MOUNTAIN MEADOW-GRASS.) Culms upright (4'–8' high); panicle small, somewhat racemed-contracted or spreading, loose, often very simple; the branches solitary or in pairs; *pedicels mostly as long as the 3–5-flowered (purple-tinged) spikelets*; flowers lanceolate-ovate, acute, woolly-haired on the keel and margins below, the nerves obsolete; leaves narrowly linear, acute. — Alpine mountain-tops, Maine to N. New York, and north-

ward. Aug. — Panicle sometimes reduced to nearly a simple raceme, when the peduncles are pretty long; occasionally with the short branches in half-whorls of 3 or 4. — *P. alpina*, L., which has an ovate panicle of larger and short-pedicelled spikelets, broader obtuse leaves, &c., is found in Canada, and may be expected within our borders.

← ← *Branches of the panicle long, capillary, roughish, flower-bearing at the summit: flowers cobwebby at the base: culm rather naked.*

3. ***P. púngens***, Nutt. (VERNAL SPEAR-GRASS.) *Culm flattened* (1° – 2° high), stoloniferous from the base; *root-leaves* long and linear, those of the culm 2 or 3, lanceolate; very short, all *abruptly sharp-pointed*; branches of the spreading panicle mostly in pairs; *spikelets 3–5-flowered* ($3''$ – $4''$ long); glumes pointed, rough on the keel; *lower palea oblong-lanceolate*, with a conspicuous scarious tip, rather obtuse, hairy along the keel below. (*P. brevifolia*, Muhl.?) — Rocky places, New York and westward. April, May.

4. ***P. débilis***, Torr. (WEAK SPEAR-GRASS.) *Culm terete, weak* and slender ($1\frac{1}{2}^{\circ}$ – 2° high); *culm-leaves 3–4*, linear, pointless, short; branches of the weak and slender panicle few, in pairs, or the lowest in threes; *spikelets 2–4-flowered* (scarcely $2''$ long, pale green); glumes acutish, smooth; *flowers broadly oblong, very obtuse, smooth*, except the sparing web at the base. — Rocky woods, from Rhode Island and N. New York to Wisconsin. May. — Allied to Nos. 3 and 5.

* * *Branches of the panicle chiefly in half-whorls of 3 to 5 or more, rough or roughish: flowers more or less webbed at the base.*

← *Spikelets scattered on the loose branches, on distinct pedicels.*

5. ***P. nemoralis***, L., var. *CÆSIA*, Trin. (WOOD MEADOW-GRASS.) *Culm flattish* (1° – 2° high); leaves pale, rather long; *ligules very short*; branches of the loose nearly sessile panicle filiform, nearly erect, bearing few or several about 3-flowered spikelets above the middle, some of them shorter than their pedicels; *flowers lanceolate, acutish, obsolete-ly nerved, minutely soft-hairy along the keel below*, naked on the sides. — Woods and shaded hills, common northward. June. — Spikelets pale, fully $2''$ long.

6. ***P. sylvéstris***. *Culm flattened*, slender, upright (2° – 3° high); leaves pale, linear; those of the culm ($2'$ – $4'$ long) much shorter than the internodes; ligules short; branches of the pyramidal-oblong long-peduncled panicle numerous from each joint, ascending or widely-spreading ($1'$ – $2'$ long), bearing 2–3-flowered spikelets from about the middle, many of them shorter than their pedicels; *flowers oblong, obtuse, rather distinctly nerved, densely silky-hairy on the whole length of the keel and on the margins to the middle*. (*P. stolonifera*, Muhl.?) — Rocky banks and meadows, Ohio (and Kentucky), Short! Sullivant! Michigan, and southwestward. — Panicle $6'$ long. Spikelets pale green, scarcely $2''$ long, appearing much like those of No. 4, except the abundant hairiness under the glass.

7. **P. serótina**, Ehrh. (FALSE RED-TOP.) *Culm terete*, slender (2° - 3° high), bearing narrowly linear leaves shorter than the internodes, and a long-peduncled diffuse ample panicle; the branches mostly in fives, rough, naked at the base, compound above, bearing numerous short-pedicelled 2-4-flowered spikelets; *glumes lanceolate, sharp-pointed*; *flowers oblong-lanceolate, acutish, obscurely nerved, hairy only next the base*; *ligules conspicuous*. — Wet meadows and banks of streams, abundant everywhere northward. June, July. — Spikelets 1" long, green, or often tinged with dull purple.

+ + *Spikelets crowded on the branches of the panicle, almost sessile.*

8. **P. triviàlis**, L. (ROUGH MEADOW-GRASS.) *Culms* (1° - 3° high) *and sheaths usually rather rough*; branches of the pyramidal diffuse panicle mostly in fives; spikelets 2-3-flowered; flowers lanceolate, acute, prominently nerved, a little hairy on the keel; *ligule acute, long*; root tufted. — Moist meadows, naturalized, less common and less valuable than the next. July.

9. **P. praténsis**, L. (GREEN, or COMMON MEADOW-GRASS.) *Culms* (1° - 3° high, from a creeping base) *and sheaths smooth*; branches of the pyramidal panicle commonly in fives, spreading; spikelets 3-5-flowered; flowers elliptical-lanceolate, evidently nerved, acute, hairy on the lateral nerves and keel; *ligule blunt, short*. — Everywhere naturalized in dry soil, prized as a pasture-grass. May - July.

10. **P. compréssa**, L. (BLUE-GRASS. WIRE-GRASS.) *Culms much flattened, obliquely ascending* (9' - 18' high) from a creeping base, the uppermost joint near the middle; leaves short, bluish-green; *panicle dense and contracted* (expanding just at flowering), partly one-sided; the short branches 2-4 together, covered to near the base with the 4-9-flowered flattened spikelets; flowers linear-elliptical, rather obtuse, hairy below on the lateral nerves and keel; *ligule short and blunt*. — Dry fields and banks, rarely in woods: introduced? Valuable for pasturage. June - August.

32. ERAGRÓSTIS, Beauv. ERAGROSTIS.

Spikelets 2-70-flowered, nearly as in *Poa*, except that the lower palea is but 3-nerved, not webby at the base, and the upper is persistent on the insoluble rachis for some time after the rest of the flower has fallen. — Culms often branching. Leaves linear, frequently involute, and the ligule bearded. Panicle various. (An early name, probably from *ępa*, *the earth*, and *Agrostis*, in allusion to the procumbent habit of the original species.) -

* *Prostrate and creeping: much-branched spikelets imperfectly diæcious, clustered, in the more fertile plant almost capitate.*

1. **E. réptans**, Nees. Spikelets linear-lanceolate, flat, 10-30-

flowered, almost sessile; flowers lanceolate-ovate, acute; leaves short, almost awl-shaped, smoothish. ① (*Poa reptans*, Michx.)—Gravelly river-borders, common northward; extensively creeping: flower-branches 2'–5' high. August.

* *Culms low, branched at the base, spreading: panicle pyramidal.*

2. **E. megastachya**, Link. Branches of the oblong crowded panicle single or in pairs, mostly naked in the axils, covered with the linear-oblong or ovate-oblong 8–40-flowered lead-colored spikelets ($\frac{1}{4}$ '– $\frac{2}{3}$ ' long), on short pedicels; flowers ovate, obtuse or mucronulate; leaves flat, smooth. ① (*Briza Eragrostis*, L.)—Var. with the spikelets smaller, 6–10-flowered, in a more open panicle, is *Poa Eragrostis*, L. (*E. poeoides*, Beauv.).—Sandy waste places, naturalized. Aug.—Emits a disagreeable odor.

3. **E. pilosa**, Beauv. Branches of the loose and ample panicle capillary, all but the lower scattered and naked in the axils, compound; spikelets 5–12-flowered (3''–5'' long, purplish), nearly linear, flattish, about equalling the pedicels; flowers ovate, acutish; leaves flat or involute, bearded with long hairs at the throat. ① (*P. pilosa*, L. *P. pectinacea*, Michx.)—Sandy soil, common southward. Aug.—Culms 5'–12' long, tufted.

* * *Culms simple, growing in large tufts, upright: panicle very large (longer than the culm), compound, capillary.*

4. **E. capillaris**, Nees. Panicle expanding, very compound (8'–18' long), delicate; the axils naked; spikelets oblong, 2–4-flowered (about 1'' long, purplish), on long capillary pedicels; sheaths and base of the flat leaves often hairy. ① (*P. capillaris*, L.)—Dry sandy places, common, especially southward. August.

5. **E. spectabilis**. Panicle divergently spreading (1°–2° long), the rigid branches reflexed with age, a bearded tuft in the principal axils; spikelets oblong or linear, 7–10- (or 15-) flowered (2''–4'' long, purplish), the lateral ones often not exceeding their appressed pedicels; flowers ovate, minutely ciliate; culm and long leaves rigid, mostly smooth; lower sheaths often downy. ①? (*P. spectabilis*, Pursh. *P. hirsuta*, at least in part, of Northern authors, not of Michx.)—Sandy fields, Massachusetts to Penn. and southward, near the coast. Aug., Sept.

33. FESTUCA, L. FESCUE-GRASS.

Spikelets 3–many-flowered, paniced or racemose; the flowers not webby at the base. Glumes unequal, mostly keeled. Paleæ chartaceous or almost coriaceous, roundish on the back, the lateral nerves vanishing below the entire apex, which is acute, pointed, or often bristle-awned; the upper mostly adhering at maturity

to the inclosed grain. Stamens mostly 3. — Flowers, and often the leaves, rather dry and harsh. (An ancient Latin name.)

* *Flowers bristle-pointed or awned from the tip, racemose-contracted.*

1. **F. tenella**, Willd. Panicle very simple and spike-like, somewhat one-sided (2'–3' long); spikelets 7–9-flowered; awns more or less shorter than the involute-awl-shaped palea; leaves almost bristle-form. ① — Dry sterile soil, not rare. July. — Culms very slender, 6'–12' high.

2. **F. ovina**, L. (SHEEP'S FESCUE-GRASS.) Panicle very simple, much contracted, partly one-sided (2'–3' long); spikelets of about 6 lanceolate-oblong flowers, bearing awns half their length or less; leaves involute-bristle-form, short, chiefly tufted at the base of the slender culm (6'–15' high). † — Fields, E. New England (introduced? rare) and northward; and the var. *VIVÍPARA*, with the spikelets partially converted into a leafy shoot, on the alpine summits of the White Mountains, New Hampshire.

3. **F. duriúscula**, L. Panicle somewhat contracted and turned to one side; spikelets 5–6-flowered, rather larger than in the last, the culm (12'–20' high) mostly larger and its leaves flat: otherwise nearly as in No. 2, of which in Europe it is now considered a variety. † — Dry fields, near the coast, and northward: probably introduced. June.

* * *Flowers awnless, and pointless or merely mucronate, open-panicled: grain commonly free.* (Differing from *Sclerochloa* by the want of the scarious obtuse tip to the lower palea, &c.; from *Poa* also by its rounded back.)

4. **F. elatior**, L. (TALL FESCUE-GRASS.) Panicle branched, loose, rather spreading; spikelets crowded, 4–6-flowered (nearly $\frac{1}{2}$ ' long); lower palea either pointless or very short-pointed: culm 3°–5° high from a somewhat creeping rootstock; leaves broadly linear. † — Moist meadows and pastures: introduced. June.

5. **F. pratensis**, Hudson. (MEADOW FESCUE-GRASS.) Panicle simple, or sparingly branched; spikelets 5–10-flowered; lower palea barely acute; culm 2°–3° high, without a creeping base. † — Fields and meadows, naturalized, common. June, July. — Probably a mere var. of the last, but deemed a more valuable grass.

6. **F. nütans**, Willd. Panicle of several slender and spreading branches, mostly in pairs, drooping when old, rough, naked below, bearing near their extremity a few ovate 3–5-flowered spikelets ($\frac{1}{4}$ ' long) on pretty long pedicels; flowers ovate-oblong, rather obtuse, pointless, close together, coriaceous, smooth, very obscurely 5-nerved. † — Rocky woods and copses. July. — Culm 2°–4° high, naked above: leaves broadly linear, taper-pointed, dark green, often rather hairy.

34. **BRÒMUS**, L. BROME-GRASS.

Spikelets 5-many-flowered, paniced. Glumes unequal, membranaceous, the lower 1-5-, the upper 3-9-nerved. Lower palea convex on the back or slightly keeled, about 7-nerved at the base, awned or bristle-pointed from below the mostly 2-cleft tip, the awn usually founded on the 3 middle nerves: upper palea at length adhering to the groove of the oblong or linear grain. Stamens 3. — Coarse grasses, with large spikelets, at length drooping, on pedicels thickened at the apex. (An ancient name for the Oat, from βρόμος, *food*.)

* *Indigenous species.*

1. **B. ciliatus**, L. *Panicle compound*, very loose, the elongated branches at length divergent, drooping; spikelets 7-12-flowered; lower glume 1-nerved, the upper 3-nerved (sometimes awn-pointed); flowers oblong-lanceolate, tipped with an awn half to three fourths their length; upper palea bristly-ciliate; the lower silky with appressed hairs near the margins, at least below (or rarely naked), smooth or smoothish on the back (*B. Canadensis*, Michx. *B. pubescens*, Muhl.);— or, in var. **PÚRGANS** (*B. purgans*, L.), clothed all over with very short and fine appressed hairs. ♀ — River-banks and moist woodlands. July, Aug. — Culm 3°-4° high, with the large leaves ($\frac{1}{4}$ '- $\frac{1}{2}$ ' wide) smooth or somewhat hairy; the sheaths in the larger forms often hairy or densely downy near the top. — Variable as to the pubescence, &c., clearly including both the Linnæan species; for which I choose the present name instead of the inapplicable *purgans*, which was taken from Feuillé's South American species.

2. **B. Kálmii**. *Panicle simple*, small (3'-4' long), the spikelets drooping on capillary peduncles, closely 7-12-flowered, densely silky all over with rather long and spreading hairs; lower glume strongly 3-nerved, the upper 5-nerved; awn only one-third the length of the lanceolate-oblong flower; culm slender ($1\frac{1}{2}$ °-3° high); leaves and sheaths conspicuously or sparingly hairy. ♀ (*B. ciliatus*, Muhl. *B. purgans*, Torr. *Fl. N. Y.*) — Dry woodlands and open places. June, July. — This is preserved in the herbarium of Linnæus under the name of *B. ciliatus*, though it is not the plant he has described; thence has arisen much confusion.

* * *Introduced and partially naturalized species.*

3. **B. secalinus**, L. (CHEAT OR CHESS.) *Panicle spreading*, the drooping peduncles but little branched; spikelets oblong-ovate, turgid, smooth, of 8-10 flowers not overlapping each other, mostly longer than the awn; lower glume 5-nerved; upper 7-nerved. ① — Grain-fields, &c., too common. June.

4. **B. mólilis**, L. *Panicle erect*, close, compound; *spikelets ovate, flattish*, the flowers closely imbricated, *downy* (as also the leaves, &c.), as long as the awn. ② — Sparingly naturalized in New York and Penn.—Darlington dubiously gives **B. ARVÉNSIS**, L., in fields, Chester county, Pennsylvania.

5. **B. stérilis**, L. *Panicle very loose*, the elongated and nearly simple branches *drooping*; *spikelets linear-lanceolate* (oblong when old), of about 6 rather distant 7-nerved *roughish flowers, shorter than the awn*; glumes lance-awl-shaped; leaves rather hairy. ① — Penn Yan, New York, *Sartwell*. July.

35. UNIOLA, L. SPIKE-GRASS.

Spikelets many-flowered, very flat and 2-edged; one or more of the lowest flowers sterile (neutral) and consisting of a single palea. Glumes lanceolate, compressed-keeled. Lower palea coriaceous-membranaceous, strongly compressed-keeled, striate-nerved, usually acute or pointed, entire, inclosing the much smaller compressed 2-keeled upper one and the free laterally flattened smooth grain. Stamen 1 (in *U. paniculata* 3). — Upright perennials, in tufts from creeping rootstocks, with broad leaves and large spikelets in a panicle. Rachis of the spikelets naked. (Ancient name of some Grass, a diminutive of *unio*, transferred to this genus on account of the unity of the lowest paleæ.)

1. **U. latifolia**, Michx. *Spikelets slender-pedicelled, drooping, in an ample loose panicle*, oblong-ovate (1' long and $\frac{1}{2}$ ' or more wide), 10-15-flowered; flowers nearly appressed, ovate-lanceolate and taper-pointed, slightly scythe-shaped, ciliate on the keel, the lowest one neutral and like a third glume; leaves flat (nearly 1' wide).—Shaded banks, S. Penn., Ohio, and southward. Aug. — Culm 3° - 4° high.

2. **U. grácilis**, Michx. *Spikelets short-pedicelled (small), in a long and slender strict panicle*, broadly wedge-shaped, acute at the base, 4-8-flowered; the flowers at length spreading, ovate, long-pointed, the lowest one neutral; leaves long and flat (3'' - 4'' wide). — Sandy soil, from Long Island southward near the coast. Aug. — Culm 3° high, slender.

36. PHRAGMITES, Trin. REED.

Spikelets 3-7-flowered; the flowers rather distant, with a conspicuous silky-bearded rachis, all perfect and 3-androus, except the lowest, which is either neutral or with a single stamen, and naked. Glumes membranaceous, shorter than the flowers, lance-

olate, keeled, sharp-pointed, very unequal. Paleæ membranaceous, slender; the lower narrowly awl-shaped, thrice the length of the upper. Styles long. Grain free. — Tall and stout perennials, with numerous broad leaves, and a large terminal panicle. (*Φραγμίτης*, growing in, or forming, hedges.)

1. **P. communis**, Trin. Panicle loose, diffuse when old; spikelets 3-5-flowered. (*Arundo Phragmites*, L.) — Edges of ponds and swamps, common northward. Aug., Sept. — Looks like Broom-corn at a distance, 6°-12° high: leaves 2' wide.

37. TRÍTICUM, L. WHEAT.

Spikelets 3-several-flowered, single at each joint, and placed with the side against the rachis. Glumes transverse, nearly equal and opposite, herbaceous, nerved. Lower palea very like the glumes, convex on the back, pointed or awned from the tip: the upper flattened, bristly-ciliate on the nerves, free or adherent to the groove of the grain. Stamens 3. (The classical name, probably from *tritus*, beaten or threshed.) — The true species are annuals, with the glumes ovate-oblong and ventricose-boat-shaped, as in the common *Wheat* (*T. vulgare*). The others are perennial, with nearly lanceolate acute or pointed glumes, and 2-ranked spikes; never furnishing bread-corn (*AGROPYRON*, Gærtn.); to which the following belong.

1. **T. repens**, L. (COUCH-GRASS. QUITCH-GRASS.) *Rootstock creeping* extensively; spikelets 4-8-flowered; glumes 5-7-nerved; rachis rough on the angles; *awn none, or never more than half the length of the flower; leaves flat*, roughish or hairy above. — Naturalized and troublesome in fields, &c., multiplying rapidly by the creeping rootstocks, which are very tenacious of life: also wild northward. June-August. — Culm 1°-2° high.

2. **T. caninum**, L. (AWNED WHEAT-GRASS.) *No creeping rootstock*; spikelets 4-5-flowered; glumes 3-nerved; rachis bristly on the edges; *awn longer than the smooth flower; leaves flat*, roughish on both sides. — Woods and banks, not rare: introduced.

3. **T. dasystachyum**. Culm (1°-3° high, from a *strong creeping rootstock*) and narrow mostly involute leaves *very smooth and glaucous*; spikelets *downy-hairy all over*, whitish, 5-9-flowered; glumes 5-7-nerved; rachis rough on the edges; awn sometimes about half the length of the flower, sometimes nearly wanting. (*T. repens*, var. *dasystachyum*, Hook.) — Sandy shores of the north of Michigan, *Dr. Pitcher*, &c. August.

38. **LÓLIUM**, L. DARNEL.

Spikelets many-flowered, solitary, and placed edgewise on the continuous rachis: the glume, except in the terminal spikelet, only one and external:— otherwise chiefly as in *Triticum* § *Agropyron*. (The ancient Latin name.)

1. **L. perénne**, L. (COMMON DARNEL. RAY OR RYE-GRASS.) *Glume much shorter than the spikelet; flowers 6-9, usually awnless, sometimes awn-pointed.* ♁ — Meadows, &c., naturalized. June. — A pretty good pasture-grass.

2. **L. temuléntum**, L. (BEARDED DARNEL.) *Glume fully equalling the 5-7-flowered spikelet; awn longer than the flower (½' long).* ① — Old fields, Massachusetts and Penn., scarcely naturalized. — Grain noxious, almost the only such instance in Grasses.

39. **ÉLYMUS**, L. LYME-GRASS. WILD RYE.

Spikelets 2-4 at each joint of the rachis, all fertile, each 2-7-flowered; the uppermost flower imperfect. Glumes nearly side by side in front of the spikelets, rarely wanting. *Paleæ coriaceous*, the lower rounded on the back, usually awned at the apex, adherent to the involving *paleæ* (whence the name of these Rye-like Grasses, *ἔλυμος*, a hull, also an ancient name for some grain, from *ἐλύω*, to roll up).

§ 1. **ELYMUS** proper. — *Glumes rigid, unequal-sided, nerved.*

1. **E. Virgínicus**, L. *Spike rigidly upright, dense and thick (3' long), on a short peduncle usually included in the sheath; spikelets 2-3 together, 2-3-flowered, smooth, rather short-awned; the rough and thickened strongly-nerved and bristle-pointed lanceolate glumes about their length.* ♁ — River-banks, common southward. Aug. — Culm stout, 2°-3° high: leaves broadly linear, rough.

2. **E. Canadénsis**, L. *Spike rather loose, curving (5'-9' long), on an exserted peduncle; spikelets mostly in pairs, of 3-5 long-awned rough or rough-hairy flowers; the lance-awl-shaped glumes tipped with shorter awns.* (E. *Philadélpicus*, L.!) — Var. **GLAUCIFÓLIUS** (E. *glaucifolius*, *Muhl.*) is pale or glaucous throughout, the flowers with spreading awns (1½' long). ♁ — River-banks, in rich soil.

3. **E. striátus**, Willd. *Spike dense but slender, upright or slightly nodding (3'-4' long); spikelets mostly in pairs, 1-2- (or rarely 3-) flowered, minutely bristly-hairy; glumes linear-awl-shaped or truly awl-shaped, bristle-awned, about thrice the length of the flowers, not counting their capillary awn (which is 1' long); leaves rather narrow and sheaths smooth or hairy, or downy.* — Var. **VILLÓsus** (E. *villosus*, *Muhl.*!) has a somewhat stouter spike and very hairy glumes.

‡ — Rocky woods and banks, rather rare. July. — The most slender and smallest-flowered species.

§ 2. *GYMNÓSTICHUM*, Schreber. (*Asprélla*, Humb.) — *Glumes wanting, or minute rudiments, sometimes apparent and awn-like.*

4: **E. Hýstrix**, L. (BOTTLE-BRUSH GRASS.) Spike upright, loose (3' - 6' long); the spreading spikelets 2 - 3 together, early deciduous from the joints, about 3-flowered; flowers smoothish, or often rough-hairy, tipped with an awn thrice their length (1' long); leaves and sheaths smoothish. ‡ — Moist woodlands, common. July.

40. HÓRDEUM, L. BARLEY.

Spikelets 1-flowered with an awl-shaped rudiment on the inner side, 3 at each joint of the rachis, but the lateral ones usually imperfect or abortive. Glumes side by side in front of the spikelets, slender and awn-pointed or bristle-form. Paleæ herbaceous, the lower (anterior) convex, long-awned from the apex. Stamens 3. Grain oblong, commonly adhering to the paleæ. Rachis of the dense spike often separating into joints. (The ancient Latin name.)

1. **H. jubàtum**, L. (SQUIRREL-TAIL GRASS.) Lateral flowers abortive, neutral, on a short pedicel, short-awned; the perfect flower bearing an extremely *long awn* (2' long) *about the length of the similar capillary glumes* which form apparently a 6-awned involucre, all spreading. ② — Marshes and moist sand along the coast and the Northern Lakes. June. — Culm 1° high, slender, bearing a light, singularly bearded spike.

2. **H. pusillum**, Nutt. Lateral flowers imperfect and neutral, awnless but pointed, the perfect flower bearing an *awn nearly twice the length of the palea, equalling the short awns of the rigid glumes*, which rise, the central from an awl-shaped, the middle ones from an oblong base; spike linear. ① — Saline soil, Ohio and westward. — Near *H. maritimum*: 4' - 10' high.

H. dístichum, L., is the cultivated TWO-ROWED BARLEY.

H. vulgàre, L., is the common FOUR- (-SIX-) ROWED BARLEY; the lateral spikelets being also fertile, probably as a consequence of long-continued cultivation.

SECÀLE CERÈALE, L., the RYE, is a well-known cultivated grain of this group, nearly allied to the Wheat in botanical character.

41. AÍRA, L. HAIR-GRASS.

Spikelets 2-flowered, in an open diffuse panicle; the (small) flowers both perfect (sometimes with a third imperfect), usually shorter than the membranaceous keeled often lead-colored glumes,

scarcely of a more rigid texture than they, hairy at the base. Lower palea 3-5-nerved, awned on the back below the middle. Stamens 3. Grain oblong, smooth. (An ancient Greek name for Darnel; which these Grasses are very unlike.)

§ 1. *DESCHAMPsia*, Beauv., Trin. — *Grain free, not grooved: glumes not exceeding the flowers.*

1. *A. cæspitosa*, L. Culms in close tufts (2°-4° high); *leaves flat, linear, roughish*; panicle pyramidal or oblong (6' long); *lower palea eroded-4-toothed at the truncate apex, short-awned* above the base; awn straight, or when somewhat exerted often bent below. ♁ — Shores of lakes and streams, not rare northward. June.

2. *A. flexuosa*, L. (COMMON HAIR-GRASS.) Culms slender, nearly naked (1°-2° high), from the small tufts of *involute-bristle-form often curved leaves* (1'-6' long); branches of the small spreading panicle capillary, mostly in pairs; *lower palea slightly 2-toothed*; *awn* from near the base, *bent in the middle, longer than the glumes.* ♁ — Dry rocky or sandy places, very common. June.

§ 2. *AIRA* proper. — *Grain grooved, adherent to the upper palea: glumes always longer than the flowers: awn bent.*

3. *A. atropurpurea*, Wahl. Culms 8'-15' high, weak; *leaves flat*; panicle of few spreading branches bearing spikelets near the summit; lower palea minutely fringe-toothed at the apex, bearing a stout *awn from the middle, which equals the ovate-lanceolate and pointed (purplish) glumes* (3'' long). ♁ — Alpine tops of the White Mountains, and those of N. New York. August.

4. *A. præcox*, L. Dwarf (3'-4' high), tufted; *leaves short, bristle-shaped*; branches of the small oblong panicle appressed, bearing spikelets from near the base; lower palea with 2 awl-pointed tips; *awn from below the middle, longer than the acute glumes.* ① — Sandy fields, naturalized in New Jersey and Penn. June.

42. *TRISËTUM*, Persoon. *TRISËTUM.*

Spikelets 2-several-flowered, usually in a contracted panicle; the lower palea compressed-keeled, awned below the sharply 2-cleft or 2-pointed apex (whence the name, from *tris*, three, and *seta*, a bristle): — otherwise nearly as in *Aira*.

1. *T. mólle*, Kunth. *Minutely soft-downy; panicle dense, much contracted*, oblong or linear (2'-3' long); glumes nearly equal, about the length of the 2-3 smooth flowers; awn diverging, much exerted, not twisted. ♁ — Mountains and rocky river-banks, N. New England to Wisconsin, and northward, rare. July. — About 1° high: leaves flat, short.

2. *T. palústre*, Torr. *Smooth; panicle* rather long and nar-

row (5' long), loose, the branches capillary; spikelets flat (3' long); glumes rather unequal, shorter than the 2 smooth lanceolate flowers, of which the upper is on an almost naked joint of the rachis and bears a slender spreading or bent awn next the short 2-pointed tip, while the lower one is commonly awnless or only mucronate-pointed. ♀ (Avena palustris, Michx. Aira pállens, Muhl.) — Low grounds, from S. New York southward and westward: common only at the South. June. — Culm slender, 2°-3° high: leaves flat, short. Spikelets yellowish-white, tinged with green.

43. DANTHÓNIA, DC. WILD OAT-GRASS.

Lower palea (oblong or ovate, rounded-cylindrical, 7-9-nerved) bearing between the sharp-pointed teeth of the tip an awn composed of the 3 middle nerves, which is flattish and spirally twisting at the base: otherwise as in Avena. Glumes longer than the imbricated flowers. (Named for *Danthoine*, a French botanist.)

1. **D. spicàta**, Beauv. Culms tufted (1°-2° high); leaves short, somewhat involute-awl-shaped; sheaths bearded at the throat; panicle simple, raceme-like (2' long), rather one-sided; the few spikelets appressed, 7-flowered; lower palea broadly ovate, loosely hairy on the back, much longer than the lance-awl-shaped teeth, about $\frac{1}{2}$ the length of the awn. ♀ — Dry and sterile or rocky soil. July. — Spikelets pale, $\frac{1}{3}$ ' long.

44. AVÈNA, L. OAT.

Spikelets 3-many-flowered, paniced, commonly large; the flowers herbaceo-chartaceous, or becoming harder, of firmer texture than the large and mostly unequal glumes; the uppermost imperfect. Lower palea rounded on the back or keeled, 7-11-nerved, bearing a long usually bent or twisted awn on the back or below the 2-cleft tip, proceeding from the mid-nerve only. Stamens 3. Grain oblong-linear, grooved on one side, usually hairy, free, but usually invested by the upper palea. (The classical Latin name.)

1. **A. striàta**, Michx. Culms tufted, slender (1°-2° high); leaves narrow; panicle simple, loose, somewhat one-sided, drooping with age; the few 3-5-flowered spikelets on rough capillary pedicels, much longer than the very unequal purple (1- and 3-nerved) glumes; lower palea strongly 7-nerved, rounded on the back, surrounded by a short bearded tuft at the base ($\frac{1}{3}$ ' long) much longer than

the ciliate-fringed upper one, bearing a long straightish awn just below the tapering 2-cleft tip. ♃ (*Trisetum purpurascens*, Torr.) — Rocky, shaded hills, common northward. June.

A. SATIVA, L., the COMMON OAT, belongs to the section with annual roots, and long 7-9-nerved glumes.

A. NUDA, L., called SKINLESS OAT, from the easy separation of the grain from the paleæ, is sometimes cultivated "on account of its superior fitness for making oat-meal."

A. PENNSYLVANICA, L., received from Kalm, seemed from a bare view of the specimen in herb. Linn. to be *Trisetum palustre* (to which the character does not apply): but a specimen in Schreber's herb., purporting to come from Kalm, is *Trisetum flavescens*.

45. ARRENATHERUM, Beauv. OAT-GRASS.

Spikelets open-panicked, 2-flowered, with the rudiment of a third (terminal) flower; the middle flower perfect, with the lower palea barely bristle-pointed from near the tip; the lowest staminate only, bearing the long bent awn below the middle of the back (whence the name, from ἄρρην, masculine, and ἀθήρ, awn): — otherwise as in *Avena*, to which it is very nearly allied.

1. *A. avenaceum*, Beauv. Leaves broad and flat; panicle elongated (8' - 10' long); glumes scarious, very unequal, the upper almost equalling the flowers. ♃ (*Avena elatior*, L.) — Introduced from Europe, naturalized in some places, absurdly called *Grass of the Andes*. May, June.

46. HÓLCUS, L. (partly). MEADOW SOFT-GRASS.

Spikelets in a contracted panicle, of 2-3 flowers pedicelled so as to stand side by side, shorter than the membranaceous glumes, viz., the lowest flower neutral, small and abortive, or obsolete; the middle one perfect, 3-androus, chartaceous, awnless; the upper one staminate only, 3-androus, bristle-awned towards the tip. (An ancient name, from ὄλκος, draught, of obscure application.)

1. *H. lanatus*, L. (VELVET-GRASS.) Soft-downy, pale; panicle oblong (1'-4' long); upper glume mucronate under the apex; awn of the staminate flower recurved. ♃ — Moist meadows, naturalized sparingly. June.

47. HIERÓCHLOA, Gmelin. HOLY-GRASS.

Spikelets plainly 3 flowered, panicked; the flowers all with 2 paleæ: the two lower (lateral) flowers staminate only, 3-androus,

sessile, often awned; the uppermost (middle) one perfect, short-pedicelled, scarcely as long as the others, 2-androus, awnless. — Leaves linear or lanceolate, flat. Name composed of *ἱερός*, *sacred*, and *χλόα*, *grass*; these sweet-scented Grasses being strewn before the church-doors on saint-days, in the North of Europe.)

1. **H. boreàlis**, Roem. & Schultes. (VANILLA OR SENECA GRASS.) Panicle somewhat one-sided, pyramidal (2' - 5' long); peduncles smooth; staminate flowers with the lower palea mucronate or bristle-pointed at or near the tip; rootstock creeping. ♁ (Holcus odoratus, L.) — Moist meadows, from New York northward, chiefly near the coast. May. — Culm 1° - 2° high, with short lanceolate leaves. Spikelets chestnut-color; the sterile flowers strongly hairy-fringed on the margins, and the fertile one at the tip.

2. **H. alpina**, Roem. & Schultes. Panicle contracted (1' - 2' long); one of the staminate flowers barely pointed or short-awned near the tip, the other exsertly awned from below the middle; lowest leaves very narrow. ♁ — Alpine mountain-tops, New England and New York, and northward. July.

48. ANTHOXÁNTHUM, L. VERNAL-GRASS.

Spikelets spiked-panicled, evidently 3-flowered, but the lateral flowers neutral, consisting merely of a narrow palea which is hairy on the outside and awned on the back: the central (terminal) one perfect, of 2 awnless paleæ, 2-androus. Glumes very thin, acute, keeled; the upper about as long as the flowers, twice the length of the lower. Squamulæ none. Grain ovate, adherent to the inclosing paleæ. (Name compounded of *ἄνθος*, *flower*, and *ἄνθων*, *of flowers*. L. Phil. Bot.)

1. **A. odoratum**, L. (SWEET-SCENTED VERNAL-GRASS.) Panicle spiked (1' - 2' long), the spikelets spreading (brownish or tinged with green); one of the neutral flowers bearing a bent awn from near its base, the other short-awned below the tip. ♁ — Copiously naturalized in meadows, pastures, &c.; very sweet-scented in drying. May - July.

49. PHÁLARIS, L. CANARY-GRASS.

Spikelets crowded in a dense panicle, 3-flowered; but the 2 lower (lateral) flowers mere neutral rudiments at the base of the perfect one, which is flattish, awnless, of 2 shining paleæ, shorter than the equal boat-shaped glumes, finally coriaceous and closely inclosing the flattened free and smooth grain. Stamens 3. —

Leaves broad, flat. (The ancient name, from *φαλός*, *shining*, alluding either to the paleæ or the grain.)

1. **P. arundinæcea**, L. (REED CANARY-GRASS.) Panicle more or less branched, clustered, a little spreading when old; *glumes obtusely keeled*, with flattened pointed tips, the lower one fringed on the margin below the middle; *rudimentary flowers cartilaginous, hairy*, $\frac{1}{2}$ the length of the fertile one. ♁ (P. *Americana*, Torr., not of Ell.) — Wet grounds. July. — Culm 2°-4° high; leaves 3"-5" wide. — The RIBBON-GRASS of the gardens is a variety, with variegated leaves.

2. **P. Canariensis**, L. (CANARY-GRASS.) Panicle spiked, oval; *glumes wing-keeled*; *rudimentary flowers smooth, chartaceous*, half the length of the fertile one. ① — Waste places, naturalized in New York, Torrey. July - Sept. — Yields the *Canary-seed*.

50. MILIUM, L. MILLET-GRASS.

Spikelets diffusely paniced, not jointed with their pedicels, apparently consisting of 2 equal membranaceous convex and awnless glumes, including a single coriaceous awnless flower: but, in fact, the lower glume is wanting, while an empty single palea of the lower (neutral) flower, resembling the upper glume, fulfils its office, and stands opposite the narrow upper palea of the terete fertile flower. Stamens 3. Stigmas branched-plumose. Grain not grooved, inclosed in the deciduous paleæ. (The ancient Latin name of the Millet (which however belongs to a different genus), probably from *mille*, a thousand, because of its fertility.)

1. **M. effusum**, L. (WILD MILLET-GRASS.) Smooth (3°-6° high); leaves broad and flat, thin; panicle spreading (6'-9' long); flower ovoid-oblong. ♁ — Cold woods, common northward. June.

51. AMPHICÁRPUM, Kunth. (MILIUM, Pursh.)

Spikelets jointed with the apex of the pedicels, apparently 1-flowered, of two kinds; one kind in a strict terminal panicle, like those of *Milium*, except that the rudiment of the lower glume is ordinarily discernible, quite deciduous from the joint, often without ripening fruit, although the flower is perfect: the other kind solitary at the extremity of slender runner-like radical peduncles (more or less sheathed towards the base), much larger than the others, perfect and fertile, subterranean in fruit; the enwrapping glume and similar empty palea many-nerved. Flower oblong or ovoid, pointed. Stamens 3 (small in the radical flowers). Stig-

mas plumose, deep purple. Grain ovoid, terete, grooveless, in the radical flowers much larger (2" - 3" long). Neutral palea somewhat exceeding the glume and the fertile flower. — Leaves lanceolate, flat, copious on the lower part of the culm, clothed like the sheaths with bristly spreading hairs. (Name from ἀμφίκαρπος, bearing fruit on both sides.)

1. **A. Púrshii**, Kunth. (*Milium amphicarpon*, Pursh.) — Moist sandy Pine barrens, N. Jersey. Sept. — 1° - 5° high. The jointed spikelets and the rudiment of the lower glume have been overlooked.

52. PÁSPALUM, L. PASPALUM.

Spikelets spiked or somewhat racemed in 2-4 rows on one side of a flattened continuous rachis, jointed with their very short pedicels, plano-convex, awnless, apparently only one-flowered, as in *Milium*, and, on the other hand, differing from *Panicum* merely in the want of the lower glume. Glume and empty palea few-nerved. Flower coriaceous, mostly orbicular, flat on the inner side. Stamens 3. — Spikes single, digitate, or racemed. (Said to have been a Greek name for Millet.)

1. **P. setàceum**, Michx. Culm ascending or decumbent (1° - 2° long), slender; leaves (2" wide, flat) and sheaths clothed with soft spreading hairs; *spikes very slender* (2' - 4' long), smooth, *solitary, the terminal one long-peduncled, and usually one from the sheaths of each of the upper leaves on short peduncles or included*; spikelets ($\frac{1}{2}$ " wide) *narrowly 2-rowed*, broader than the zigzag rachis. † (*P. débile* and *P. ciliatifolium*, Michx.) — Sandy fields, common southward and near the coast. August.

2. **P. læve**, Michx. Culm upright, rather stout (1° - 3° high); the pretty large and long leaves with the flattened sheaths smooth or somewhat hairy; *spikes few* (2-6), *alternate and approximated at the summit of a usually elongated naked peduncle*, spreading (2' - 4' long), smooth, except a bearded tuft at their base; *spikelets broadly 2-rowed* (over 1" wide), much broader than the rachis. † — Moist soil, S. New England to Penn. near the coast. August. — Sometimes the lower sheaths, &c., are very hairy.

53. PÁNICUM, L. PANIC-GRASS.

Spikelets paniced, racemed, or sometimes spiked, not involucrate, 1½ - 2-flowered. Glumes 2, but the lower one usually short or minute (wanting in No. 3), membranaceo-herbaceous; the upper as long as the fertile flower. Lower flower either neutral or

staminate, of one palea which closely resembles the upper glume, and sometimes with a second thin one. Upper flower perfect, closed, coriaceous or cartilaginous, usually flattish parallel with the glumes, awnless, inclosing the free and grooveless grain. Stamens 3. Stigmas plumose, usually purple. (An ancient Latin name, thought to come from *panis*, bread; some species furnishing a kind of bread-corn, e. g. Millet.)

§ 1. *DIGITARIA*, Scop. — *Spikelets crowded 2-3 together in simple and mostly 1-sided clustered spikes or spike-like racemes, wholly awnless and pointless: lower flower neutral, of a single palea: lower glume minute, in No. 3 wanting.*

1. **P. sanguinale**, L. (FINGER-GRASS. CRAB-GRASS.) *Culms spreading from the tufted base, then upright (1° - 2° high); leaves linear-lanceolate and sheaths rather hairy; spikes 4-15, digitate-clustered; spikelets oblong (1" long), downy-margined; upper glume shorter than the flower.* ① — Everywhere naturalized in cultivated grounds, troublesome in gardens. Aug. - Oct. — Spikes and often the leaves purplish; as also in the other species.

2. **P. glabrum**, Gaudin. *Procumbent or spreading (6' - 12' long), smooth or nearly so; spikes 2-6, somewhat alternate-clustered, spreading; spikelets ovoid, rather hairy (1" long); upper glume nearly equalling the flower.* ① — Sandy fields. Aug.

3. **P. filiforme**, L. *Culms extremely slender, upright (1° - 2° high); leaves narrow; lower sheaths hairy; spikes 2-8, alternate and approximated, thread-like; spikelets all distinctly pedicelled, oblong, acute (½" long); lower glume none.* ① — Dry sandy soil, from Massachusetts near the coast to New Jersey and southward. August.

§ 2. *PANICUM* proper. — *Spikelets scattered, panicle, awnless.*

* *Panicle elongated and racemose, wand-like or pyramidal; the numerous (usually pointed) spikelets short-pedicelled, excepting No. 7.*

+ *Sterile flower neutral, fully twice the length of the lower glume: spikelets small (less than 1" long).*

4. **P. anceps**, Michx. *Culms flat, upright (2° - 4° high); leaves rather broadly linear (1° - 2° long, 4" - 5" wide), smooth; panicle contracted-pyramidal; spikelets ovate-lanceolate, pointed, a little curved; upper glume 7-nerved; neutral flower ½ longer than the perfect, of 2 paleæ.* † — Wet soil, Pine barrens of New Jersey and southward. Aug. — Allied to the next: spikelets and branches of the panicle longer.

5. **P. agrostoides**, Spreng. *Culms flattened, upright (2° high); leaves long, and with the sheaths smooth; panicles terminal and often lateral, pyramidal (4' - 8' long); the spikelets racemose, crowded and one-sided on the spreading branches, ovate-oblong, acute*

(purplish); *upper glume 5-nerved*, longer than the neutral flower, which has 2 paleæ and exceeds the perfect one. — Wet meadows, from E. Massachusetts southward. August.

6. **P. proliferum**, Lam. *Smooth throughout; culms thickened, succulent, branched, and geniculate, ascending from a procumbent base; sheaths flattened; ligule ciliate; panicles terminal and lateral, compound, pyramidal, the slender primary branches at length spreading; spikelets appressed, lance-oval, acute (pale green), lower glume broad, $\frac{1}{3}$ to $\frac{1}{4}$ the length of the upper; neutral flower little longer than the perfect one, of a single palea.* ① — Brackish marshes and meadows, common along the coast. August.

7. **P. capillare**, L. *Culm upright, often branched at the base and forming a tuft; leaves and especially the flattened sheaths hairy; panicle pyramidal, capillary, compound and very loose (6'–12' long), the slender straight branches somewhat reflexed when old; spikelets ($\frac{1}{2}$ " long) scattered on long pedicels, oblong, pointed; lower glume half the length of the single palea of the neutral flower, which is much longer than the perfect one.* ① — Sandy soil and cultivated fields everywhere. Aug.–Sept.

← ← *Sterile flower staminate, of 2 paleæ; lower glume nearly equalling it: spikelets large (nearly 2" long).*

8. **P. virgatum**, L. *Very smooth; culms upright (3°–5° high); leaves very long, flat; branches of the compound loose and large panicle (9'–2° long) at length spreading or drooping; spikelets scattered, oval, pointed; glumes and sterile paleæ pointed, usually purplish.* ¶ — Moist sandy soil, common, especially near the coast and southward. August.

9. **P. amarum**, Ell. *Nearly smooth, rigid; culms (1½° high) sheathed to the top; leaves involute, glaucous, coriaceous, the uppermost exceeding the contracted panicle, the simple racemose branches of which are appressed, very smooth; spikelets ovate, pointed (pale); lower glume little shorter than the sterile flower.* ¶ — Sandy shores of Connecticut, Barratt, Robbins. September.

* * *Panicle loosely spreading, or diffuse, short.*

← *Lower (sterile) flower with a scarious (sometimes quite small) upper palea, neutral, except in No. 10, and sometimes in No. 13.*

↔ *Culm-leaves broadly lanceolate or wider, with 9–15 principal nerves.*

10. **P. latifolium**, L. (excl. syn. Sloane). *Culm (1°–2° high), smooth; the joints and the orifice of the throat or margins of the otherwise smooth sheaths often bearded with soft woolly hairs; leaves broadly oblong-lanceolate from a heart-clasping base (often 1' wide), taper-pointed, 11–15-nerved, smooth, or sparingly downy-hairy; panicle more or less exserted (2'–3' long), the branches spreading; spikelets obovate, 1½' long, downy; lower glume ovate, not half the length of the many-nerved upper one; sterile flower often (but not*

always) with 3 stamens. ♁ (P. Waltèri, Poir.)—Moist thickets, common. June.

11. **P. clandestinum**, L. Culm rigid (1° – 3° high), very leafy to the top, at length producing appressed branches, the *joints naked*; *sheaths rough with papillæ bearing spreading bristly hairs*; leaves oblong-lanceolate from a heart-clasping base, very taper-pointed; lateral and usually the terminal *panicle partly or entirely inclosed in the sheaths*, or, in var. *PEDUNCULATUM*, with the terminal one at length long-peduncled:—otherwise resembling the last, but the *spikelets more ovoid*, often smooth; the lower flower (always?) neutral. — Low thickets and river-banks. August.

12. **P. microcarpon**, Muhl. Culm and sheaths as in No. 10; the broadly lanceolate leaves nearly similar, but longer in proportion and less taper-pointed, not dilated at the rounded bristly-ciliate base, very rough-margined, the upper surface roughish; panicle soon exerted, very many-flowered, narrowly oblong ($3'$ – $7'$ long); spikelets $\frac{1}{2}''$ long, ovoid, smooth or smoothish; lower glume orbicular, very small. ♁ (P. multiflorum, Ell.?) — Thickets, Penn. and southward.

13. **P. xanthophysum**, Gray. Culm simple, or at length branched near the base ($9'$ – $15'$ high); *sheaths hairy*; *leaves lanceolate, very acute* ($4'$ – $6'$ long by $\frac{1}{2}'$ wide), *not dilated at the ciliate-bearded clasping base, smooth except the margins, strongly 9–11-nerved*; *panicle long-peduncled, simple, contracted*, the appressed branches bearing few *roundish-obovate spikelets $1\frac{1}{2}''$ long*; lower glume ovate, acutish, $\frac{1}{3}$ to $\frac{1}{2}$ the length of the 9-nerved upper one. ♁ — Dry sandy soil, Maine to Wisconsin and northward, rare. June.—Plant yellowish-green: spikelets minutely downy: ster. fl. sometimes staminate.

14. **P. viscidum**, Ell. Culms upright or ascending, at length much branched, leafy to the top, *densely velvety-downy all over, as also the sheaths*, with reflexed soft and often clammy hairs, *except a ring below each joint*; *leaves likewise velvety all over, lanceolate* ($\frac{1}{2}'$ wide), 11–13-nerved; panicles spreading, the lateral included; *spikelets obovate, $1''$ long, downy*, the roundish lower glume scarcely $\frac{1}{4}$ the length of the 7-nerved upper one. — Damp soil, S. New Jersey and southward.

15. **P. pauciflorum**, Ell.? Culms upright, at length much branched and reclining (1° – 2° long), *roughish*; *leaves lanceolate* ($3'$ – $5'$ long by $\frac{1}{3}'$ – $\frac{1}{2}'$ wide), *rather faintly 9-nerved*, hairy or smooth, *fringed on the whole margin or next the base with long and stiff spreading hairs, the sheaths bristly throughout* with similar hairs; *panicle open, nearly simple, bearing few tumid-obovate hairy or smoothish spikelets about $1\frac{1}{2}''$ long*; lower glume roundish, $\frac{1}{2}$ to $\frac{1}{4}$ the length of the upper. ♁ (P. leucoblèpharis, Trin.?)—Wet meadows and copses, N. Pennsylvania (Carey) and W. New York to Michigan. June, July.—Distinguished by its much larger spikelets, more nerved leaves, and coarser aspect, from any form of the next.

++ ++ *Leaves linear or lanceolate, with few or indistinct primary nerves.*

16. **P. dichotomum**, L.! Culms (8' - 20' high) at first mostly simple, bearing a more or less exserted *spreading compound panicle* (1' - 3' long), and *lanceolate flat leaves* (those tufted at the root usually ovate-lanceolate and very short, thickish); but commonly branching later in the season, the branches often clustered, and bearing nearly simple and included small panicles; *spikelets* $\frac{1}{2}$ " to about 1" long; oblong-obovate, downy or smooth; *lower glume roundish*, $\frac{1}{3}$ to $\frac{1}{4}$ the length of the 5-7-nerved upper one. ♁ — Founded on an autumnal state, much forked, with densely clustered lateral branchlets and panicles. (*P. nodiflorum*, Lam.) — Exhibits an interminable diversity of forms; of which a shaggy-hairy variety is *P. pubescens*, Lam.; or with smaller spikelets, *P. laxiflorum*, Lam.; while the varied smooth or smoothish states with shining leaves are *P. nitidum*, Lam., and the more slender forms *P. barbulatum*, Michx., and *P. ramulosum*, Michx., &c. — Dry or low grounds, common. June - August.

17. **P. depauperatum**, Muhl. Culms simple or branched from the base, forming close tufts (6' - 12' high), terminated by a *simple and few-flowered contracted panicle*, often much overtopped by the *narrowly linear elongated* (4' - 7') upper leaves; *spikelets* $1\frac{1}{2}$ " to 1" long, oval-obovate, commonly pointed when young; the ovate lower glume $\frac{1}{3}$ the length of the 9-nerved upper one. ♁ (*P. strictum*, Pursh. *P. rectum*, Ræm. & Schult.) — Varies, with the leaves often involute when dry (*P. involutum*, Torr.), and especially the sheaths beset with long hairs, or sometimes nearly smooth: the panicle partly included or oftener on a long and slender peduncle: spikelets sometimes less than 1" long. — Dry woods and hills, common. June.

++ Lower (neutral) flower destitute of an upper palea.

18. **P. verrucosum**, Muhl. Smooth; culms branching and spreading, very slender (1° - 2° long), naked above; leaves linear-lanceolate (2" - 3" wide), shining; branches of the diffuse panicle capillary, few-flowered; *spikelets oval, acute*, $\frac{3}{4}$ " long, *warty-roughened* (dark green), the lower glume $\frac{1}{4}$ the length of the obscurely nerved upper one. ①? — Sandy swamps, N. Engl. and southward, near the coast.

§ 3. **ECHINÓCHLOA**, Beauv. — *Spikelets imbricated-spiked on the branches of the simple or compound raceme or panicle, rough with appressed stiff hairs: lower palea of the sterile flower awl-pointed or awned.*

19. **P. Crus-galli**, L. (BARNYARD-GRASS.) Culms stout, branching from the base (1° - 4° high); leaves lanceolate ($\frac{1}{2}$ ' or more wide), rough-margined, otherwise with the sheaths smooth; spikes alternate (1' - 3' long), crowded in a dense panicle; glumes ovate, abruptly pointed; lower palea of the neutral flower bearing a rough awn of variable length. ① — Varies greatly, sometimes awnless or nearly so; sometimes long-awned, and var. **HISPIDUM** (*P. hispidum*, Muhl.) with the sheaths of the leaves very bristly. — Moist, chiefly manured soil: the var. in ditches, usually near salt water. Aug., Sept.

54. SETÀRIA, Beauv. BRISTLY FOXTAIL-GRASS.

Spikelets altogether as in *Panicum* proper, and awnless, but with the short peduncles produced beyond them into solitary or clustered bristles resembling awns (not forming a real involucre). Inflorescence a dense spiked panicle, or apparently a cylindrical spike. — Annuals, in cultivated grounds, with linear or lanceolate flat leaves. (Name from *seta*, a bristle.)

* *Bristles single or in pairs, roughened or barbed downwards.*

1. **S. verticillàta**, Beauv. Spike cylindrical (2'–3' long, green), somewhat interrupted, composed of apparently whorled short clusters; bristles short. (*Panicum*, L.) — Naturalized near dwellings.

* * *Bristles in clusters, roughened or barbed upwards.*

2. **S. glàuca**, Beauv. (BOTTLE-GRASS.) Spike cylindrical, very dense (tawny yellow, 2'–4' long); bristles 6–11 in a cluster, much longer than the spikelets; perfect flower transversely wrinkled. — Very common in stubble, &c.

3. **S. viridis**, Beauv. (GREEN FOXTAIL.) Spike nearly cylindrical, more or less compound (green); bristles few in a cluster, longer than the spikelets; perfect flower striate lengthwise and dotted. — Common in cultivated grounds.

4. **S. Itàlica**, Kunth. Spike compound, interrupted at the base, thick, nodding (6'–9' long, yellowish or purplish); bristles 2–3 in a cluster, either much longer or shorter than the spikelets. — *S. Germanica*, Beauv., is a variety. Sometimes cultivated under the name of *Millet*, or *Bengal Grass*: sparingly naturalized.

55. CÉNCHRUS, L. HEDGEHOG or BURR GRASS.

Spikelets as in *Panicum*, awnless, but inclosed 1 to 5 together in a globular bristly or spiny involucre, which becomes coriaceous forming a deciduous burr in fruit: the involucre sessile in a terminal spike. Styles united below. (An ancient Greek name of *Setaria Italica*, transferred, for no evident reason, to this genus.)

1. **C. tribuloïdes**, L. Culms branched at the base, ascending (1°–2° long); leaves flat; spike oblong, composed of 8–10 spherical heads; involucre prickly all over with spreading downwardly barbed short spines, more or less downy, inclosing 2 or 3 spikelets. ① — Sandy soil, along the coast; the spikes whitish near salt water.

56. TRÍPSACUM, L. GAMA-GRASS. SESAME-GRASS.

Spikelets monœcious, in jointed spikes, which are staminate above and fertile below. Staminate spikelets 2, sessile at each

triangular joint of the narrow rachis, longer than the joints, forming a 1-sided 2-ranked spike, both alike, 2-flowered: glumes coriaceous, the lower (outer) one nerved, the inner boat-shaped: paleæ very thin and membranous, awnless: anthers (turning orange or reddish-brown) opening by 2 pores at the apex. Pistillate spikelets single and deeply imbedded in each oblong joint of the cartilaginous thickened rachis, occupying a boat-shaped recess which is closed by the polished cartilaginous ovate outer glume, the inner glume much thinner, pointed, 2-flowered, the lower flower neutral: paleæ very thin and scarious, crowded together, pointless. Styles united: stigmas very long (purple), hairy. Grain ovoid, free. Culms stout and tall, solid, from thick creeping rootstocks. Leaves broad and flat. Spikes axillary and terminal, separating spontaneously into joints at maturity. (Name from *τριβω*, *to rub*, perhaps in allusion to the polished fertile spike.)

1. **T. dactyloides**, L. Spikes (4' - 8' long) 2 - 3 together at the summit (when the contiguous sides are flattened), and solitary from some of the upper sheaths (when the fertile part is cylindrical); sometimes, var. *MONOSTACHYUM*, the terminal also solitary. — Moist soil, Connecticut to Penn., near the coast, and southward. Aug. — Culm 3° - 6° high: the leaves like those of Indian Corn.

57. **ERIÁNTHUS**, Michx. WOOLLY BEARD-GRASS.

Spikelets spiked in pairs upon each joint of the slender rachis, one of them sessile, the other pedicelled, otherwise both alike; with the lower flower neutral, of one membranaceous palea; the upper perfect, of 2 hyaline paleæ, which are thinner and shorter than the nearly equal membranaceous glumes, the lower awned from the tip. Stamens 1 - 3. Grain free. — Tall and stout reed-like Grasses, with the spikes crowded in a panicle, and clothed with long silky hairs, especially in a tuft around the base of each spikelet (whence the name, from *ἔριον*, *wool*, and *ἄνθος*, *flower*).

1. **E. alopecuroides**, Ell. Culm (4° - 6° high) woolly-bearded at the joints; panicle contracted; the silky hairs much longer than the spikelets, shorter than the straight awn; stamens 2. 4 - Wet Pine barrens, New Jersey, rare, and southward. Sept.

58. **ANDROPÒGON**, L. BEARD-GRASS.

Spikelets in pairs upon each joint of the slender rachis, spiked or racemed; one of them pedicelled and sterile, often a mere ves-

tige: the other sessile, with the lower flower neutral and of a single palea; the upper perfect and fertile, of 2 thin and hyaline palea shorter than the herbaceous or chartaceous glumes, the lower awned from the tip. Stamens 1-3. Grain free. — Coarse and rigid perennial Grasses, with lateral or terminal spikes commonly clustered or digitate, the rachis hairy or plumose-bearded. (Name composed of ἀνήρ, *man*, and πώγων, *beard*.)

* *Sterile spikelet staminate (stamens 3), awnless: spikes digitate.*

1. **A. furcatus**, Muhl. Culms (4° high) and leaves nearly smooth, bearing 3-5 straight and rather rigid hairy spikes together at the naked summit (or fewer on lateral branches); spikelets approximated, roughish-downy; awn bent. — Sterile soil, common. Sept.

** *Sterile spikelet neutral, its lower glume awned: spikes simple.*

2. **A. scoparius**, Michx. Culms slender (2°-4° high), with many paniculate branches; the lower sheaths and narrow leaves hairy; spikes terminating the branches, peduncled, very loose, slender (2' long, often purple), the zigzag rachis hairy along the edges; pairs of spikelets rather distant, the sterile small, on a very hairy pedicel; the fertile 3-androus, bearing a twisted awn. — Sterile soil. Aug.

*** *Sterile spikelet abortive, reduced to a mere awn-like plumose pedicel; the fertile 1-androus, straight-awned: spikes clustered, lateral and terminal, often partly inclosed in the flattened bract-like sheaths; the slender rachis clothed with copious long silky (white) hairs.*

3. **A. Virginicus**, L. Culm flattish below, sparingly short-branched above (3° high); sheaths smooth; spikes 2-3 together in distant appressed clusters (1' long). — Sandy soil, southward. Sept.

4. **A. macrourus**, Michx. Culm stout (2°-3° high), bushy branched at the summit, loaded with numerous spikes in dense leafy clusters; sheaths rough, the upper hairy. — Low grounds, southward near the coast. September.

59. SÓRGHUM, Pers. BROOM-CORN.

Spikelets 2-3 together on the ramifications of an open panicle, the lateral ones sterile or often reduced merely to their pedicels; the middle or terminal one only fertile, its glumes coriaceous or indurated, sometimes awnless: otherwise as in Andropogon. Stamens 3. (The Asiatic name of a cultivated species.)

1. **S. nütans**. (INDIAN GRASS. WOOD-GRASS.) Culm simple (3°-5° high), terete; leaves linear-lanceolate, glaucous; sheaths smooth; panicle narrowly oblong, rather crowded (6'-12' long); the perfect spikelets at length drooping (light russet-brown and shining), clothed, especially towards the base, with fawn-colored hairs, lanceolate,

shorter than the twisted awn; the sterile spikelets small and very imperfect, or commonly reduced to a mere plumose-hairy pedicel. ♀ (Andropogon nutans, L.) — Dry soil, common. August.

S. SACCHARATUM, Pers., is the well-known BROOM-CORN.

S. CÉRNUUM, the GUINEA CORN, and S. VULGÀRE, the INDIAN MILLET, are sometimes cultivated for the grain.

ZEA MAYS, L., the INDIAN CORN, is a monœcious Paniceous Grass.

SERIES II. CRYPTÓGAMOUS or FLOWERLESS PLANTS.

VEGETABLES destitute of proper flowers (stamens and pistils), and producing seeds of homogeneous structure (called *spores*), in which there is no embryo or plantlet manifest anterior to germination.

CLASS III. ÁCROGENS.

Cryptogamous plants with a distinct axis (stem and branches), growing from the apex only, containing woody fibre and vessels (especially ducts), and usually with distinct foliage.

ORDER 130. EUISETÀCÆ. (HORSETAIL FAMILY.)

Leafless plants, with rush-like hollow and jointed stems, arising from running rootstocks, terminated by the fructification in the form of a cone or spike, which is composed of shield-shaped stalked scales bearing the spore-cases underneath. — Comprises solely the genus

1. EUISETUM, L. HORSETAIL. SCOURING RUSH.

Spore-cases (*sporangia, thecæ*) 6 or 7, adhering to the under side of the angled shield-shaped scales of the spike, 1-celled, opening down the inner side and discharging the numerous loose spores. To the base of these spores are attached 4 thread-like and club-shaped elastic filaments (*elaters*), which roll up closely around them when moist, and uncoil when dry. — Stems striate-grooved,

rigid, the hard cuticle abounding in grains of silex, hollow, and also with an outer circle of smaller air-cavities corresponding with the grooves; the joints closed and solid, each bearing instead of leaves a sheath, which surrounds the base of the internode above, and is split into teeth corresponding in number and position with the principal ridges of the stem: the stomata always occupying the principal grooves. Branches, when present, in whorls from the base of the sheath, like the stem, but without the central air-cavity. (The ancient name, from *equus*, horse, and *seta*, bristle.)

* *Stems annual (not surviving the winter). (Stomata irregularly scattered overed the whole surface of the grooves.)*

+ *Fertile stems different from the sterile ones, earlier, brownish.*

++ *Fertile stems never branching, decaying early after fructification: the sterile stems bearing simple branches.*

1. **E. arvénse**, L. Sterile stems smoothish, 12-14-furrowed, producing ascending sharply 4- (3-5-) angled long branches, with 4 herbaceous lanceolate pointed teeth; sheaths of the fertile stems (8'-15' high) remote, large and loose. — Damp places, common. April.

2. **E. cbúrneum**, Schreber. Sterile stems very smooth, ivory-white, about 30-furrowed, the rough usually 4-angled branches again grooved on the angles, and with awl-shaped fragile teeth; sheaths of the fertile stems crowded, deeply toothed. (*E. fluviatile*, Smith.) — Shore of the Great Lakes, and northward. April, May. — Fertile stems 1° or more high, stout; the sterile, 2°-5°.

++ ++ *Fertile stems producing herbaceous branches after fructification.*

3. **E. sylváticum**, L. Sterile and fertile stems about 12-furrowed, bearing numerous whorls of compound racemed branches; sheaths loose, with 8-14 rather blunt membranous teeth which are more or less united; those of the branches bearing 4 or 5, of the branchlets 3, lance-pointed divergent teeth. — Wet shady places, common northward. May.

++ ++ *Fertile and sterile stems similar and contemporaneous, both herbaceous, or all the stems fertile, fruiting in summer, producing mostly simple branches from the upper or middle joints, sometimes quite naked.*

4. **E. limòsum**, L. Stems tall (2°-3° high), smooth, slightly 14-16-furrowed, usually producing upright simple branches after fructification; sheaths appressed, rather short, with dark-brown and acute rigid short teeth. (*E. uliginòsum*, Muhl.) — In shallow water, &c. — Air-cavities none under the grooves, but small ones under the ridges. — Near this is the European *E. PALÚSTRE*, with a strongly grooved roughish stem, large air-cavities under the grooves, and pale sheaths, also attributed to this country, probably incorrectly, by Pursh.

* * *Stems evergreen, all alike, mostly branchless. (Stomata 1-rowed.)*

5. **E. hyemàle**, L. (SCOURING RUSH. SHAVE-GRASS.) *Stems stout and upright (2°-3° high), 14-26-furrowed, the ridges rough with 2 rows of minute tubercles; sheaths close, whitish, with the top and bottom black, with awl-shaped black teeth which are early deciduous, leaving a bluntly crenate margin. — Wet banks, common: well known for its use in scouring. June. — E. LÆVIGÀTUM and E. ROBÚSTUM, of Braun, allied to this, are to be sought along our southern and western borders.*

6. **E. variegàtum**, Schleicher. *Stems ascending (6'-12' long), simple, from a branched and tufted base, 5-9-furrowed, the ridges rough with 2 rows of tubercles which are separated by a secondary furrow; sheaths enlarged upwards, green variegated with black above; the teeth persistent, obtuse, tipped with a deciduous bristle. — Shores or river-banks, from Bellows Falls, Vermont (Carey), and Buffalo, to Michigan; rare.*

7. **E. scirpoides**, Michx. *Stems thread-like, in dense little tufts (4'-8' high), somewhat bent or curved, rough, 3-4-grooved alternately with as many ovate bristle-pointed teeth, and with the same number of intermediate furrows of equal width; sheaths variegated with black; central air-cavity wanting. — Moist wooded hill-sides, common northward.*

ORDER 131. FÍLICES. (FERNS.)

Leafy plants, with the leaves (fronds) usually rising from prostrate or subterranean rootstocks, separately rolled up (circinate) in the bud (except in suborder 3), and bearing, on the veins of their lower surface or along the margins, the simple fructification, which consists of 1-celled spore-cases (sporangia), opening in various ways, and discharging the numerous minute spores. (The principal stalk, or petiole, of the frond is termed a stipe.)

Synopsis.

Suborder I. POLYPODÍNEÆ. (TRUE FERNS.)

Sporangia collected in dots, lines, or variously shaped clusters (*sori* or *fruit-dots*) on the back or margins of the frond or its divisions, stalked, cellular-reticulated, the stalk running into a vertical incomplete ring, which by straightening at maturity ruptures the sporangium transversely on the inner side, discharging the spores. Fruit-dots often covered, at least when young, by a membrane called the *involucre*, or more properly the *indusium*.

- * (POLYPODIÈÆ.) Fruit-dots without a special indusium (roundish).
 - + Fertile fronds like the sterile, leaf-like, the margins not revolute.
 - 1. POLYPODIUM. Fruit-dots scattered on the back, separate.
 - + + Fertile fronds contracted, revolute, forming a general involucre.
 - 2. STRUTHIOPTERIS. Fruit-dots borne on the 5 pinnate veins of each lobe of the linear necklace-form pinnæ, soon confluent over the whole under surface.
 - 3. ALLOSORUS. Fruit-dots on the simply forked veins, soon laterally confluent, forming a broad intramarginal line, concealed under the reflexed margin.
- * * (PTERIDÈÆ.) Fruit-dots covered by a special indusium produced from the outer side and free on the inner (next the midrib or axis of venation), either marginal or on cross veinlets parallel with the midrib, therefore *transverse*.
 - + Fruit-dots marginal, laterally confluent or separate, borne on the free terminations of the forked direct veins (no cross veinlets).
 - 4. PTERIS. Indusium linear, continuous, bearing the sporangia of the laterally confluent fruit-dots next its line of attachment.
 - 5. ADIANTUM. Indusium kidney-shaped, roundish, or oblong (usually appearing as the reflexed margin of a lobe of the frond), bearing the sporangia on its under surface on 2 or more veins.
 - 6. CHEILANTHES. Indusium kidney-shaped, receiving a single vein which is fruit-bearing at its extremity.
 - + + Fruit-dots parallel and near the midrib, borne on transverse anastomosing veinlets.
 - 7. WOODWARDIA. Indusium oblong or linear. Marginal veinlets free.
- * * * (ASPLENIÈÆ.) Fruit-dots elongated, borne on the back of the frond oblique to the midrib (not parallel with it nor with the margin), each covered by a special indusium which is free along one edge, and attached longitudinally to the fertile veinlet on the other.
 - + Veins reticulated, except next the margin.
 - 8. CAMPTOSORUS. Fruit-dots irregularly scattered over the frond.
 - + + Veins forked and free, none of them reticulated.
 - 9. SCOLOPENDRIUM. Fruit-dots in pairs laterally confluent into one.
 - 10. ASPLENIUM. Fruit-dots separate, on the upper side of the veinlets.
- * * * * (DICKSONIÈÆ.) Fruit-dots marginal, on the termination of a (free) vein, contained in a little cup formed by the confluence or connivence of an inner special indusium with a reflexed indusium-like tooth or lobe of the margin of the frond.
- 11. DICKSONIA. Fruit-dots globular, exserted. Frond thin.
- * * * * * (ASPIDIÈÆ.) Fruit-dots borne on the back of the frond, round, rarely oblong and then placed across the vein, furnished with a special orbicular, kidney-shaped, or hooded indusium, but no accessory proper involucre.

- + Veins all free, none of them reticulated or anastomosing.
 ++ Indusium inflated, fixed by half or all the margin.
12. *CYSTOPTERIS*. Indusium hood-like, fixed on one side by a broad base, opening on the other outwardly.
13. *WOODSIA*. Indusium globular, fixed by the whole margin, early bursting through the top or centre, and becoming cup-shaped.
 ++ ++ Indusium flat or depressed, opening round the whole margin.
14. *DRYOPTERIS*. Indusium round-kidney-shaped, fixed at the sinus.
15. *POLYSTICHUM*. Indusium circular, centrally peltate.
 +-+ Veins of the sterile frond finely reticulated.
16. *ONOCLEA*. Fertile frond contracted, the divisions rolled up or even berry-like. Indusium hood-like, fixed by the inner edge.

Suborder II. OSMUNDINEÆ. (FLOWERING FERN FAM.)

Sporangia variously collected, destitute of any proper ring, cellular-reticulated, opening lengthwise by a regular slit.

- * (*SCHIZÆÆ*.) Sporangia oblong or oval, sessile, with a circular striate-rayed portion at the apex, opening down the outer side.
17. *SCHIZÆA*. Indusium none: sporangia covering one side of the linear pinnæ of the naked and stalk-like fertile frond.
18. *LYGODIUM*. Indusia imbricated in 2 ranks on one side of the fertile lobes of the leafy climbing frond, sac-like.
- * * (*OSMUNDÆÆ*.) Sporangia globose, pedicelled, vertically 2-valved.
19. *OSMUNDA*. Sporangia naked, covering contracted fronds.

Suborder III. OPHIOGLÓSSEÆ. (ADDER'S-TONGUE FAM.)

Sporangia spiked, closely sessile, naked, coriaceous and opaque, not reticulated, destitute of a ring, opening by a transverse slit into 2 valves, discharging the very copious spores which appear like floury dust. — Fronds straight, never rolled up in the bud!

20. *BOTRYCHIUM*. Sporangia distinct, in compound or pinnate spikes.
21. *OPHIOGLOSSUM*. Sporangia cohering in a 2-ranked simple spike.

I. POLYPÓDIUM, L. POLYPODY.

Fruit-dots round, naked, variously or irregularly scattered over the back of the flat and expanded leaf-like frond. Veins simple, forked or pinnate, free (not connected by cross branches or anastomosing). — Rootstocks creeping, often covered with wool-like chaff, and with tufted branches (whence the name, from *πολύ*, many, and *ποῦς*, foot).

* Fronds simply and deeply pinnatifid, evergreen: fruit-dots large.

1. *P. vulgàre*, L. Fronds oblong, smooth, and green both

sides (6'-10' high); the divisions linear-oblong, obtuse, minutely and obscurely toothed. — Rocks, common. July.

2. **P. incànum**, Willd. *Fronde oblong, pale (2'-5' long), the lower surface and the stalk scurfy-scaly; the divisions oblong-linear. — Rocks and on the trunks of trees. S. Ohio and southward.*

* * *Fronde 2-pinnatifid, triangular, annual: fruit-dots minute.*

3. **P. Phegópteris**, L. *Stalk sparingly chaffy and downy; frond triangular in outline, longer than broad (3'-6' long), hairy on the veins; pinnæ linear-lanceolate, closely approximated, the lowest pair deflexed and standing forwards; their divisions linear-oblong, obtuse, entire, each bearing about 4 fruit-dots towards the base and near the margin. (P. connéctile, Michx.) — Damp woods, common northward. July. — Rootstocks slender, blackish.*

4. **P. hexagonópterum**, Michx. *Stalk smooth; frond broadly triangular, the base (6'-9' broad) usually exceeding the length; pinnæ rather distant, the lower of the lanceolate obtuse divisions toothed, decurrent and forming a conspicuous wing to the rachis. — Rather open woods, common southward. — Smoother and larger than the last.*

* * * *Fronde ternate, the primary divisions twice-pinnate.*

5. **P. Dryópteris**, L. *Stalk slender and brittle, smooth; frond smooth (pale light-green, 4'-6' wide); the 3 principal divisions widely spreading, the ultimate ones oblong, obtuse, nearly entire; fruit-dots marginal, finally in contact. — Var. CALCÀREUM (P. calca-reum, Smith) is more rigid, and minutely glandular-mealy on the rachis and midribs. — Deep rocky woods, common northward. July.*

2. STRUTHIÓPTERIS, Willd. OSTRICH-FERN.

Fruit-dots essentially as in *Polypodium*, but on a separate contracted frond, crowded together and soon confluent so as to occupy the whole lower surface of its narrowly linear pinnatifid pinnæ, the margins of which are rolled backward so as to form a sort of general involucre, and to become somewhat necklace-shaped: there are 5 pinnate free veins in each lobe, each fruit-bearing laterally, the stalks of the sporangia united below, forming an elevated brush-like receptacle. — Sterile fronds large (2°-3° high), very much exceeding the fertile, pinnate, the many pinnæ deeply pinnatifid, all growing in a close circular tuft from thick and scaly matted rootstocks. Stalks stout, angular. (Name compounded of *στρουθός*, an ostrich, and *πτερίς*, a fern, from the plume-like arrangement of the divisions of the fertile frond.)

1. **S. Germánica**, Willd. (*S. Pennsylvánica*, Willd. *Os-múnda Struthiopteris*, L.) — Alluvial soil, not rare northward. Aug.

3. ALLOSORUS, Bernhardi. ALLOSORUS.

Fruit-dots roundish, without any proper indusium, borne on the ends of the simply forked veins, terminating free within the membranaceous margins, which are reflexed so as to cover them and form a sort of general involucre, soon confluent laterally so as to produce a broad and intramarginal transverse line of fructification, resembling that of *Pteris*. — Fronds 1-3-pinnate, low, from slender creeping rootstocks; the fertile usually more or less contracted. (Name from *ἄλλος*, *various*, and *σωρός*, *a heap*, for fruit-dot.)

1. **A. gracilis**, Presl. Smooth, low (3'-6' high); fronds thin, of few pinnæ, which are pinnately parted into 3-5 oblong or linear-oblong, somewhat crenate divisions, or in the sterile frond ovate. (*Pteris gracilis*, *Michx.*) — Shaded rocks, Vermont to Michigan; rare.

4. PTÉRIS, L. BRAKE, BRACKEN.

Fruit-dots linear, confluent laterally in a line which borders the divisions of the frond, the continuous indusium fixed at the very margin, the inner edge free. Veins forked and free, bearing the sporangia at their apex. — Fronds 1-3-pinnate or decomposed, rather coriaceous. (The ancient Greek name of Ferns, from *πτέρων*, *a wing*, on account of the prevalent pinnate fronds.)

§ 1. *PTERIS* proper. — *Indusium very narrow, at its attachment the veinlets connected at their very apex by a transverse receptacle which bears the sporangia.*

1. **P. aquilina**, L. (COMMON BRAKE.) Frond ternate at the summit of an erect stout stalk (1^o-2^o high), the widely spreading branches 2-pinnate; pinnules oblong-lanceolate, the upper undivided, the lower more or less pinnatifid, with oblong obtuse lobes, margined all round with the indusium. — Thickets and stony hills, everywhere. Aug. — Whole frond 2^o-3^o wide, dull green.

§ 2. *PLATYLOMA*, J. Smith. — *Indusium rather broad: sporangia occupying a portion of the upper part of the closely approximated but unconnected veinlets, forming a broad continuous fruiting line.*

2. **P. atropurpurea**, L. Stalk of the simply or somewhat doubly pinnate pale frond (6'-9' high) dark purple and shining; pinnæ, or their 3-7 divisions below, oblong or linear, entire, obliquely truncate or heart-shaped at the stalked base. — Limestone rocks; rare.

5. ADIANTUM, L. MAIDENHAIR.

Fruit-dots roundish or crescent-shaped, occupying the edge of the lobes of the frond, the indusium appearing as a reflexed edge of

it, and bearing the sporangia on its under side on the free ends of several simply forking veins. Midrib none, or lateral. — Stalk and rachis black and polished. (The ancient name, from a privative, and *δαίνω*, to *moisten*, the smooth glaucous foliage repelling the rain-drops.)

1. **A. pedàtum**, L. Frond forked at the summit of the upright slender stalk (9'–15' high), the forks pedately branching from one side into several slender spreading divisions, which bear numerous triangular-oblong and oblique short-stalked pinnules; these are as if halved, being entire on the lower margin, from which the veins all proceed, and terminate in the cleft and fruit-bearing upper margin. — Rich, moist woods. July. A delicate and most graceful Fern.

6. CHEILÁNTHEs, Swartz. LIP-FERN.

Fruit-dots roundish, solitary or contiguous on the margins of the lobes; the usually kidney-shaped indusium fixed to the margin at the point where the sporangia arise, free along the inner edge, each receiving but one (direct and free) vein or veinlet. Fronds 2–3-pinnate, the pinnules or lobes with a central midrib. (Name composed of *χέιλος*, a *lip*, and *ἄνθος*, *flower*, from the shape of the indusium.)

1. **C. vestita**, Willd. Fronds 2-pinnate, hairy all over (6'–9' high); pinnules short, pinnatifid, the lobes roundish. — Shady rocks, from S. Penn. southward and westward.

7. WOODWÁRDIA, Smith. WOODWARDIA.

Fruit-dots oblong or linear, approximate or contiguous, parallel to the midrib or transverse anastomosing veinlets, in one or rarely two rows; the veins forking and free towards the margin. Indusium fixed to the outer margin of the veinlet, free on the side next the midrib. — Fronds pinnatifid or pinnate. (Named for *Woodward*, an English botanist of the last century.)

§ 1. WOODWÁRDIA proper. — *Indusium vaulted and the free edge involute: veins (at least of the sterile frond) with several rows of reticulations.*

1. **W. angustifolia**, Smith. Sterile fronds (1° high, thin, bright green) deeply pinnatifid, with lanceolate serrulate divisions; the fertile simply pinnate; pinnæ contracted, linear (2'–4" wide), with only one row of cross veins, bearing the fruit-dots ($\frac{1}{5}$ ' long) as near the margins as the midrib. (*W. onocleoides*, Willd.) — Bogs, Massachusetts to Penn., near the coast; rare. Aug.

§ 2. *DOÓDIA*, R. Brown. — *Indusium flattish* : fertile frond with usually but one row of cross veinlets, bearing the fruit near the midrib.

2. **W. Virgínica**, Willd. Fertile and sterile fronds similar (2° high), pinnate ; the pinnæ lanceolate, pinnatifid, with numerous oblong lobes ; fruit-dots contiguous or confluent with age, making a row on each side of the midrib, both of the pinnæ and the lobes. — Swamps, not rare. July.

8. CAMPTOSÓRUS, Link. WALKING LEAF.

Fruit-dots linear or oblong, irregularly scattered on the reticulated veins of the simple frond, which form mostly hexagonal meshes, variously diverging, inclined to approximate in pairs by their free margins, especially those of the secondary reticulations, or to become confluent at their ends, forming crooked lines (whence the name, from *καμπτός*, bent, and *σωρός*, for fruit-dot).

1. **C. rhizophýllus**, Link. (*Asplénium rhizoph.*, L.) — Shaded, moist rocks, rare. July. — Fronds evergreen, growing in tufts, spreading or procumbent (4' - 9' long), lanceolate from an auricled-heart-shaped base, entire or wavy on the margin, tapering above into a slender prolongation like a runner, which often roots at the apex and gives rise to new fronds, and these in turn to others ; hence the popular name. (If *Antigramma* be not a distinct genus, it must be reduced to *Camptosorus*, which is the oldest name.)

9. SCOLOPÉNDRIUM, L. HART'S-TONGUE.

Fruit-dots linear, elongated, borne in pairs on the contiguous sides of the 2 parallel forks of the straight free veins, one on each, but so confluent side by side as to appear like one opening by an apparently double indusium down the middle. (The ancient Greek name, so called because the numerous parallel lines of fruit resemble the feet of the centipede, or scolopendra.)

1. **S. officinàrum**, Smith. Frond simple (rarely 2-forked at the apex), oblong-lanceolate from an auricled-heart-shaped base, entire or wavy-margined (7' - 18' long, 1' - 2' wide), bright green. — Limestone rocks, in a deep ravine at Chittenango Creek, below the Falls, where it abounds, and also, it would seem, in some other places in W. New York ("near Canandaigua," *Nuttall*).

10. ASPLÈNIUM, L. SPLEENWORT.

Fruit-dots linear or oblong, oblique, separate, not in pairs, all attached lengthwise to the upper side of the simple, forked or pin-

nate, free veins; the indusium opening along the side towards the midrib or axis of venation. (Name from a privative, and *σπλήν*, the spleen, for supposed remedial properties.)

§ 1. *ASPENIUM* proper. — *Indusium* straight, fixed by the whole length.

* *Indusium* flat or flattish, membranaceous. (*Fronde* evergreen.)

1. **A. pinnatifidum**, Nutt. *Fronde* (3'–6' long) diffusely spreading, lanceolate, pinnatifid, sometimes pinnately parted near the base, tapering above into a slender prolongation, with the apex sometimes rooting; lobes roundish-ovate, obtuse, cut-toothed or nearly entire; the midrib evanescent by forking below the apex. — Cliffs on the Schuylkill and Wissahickon, near Philadelphia, Nuttall, Miss Morris; also southward: very rare. July. — Resembling the Walking Fern (*Camptosorus*), but the venation is that of *Asplenium*: fruit-dots irregular, numerous, even the slender prolongation fertile.

2. **A. Ruta-muraria**, L. *Fronde* (2'–4' long) 2-pinnate below, simply pinnate above, ovate in outline, the few divisions narrowly rhombic-wedge-shaped, toothed at the apex, without a midrib, the veins all rising from the base. — Limestone cliffs, rare. July.

3. **A. montanum**, Willd. *Fronde* (3'–5' high, bright green) ovate-lanceolate or triangular-oblong in outline, pinnate; the ovate pinnæ pinnately 3–7-parted (or the upper barely cleft) and cut-toothed; the veins forking from a midrib. — Cliffs, Alleghany Mountains in Penn. (Mr. Lea), and southward, rare. July. — Rachis green: stalk brownish.

4. **A. Trichomanes**, L. *Fronde* (3'–8' long) in dense spreading tufts, linear in outline, pinnate; pinnæ numerous, roundish-oblong or oval (3''–4'' long), unequal-sided, obliquely wedge-truncate at the base, attached by a narrow point, the midrib evanescent; the thread-like stalk and rachis purple-brown and shining. (*A. melanocaulon*, Willd.) — Shaded cliffs, common. July.

5. **A. ebenum**, Ait. *Fronde* upright (8'–16' high), pinnate, lanceolate-linear in outline; pinnæ ($\frac{1}{2}$ '–1' long) many, lanceolate, or the lower oblong, slightly scythe-shaped, finely serrate, sessile, the dilated base auricled on the upper or both sides; fruit-dots numerous on both sides of the elongated midrib; stalk and rachis blackish-purple and shining. — Rocky, open woods, common southward. Aug.

* *Indusium* vaulted, thickish. (*Fronde* decaying in autumn, $1\frac{1}{2}^{\circ}$ – 3° high.)

6 **A. angustifolium**, Michx. *Fronde* simply pinnate; pinnæ linear-lanceolate, acute, minutely wavy-toothed (3'–4' long), on the fertile fronds usually more contracted and smaller; the linear-oblong turgid fruit-dots crowded. — Rich woods, from W. New England westward; rather rare. Aug.

7. **A. thelypteroides**, Michx. *Fronde* pinnate; pinnæ deeply pinnatifid, linear-lanceolate (3'–5' long); the lobes oblong, obtuse,

minutely toothed, crowded, each bearing 3-6 pairs of approximated oblong fruit-dots.—Rich woods, not rare. July.—A handsome pale-green and smooth Fern, with conspicuous parallel fruit-dots, as in the last, which are rarely double on the lowest veins.

§ 2. *ATHYRIUM*, Roth. — *Indusium of the short fruit-dots free at the ends, vaulted, often becoming curved or crescent-shaped.*

8. **A. Filix-fœmina**, R. Brown. Frond 2-pinnate (1°-3° high, smooth), oblong or lanceolate in outline; pinnæ lanceolate, numerous; the narrowly oblong pinnules confluent on the rachis by a narrow margin, sharply pinnatifid-toothed; fruit-dots oblong, at first straight, 4-8 pairs on each pinnule. (*Aspidium Filix-fœmina* and *asplenioides*, Swartz.) — A narrow form is *Aspid. angustum*, Willd. — Moist woods, common. July.

11. DICKSONIA, L'Her. DICKSONIA.

Fruit-dots globular (small), marginal, each placed on the apex of a free vein or fork, inclosed in a recurved little cup-shaped or 2-lipped sac, which consists of a reflexed and changed lobelet or tooth of the frond united by its edges with those of a nearly similar proper indusium, which is fixed along its base on the inner side: the receptacle elevated, globular. (Dedicated to *J. Dickson*, an English cryptogamous botanist.)

1. **D. punctilóbula**, Hook. Minutely glandular and hairy (2° high); fronds ovate-lanceolate and pointed in outline, pale green and very thin, with strong stalks rising from slender extensively creeping rootstalks, pinnate, the lanceolate pinnæ twice pinnatifid and cut-toothed, the lobes oblong; fruit-dots minute, usually one at the upper margin of each lobe. (*D. pilosúscula*, Willd. *Nephrodium punctilobulum*, Michx. *Sitolóbium*, Desv. *Patánia*, Presl.) — Moist, rather shady places, very common; odorous. July.

12. CYSTÓPTERIS, Bernhardi. BLADDER-FERN.

Fruit-dots roundish, borne on the middle of a straight fork of the free veins; the delicate indusium oblong-kidney-shaped, hood-like, attached by a broad inflated base on the inner side partly under the fruit-dot, opening free at the other side which looks toward the apex of the lobe, and is somewhat jagged.—Tufted Ferns with slender and delicate 2-3-pinnate fronds; the lobes cut-toothed. (Name composed of *κύστις*, a bladder, and *πτερίς*, Fern, from the sac-like indusium.)

1. **C. bulbífera**, Bernh. Frond lanceolate, elongated (1°-2°

long), 2-pinnate; the pinnæ lance-oblong, pointed, horizontal (1' - 2' long); the rachis often bearing bulblets underneath, wingless; pinnules crowded, oblong, obtuse, toothed or pinnatifid. (*Aspidium*, Swartz. *A. atomarium*, Muhl.!) — Shaded, moist rocks, common. July.

2. **C. frágilis**, Bernh. Frond oblong-lanceolate (4' - 8' long, besides the stalk which is fully as long), 2-3-pinnate; the pinnæ and pinnules ovate or lanceolate in outline, irregularly pinnatifid or cut-toothed, mostly acute, decurrent on the margined or winged rachis. — Var. **DENTATA**, Hook., is narrower and less divided, barely 2-pinnate, with ovate obtuse and bluntly toothed pinnules. (*Asp. ténue*, Swartz.) — Shaded cliffs, common: very variable. July.

13. WOÓDSIA, R. Brown. WOODSIA.

Fruit-dots globular, borne on the back of simply-forked free veins; the thin indusium attached by its base all around the receptacle, open or early bursting through at the top or centre, the orifice or edge irregular or jagged, and usually cut-fringed with long hairs which involve the sporangia. — Small and tufted pinnately-divided Ferns. (Dedicated to *Joseph Woods*, an English botanist.)

§ 1. **HYPOPÉLTIS**, Torr. — *Indusium early open at the top, soon spreading, larger than the fruit-dot and as if placed under it, jagged-lobed, naked.*

1. **W. obtùsa**, Torr. Frond broadly-lanceolate, minutely glandular-hairy (6' - 12' high), pinnate; the pinnæ rather remote, triangular-ovate or oblong (1' or more long), bluntish, pinnately parted; pinnules oblong, very obtuse, crenately pinnatifid-toothed, with a single smooth fruit-dot on each rounded minutely-toothed lobe near the sinus; stalk and rachis a little chaffy. (*W. Perriniàna*, Hook. & Grev. *Aspidium obtusum*, Willd.) — Rocky banks and cliffs, common, especially westward. July.

§ 2. **WOODSIA** proper. — *Indusium minute, open and flattened from an early stage and concealed under the fruit-dot, except its marginal fringe.*

2. **W. Ilvénsis**, R. Brown. Frond oblong-lanceolate (2' - 4' long by 1' wide), smoothish and green above, thickly clothed underneath as well as the stalk with rusty bristle-like chaff, pinnate; the pinnæ crowded, oblong, obtuse, sessile, pinnately parted, the numerous crowded pinnules oblong, obtuse, obscurely crenate, almost coriaceous, the fruit-dots near the margin, somewhat confluent when old. (*Nephrodium rufidulum*, Michx.) — Exposed rocks, frequent. June.

3. **W. glabélla**, R. Brown. Smooth and naked throughout; frond linear (2' - 5' high), pinnate; pinnæ rather remote towards the

short stalk, *rhombic-ovate*, very obtuse (2''-4'' long), cut into 3-7 rounded or somewhat wedge-shaped lobes.—Rocks, Little Falls, New York, *Dr. Vasey!* To be sought farther northward, being also an arctic species.

14. **DRYÓPTERIS**, Adans., Schott. WOOD-FERN.

Fruit-dots round, borne on the back or near the apex of the simple and free pinnate veins or their forks. Indusium flattish, rounded-kidney-shaped, fixed at the sinus, opening round the margin.—Fronds 1-3-pinnate, of thin or thinnish texture. (An ancient name, composed of *δρῦς*, an oak, or tree in general, and *πτερίς*, Fern; growing in woods.)

§ 1. **THELYPTERIS**, Schott (not of *Presl.*).—Veins simple and straight or simply forked. (Fronds annual: stalks and creeping rootstocks nearly naked.)

1. **D. Thelypteris**. Frond pinnate, *lanccolate* in outline; the horizontal pinnae gradually diminishing in length from near the base to the apex, sessile, linear-lanceolate, deeply pinnatifid, with oblong nearly entire obtuse lobes, (or appearing acute from) the margins strongly revolute in fruit; veins mostly forked, bearing the crowded fruit-dots (soon confluent) near their middle. (*Polypodium Thelypt.*, L. *Aspidium*, Swartz. *Lastræa*, *Presl.*)—Marshes, common. Aug.—Stalk 1° long or more, usually longer than the frond, which is of thicker texture than in the next, slightly downy; the fruit-dots soon confluent and covering the whole contracted lower surface of the pinnae.

2. **D. Noveboracensis**. Frond pinnate, *oblong-lanceolate* in outline, tapering below from the lower pinnae (2-several pairs) being gradually shorter and bent downwards; lobes flat, broadly oblong; their veins all simple except in the lowest pairs, bearing scattered fruit-dots (never confluent) near the margin. (*Polypodium Noveboracense*, L. *Aspidium thelypteroides*, Swartz.)—Swamps and moist thickets, common. July.—Frond pale green, delicate and membranaceous, nearly agreeing with the last, except in the points mentioned.

§ 2. **LASTRÆA**, Bory.—Veins more than once forked or somewhat pinnately branching. (Fronds, at least the sterile, usually lasting through the winter: stalks chaffy: rootstocks scaly-thickened.)

* Fronds verging to 3-pinnate, viz. 2-pinnate, the pinnules pinnatifid.

3. **D. intermedia**. Frond *ovate-oblong* in outline (1°-2° long, lively green, smooth); pinnules *oblong-linear*, obtuse, horizontal, crowded, the lower deeply pinnatifid into linear-oblong obtuse lobes which are sharply cut-toothed, the upper cut-pinnatifid or incised,

with the shorter lobes few-toothed at the apex; fruit-dots sparse; *indusium fringed with stalked glands* at its margin. (*Aspidium intermedium*, Muhl. in Willd.!) — The commonest species of this country, on hill-sides in woods, the *Asp. dilatatum* of American authors generally, but not that of Swartz and Willdenow.

4. **D. dilatata.** *Fronde ovate or triangular-ovate* in outline (1° – $2\frac{1}{2}^{\circ}$ long); *pinnules triangular-lanceolate, or lance-oblong, mostly acute, directed obliquely forwards*, often rather scythe-shaped, all the lower pinnatifid into closely set oblong lobes, cut-toothed, the appressed teeth spiny-pointed; fruit-dots just within the sinuses; *indusium smooth.* (*Asp. dilatatum*, Willd. *Lastræa*, Presl.) — Cold woods, northward, rare. — Frond broader, usually larger, and with coarser divisions, than in the last, also distinguished from it, as well as from *D. spinulosa*, by its smooth and entire indusium.

* * *Fronde at most 2-pinnate, the pinnules barely incised or toothed: indusium thickish, at first tumid, persistent: rachis chaffy when young.*

5. **D. rigida.** Frond oblong-lanceolate in outline, short-stalked; pinnæ lanceolate from a broad base or the lower triangular-lanceolate, pointed, numerous and approximated, mostly opposite; *pinnules many pairs, broadly oblong, obtuse, nearly horizontal, confluent on the narrowly-winged rachis, sharply serrate with pointed teeth, the lower ones cut-lobed or pinnatifid-toothed; fruit-dots small for this section (larger than in the last), halfway between the midrib and the margins; indusium minutely glandular.* (*Asp. rigidum*, Swartz.) — The only specimen I have seen is that kindly lent by Mr. Tuckerman, gathered in woods near Lowell, Massachusetts, by Mr. Wm. Boott, and which Mr. T. has described as *Aspidium Boottii*: but it seems to differ from *A. rigidum* only in its luxuriant size (2° long), and the upper surface of the indusium is sprinkled with minute deciduous glands. It is deep green in color, and, although allied to *D. spinulosa*, yet with the thicker fronds and the fruit-dots of the present subdivision.

6. **D. cristata.** Frond linear-oblong in outline ($1\frac{1}{2}^{\circ}$ to $2\frac{1}{2}^{\circ}$ long and very long-stalked); pinnæ short, triangular-oblong, or the lowest nearly triangular-ovate, from a somewhat heart-shaped base, acute, commonly alternate, deeply pinnatifid; *pinnules (8–13 pairs) oblong, very obtuse, finely serrate or cut-toothed, the lowest pinnatifid-lobed; fruit-dots as near the midrib as the margin, large, often confluent; indusium smooth and naked.* (*Asp. cristatum* and *A. Lancastriense*, Swartz.) — Swamps, &c., common. July. Rather variable: stalk with broad deciduous chaffy scales: pinnæ $2'$ – $3\frac{1}{2}'$ long.

7. **D. Goldiana.** Frond broadly ovate, or the fertile ovate-oblong in outline (2° – 3° long), short-stalked; pinnæ oblong-lanceolate, mostly alternate, pinnately parted; *pinnules (about 20 pairs) narrowly oblong, slightly scythe-shaped, obtuse (1' long), serrate with appressed teeth, bearing the distinct fruit-dots nearer the midrib than the*

margin (smaller in proportion than in No. 6). (Asp. Goldianum, Hook.)—Rich, moist woods, from Vermont and New York westward. Sept. — A showy Fern: fertile fronds commonly decaying in autumn.

8. **D. marginale**. Frond 2-pinnate, ovate-oblong in outline (1° - 2° long); pinnæ opposite, lanceolate from a broad almost sessile base; pinnules oblong, obtuse ($\frac{1}{2}$ ' to $\frac{3}{8}$ ' long), crowded, obtusely crenate-toothed, at least the lower, the upper confluent, bearing the conspicuous distinct *fruit-dots next the margin*; indusium smooth. (Asp. marginale, Swartz.)—Rocky hill-sides and ravines in moist woods, very common. July.

15. POLÝSTICHUM, Roth, Schott. SHIELD-FERN.

Fruit-dots round, borne on the back of free pinnately-forked veins (especially on the lower outer one of each set). Indusium orbicular, shield-like, fixed by the depressed centre, opening all round the margin. — Pinnate or 2-3-pinnate Ferns, much like ♂ *Lastræa* of the last genus; but rigid and coriaceous, evergreen, very chaffy; the pinnæ or pinnules auricled at the base on the upper side, crowded, the teeth or lobes tipped with a spiny bristle. (Name composed of *πολύς*, many, and *στίχος*, a row or line, the numerous fruit-dots forming close lines in the original species.)

* *Fronde twice pinnate, spreading.*

1. **P. aculeatum**, Roth. Frond broadly lanceolate in outline; pinnæ many pairs, lanceolate; pinnules ovate and slightly crescentic or oblique, short-stalked or the upper confluent, obliquely truncate at the base, sharply toothed, chaffy-bristly, the one next the main rachis rather larger; fruit-dots copious. — Deep woods, mountains of New Hampshire, *Tuckerman*, to those of N. New York, *Macrae*. Green Mountains, Vermont, *Pursh*, *Macrae*, &c. — The plants I possess have obtuse pinnules, the lowest scarcely longer, as in the var. **ANGULARE**: but I have the typical form from Halifax.

* * *Fronde simply pinnate, mostly upright.*

2. **P. acrostichoides**, Schott. Frond lanceolate (1° - 2° high), *stalked*; pinnæ linear-lanceolate, somewhat scythe-shaped, half-halbert-shaped at the slightly-stalked base, serrulate with appressed bristly teeth; *the fertile* (upper) ones *contracted and smaller*, bearing contiguous fruit-dots near the midrib, which are confluent with age and cover the surface. (*Nephrodium acrost.*, *Michx.* *Aspidium*, *Swartz.*) — Var. **INCISUM** (A. Schweinítzii, *Beck*) is a state with cut-lobed pinnæ, a not unfrequent case in the sterile fronds. — Hill-sides and ravines in woods, common. July.

3. **P. Lonchitis**, Roth. Frond linear-lanceolate (9' - 20' high), *scarcely stalked, very rigid*; pinnæ broadly lanceolate-scythe-shaped, or

the lowest triangular, strongly auricled on the upper side and wedge-truncate on the lower, densely spiny-toothed (1' or less in length), copiously fruit-bearing; fruit-dots contiguous and near the margins. — Michigan! probably in cold woods near the Northern Lakes. I have seen but a single specimen, of pretty large size, in the collection made by the State geologists, the locality not given.

16. ONOCLÈA, L. SENSITIVE FERN.

Fertile frond 2-pinnate, much contracted; the pinnules short and revolute, usually so rolled up as to be converted into berry-shaped closed involucre filled with sporangia, and forming a one-sided spike or raceme. Fruit-dots one on the middle of each strong and simple primary vein (with or without sterile cross-veins), round, soon all confluent. Indusium very thin, hood-like, lateral, fixed by its lower side, free on the upper (towards the apex of the pinnule). — Sterile fronds rising separately from the naked extensively creeping rootstock, long-stalked, broadly triangular in outline, deeply pinnatifid into lance-oblong pinnæ, which are entire or wavy-toothed, or the lowest pair even sinuate-pinnatifid (decaying in autumn); veins reticulated into fine meshes throughout. (Name apparently from *ὄνος*, a vessel, and *κλείω*, to close, from the singularly inclosed fructification.)

1. *O. sensibilis*, L. — Moist copses, common. July. — A rare, abnormal state of this Fern, in which the pinnæ of some of the sterile fronds, becoming again pinnatifid and more or less contracted, bear fruit-dots without being much revolute or losing their foliaceous character, is the var. *obtusilobata*, Torr. *N. Y. State Fl.*, described from specimens gathered in Yates county, New York, by Dr. Sartwell, and Washington county, by Dr. Smith. This explains the long-lost *O. obtusilobata*, Schkuhr (from Penn.), which, as figured, has the sterile fronds thus 2-pinnately divided, with rounded pinnules, but the fertile nearly as in the ordinary *O. sensibilis*. (*Ragiópteris*, Presl, is founded on a young fertile frond of this species which is placed (in *herb. Willd.*!) along with the sterile frond of some different Fern.)

17. SCHIZÆA, Smith. SCHIZEA.

Fertile fronds of several contracted linear pinnæ which are connivent in pairs at the apex of a slender stalk; the under (inner) side covered with two rows of sessile naked sporangia, which are oval, vertical, furnished with a striate-rayed crest at the apex, and opening by a longitudinal cleft down the outer side. Sterile fronds

linear or thread-like, sometimes forked and cleft (whence the name, from $\sigma\chi\iota\zeta\omega$, *to slit*).

1. **S. pusilla**, Pursh. Sterile fronds linear-thread-form, simple, tortuous, much shorter than the stalk of the fertile, which bears about 5 pairs of short crowded pinnæ at its apex. — Low grounds, Pine barrens of New Jersey, rare. — A delicate little plant, 3'-4' high.

18. LYGÓDIUM, Swartz. CLIMBING FERN.

Fronds twining or climbing, bearing stalked and variously lobed divisions in pairs, with free veins, fruit-bearing on separate contracted divisions or spike-like lobes, one side of which is covered with scale-like hooded indusia imbricated in 2 ranks, fixed by its lower edge, each inclosing a single sporangium, or rarely a pair. Sporangia much as in *Schizæa* but oblique, fixed to the vein by its inner side next the base. (Name from $\lambda\upsilon\gamma\acute{\omega}\delta\eta\varsigma$, *flexile*.)

1. **L. palmatum**, Swartz. Very smooth; stalks slender, flexile and twining (1°-3° long), from slender running rootstocks; its short alternate branches or petioles deeply 2-forked, each fork bearing a rounded heart-shaped palmately 4-7-lobed sterile frondlet; fertile frondlets above, all contracted and several times forking, forming a compound terminal panicle. (*Hydroglóssum*, Willd.) — Shaded, moist banks, E. New England to Penn.; rare. July.

19. OSMÚNDA, L. FLOWERING FERN.

Sporangia globose, short-pedicelled, naked, entirely covering the fertile fronds or pinnæ (which are contracted to the mere rachis), thin and reticulated, not striate-rayed at the apex, opening by a slit into 2 valves across the apparent top (opposite the pedicel). Spores green. Fronds tall and upright, from thickened rootstocks, 1-2-pinnate; the veins forking and free. (*Osmunder*, a Saxon name of Thor, a Celtic divinity.)

* *Fronds 2-pinnate; the pinnules somewhat stalked, merely serrulate.*

1. **O. spectabilis**, Willd. (FLOWERING FERN.) Very smooth, pale (2°-4° high); sterile pinnules 20 or more, lance-oblong, rather oblique but not auricled at the base (2' long); the fertile forming an oblong racemose panicle at the summit of the frond. — Swamps, common. July.

* * *Sterile fronds pinnate: pinnæ deeply pinnatifid; the divisions entire.*

2. **O. Claytoniana**, L. Clothed with loose wool when unfolding, soon perfectly smooth; pinnæ oblong-lanceolate, with oblong obtuse divisions; some (2-5 pairs) of the middle pinnæ fertile, these

entirely pinnate; sporangia brownish. (*O. interrupta*, Michx., &c.) — Low grounds, common. May: fruiting as it unfolds. — This being Clayton's plant (as I ascertained in 1839, both from the Claytonian and Linnæan herbaria), though wrongly described from young specimens in which the fructification was mistakenly thought to be terminal, must bear the original name.

3. **O. cinnamomea**, L. (CINNAMON-FERN.) Clothed with rusty wool when young; sterile fronds smooth when full grown, the lanceolate pinnæ pinnatifid into broadly oblong obtuse divisions; *fertile fronds separate, contracted*, 2-pinnate, entirely covered, or nearly so, with the cinnamon-colored sporangia. — Var. *FRONDOSA* is a rare occasional state, in which some of the fronds are sterile below and more sparsely fertile at their summit. (*O. Claytoniana*, Conrad, not of L.) — Swamps and low copses, everywhere. May. — Growing in large bunches, the fertile fronds in the centre, perfecting fruit as they unfold, 1° - 2° long, decaying long before the sterile fronds (at length 4° - 5° high) get their growth.

20. BOTRYCHIUM, Swartz. MOONWORT.

Fronde ternately or pinnately divided or compound, rising straight from the clustered roots; the lateral division sterile, with forking free veins, the terminal one wholly fertile, spike contracted, the spikes pinnately paniced. Sporangia sessile, clustered but distinct, rather coriaceous, transversely 2-valved, shedding the copious powdery sulphur-colored spores. (Name a diminutive of *βότρυς*, a cluster of grapes, from the appearance of the fruitful fronds.)

1. **B. lunarioides**, Swartz. Stalk bearing the *petioled sterile frond near the base*, which is broadly triangular, 2-ternately divided, and the divisions mostly pinnatifid; lobes roundish, ovate, or somewhat kidney-shaped, crenulate, thickish; fructification 2-pinnate. (*B. fumarioides*, Willd.) — Varies greatly in division of the frond; as var. *OBLIQUUM* (*B. obliquum*, Willd.), with oblong or lanceolate divisions, oblique at the base; and var. *DISSÉCTUM* (*B. dissectum*, Willd.), with linear cleft and toothed divisions and lobes. — Low woods, rare. July. — Plant 6' - 15' high.

2. **B. Virginicum**, Swartz. Slightly hairy (10' - 20' high); *sterile frond above the middle, broadly triangular* in outline, spreading (6' - 12' wide), ternately divided to the base, therefore *sessile*, thin; the branches pinnate; pinnæ pinnately parted; pinnules lance-oblong, cut-pinnatifid or sharply toothed; fructification 2-pinnate. (A smaller state is *B. gracile*, Pursh.) — Rich woods, common. July.

3. **B. simplex**, Hitchcock. Dwarf (2' - 5' high); *sterile frond oblong, pinnatifid into a few obovate-wedge-shaped cut-toothed divisions*,

sometimes rather 2-pinnatifid with narrower lobes; fructification irregular, 1-2-pinnate. — Rocky woods, New England and New York, rare. — Very likely a depauperate state of the last.

21. OPHIOGLOSSUM, L. ADDER'S-TONGUE.

Fronde a naked stalk rising straight, bearing a lateral sterile portion resembling an entire ovate-oblong leaf with finely reticulated immersed veins, and a simple terminal spike, on which the opaque and coriaceous sessile sporangia are closely packed in 2 ranks, all more or less coherent together, so as to appear necklace-jointed, transversely 2-valved. Spores copious, sulphur-color. (Name compounded of *ὄφις*, a serpent, and *γλῶσσα*, tongue.)

1. **O. vulgatum, L.** Sterile frond borne about the middle, ovate-oblong, obtuse, sessile (about 3' long), shorter than the spike; root fibrous. — Moist woods, very rare. June. — A few immature specimens of a remarkably dwarf state, 1'-2' high, with the young spike almost sessile, were gathered by Dr. Curtis, in Otsego county, New York.

ORDER 132. **LYCOPODIACEÆ.** (CLUB-MOSS FAM.).

Low plants, usually of Moss-like aspect, with the solid and often woody stems thickly clothed with sessile awl-shaped or lanceolate persistent and simple leaves, bearing the 2-4-valved spore-cases sessile in their axils; chiefly represented by the typical genus

1. LYCOPÓDIUM, L., Spring. CLUB-MOSS.

Spore-cases of only one kind (*sporangia*, much like those of *Ophioglossum*, but larger), coriaceous, flattened, usually kidney-shaped, 1-celled, opening by a transverse line round the margin, thus 2-valved, discharging the subtile spores in the form of a very copious sulphur-colored inflammable powder. — Perennials, with evergreen 1-nerved leaves, imbricated or crowded in 8-16, rarely in 4, ranks. (Name compounded of *λύκος*, a wolf, and *πούς*, foot, from no obvious resemblance.)

§ 1. SELAGO, Dill. — *Sporangia scattered in the axils of the ordinary and uniform (dark-green and shining, rigid, about 8-ranked) leaves.*

1. **L. lucidulum, Michx.** Stems thick, 2 or 3 times forked, the branches ascending (6'-12' high); *leaves widely spreading or re-*

flexed, linear-lanceolate, acute, *minutely toothed*. — Cold, damp woods. August.

2. **L. Selàgo**, L. Stems thick and rigid, erect, fork-branched, forming a level-topped cluster (3' - 6' high); *leaves spreading*, lanceolate, pointed, *entire*. — Tops of high mountains, Maine to New York, and northward, rare; both the variety with more erect, and that with widely spreading, leaves.

§ 2. LYCOPIDIUM proper. — *Sporangia borne only in the axils of the upper (bracteal) leaves, thus forming terminal spikes or catkins.*

* *Leaves of the creeping sterile and the upright fertile stems or branches, and those of the simple spike all alike, many-ranked (sporangia opening near the base).*

3. **L. inundatum**, L. Dwarf; creeping sterile stems forking, flaccid; the fertile solitary (1' - 4' high), bearing a short thick spike; *leaves lanceolate or lance-awl-shaped, acute, soft, spreading, naked*, or sometimes bearing a few minute spiny teeth. — Leaves (curving upwards on the prostrate shoots) narrower in the American than in the European plant (perhaps a distinct species), and passing into the var. BIGELÒVII, Tuckerm.: fertile stems 5' - 7' high, its leaves more awl-shaped and pointed, sparser and more upright, often somewhat teeth-bearing. (L. Carolinianum, Bigel., not of L.) — Sandy bogs, northward, rare: the var. from New England to New Jersey near the coast. Aug.

4. **L. alopecuroides**, L. Stems stout, very densely leafy throughout; the sterile branches recurved-procumbent and creeping; the fertile of the same thickness, 6' - 20' high; *leaves narrowly linear-awl-shaped, spinulose-pointed, spreading, conspicuously bristle-toothed below the middle; those of the cylindrical spike with long setaceous tips.* — Pine-barren swamps, New Jersey and southward. Aug., Sept. — Stems, with the dense leaves, $\frac{1}{2}$ ' thick; the comose spike, with its longer spreading leaves, $\frac{3}{4}$ ' to 1' thick. — Most distinct from the true L. inundatum, and I think also from the variety given above, which has been confounded with it.

* * *Leaves of the catkin-like spike (bracts) scale-like, imbricated, yellowish, ovate or heart-shaped, very different from those of the sterile stems and branches.*

+ *Spikes sessile (branches equally leafy to the top).*

5. **L. annótinum**, L. Much branched; stems prostrate and creeping (1° - 4° long); the ascending branches similar (5' - 8' high), sparingly forked, the sterile ones making yearly growths from the summit; *leaves equal, spreading, in about 5 ranks, rigid, lanceolate, pointed, minutely serrulate (pale green); spike solitary, oblong-cylindrical, thick.* — Var. PÚNGENS, Spring, is a reduced subalpine or montane form, with shorter and more rigid-pointed erectish leaves.

(Var. *montanum*, *Tuckerm.*) — Woods, common northward: the var. on the White Mountains, with intermediate forms around the base. July.

6. **L. dendroïdeum**, Michx. (GROUND-PINE.) *Stems upright* (6'–9' high) from a subterranean creeping rootstock, *simple below*, and clothed with homogeneous lanceolate-linear acute entire leaves appressed-erect in 4–6 rows, *bushy-branched at the summit*; *the crowded branches spreading, fan-like*, with the lower row of leaves shorter and the lateral spreading, — in var. *obscurum* appearing flat, from the leaves of the upper side being also shorter and appressed. (L. *obscurum*, L., the older name, applied to the plant in a sterile state, had best give way to the characteristic name of Michaux, unless, with Bigelow, we preserve it for the flat-branched plant, which is very likely a distinct species.) — Moist woods. Aug. — Remarkable for its tree-like growth. Spikes solitary, or 2 to 3, cylindrical.

+ + *Spikes peduncled: viz. the leaves minute on the fertile branches.*

+ + *Leaves homogeneous and equal, many-ranked: stems terete.*

7. **L. clavatum**, L. (COMMON CLUB-MOSS.) *Stems creeping extensively*, with similar ascending short and very leafy branches; the fertile terminated by a slender peduncle (4'–6' long) bearing about 2–3 (rarely 1 or 4) linear-cylindrical spikes; leaves linear-awl-shaped, incurved-spreading (light green), tipped as also the bracts with a fine bristle. — Dry woods, common, especially northward. July.

+ + + *Leaves of two forms, few-ranked: stems or branches flattened.*

8. **L. Carolinianum**, L. Sterile stems and their few short branches *entirely creeping* (leafless and rooting on the under side), thickly clothed with broadly lanceolate acute and somewhat oblique 1-nerved *lateral leaves widely spreading in 2 ranks*, and a shorter intermediate row appressed on the upper side; also sending up a slender peduncle (2'–4' high, clothed merely with small bract-like and appressed awl-shaped leaves), *bearing a single cylindrical spike*. — Wet Pine barrens, New Jersey and southward. July.

9. **L. complanatum**, L. *Stems extensively creeping* (often subterranean), the erect or *ascending branches several times forked above*; *branchlets equal, crowded, spreading, somewhat fan-like, flattened, all clothed with minute imbricated-appressed awl-shaped leaves in 4 ranks*, with decurrent-united bases, the lateral rows with slightly spreading tooth-like tips, those of the upper and under rows smaller, narrower, wholly appressed; peduncle slender, bearing 2–4 cylindrical spikes. — Dry woods and copses, common. July.

2. SELAGINÉLLA, Beauv., Spring. SELAGINELLA.

Fructification of two kinds, namely, of spore-cases like those of *Lycopodium*, but very minute and oblong or globular, containing

powdery reddish or orange-colored spores; and of 3-4-valved tumid *oophoridia*, filled by 3 or 4 (rarely 1 or 6) much larger globose-angular spores; the latter either intermixed with the former in the same axils, or solitary (and larger) in the lower axils of the leafy 4-ranked sessile spike. (Name a diminutive of *Selago*, an ancient name of a Lycopodium, from which this genus is separated.)

* *Leaves all alike, equally imbricated; those of the spike similar.*

1. **S. selaginoides.** *Sterile stems prostrate or creeping, small and slender; the fertile thicker, ascending, simple (1'-3' high); leaves lanceolate, acute, spreading, sparsely spinulose-ciliate.* — Wet places, New Hampshire (*Pursh*) and Michigan! — Leaves larger on the fertile stems, thin, yellowish-green.

2. **S. rupéstris,** Spring. *Much branched in close tufts (1'-3' high); leaves densely appressed-imbricated, linear-lanceolate, convex and with a grooved keel, minutely ciliate, bristle-tipped; those of the strongly 4-angular spike rather broader; the two sorts of fructification in the same axils.* (*Lycopodium rupestre, L.*) — Exposed rocks, common. — Grayish-green, resembling a rigid Moss.

* * *Leaves of 2 sorts, appearing 2-ranked.*

3. **S. âpus,** Spring. *Stems tufted and prostrate, creeping, much branched, flaccid; leaves pellucid-membranaceous, 4-ranked; those of the lateral rows spreading horizontally, ovate, oblique, mostly obtuse; the others much smaller, appressed, taper-pointed; those of the short spikes nearly similar; oophoridia copious at the lower part of the spike.* (*Lycop. âpodum, L.*) — Low, shady places. S. New England, near the coast, to Penn., and southward. — A delicate little plant, resembling a Moss or *Jungermannia*.

ORDER 133. HYDROPTÉRIDES.

Aquatic cryptogamous plants, of diverse habit, with the fructification borne at the bases of the leaves, or on submerged branches, consisting of two sorts of organs (of dubious nature), contained in indehiscent or irregularly bursting involucre (sporocarps).

Suborder I. ISOETÍNEÆ. (THE QUILLWORT FAMILY.)

Stemless rooting plants growing under water: sporocarps in the axils and immersed in the inflated base of the grassy-stalk-like leaves. (Allied to Club-Mosses.)

1. **ISOETES.** Sporocarps membranaceous, traversed with delicate thread-like partitions.

Suborder II. SALVINIÆÆ. (THE SALVINIA FAMILY.)

Floating branching plants, with alternate and imbricated cellular leaves; the sporocarps borne on the stem or branches underneath. (Aspect of Liverworts.)

2. SALVINIA. Sporocarps clustered on short leafless branches turned downward and immersed, surrounded by long rootlets.
3. AZOLLA. Sporocarps sessile at the forks of the frond or along the under side, bursting transversely or irregularly.

1. ISÒETES, L. QUILLWORT.

Stem a mere succulent disk, rooting from underneath, and covered above with the dilated imbricated bases of the elongated terete awl-shaped or stalk-like cellular leaves. Sporocarps ovoid and plano-convex, pretty large, sessile in the axils of the leaves and adherent to their excavated dilated base, covered by an interior scale, very thin, indehiscent, traversed internally by transverse threads forming a kind of partitions; those of the central leaves filled with very minute powdery grains (analogous to the spores of *Lycopodium*); the exterior filled with larger spherical-quadrangular spores (*oophoridia*), at first cohering in fours, their crustaceous integument traversed by 3 radiant lines. (Name composed of *ἴσος*, *equal*, and *ἔτος*, *year*, i. e. alike the year through.)

1. **I. lacustris**, L. Disk-like rootstock broad and depressed; leaves wholly submersed, dark green, rigid and fragile, awl-shaped (2' - 6' long), the dilated base as broad as long; spores (*oophoridia*) roughish-granulated, scarcely reticulated. — Bottom of ponds and slow streams, not rare northward. — New England specimens agree well with the N. European plant, and also seem too nearly like the next.

2. **I. riparia**, Engelm. Rootstock small; leaves slender, soft, yellowish-green (4' - 6' long), the base broader than long; spores minutely farinaceous and reticulated. — Gravelly banks of the Delaware below Philadelphia, between high and low water mark, *Dr. Zantzing*: probably throughout the Middle States.

3. **I. Engelmánni**, Braun. Leaves long and slender (9' - 12' long), entirely emersed in summer, soft and flaccid, light yellowish-green, the dilated base longer than broad; spores coarsely farinaceous and reticulated. — Shallow ponds of the Western States.

2. SALVÍNIA, Micheli. SALVINIA.

Stem filiform, floating free, bearing sessile entire leaves above; and the fructification on short leafless branches from the under

side, surrounded by large rootlets, consisting of thin globular closed sporocarps or indusia, composed of a double membrane, bursting irregularly: these are of 2 kinds, one filled with many minute spherical globules, borne on branching pedicels from a central receptacle (*antheridia*); the other containing larger bodies (*sporangia*) short-stalked on a central receptacle, each including a single spore. (Named for *Salvini*, an Italian botanist.)

1. **S. nàtans**, Willd. Leaves elliptical, obtuse, with clusters of bristly hairs above. — A small plant, “floating like *Lemna* on the surface of stagnant waters in several of the small lakes in W. New York.” *Pursh*. — Not since found.

3. AZÓLLA, Lam. AZOLLA.

Plant floating free, pinnately branched, clothed with minute imbricated leaves, appearing like a small *Jungermannia*: fructification sessile on the under side of the branches, of 2 sorts. Sporocarps or indusia ovoid, of a single diaphanous membrane: the smaller kind opening transversely all round, containing several roundish-angular *antheridia* peltately borne on the sides of a central erect column: the large (fertile) kind bursting irregularly, filled with numerous spherical sporangia rising from the base on slender stalks, each containing a few globular hairy spores. (Name said to come from *ἄζω*, to dry, and *ὀλλω*, to kill, being destroyed by dryness.)

1. **A. Caroliniàna**, Willd. Leaves ovate-oblong, obtuse, spreading, reddish underneath. — Pools and lakes, New York and westward, common in Ohio and southward. — Plant $\frac{1}{2}$ ' to 1' broad.

MARSILÈA MUCRONÀTA, Braun, perhaps grows in Wisconsin.

CLASS IV. ANOPHYTES.

Cryptogamous acrogenous plants, growing upwards by an axis or stem, and usually furnished with distinct leaves (sometimes the stem and foliage confluent into a frond), composed of cellular tissue alone.

ORDER 134. MÚSCI. (MOSSES.)

Low, tufted plants, always with a stem and distinct (sessile) leaves, producing spore-cases which open by a terminal lid

(except in Nos. 1–4), and contain simple spores alone. — Reproductive organs of two kinds: 1. The sterile flower, consisting of numerous (4–20) minute cylindrical sacs (*antheridia*) which discharge from their apex a mucous fluid filled with oval particles, and then perish. 2. The fertile flower, composed of numerous (4–20) flask-like bodies (*pistillidia*), each having a membranous covering (*calyptra*) terminated by a long cylindrical funnel-mouthed tube (*style*). The ripened pistillidium (seldom more than one in a flower maturing) becomes the *capsule*, which is rarely indehiscent or splitting by 4 longitudinal slits, but usually opens by a *lid* (*operculum*): beneath the lid and arising from the mouth of the capsule are commonly either 1 or 2 rows of rigid processes (collectively the *peristome*) which are always some multiple of four: those of the outer row are called *teeth*, of the inner *cilia*. An elastic ring of cells (*annulus*) lies between the rim of the capsule and operculum. The powdery particles filling the capsule are *spores*. The thread-like stalk (*pedicel*) supporting the capsule is inserted into the elongated torus (*vaginula*) of the flower. The pedicel continued through the capsule forms the *columella*: enlarged under the capsule it sometimes forms an *apophysis*. The calyptra separating early at its base is carried up on the apex of the capsule; if it splits on one side it is hood-shaped or *cuculliform*, if not, it is mitre-shaped or *mitriform*. Intermixed with the reproductive organs are cellular jointed filaments (*paraphyses*). The leaves surrounding the antheridia are called the *perigonial* leaves, those around the pistillidia or pedicel the *perichæatial* leaves.

Artificial Analysis.

I. ACROCÁRPI.—Fruit terminal.

§ 1. Capsule without a lid.

* Irregularly ruptured.

1. ARCHIDIUM. Calyptra torn irregularly at the middle, no apophysis.
2. PHASCUM. Calyptra circumscissile at base, no apophysis.

3. BRUCHIA. Calyptra mitriform. Capsule with an apophysis.
* * Regularly ruptured.
4. ANDRÆA. Capsule dehiscent by 4 longitudinal slits.
§ 2. Capsule with a lid.
* GYMNÓSTOMI. — Mouth of the capsule naked.
+ Capsule sessile on a stalk-like vaginula.
5. SPHAGNUM. Calyptra irregularly torn, persistent. (Pallid plants.)
+ + Capsule on a proper pedicel : vaginula not stalk-like.
6. GYMNOSTOMUM. Calyptra cuculliform. Antheridia terminal.
7. POTTIA. Calyptra cuculliform. Antheridia axillary.
8. APHANORHEGMA. Calyptra mitriform. Antheridia axillary.
10. PHYSCOMITRIUM. Calyptra mitriform. Antheridia terminal.
15. HEDWIGIA. Calyptra conical. Antheridia axillary.
* * ODONTÓSTOMI. — Mouth of the capsule with teeth.
+ Peristome single ; the teeth 4 - 64.
++ Teeth 4.
19. TETRAPHIS. Calyptra mitriform. Lid conical.
++ ++ Teeth 16. Calyptra mitriform.
11. SPLACHNUM. Teeth in pairs, reflexed when dry.
13. GRIMMIA. Teeth entire, sieve-like, or 3-cleft at the apex.
14. RACOMITRIUM. Teeth filiform, 2 - 3-parted to the base.
27. CONOMITRIUM. Teeth truncate, very short, irregularly divided or perforated.
++ ++ ++ Teeth 16. Calyptra cuculliform.
34. CONOSTOMUM. Teeth united at the apex.
23. TREMATODON. Teeth entire or split. Apophysis very long.
12. WEISSIA. Teeth entire, lanceolate, staminidia terminal.
18. DRUMMONDIA. Teeth entire, truncate, very short.
24. DICRANUM. Teeth split halfway down into equal parallel lobes.
25. LEUCOBRYUM. Teeth split halfway into equal divergent lobes.
26. FISSIDENS. Teeth split halfway into unequal divergent lobes.
22. CERATODON. Teeth split to the base into equal parallel divisions.
++ ++ ++ ++ Teeth 32.
20. TRICHOSTOMUM. Teeth free at the apex, filiform, in pairs, erect.
21. BARBULA. Teeth free at the apex, filiform, spirally twisted.
28. ATRICHUM. Teeth as in No. 30 : calyptra spinulose at the summit.
29. POGONATUM. Teeth adherent as in No. 30 : calyptra densely hairy.
++ ++ ++ ++ ++ Teeth 64.
30. POLYTRICHUM. Teeth adherent to the expanded top of the columella : calyptra densely hairy.
+ + Peristome double ; the teeth 16.
++ Capsule symmetrical, erect : inner peristome of 16 cilia.
16. ENCALYPTA. Calyptra mitriform, smooth, very large.

17. *ORTHOTRICHUM*. Calyptra mitriform, hairy, plaited.
 ++ ++ Capsule unsymmetrical, and inclined to one side.
 = Inner peristome a plaited cone.
31. *BUXBAUMIA*. Capsule pedicelled. Lid and calyptra minute.
32. *DIPHYSCIUM*. Capsule sessile. Lid and calyptra conspicuous.
 == Inner peristome a membrane cut into 16 cilia.
33. *BARTRAMIA*. Capsule globose, striate.
37. *AULACOMNION*. Capsule oblong, ribbed.
36. *BRYUM*. Capsule elongated-pear-shaped: peristomes equal.
35. *MEESIA*. Capsule as in the last: outer peristome shorter.
9. *FUNARIA*. Capsule pear-shaped: teeth all united at the apex.
 === Inner peristome a membrane cut into 64 cilia.
38. *TIMMIA*. Cilia united at their apex in fours.

II. PLEUROCÁRPI. — Fruit lateral. (Peristome double.)

- * Capsule symmetrical, erect. Teeth 16.
 + Inner peristome a fugacious membrane.
39. *PTERIGONIUM*. Calyptra cuculliform, smooth or hairy.
40. *LEPTODON*. Calyptra half-mitriform, hairy.
41. *LEUCODON*. Calyptra half-mitriform, not hairy.
 +- Inner peristome a tessellated membrane.
49. *FONTINALIS*. Calyptra mitriform. Capsule sessile.
50. *DICHELYMA*. Calyptra cuculliform. Capsule pedicelled.
 +-+ Inner peristome a membrane cut into 16 cilia.
48. *CLIMACIUM*. Cilia from a narrow plane base, scalariform.
45. *ANACAMPTODON*. Cilia necklace-shaped from a narrow plane base.
42. *NECKERA*. Cilia keeled, from a narrow base. Calyptra mitriform.
43. *ISOTHECIUM*. Cilia as in No. 42. Calyptra cuculliform.
44. *LESKEA*. Cilia from a broad plaited base. Calyptra cuculliform.
 * * Capsule unsymmetrical, nodding. Teeth 16.
46. *HYPNUM*. Calyptra cuculliform. Inner peristome cut into 16 cilia.
47. *HOOKERIA*. Calyptra mitriform. Peristome as in the last.
 * * * Fructification unknown.
51. *LEUCOPHANES*. 52. *PHYLLOGONIUM*.

PHASCACEÆ.

I. ARCHÍDIUM, Bridel. ARCHIDIUM.

Calyptra laciniately ruptured in the middle, the lower part persistent. Capsule terminal, spherical, indehiscent, nearly sessile upon a hemispherical vaginula. Sporules large, dotted. Inflorescence monœcious; sterile flower axillary, gemmiform. (Diminutive of ἀρχή, *beginning*; these minute and simplest of Mosses first appearing where pools dry up in summer.)

1. **A. phascoides**, Brid. Stems at first erect, simple (2'' - 3'' high), afterwards decumbent and increased by innovations to 8'' - 10'' in length; leaves of the stem and branches lanceolate, entire, the nerve disappearing below the summit; perichætal leaves ovate-lanceolate, concave, toothed at the apex, the nerve excurrent; areolæ rhomboidal, large. — On the ground, meadows and waste fields.

2. PHÁSCUM, L. PHASCUM.

Calyptra conic-bell-shaped or cuculliform. Capsule terminal, indehiscent. Inflorescence monœcious or diœcious. (Φάσκον, an ancient generic name for Moss.)

* *Inflorescence diœcious: calyptra mitriform.*

1. **P. crassinerviūm**, Schwægr. *Leaves lance-awl-shaped, rigid, erect, strongly and irregularly denticulate, the strong nerves excurrent, sometimes vanishing at base; capsule globular, nearly sessile.* — Moist grounds. About 1'' high, furnished at the base with conferva-like filaments (pseudo cotyledons); sterile flower terminal.

2. **P. cohærens**, Hedwig. *Leaves ovate-lanceolate, serrate, nerve vanishing at the apex; in other respects very like No. 1.*

* * *Inflorescence monœcious: calyptra cuculliform.*

3. **P. cuspidatum**, Schreber. Stems simple or forked-branched (1'' - 2'' high); *leaves erect, ovate-lanceolate, entire, the nerve excurrent; capsule immersed, roundish; pedicel short; spores smooth.* — Clayey soils. Ster. fl. with paraphyses, and but one perigonal leaf.

4. **P. crispum**, Hedwig. Stems usually branched (3'' - 6'' high); *leaves lance-awl-shaped, entire, crisped when dry, the nerve percurrent; capsule nearly spherical, immersed.* — Waste fields. — Sterile flower gemmiform, axillary.

5. **P. alternifolium**, Bruch & Schimper. Stems erect, branched (4'' - 7'' high); *leaves lanceolate, spreading; perichætal leaves awl-shaped from an ovate base; nerve excurrent; areolæ rather square; capsule oval, immersed, pedicelled.* — Dry soils. — Sterile flower axillary, gemmiform, destitute of paraphyses.

3. BRÚCHIA, Schwægr. BRUCHIA.

Calyptra mitriform, lacinate at the base. Capsule terminal, oval, apophysated, beaked, indehiscent. Inflorescence diœcious: sterile flower terminal, gemmiform. (Named for *Prof. Bruch*, a distinguished muscologist.)

1. **B. flexuosa**, B. & S. Stems mostly simple; leaves oblong-ovate, pointed, the strong nerve continued into a long and flexuous eroded-denticulate point; capsule oblong-pear-shaped, with a short acute beak. (*Phascum flexuosum*, Schwægr. *Bruchia vaginacea*, Hook. & Wils. in *Drumm. Southern Mosses.*) — Damp ground, Penn.

ANDRÆACEÆ.

4. **ANDRÆA**, Ehrhart. SPLIT-MOSS.

Calyptra irregularly ruptured. Capsule terminal, apophysated, sessile upon the elongated vaginula, dehiscent lengthwise by 4 fissures. Lid persistent. Inflorescence mono-dioecious: sterile fl. gemmiform, axillary. (Named for *Andræa*, a German botanist.)

1. **A. rupéstris**, Hedwig. Stems somewhat branching; leaves ovate, pointed, nerveless, papillose on the back. — Alpine tops of White Mountains, New Hampshire.

SPHAGNACEÆ.

5. **SPHÁGNUM**, Dill. PEAT-MOSS.

Calyptra irregularly torn. Capsule sessile upon a stalk-like vaginula. Peristome none. Lid deciduous. Inflorescence monoecious, terminal. — Soft, flaccid, and usually pale-colored Mosses, inhabiting bogs and swampy places; the stems often attaining a foot or more in length: leaves composed of two kinds of cells: one kind large, elongated, spindle-shaped, and colorless, furnished with pores and a spiral thread; the other much smaller and linear, containing chlorophyl; both together forming a beautiful network of serpentine meshes. (*Σφάγνος*, the ancient name.)

1. **S. cymbifolium**, Ehrh. Branches cylindrical, turgid; leaves ovate or oblong, obtuse, concave, closely imbricated. — Bogs, &c.

2. **S. squarrosum**, Weber & Mohr. Branches gradually tapering to a point; leaves oblong, pointed, squarrose-spreading. — Cranberry bogs.

3. **S. recurvum**, Beauv. Leaves ovate-lanceolate, constricted in the middle, recurved-spreading. — Bogs, N. Engl. Smaller than No. 2.

4. **S. acutifolium**, Ehrh. Leaves ovate-lanceolate, involute at the apex, acute, crowded. — Wet places, very common. Less robust than any of the preceding.

5. **S. cuspidatum**, Ehrh. Leaves lanceawl-shaped, loosely disposed on the branches. — Swamps, New York. More slender than No. 4.

GYMNOSTOMACEÆ.

6. **GYMNÓSTOMUM**, Hedwig. GYMNSTOMUM.

Calyptra cuculliform. Capsule terminal. Peristome none. Lid beaked. Inflorescence dioecious: sterile fl. terminal, gemmiform. (Name from *γυμνός*, *naked*, and *στόμα*, *mouth*: no peristome.)

1. **G. curviróstrum**, Hedw. Stems fork-branched; leaves spreading, lanceolate, pointed, the nerve percurrent; capsule erect, obovate; lid with a long oblique beak from a convex base. — Faces of dripping rocks, mostly limestone; in dense cushions; 1' to 1½' high.

2. **G. rupéstre**, Schwægr. Stems with clustered branches; leaves lance-linear; nerve percurrent; capsule oval; lid erect, elongated-conic. — Smaller than No. 1, in similar situations.

POTTIACEÆ.

7. **PÓTTIA**, Ehrhart. POTTIA.

Calyptra cuculliform, entire, or laciniate at the base. Capsule terminal. Peristome none. Lid conic or beaked, the columella adherent. Inflorescence monœcious: sterile fl. axillary. (Named for one *Pott*, a German botanist.)

1. **P. truncàta**, Bruch & Schimper. Stems simple or branched; leaves spreading, obovate-pointed or oblong-lanceolate, the nerve percurrent; capsule truncate-obovate; lid beaked. (*Gymnóstomum truncátulum*, *Auct.*) — On the ground, fields, New England.

8. **APHANORHÉGMA**, Sulliv. APHANORHEGMA.

Calyptra bell-shaped, awl-pointed, 4–5-laciniate at the base. Capsule spherical, terminal. Peristome none. Lid hemispherical, apiculate. Inflorescence monœcious: sterile fl. axillary. (Name composed of ἀφανής, unapparent, and ῥήγμα, rupture or suture: dehiscence obscure.)

1. **A. serràta**, Sulliv. Annual; stems 2''–3'' high, simple or branched; leaves oblong-lanceolate, spreading, serrate, of loose texture; areolæ large; nerve failing near the apex; capsule immersed, separating transversely by an indistinct suture, each portion being exactly hemispherical, the upper (lid) having a slight point; spores minutely muricate; sterile flower with or without perigonal leaves, in the axils of the upper stem-leaves; paraphyses globosely distended at apex. (*Schistídium serratum*, *Wils. & Hook. in Drumm. Southern Mosses; Sulliv., Musc. Alleghan. No. 198, & in Mem. Amer. Acad. 3, n. series, p. 60, t. 2.*) — Damp soil, New England to Ohio. — Strikingly like *Phascum patens*, distinguished mainly by its feeble operculation, and the denser texture of outer parietes of the capsule.

FUNARIACEÆ.

9. **FUNÀRIA**, Schreber. FUNARIA.

Calyptra cuculliform, ventricose, awl-beaked. Capsule terminal,

pear-shaped, nodding, the orifice oblique. Peristome double; the outer of 16 lance-awl-shaped teeth coherent at the apex; the inner of 16 cilia opposite the teeth. Lid plano-convex. Inflorescence monœcious: sterile fl. terminal, disk-shaped: paraphyses club-shaped. (Name from *funis*, a cord, from the twisting pedicel.)

1. **F. hygrométrica**, Hedwig. Leaves oval-lanceolate, concave, imbricated, the nerve reaching to or beyond the point; capsule annulate, when dry grooved; pedicel long, twisting and incurved, very hygrometrical. — On the ground, old walls, &c., everywhere.

10. PHYSCOMÍTRIUM, B. & S. PHYSCOMITRIUM.

Calyptra mitriform, lobed at the base, or inflated-cuculliform, beaked. Capsule terminal, symmetrical, pear-shaped. Peristome none. Lid convex, with or without a point. Inflorescence, sterile fl., &c., as in the last. (Name composed of *φύσκων*, something inflated, and *μικρὸν*, a little cap.)

1. **P. pyriforme**, B. & S. Leaves spatulate-lanceolate, serrate, spreading, the nerve nearly percurrent; capsule globular-pear-shaped, on an exerted pedicel; calyptra mitriform, torn at the base. (*Gymnóstomum pyriforme*, Hedwig.) — Moist ground, very common.

2. **P. immérsum**, Sulliv. Leaves obovate-lanceolate, serrate, the nerve percurrent; capsule immersed, nearly hemispherical; lid short-pointed from a convex base, adherent to the columella; calyptra 4-5 lobed at the base. (*P. sphæricum*, *Musc. Alleghan. No. 196.*) — Inundated banks of Ohio River. — A minute annual, 2'' - 3'' high.

SPLACHNACEÆ.

11. SPLÁCHNUM, L. UMBRELLA-MOSS.

Calyptra conic, entire or laciniate at base. Capsule terminal, ovate-cylindrical, with a very conspicuous apophysis. Peristome single, of 16 lanceolate teeth partly connected in pairs, when dry reflexed and appressed to the capsule. Lid convex or convex-conic. Inflorescence monœcious or diœcious: sterile fl. terminal, in a little head. (An old Greek name of some Moss.)

1. **S. ampullæcum**, L. Leaves oblong-lanceolate, pointed, entire or irregularly toothed, the reticulation loose; nerve excurrent; apophysis violet-purple, obovate, tapering into the pedicel, twice or thrice the width of the yellow capsule; plant 1' - 2' high. — New England to Penn., rare; mostly on dung.

2. **S. rùbrum**, L. Leaves spatulate-obovate, long-pointed,

regularly serrate, the nerve extending nearly to the apex; *apophysis* very large, red, umbrella-shaped, 7-10 times as wide as the minute capsule; pedicel 3' - 5' long. — Maine, Dr. Young.

3. **S. angustatum**, L. Leaves oblong-lanceolate, produced into a long flexuous point, obsoletely or distinctly toothed; *apophysis* oblong-obconic, rather wider than the capsule. — New England to New Jersey, and southward.

WEISSIACEÆ.

12. WEISSIA, Hedwig. WEISSIA.

Calyptra cuculliform. Capsule terminal, regular. Peristome single, of 16 lanceolate entire erect and equidistant teeth. Lid beaked. Inflorescence monœcious: sterile fl. terminal, gemmiform. (Named for *Weiss*, a German botanist.)

1. **W. controversa**, Hedw. Leaves linear-lanceolate, the margins involute, crisped when dry; nerve strong, excurrent; capsule ovate-elliptical. — On the ground, very common: 6'' - 10'' high.

2. **W. calcàrea**, Hedw. Leaves erect, both in a wet and dry state, linear from a wide base, obtuse, the nerve very broad and thick; capsule top-shaped; lid convex-beaked. — Moist and shady limestone cliffs: 3'' - 5'' high.

3. **W. recurvata**, Hook. & Tayl. Leaves lance-awl-shaped, nerved to the point; capsule ovate; pedicel curved when moist. — In similar situations with the last: 6'' - 9'' high.

4. **W. striata**, Hook. & Tayl. Leaves linear, denticulate at the apex, crisped when dry; capsule ovate-top-shaped, grooved; lid beaked from a flat base. — Alleghany Mountains, in crevices of rocks, &c.: 7'' - 10'' high.

GRIMMIACEÆ.

13. GRIMMIA, Ehrhart. GRIMMIA.

Calyptra mitriform, lobed at base. Capsule terminal, regular. Peristome of 16 lanceolate teeth, entire or perforated, or 2-3-cleft at the apex. Inflorescence monœcious or diœcious: sterile fl. gemmiform, axillary. (Named for *Grimm*, a German botanist.)

1. **G. trichophýlla**, Greville. Leaves linear-lanceolate, tapering into a long diaphanous point; capsule oval when dry, prominently ribbed, rather pendulous on the exerted curved pedicel; annulus large; lid conic-beaked. — On rocks, New England.

2. **G. Pennsylvànica**, Schwægr. Leaves elongated-lanceolate, terminated by a long diaphanous point; capsule oval, immersed

within the perich. leaves; lid conical, pointed. — Rocks, very common along the Alleghany Mountains.

3. **G. conférta**, Funck. Leaves oblong-lanceolate, acute or obtuse, the upper with a short diaphanous point; capsule immersed, oval; teeth of peristome much perforated, orange-yellow; lid convex, minutely beaked. — White Mountains, Oakes.

4. **G. apocárpa**, Hedw. Leaves ovate-lanceolate, rather diaphanous at the apex; capsule oval, immersed; teeth of peristome entire or sparingly perforated, bright purple; lid as in the last. — Rocks.

5. **G. Muhlenbérghii**, Bridel. Leaves linear-lanceolate, obtuse, concave, when dry incurved, the nerve vanishing below the point; pedicel exserted; capsule erect, oval; teeth of peristome linear, deeply cleft; lid awl-shaped from a conic base; calyptra large, mitriform, longitudinally plaited, crenate-laciniate at the base. (*Physcomitrium pusillum*, Bruch & Sch.) — Plant 4''–6'' high. — Rocks, Penn.

14. RACOMÍTRIUM, Bridel. RACOMITRIUM.

Calyptra mitriform or campanulate-awl-shaped, laciniate at base. Capsule terminal, regular. Peristome of 16 thread-shaped and deeply 2–3-cleft teeth. Lid conical, awl-shaped. Inflorescence diœcious: sterile fl. terminal, gemmiform. (Composed of *ράκος*, a shred, and *μυρτίον*, a little cap; from the torn calyptra.)

1. **R. fasciculàre**, Bridel. Stems decumbent, 3'–5' long, the clustered branches short; leaves elongated-lanceolate, spreading, the entire margins revolute; capsule exserted, oblong-oval; lid conic-awl-shaped; calyptra papillose. — Rocks, alpine tops of White Mountains, New Hampshire, Oakes, Tuckerman.

2. **R. lanuginòsum**, Bridel. Stems elongated, slender, somewhat pinnately branched; leaves lanceolate, tapering into a long and diaphanous eroded-toothed point; capsule small; pedicel tuberculate. — With No. 1.

3. **R. microcárpon**, Bridel. Stems ascending, branched; leaves spreading, lanceolate, pointed; the upper with their points diaphanous and somewhat toothed, the areolæ elongated and very sinuous. — With the foregoing; a smaller plant.

4. **R. Sudéticum**, B. & S. The less fasciculated branches, and the longer leaves with a more square areolæ, distinguish this species from the last, which it much resembles. — Rocky places in subalpine districts, New England, Oakes.

15. HEDWÍGIA, Ehrh. HEDWIGIA.

Calyptra conic. Capsule terminal, globose. Peristome none. Lid plano-convex. Inflorescence monœcious: ster. fl. axillary,

gemmiform. (Dedicated to the distinguished cryptogamist, *Prof. Hedwig*.)

1. **H. ciliàta**, Hedw. Leaves spreading, sometimes one-sided, ovate-lanceolate, the apex diaphanous and eroded-denticulate; the perich. leaves ciliate; calyptra minute, smooth or hairy. (*Anœctângium ciliatum*, *Auct.*)—Rocks and boulders, very common. Stems 1'–4' long, forming large glaucous-green patches.

ENCALYPTEÆ.

16. ENCALÝPTA, Schreber. ENCALÝPTA.

Calyptra large, loose, cylindrical-bell-shaped, longer than the terminal capsule. Peristome single, of 16 teeth. Lid with a filiform and slightly club-shaped beak. Inflorescence monœcious, rarely diœcious: ster. fl. gemmiform, axillary or terminal. (Name composed of *έν*, *within*, and *καλυπτήρ*, *a cover*; the capsule veiled by the large calyptra.)

1. **E. ciliàta**, Hedw. Stems branched; leaves erect-spreading, oblong, short-pointed by the percurrent nerve; capsule smooth, not annulate; calyptra fringed at the base.—Rocks, N. New York.

ORTHOTRICACEÆ.

17. ORTHÓTRICHUM, Hedwig. ORTHOTRICHUM.

Calyptra bell-shaped, plaited, usually hairy. Capsule terminal. Peristome double or single; the outer of 16 teeth approaching in pairs, when dry reflexed; the inner of 16 or 8 horizontal cilia (sometimes wanting). Operculum elongated-conic. Inflorescence monœcious or diœcious: ster. fl. gemmiform, axillary. (Name composed of *ὀρθός*, *straight*, and *θρίξ*, *hair*; of which the calyptra is apparently made.)

1. **O. críspum**, Hedw. *Leaves spreading, linear-lanceolate, when dry very much crisped*; capsule elongated club-shaped, grooved; calyptra very hairy.—Trees in mountainous districts.

2. **O. Hutchínsiæ**, Hook. & Tayl. *Leaves lanceolate, erect, when dry appressed to the stem*; capsule exserted, grooved; calyptra hairy.—Grows on rocks; by which and by the blackish-green foliage it is easily identified.

3. **O. Ludwígii**, Schwægr. *Leaves erect-spreading, lanceolate, pointed*; capsule exserted, grooved only at the orifice; inner peristome rudimentary; calyptra hairy, laciniate at the base.—On trees. The

smooth capsule, and yellowish-green foliage somewhat crisped, are good marks of this species.

4. **O. speciosum**, Nees. *Leaves recurved-spreading, lanceolate, pointed, the margins revolute*; capsule exserted, obsoletely grooved. — Trees, banks of the St. Lawrence River. A large species with a loose mode of growth, and reddish-brown foliage.

5. **O. strangulatum**, Beauv. *Leaves lanceolate, obtuse; capsule immersed, grooved, with an inner peristome of 8 cilia (absent, fide Schwægr.); calyptra smooth or slightly hairy*. — Trees; extremely common, much smaller than any of the preceding (5''–8'' high), with a condensed mode of growth, and leaves large in proportion.

18. DRUMMÓNDIA, Hook. DRUMMONDIA.

Calyptra large, cuculliform, beaked, ventricose and somewhat plaited at the base. Capsule terminal, exserted. Peristome of 16 very short and truncated teeth. Lid convex-beaked. Inflorescence gemmiform, axillary. (Named for the late *Th. Drummond*.)

1. **D. clavellata**, Hook. Stems prostrate and creeping, throwing up thickly crowded erect branches, from the extremity of which arise the pedicelled ovate capsules; leaves oblong, pointed, densely imbricated; the minute areolæ roundish; nerve vanishing near the apex; beak of the lid long, oblique from a convex base. (*Orthotrichum clavellatum*, *Auct.*) — Bark of trees, adhering very closely, and forming large, dark-green patches.

TETRAPHIDEÆ.

19. TÉTRAPHIS, Hedwig. FOUR-TOOTHED MOSS.

Calyptra mitriform, plaited and rather lacerated at the base. Capsule terminal. Peristome single, of 4 three-sided-pyramidal teeth longitudinally ribbed on the back, not articulated. Lid conic. Inflorescence monœcious, terminal. (Name formed of *τέτρα*, *four*, and *φύς*, *produced*; from the 4-toothed peristome.)

1. **T. pellucida**, Hedw. Stems sparingly branched, lower leaves minute; upper ones ovate-lanceolate and oval, pointed, nerved to near the apex; capsule oblong-cylindrical. — Woods, on rotten wood, very common.

TRICHOSTOMACEÆ.

20. TRICHÓSTOMUM, Hedwig. TRICHOSTOMUM.

Calyptra cuculliform. Capsule terminal. Peristome of 32 capillary-filiform teeth approximated in pairs. Lid elongated-conic.

Inflorescence various. (Name formed of *θρίξ*, *hair*, and *στόμα*, *mouth*; from the capillary teeth of the peristome.)

1. **T. pállidum**, Hedw. Stems short; *leaves setaceous from a lanceolate base*, nerve excurrent, denticulate at the apex; capsule oblong, erect or very slightly curved; annulus simple; pedicel 2' - 3' long, slender, flexuous; *lid conic, short-beaked*. — Clayey grounds, frequent. Conspicuous by its straw-colored pedicels which give color to the whole mass. Monœcious: sterile fl. gemmiform, in the axils of the upper leaves.

2. **T. tórtile**, Schrad. *Leaves spreading lance-awl-shaped, channelled, denticulate at the apex of the excurrent nerve*; capsule erect, oblong-elliptical; teeth of the peristome somewhat oblique, with their basal membrane emergent; annulus simple. — Road-sides, clay banks, &c., frequent, 7" - 10" high, diœcious: sterile fl. terminal.

3. **T. vaginans**, Sulliv. *Leaves erect, appressed, ovate-lanceolate*; perich. leaves sheathing, suddenly attenuated, spreading at the apex, the strong nerve excurrent; capsule oval-oblong; teeth of the peristome short, erect, anastomosing in pairs; annulus double, very large, its width equal to half the length of the teeth; pedicel slender, flexuous; lid elongated-conic, obtuse. — Sides of ditches and roads, Penn. to New England. Plant 10" - 15" in height; branched by slender and erect innovations. Inflorescence same as in the last. — (*Musc. Alleghan. No. 176.*)

21. BÁRBULA, Hedwig. BARBULA.

Calyptra cuculliform. Capsule terminal. Peristome of 32 filiform spirally-twisted teeth. Lid elongated-conic. Inflorescence various. (Name a diminutive of *barba*, beard, from the capillary peristome.)

1. **B. unguiculàta**, Hedw. Stems elongated, fork-branched; *leaves erect-spreading, oblong-lanceolate, obtuse, pointed by the excurrent nerve, the margins revolute*; capsule cylindrical, erect or slightly curved; lid awl-shaped. — Clay banks, road-sides, &c., frequent. Plant $\frac{1}{2}$ ' to 2' high, diœcious: the sterile fl. terminal, gemmiform.

2. **B. cæspitòsa**, Schwægr. Stems short; *leaves crowded, linear-oblong, taper-pointed, mucronate by the excurrent nerve, undulate*; capsule cylindrical, slightly curved. — Woods, on the ground, near the base of trees. Monœcious: sterile fl. axillary, gemmiform, pedicelled. — Readily known by its pale-green foliage, yellow capsule, and red lid.

3. **B. mucronifòlia**, Bruch & Schimper. Stems short; *leaves condensed, obovate-oblong, pointed*, and the nerve a little excur-

rent; capsule elongated-cylindrical; basal membrane of the *peristome* produced into a tessellated tube longer than the teeth. — Rocky banks of streams: inflorescence as in No. 2.

DICRANACEÆ.

22. CERÁTODON, Bridel. CERATODON.

Calyptra cuculliform. Capsule terminal, oblong, somewhat strumose, annulate. Peristome single, of 16 lanceolate teeth 2-cleft nearly to the base, their articulations prominent. Lid conical-beaked. Inflorescence diœcious: sterile fl. terminal. (Name formed of *κέρας*, a horn, and *ὀδοός*, tooth; the teeth of the peristome nodulose, like a goat's horn.)

1. **C. purpùreus**, Bridel. Stems tufted, fastigiately branched; leaves keeled, oblong-lanceolate, the margins reflexed, nerved to the apex; capsule cylindrical, nodding, striate. — Common on the ground. Capsule and pedicels dark and shining purple.

23. TREMATODON, Michx. TREMATODON.

Calyptra inflated-cuculliform. Capsule terminal, with a very long apophysis, annulated. Peristome single, of 16 lanceolate teeth, entire, 2-cleft or perforated (whence the name, from *τρήμα*, a perforation, and *ὀδοός*, tooth): otherwise nearly as in the last.

1. **T. longicóllis**, Michx. Stems short and nearly simple; leaves awl-shaped from an ovate base, flexuous, the nerve excurrent; capsule elongated-cylindrical, slightly curved, with a linear apophysis twice or thrice its length; pedicel long, flexuose, straw-colored. — Clay banks, New England: resembles *Trichóstomum pallidum*.

24. DICRÀNUM, Hedwig. DICRANUM.

Calyptra cuculliform. Capsule terminal. Peristome single, of 16 equidistant teeth which are 2-3-cleft to near their middle (whence the name, from *δίκρανον*, a fork), the lobes equal and parallel. Lid beaked. Inflorescence monœcious or diœcious, gemmiform.

1. **D. scopàrium**, Hedw. Stems ascending, branched; leaves *fulcate*, turned to one side, lance-awl-shaped, channelled, serrulate; capsule cylindraceous, erect-drooping; lid long-beaked. — Woods, on the ground and decayed logs; one of the largest and commonest species, 3' - 5' high.

2. **D. undulàtum**, Ehrh. Resembles closely No. 1; but the

transverse undulations of its leaves perceptible to the naked eye, and with *numerous pedicels* (2-5) *from the same perichæth.* (*D. polysætum*, Schwægr.) — On the ground; rather rare.

3. ***D. congéstum***, Bridel. Stems erect, fastigiately branched; *leaves* crowded, *rather one-sided, linear-lanceolate, pointed*, keeled, serrulate, somewhat crisped when dry; capsule ovate-oblong, nodding; lid long-beaked. — Mountainous districts. Smaller than No. 1, and in denser tufts: the capsule striated after losing the lid.

4. ***D. Schradèri***, Weber & Mohr. Stems erect; *leaves* crowded, *erect, not turned to one side, linear-lanceolate, rather obtuse*, slightly denticulate at the apex, when dry somewhat wrinkled; capsule ovate-oblong. — Mountains of New York.

5. ***D. fúlvum***, Hook. Stems ascending, branched; *leaves* not turned to one side, *lance-awl-shaped*, flexuous, crisped when dry, the nerve strong; *capsule oblong-elliptical, erect*; lid with an *awl-shaped erect beak*. — On rocks, among the Alleghany Mountains.

6. ***D. flagellàre***, Hedw. Stems erect, densely crowded, emitting from near their summits *slender and rigid innovations* furnished with minute imbricated leaves; *stem-leaves linear, awl-shaped, one-sided*; *capsule cylindraceous, erect*. — Woods, on decayed logs, common.

7. ***D. longifòlium***, Ehrh. Stems branched, ascending; *leaves falcate, one-sided*, very long, *bristle-awl-shaped*, slightly serrulate, the nerve very broad; *capsule oblong, erect*. — High mountains of Penn., on rocks and trees.

8. ***D. heteromállum***, Hedw. Stems erect, nearly simple; *leaves falcate, one-sided, awl-shaped from a broad base*, slightly serrulate; *capsule obovate, unequal, slightly nodding*; lid with an oblique awl-shaped beak. — Shaded banks, frequent.

9. ***D. vârium***, Hedw. Stems nearly simple; *leaves* erect-spreading, *sometimes one-sided, lance-awl-shaped*; *capsule ovate, oblique, nodding*; lid conic, pointed, rather short. — Moist, clayey banks; very common, much smaller than any of the preceding, 7'' - 10'' high.

10. ***D. cerviculàtum***, Hedw. Stems simple; *leaves* rather *one-sided, lance-awl-shaped*, the nerve very broad; *capsule ovate-globose, nodding*, strumose; lid obliquely beaked. — Boggy places, New Jersey: grows in dense tufts, 8'' - 10'' in height.

LEUCOBRYACEÆ.

25. **LEUCÒBRYUM**, Hampe. LEUCOBRYUM.

Calyptra cuculliform. Capsule terminal, oblong. Peristome single, of 16 slender 2-cleft densely-jointed teeth; the lobes equal, divergent. Lid with an awl-shaped beak. — Leaves composed of

two equal strata of empty cellules furnished with pores: between the strata are minute 3-4-sided intercellular passages filled with chlorophyl. (Name composed of *λευκός*, *white*, and *βρύον*, *Moss*, from the pallid color.)

1. **L. vulgare**, Hampe. Stems erect, divided above, fragile; leaves closely imbricated, erect, ovate-lanceolate, channelled, rather obtuse, nerveless; capsule erect-nodding, slightly strumose, striate when dry. (*Dicranum glaucum*, *Hedw.*) — About the roots of trees, margins of swamps, &c.; growing in dense glaucous-green tussocks, 3' - 6' high.

FISSIDENTEÆ.

26. FISSIDENS, Hedwig. FISSIDENS.

Calyptra cuculliform, rarely conic-mitriform. Capsule terminal or lateral. Peristome single, of 16 linear-lanceolate 2-cleft teeth, the divisions unequal, divergent. Lid conic-beaked. Inflorescence various. — Frond-like plants; the leaves exactly 2-ranked, their proper lamina infolded-boat-shaped, producing from the keel an equitant blade which forms the principal portion of the leaf. (Name from *fissus*, split, and *dens*, tooth; alluding to the cleft teeth of the peristome.)

* *Fruit terminal.*

1. **F. hyalinus**, Wils. & Hook. Stems erect, simple; leaves oblong, acute, loosely reticulated, hyaline, nerveless; capsule erect, ovate; lid conical-pointed; calyptra mitriform, entire at the base. — Damp earth in shady woods, Cincinnati, Ohio. — A very rare plant, 2" - 3" high.

2. **F. obtusifolius**, Wils. Stems simple, erect; leaves nearly oval, very obtuse, the nerve vanishing below the apex; capsule inversely conical; calyptra cuculliform; spores very large; diœcious; sterile fl. terminal; plant 2" - 3" high. Dripping cliffs, Cincinnati, Ohio. — This and the preceding were first discovered by the late T. G. Lea.

3. **F. exiguus**, Sulliv. Stems simple, ascending; leaves oblong-lanceolate, marginless, the nerve running to near the apex; capsule oval, rather oblique; lid conic, minutely beaked; calyptra cuculliform. — Woods, upon stones in the channels of dried-up brooks, Ohio. — Diœcious; the sterile fl. terminal: plant 2" - 3" high. — (*Musc. Alleghan. No. 182.*)

4. **F. minutulus**, Sulliv. Stems simple; leaves linear-lanceolate, margined by a transparent rather wavy border; capsule erect, oval; lid elongated-conic; calyptra cuculliform; diœcious; the sterile

fl. terminal. — Plant of the same size as the preceding, and often found growing with it. (*Musc. Alleghan. No. 183.*)

5. **F. bryoides**, Hedw. Stems nearly simple, ascending; *leaves oblong-lanceolate, margined, minutely pointed by the excurrent nerve*; capsule oblong-oval; lid conic-pointed; *calyptra cuculliform*. — Moist banks; monœcious; sterile fl. axillary, gemmiform, pedicelled; plant 4" - 10" high.

6. **F. osmundioides**, Hedw. Stems erect, branched by innovations; *leaves oblong, somewhat obtuse, apiculate, denticulate, the nerve stopping short of the apex*; *calyptra mitriform*, lobed at the base. — About the roots of trees in swamps, 1' - 2' high, diœcious; sterile fl. terminal.

* * *Fruit lateral.*

7. **F. adiantoides**, Hedw. Stems much branched; *leaves oblong-lanceolate, serrulate*, the marginal cells transparent, the *nerve percurrent*; capsule oblique; lid with a long beak; *calyptra cuculliform*. — Shaded, moist places, on the ground; 1' - 2' high. Inflorescence as in *F. bryoides*.

8. **F. grandifrons**, Bridel. Stems erect, divided; *leaves crowded, linear-lanceolate, thick*, composed of many strata of cells, the *nerve vanishing short of the apex*. — Niagara Falls, on perpendicular faces of rocks moistened by the spray; fertile fl. axillary and gemmiform; fruit unknown. — Plant 2' - 3' high.

9. **F. subbasilâris**, Hedw. Stems erect, crowded, branched by innovation; *leaves elongated-oblong, obtuse, apiculate, eroded-denticulate at the summit, the nerve disappearing near the apex*; capsule erect; pedicel arising from near the base of the stem. — Woods, on decayed logs and trees near the ground, in large dense patches; 5" - 9" high.

27. CONOMÍTRIUM, Montagne. CONOMITRIUM.

Calyptra conic-mitriform, wavy at the base. Capsule terminal upon axillary branches. Peristome of 16 short and truncated irregularly divided or perforated teeth. Lid conic, minutely beaked. Inflorescence monœcious: sterile fl. axillary. (Name composed of *κῶνος*, a cone, and *μῆτριον*, cap, or calyptra.)

1. **C. Juliânum**, Mont. Stems filiform, floating, much divided; leaves distant, very narrowly lanceolate, acute, the nerve extending to near the apex; capsule obconic, tapering into a short pedicel; lid conic with a long erect beak, which alone is covered by the calyptra; sometimes tufted and throwing out rootlets from its base. (*Fissidens octradiceras*, *Brid.*) — Immersed in springs and brooks, 3' - 5' long.

POLYTRICHACEÆ.

28. ÁTRICHUM, Beauv. SMOOTH-CAP MOSS.

Calyptra narrowly cucullate, naked, spinulose at the apex. Capsule terminal, elongated-cylindrical, slightly curved. Peristome single, of 32 short strap-shaped teeth, incurved and adhering by their summits to the margin of the disk-like apex of the columella. Lid awl-beaked. Inflorescence monœcious or diœcious: sterile fl. cup-shaped. (Name formed of *a* privative and *θρίξ*, hair, from the smooth calyptra.)

1. **A. undulatum**, Beauv. Stems erect, mostly simple; leaves long, ligulate-lanceolate, undulate, spinulose-toothed, narrowly margined, the nerve with 2-4 narrow lamellæ. — Moist clay banks, in hilly districts; rare. Monœcious; the fertile fl. terminal on a prolongation of the axis of the sterile flower. (Catharinæa undulata, Bridel.)

2. **A. angustum**, Beauv. More slender than the preceding; leaves narrower, more densely reticulated, not denticulate below the middle, the nerve with more and broader lamellæ. — Shady woods and margins of swamps; common. Diœcious.

29. POGONÁTUM, Beauv. HAIR-CAP MOSS.

Calyptra cuculliform, densely hairy. Capsule terminal, cylindrical. Peristome single, of 32 teeth, adherent by their summits to the membranous-dilated apex of the columella. Lid beaked. Inflorescence diœcious; sterile fl. terminal, cup-shaped. (Name from *πώγων*, beard, from the hairy calyptra.)

* Stems extremely short.

1. **P. brevicaulis**, Brid. Stems very short; leaves few, crowded and appressed, awl-shaped from a membranaceous base, denticulate; capsule cylindrical; lid obliquely beaked. — Moist, clayey banks. Stems 1''-2'', the pedicels 1' to 1½', high: the ground around is always covered by a green stratum of confervoid filaments.

* * Stems elongated. (Alpine species.)

2. **P. urnigerum**, Brid. Stems elongated, divided above; leaves lanceolate from a short sheathing base, pointed, serrate, the limb densely covered with lamellæ, which have their borders abruptly thickened; capsule cylindrical, the surface granulated. — White Mountains, New England. Plant 2' - 4' high.

3. **P. capillare**, Brid. Very like the preceding species, but a smaller plant; leaves oblong, approaching to spatulate, pointed, more loosely placed on the stem, pedicels more slender; beak of the lid

rather flexuous; teeth of peristome more linear, with their basal membrane conspicuously emergent. — White Mountains, New Hampshire.

4. **P. alpinum**, Brid. Stems much elongated, fastigiately branched above; *leaves linear-lanceolate* from a long sheathing base, serrate; *lamellæ of the nerve gradually thickened at their margins*; *capsule erect or oblique, oval-oblong, the surface smooth*. — White Mountains. — Larger than any of the above.

30. POLYTRICHUM, L. HAIR-CAP MOSS.

Calyptra densely hairy. Capsule 4-6-sided, with a discoidal apophysis. Peristome single, of 64 teeth, adherent by their summits to the membranous-dilated apex of the columella. Otherwise as in the last. (Name formed of *πολύς*, *many*, and *θρίξ*, *hair*; the calyptra apparently made up of hairs.)

1. **P. commune**, Linn. Stems nearly erect, simple; *leaves spreading or recurved, linear-lanceolate, flat, serrate on the margins and back*; the lamellæ somewhat 2-cleft at their margins; *capsule oblong 4-sided, the angles acute*; *lid short-beaked from a convex base*. — Shady, moist places. — Plant 6' - 12' high.

2. **P. formosum**, Hedw. Differs from the preceding by its longer and slightly curved *capsule with obtuse angles*, smaller obconic apophysis tapering into the pedicel, and the *conical lid*. — Woods, around the base of trees, &c.

3. **P. gracile**, Menzies. Usually somewhat smaller than No. 1 or 2; *capsule ovate, 4-6-sided, obtuse-angled*; *lid long-beaked*; woolly hairs of the calyptra shorter than the capsule; spores large; basal membrane of the peristome not emergent. — Boggy places, Ipswich, Massachusetts, *Oakes*.

4. **P. juniperinum**, Hedw. Stem simple or divided; *leaves linear-lanceolate, awn-pointed, the margins inflexed, entire*; capsule and lid as in No. 1. — Var. **strictum**; stems elongated, slender; leaves appressed; capsule cubical. — Margins of woods, exposed places, &c. Plant 4' - 7' high; the variety subalpine.

5. **P. piliferum**, Schreb. Stems simple; *leaves clustered at its summit, lanceolate, the margins inflexed, entire, the nerve excurrent into a long diaphanous awn*; capsule ovate-oblong, 4-sided; lid conical, beaked. — Rocky places, mountainous districts; plant 2' - 4' high.

BUXBAUMIACEÆ.

31. BUXBAUMIA, Haller. BUXBAUMIA.

Calyptra minute, cylindrical-bell-shaped. Capsule terminal, ovate, gibbous, plane on the upper side, convex on the lower,

with an apophysis. Peristome double, the exterior a solid membrane of elongated cells, or numerous distinct moniliform teeth; the interior a white plaited cone-shaped membrane. Lid minute, conical-cylindrical. Inflorescence monœcious: antheridia naked, axillary. (Named for the early botanist *Buxbaum*.)

1. **B. aphýlla**, Haller. Stems short, scarcely 1" high, bulb-like and buried in the ground, covered with minute membranous ovate ciliate leaves; pedicel 5"-8" in length, tuberculate. — Exposed places, New England and New York; very rare.

32. **DIPHÝSCIUM**, Weber & Mohr. DIPHYSCIUM.

Calyptra conic-mitriform. Capsule terminal, immersed, ovate-ventricose, oblique at the base. Peristome double; the exterior 16 minute crenatures; the interior a white plaited cone-shaped membrane. Lid conical. Inflorescence monœcious: sterile fl. gemmiform, terminal. (Name from *δύς*, *twice*, and *φύσκη*, *something inflated*, from the wide separation of the two membranes of the ventricose capsule.)

1. **D. foliòsum**, W. & M. Stems short (1" high); lower leaves ligulate, upper ones ovate-lanceolate, somewhat laciniate at the apex, with a long excurrent nerve; capsule very large for the size of the plant, slightly pedicelled. — Shady woods, on moist rocks, rare.

BARTRANIACEÆ.

33. **BARTRÀMIA**, Hedwig. BARTRAMIA.

Calyptra cuculliform. Capsule terminal, globular, unequal at the base, furrowed. Peristome double; the outer of 16 lanceolate teeth; the inner a membrane divided into 16 two-cleft divisions. Lid small, depressed-conic. Inflorescence various. (Named for *John Bartram*, the earliest North American botanist.)

1. **B. pomifórmis**, Hedw. Stems elongated, fork-branched, branches fastigiate; *leaves spreading, linear, serrate, crisped* when dry, the nerve excurrent; sterile and fertile fl. together. — Woods, on moist banks; grows in large cushion-like patches, of a light-green color, 3' - 4' high.

2. **B. ithyphýlla**, Bridel. Distinguished from No. 1 by its *straight leaves with white and shining half-sheathing bases*, and *monœcious* inflorescence; sterile fl. axillary. — New England.

3. **B. fontàna**, Bridel. Stems much elongated; branches short; clustered; *leaves oval, pointed or elongated-lanceolate*, often turned to one side, secund, serrate, the nerve extending to the apex

diœcious. — Springy places. Plant 2' - 7' high; sterile fl. disk-like or cup-shaped, terminal.

34. CONÓSTOMUM, Swartz. CONOSTOMUM.

Calyptra cuculliform. Capsule terminal, obovate-globose, gibbous, furrowed. Peristome single, of 16 linear-lanceolate nodulose teeth, united at their apices. Lid conic, beaked. Inflorescence diœcious: sterile fl. terminal, disk-like. (Name formed of *κῶνος*, a cone, and *στόμα*, orifice, from the form of the peristome.)

1. **C. boreàle**, Swartz. Stems compactly tufted; leaves imbricated, lanceolate-pointed, serrate at the apex; nerve rather excurrent. — Alpine regions of White Mountains, Oakes, Tuckerman. Plant 1' - 2½' high.

MEESIACEÆ.

35. MEÉSIA, Hedwig. MEESIA.

Calyptra small, cuculliform. Capsule terminal, erect-drooping, elongated-pear-shaped. Peristome double; the exterior of 16 short and concave obtuse teeth; the interior of 16 long processes, either distinct or connected by a membrane. Lid convex. Inflorescence various. (Named for *Meese*, a German botanist.)

1. **M. longiseta**, Hedw. Stems elongated (2' - 4' high); leaves remote, decurrent, spreading, lanceolate, entire; pedicel very long (3' - 6'); flowers of both kinds together. — Boggy places, Ohio.

2. **M. tristicha**, Bruch & Schimper. Separated from No. 1 by the 3-ranked squarrose and denticulate leaves, also by the discoid sterile fl. on a separate plant. — Grows with the preceding.

BRYACEÆ.

36. BRÝUM, L. BRYUM.

Calyptra cuculliform. Capsule terminal, smooth. Peristome double; the exterior of 16 lanceolate teeth; the interior a membrane divided into 16 processes, with or without ciliolæ between them: annulus mostly present. Lid and inflorescence various. (*Brýovon*, an ancient name for Moss.)

§ 1. *Innovations proceeding from near the summit of the stem.*

* *Ciliolæ of the interior peristome none.* (PÓHLIA.)

1. **B. cucullatum**, Schwægr. Leaves lanceolate, somewhat obtuse, incurved and slightly denticulate at the apex, nerve reaching

nearly to the summit; capsule nodding, obovate or oblong-pear-shaped; lid convex with a minute point. — Alpine regions of the White Mountains. Monœcious: antheridia naked in the axils of the perichaetial leaves.

* * *Ciliolæ smooth.* (WEBÈRA.)

2. **B. elongatum**, Dicks. Stems short; leaves elongated-lanceolate, serrate at the apex, the nerve nearly percurrent; capsule very long and slender, horizontal or almost erect; lid minutely short-beaked from a nearly conic base. — Southern Alleghanies. Inflorescence as in No. 1.

3. **B. pulchellum**, Hedw. Leaves lanceolate, serrate at apex, nerved to the summit; capsule nodding, short-pear-shaped, not annulate; lid convex, apiculate. — Clay banks, Ohio. A small diœcious species; the fertile plant simple, the sterile branched, with gemmiform perigonia on the apices of the branches.

4. **B. Wahlenbërgii**, Schwægr. Leaves ovate-lanceolate, serrate at the apex, with a nearly percurrent nerve; capsule short-pear-shaped, inclined or drooping, not annulate; lid convex-mamillate; sterile fl. conspicuous, disk-shaped, on a separate individual. — Springy places. Easily known by its pale yellowish-green foliage: fruit rare.

* * * *Ciliolæ with appendages at their articulations.* (BRYUM.)

5. **B. pyriforme**, Hedw. Stem nearly simple; leaves bristleawl-shaped, serrate; nerve broad, excurrent; capsule inclined, ventricose-pear-shaped. — Shady humid places: often with *Funaria hygrometrica*. Inflorescence perfect.

6. **B. bimum**, Schreb. Leaves ovate-lanceolate, with reflexed margins, mucronate by the excurrent nerve, obsoletely denticulate at the apex; capsule drooping, pear-shaped. — Woods, along margins of swamps. Inflorescence as in No. 5.

7. **B. cœspiticium**, L. Much branched by innovations, forming dense tufts; leaves ovate-lanceolate, slightly denticulate at the apex, the margins revolute, nerve excurrent; capsule elongated-pear-shaped, rather pendulous. — On old walls, and dry or humid ground, very common. Diœcious: perigonial leaves terminal, spreading.

8. **B. alpinum**, L. Leaves imbricated, erect, lanceolate, nearly entire, mucronate by the excurrent nerve; capsule oblong-pear-shaped, pendulous. — Mount Marcy, N. New York. — Diœcious: foliage deep shining purple.

9. **B. argenteum**, L. Stems and branches crowded, cylindrical; leaves closely imbricated, broadly oval, short-pointed, the nerve vanishing at the apex; capsule oval-oblong, pendulous. — House-tops, road-sides, brick pavements, &c.; extremely common. Color varying from glaucous green to silvery white: diœcious.

§ 2. *Innovations proceeding from the base of the stem.*

* *Ciliolæ* (except in *B. roseum*) smooth. (MNIUM.)

+ *Leaves margined.*

10. **B. punctatum**, Hedw. *Leaves large, distant, spreading, obovate-orbicular, narrowed at the base, entire, the nerve disappearing below the summit; capsule oval, rather pendulous; lid nearly conic, short-beaked. — Borders of mountain rivulets. Diœcious; sterile fl. discoid.*

11. **B. hórnum**, Hedw. *Leaves oblong-lanceolate, erect-spreading, spinulose-serrate* (the spines in pairs), and *spinulose on the back*, nerve vanishing near the apex; capsule ovate-elliptical; lid hemispherical-conic, apiculate. — White Mountains. Inflorescence as in No. 10.

12. **B. serratum**, Bridel. *Leaves decurrent, ovate-lanceolate, 2-spinose-serrate, nerved to the apex; capsule oval, horizontal or rather pendulous; lid rather conic, short-beaked. — Woods, margins of rivulets. Fl. perfect: foliage pale green.*

13. **B. rostratum**, Schwægr. *Leaves spatulate-ligulate, rather wavy, distantly and obtusely toothed, the nerve reaching to the summit; capsule oval, rather pendulous; lid beaked from a conic base. — Margins of streams, shady places. Fl. perfect: pedicels 1-4 together.*

14. **B. cuspidatum**, Hedw. *Leaves obovate and pointed, with a narrowed base, serrate; capsule oval, with a short neck; lid hemispherical, with or without an apiculus. — Woods, about the roots of trees; common. Fl. perfect.*

15. **B. affine**, Blandon. *Leaves oval-lanceolate and ligulate-lanceolate, rather wavy, sharply serrate even to the base; nerve excurrent; capsule elongated-oval, pendulous; lid hemispherical-mamillate. — Woods. A large diœcious species: sterile fl. discoid: pedicels usually 2-5 together.*

16. **B. roseum**, Schreber. *Stems short, nearly leafless below; leaves large, crowded into a rosular head at the summit of the stem, spatulate, pointed, flat, serrate, the nerve nearly excurrent; capsule cylindrical-oblong, slightly curved; lid and pedicels as in No. 15. — Moist woods, about the roots of trees. Diœcious: sterile fl. discoid.*

+ + *Leaves not margined.*

17. **B. stellare**, Hedw. *Leaves oval-oblong, pointed, irregularly serrate, the nerve vanishing considerably short of the apex; capsule oval, horizontal; lid hemispherical, without any apiculus. — Woods, margins of brooks, Ohio: rare. Diœcious: sterile fl. discoid.*

37. AULACOMNION, Schwægr. AULACOMNION.

Calyptra small, cuculliform. Capsule terminal, ribbed when dry, annulate. Peristome double; the exterior of 16 lance-awl-

shaped teeth; the interior a membrane divided into 16 processes, with ciliolæ interposed. Lid convex-beaked. Inflorescence monœcious or diœcious. (Name formed of *αὐλαξ*, a furrow, and *μνίον*, an ancient name for Moss.)

1. **A. heteróstichum**, Br. & Sch. *Leaves obovate-oval, strongly serrate, turned to one side, the nerve proceeding nearly to the summit; capsule cylindrical-oblong, slightly curved; lid obliquely beaked.* (*Arrhenópterum heterostichum*, Schwægr.) — Woods, shaded banks, &c. Monœcious: sterile fl. gemmiform, axillary.

2. **A. túrgidum**, Schwægr. *Leaves ovate-oblong, obtuse, entire, nerve disappearing below the apex; capsule curved, somewhat gibbous.* — White Mountains. Diœcious: sterile fl. discoid.

3. **A. palústre**, Schwægr. *Leaves elongated-lanceolate, denticulate at the apex, nerve failing below the summit; capsule oblong, drooping.* — Borders of swamps. Diœcious: sterile fl. discoid. Upper portions of stems often elongated, pedicel-like, nearly leafless and terminated by clusters of rudimentary leaves.

38. TÍMMIA, Hedwig. TIMMIA.

Calyptra cuculliform. Capsule oblong, annulate. Peristome double; the exterior of 16 lanceolate geniculate-incurved teeth; the interior a membrane divided into 64 cilia adherent in fours at their apices. Lid hemispherical, slightly mamillate. Inflorescence monœcious: sterile fl. gemmiform, axillary. (Named for *Timm*, a German botanist.)

1. **T. megapolitána**, Hedw. *Leaves elongated-lanceolate from a sheathing base, recurved, strongly toothed, the nerve excurrent; capsule oblique, almost horizontal.* — Shady banks of water-courses. Calyptra often found detached from the capsule, and involute on the pedicel. (*T. cucullàta*, Michx.)

PTEROGONIACEÆ.

39. PTEROGÒNIUM, Swartz. PTEROGONIUM.

Calyptra cuculliform, smooth or hairy. Capsule lateral. Peristome double; the exterior of 16 lanceolate teeth; the interior a delicate membrane lining the inner face of the teeth, or divided into 16 free processes. Lid conic-beaked. Inflorescence monœcious: sterile fl. gemmiform, axillary. (Name formed of *πτερόν*, a wing, for *axil*, and *γονή*, sexes, from the axillary flowers of both kinds.)

1. **P. intricatum**, Hedw. Stems creeping, the branches entangled; leaves imbricated, ovate-lanceolate, one-sided, nerveless; capsule erect, oblong-ovate; lid conic, with a short oblique beak. — On the bark of trees, very common. Fruits copiously: pedicels $\frac{3}{4}$ ' long. Robust specimens exhibit an inner peristome of 16 free keeled processes, as long as the teeth.

2. **P. rèpens**, Schwægr. Stems creeping, very much branched; branches erect, crowded; leaves closely imbricated, oval, short-pointed, with a short forked nerve at the base, margins reflexed; capsule erect, ovate-cylindrical. (*Neckera sericea*, Auct.) — Old fences, logs, &c., forming dense brownish-yellow patches. Inner peristome free and conspicuous.

3. **P. subcapillatum**, Hedw. A smaller plant, much like No. 1; well marked by its minutely muricate pedicel, inclined capsule, and sparsely hairy calyptra. — On trees.

4. **P. hirtellum**, Hedw. Stems creeping, throwing up densely-crowded cylindrical branches; leaves deltoid, pointed, minutely fringed on their margins, nerveless; capsule oblong, somewhat ventricose at the base; teeth of the peristome very long and white. — Woods, investing the bases of young trees (particularly of Hickory and Hornbeam) with dense glaucous-green mats.

5. **P. decumbens**, Schwægr. Stems creeping, rather pinnately branched; branches erect, crowded; leaves ovate, pointed, serrulate at the apex, the nerve wanting or very short; capsule erect, oblong-cylindrical; teeth of the peristome densely articulated, firm, obtuse. (*P. brachycladon*, Bridel.) — Bark of trees, Massachusetts? (Arkansas.) Rare, not well known.

* * * *Obscure species, known only from Bridel's description.*

6. **P. crinitum**, Bridel. Stems erect, rather pinnately branched; leaves densely imbricated, ovate-lanceolate, with a tendril-like point, the strong nerve reaching beyond the middle of the leaf; capsule erect, oblong; lid elongated-conic, slightly beaked. — Trees, Massachusetts.

7. **P. apiculatum**, Bridel. Stems decumbent, branching, the branches compressed; leaves ovate, concave, with a ciliate-serrate point; nerve extending to the middle of the leaf; fruit unknown. — Salem, Massachusetts.

40. LÉPTODON, Weber. LEPTODON.

Calyptra large, cuculliform, hairy. Capsule lateral, oblong. Peristome double; the exterior of 16 linear-lanceolate teeth; the interior, and the inflorescence, as in *Pterogonium*. Lid conic, somewhat beaked. (Name composed of *λεπτός*, slender, and *ὀδών*, tooth.)

1. **L. trichomitrium**, Mohr. Main stem creeping, leafless, throwing out pinnate branches; *leaves when moist erect-spreading*, oblong-ovate, pointed, *nerveless*, the margins reflexed; perich. leaves very large, scarious, convolute, as long as the pedicel; capsule ovate-cylindrical. (*Pterogonium trichomitrium*, Hedw.) — Woods, in large spongy masses on the bark of trees, sometimes on rocks.

2. **L. Ohioense**, Sulliv. Resembles No. 1, but a smaller plant; *leaves more densely imbricated, when moist spreading horizontally, furnished with a strong nerve half their length.* — Woods, Ohio.

41. LEUCODON, Schwægr. LEUCODON.

Calyptra cuculliform, large, rather ventricose, plaited at the base. Capsule lateral, globose-ovate. Peristome double; the exterior of 16 linear-oblong perforated teeth; the interior, and the inflorescence, as in *Pterogonium*. Lid small, depressed-conic, short-beaked. (Name composed of *λευκός*, *white*, and *ὀδών*, *tooth*.)

1. **L. julæceus**, Hedw. Main stem creeping, leafless; *branches crowded, erect*, simple, cylindrical; *leaves densely imbricated, ovate, nerveless, spreading horizontally when moist*; perich. leaves large, scarious, convolute, *two thirds the length of the pedicel.* — Woods, on the bark of trees, common westward, rare in mountainous districts.

2. **L. brachypus**, Brid. Distinguished from No. 1 by its longer and slenderer *recurved branches*, elongated and when moist only *erect-spreading one-sided leaves*, and *much shorter pedicel*, whence the specific name. (*Fissidens sciuroides*, Michx.) — Abundant on the Alleghany ranges, not affecting low lands like No. 1.

NECKERACEÆ.

42. NECKERA, Hedw. NECKERA.

Calyptra halved-mitriiform. Capsule lateral. Peristome double; the exterior of 16 linear teeth; the interior 16 cilia arising from a very narrow membrane. Lid conic, more or less beaked. Inflorescence monœcious: sterile fl. gemmiform, axillary. (Named for *Necker*, a German botanist.)

1. **N. pennata**, Hedw. *Stems decumbent*; the nearly *pinnate branches flat*; *leaves 2-ranked*, ovate-lanceolate, slightly wavy; capsule ovate, erect, short-pedicelled, immersed in the large perich. leaves. — Trees, very common northward and along the Alleghany Mountains. A showy species, with broad and flat stems and branches.

2. **N. filiformis**, Hedw. *Stems creeping*, throwing out at right angles irregularly divided *cylindrical branches*; *leaves spreading*,

ovate, pointed, concave; the nerve extending two thirds its length; capsule oblong, urn-shaped, annulate, immersed in the perich. leaves; spores large (diameter of one equalling the width of a tooth of the peristome at its base). (*Cryphæa filiformis*, *Brid.*) — Trees, S. Ohio.

LESKEACEÆ.

43. ISOTHÈCIUM, Bridel. ISOTHECIUM.

Calyptra cuculliform. Capsule lateral, erect, annulate. Peristome double; the exterior of 16 linear teeth; the interior 16 cilia connected at the base by a very narrow membrane. Lid conic, more or less beaked. Inflorescence as in *Leskea*. (Name composed of ἴσος, *equal*, and ἑγκίον, *a little case*, from the symmetrical capsule.)

1. **I. cladorrhizans**, Hedw. Stems prostrate; the rather *pinnate branches much compressed; leaves concave, oblong-ovate, suddenly pointed*, more or less apiculate, shining, somewhat serrulate at the apex, indistinctly 2-nerved at the base, imbricated; capsule erect, cylindrical; *lid elongate-conic, obtuse*. — Woods, common on old logs, &c., near the ground, forming large mats; conspicuous by the broad flat branches, and greenish-yellow foliage, dashed with bright brown.

2. **I. compréssum**, Hedw. Allied to the preceding, but smaller and more delicate, of a lax mode of growth; *stems more regularly pinnate*; leaves less densely imbricated; *lid taper-beaked*; bears fruit less copiously. (*Leskea compressa*, *Hedw.*) — Pennsylvania.

3. **I. sedúctrix**, Hedw. Separated from No. 1, by its *cylindrical branches*: bears fruit much more abundantly, and affects humid situations. — Margins of swamps, on old logs and roots of trees. — Its numerous *dark-red pedicels* give a striking character.

4. **I. brevisètum**, Wils. & Hook. *Branches short, crowded, thick, not compressed*; leaves less densely imbricated and their points longer and more attenuated than in Nos. 1 and 3; the inner peristome often reduced to a delicate membrane lining the inner face and bordering the edges of the teeth. — Dry places, tops of dead standing trees, &c. Fruits sparingly: *pedicels brownish-yellow*.

5. **I. viticulòsum**, Hedw. Stems creeping, loosely branched; *branches nearly erect, elongated, simple, terete; leaves ovate-oblong, crowded, spreading, rather one-sided, obtuse*, the nerve reaching nearly to the apex; capsule erect, cylindrical; lid conic, pointed. (*Anómodon* and *Neckèra* of authors.) — Old logs, &c., in hilly districts.

6. **I. mìnus**, Beauv. Separated from No. 5 by its *compressed stems and branches, somewhat 2-ranked and very obtuse leaves*, and large annulus. — Woods, on trees, near water-courses.

44. **LÉSKEA**, Hedwig. LESKEA.

Calyptra cuculliform. Capsule lateral, erect or inclined. Peristome double; the exterior of 16 teeth; the interior of 16 cilia arising from a broad keeled membrane. Lid conic, more or less beaked. Inflorescence monœcious: sterile fl. axillary, gemmiform. (Dedicated to *Leske*, a German naturalist.)

1. **L. attenuàta**, Schreber. Stems creeping, much branched, the branches attenuated or thickened at the apex; *leaves ovate, rather obtuse* and one-sided, the strong nerve vanishing near the point; *capsule erect, cylindrical*; lid conic, *obtusely pointed*. — Very common on shaded rocks and the roots of trees, in damp places.

2. **L. imbricàtula**, Hedw. Stems creeping, the branches crowded, attenuated; *leaves closely imbricated, erect-spreading, ovate and lanceolate, pointed*, the serrulate margins somewhat reflexed; the shining nerve disappearing about the middle of the leaf; *capsule erect, cylindrical*; lid conic. — Woods, on logs, &c.: common and very variable.

3. **L. tenuiróstris**, Bruch & Schimp. Stems creeping, much branched; branches short, erect; *leaves erect-spreading, lanceolate, pointed, serrulate, nerveless*; *capsule cylindrical*; lid conic, *long-beaked*. — On decayed logs, &c. Very variable; closely allied to *L. polyántha*, Hedw., of which it may be an American form. (*Musc. Alleghan. No. 60.*)

4. **L. polycárpa**, Ehrh. *Leaves opaque, somewhat one-sided, ovate, concave, rather acute*, the nerve reaching to the summit; *capsule inclined*; lid conic. — Roots and base of trees, in wet places. Plant dark green.

5. **L. obscùra**, Hedw. *Leaves opaque, ovate, rather obtuse*, the margins somewhat recurved; nerve extending to near the apex; *capsule erect, oblong-elliptic*; lid conic. (*L. gracilèscens*, Hedw.) — Banks of rivers, on trees, within reach of floods; fruits copiously.

6. **L. rostràta**, Hedw. Stems ascending, variously divided; branches very crowded, short, erect, terete; *leaves ovate-lanceolate, attenuated, the strong nerve percurrent*; *capsule ovate-oblong*; lid *obliquely short-beaked* from a conic base. — Woods, on roots of trees, in large dense mats.

7. **L. denticulàta**, Sulliv. Stems creeping and fastigiately branched; branches erect, crowded, a little compressed; *leaves densely imbricated, somewhat one-sided, ovate, concave, pointed, denticulate, nerveless*; *capsule oval-oblong*; lid *obliquely short-beaked*. — Near the base of trees: a small species, not uncommon in the Western States; fruit very rare, found only on southern Alleghany specimens. (*Musc. Alleghan. No. 62.*)

8. **L. adnàta**, Michx. Stems creeping, much branched and entangled; branches rather compressed and plume-like; *leaves narrowly lanceolate, pointed, nerveless*, the margins recurved; *lid with an oblique beak as long as the oval-oblong capsule*. — On trees, in a Cedar swamp, Central Ohio. A small species, frequent in the Southern States.

9. **L. subtilis**, Hedw. Stems creeping, branched, the *branches filiform*; *leaves remote, linear-lanceolate, nerveless*; capsule oblong; *lid conic, acute*. — New England, on trees. Very small and delicate.

10. **L. fláccida**, Bridel. Stems procumbent, divided, the *branches compressed*; *leaves loosely imbricated, erect-spreading, ovate-lanceolate, taper-pointed, nerveless*; capsule erect, oblong. — Alleghany Mountains, on shaded rocks. Easily known by its shining flaccid-foliage.

11. **L. frágilis**, Hook. & Wils. Stems creeping, irregularly divided; *branches filiform, rigid and very fragile*; *leaves appressed* when dry, *ovate-tongue-shaped*, somewhat acute, *nerved to the middle*, the margins crenulate (fruit unknown). — Frequent on trees, particularly the Beech and Hornbeam, near water-courses.

45. ANACÁMPTODON, Bridel. ANACAMPTODON.

Calyptra conic-cuculliform. Capsule lateral. Peristome double; the exterior of 16 linear-lanceolate teeth, when dry reflexed; the interior of 16 necklace-like cilia. Lid short-beaked from a conic base. Inflorescence as in *Leskea*. (Name compounded of *ἀνακάμπτω*, to bend backwards, and *ὀδών*, tooth, from the peristome.)

A. splachnoïdes, Bridel. Stems prostrate, branched, entangled; leaves loosely disposed, spreading, ovate, pointed, pellucid, nerved to near the apex; capsule erect, oblong, constricted below the orifice, at length urn-shaped. (*Campylodóntium hypnoïdes*, Schwagr.) — On trees, New Jersey and Ohio; rare.

HYPNACEÆ.

46. HÝPNUM, L. FEATHER-MOSS.

Calyptra cuculliform. Capsule lateral, nodding, unequal (upper side more convex), with an oblique orifice. Peristome double; the exterior of 16 lanceolate teeth; the interior a keeled-furrowed membrane divided into 16 entire or perforated cilia, with ciliolæ interposed. Lid various. Inflorescence monœcious or diœcious: sterile fl. axillary, gemmiform. (An ancient Greek name of some sort of Moss.)

§ 1. *Stems and branches flat: leaves 2-ranked.* — DEPLANÀTA.

1. **H. sylvaticum**, L. *Stems tender and fragile; branches linear-lanceolate, frondiform, tapering, loose, rooting occasionally at their points; leaves broadly lanceolate, pointed, with narrowly reflexed margins resembling a border, decurrent, shining, with two short faint nerves at base; capsule oblong, erect-nodding, striate when dry; annulus large; peristome white; lid elongated-conic, acute.* — In loose spongy masses, on tussocks in swamps, and crevices of moist rocks.

2. **H. deplanatum**, Bruch & Schimper. Resembles No 1, but the *stems tough* and much more divided; *branches obtuse* and shorter, *profusely rooting* along their whole length; *leaves slightly serrulate*; capsule shorter and more horizontal; lid shorter, and annulus smaller. — Woods, in close thin mats, on roots of trees and stones near the ground; affects shaded dry situations.

3. **H. Silesiacum**, Beauv. *Stems decumbent; leaves lanceolate, with an attenuated flexuous point, serrulate, nerveless or indistinctly 2-nerved at base; capsule cylindrical, erect-nodding; annulus large; lid hemispherical-conic, apiculate.* — Mountainous districts of New England. Smaller than No. 1.

4. **H. riparium**, L. *Stems procumbent, extended, branched; branches divided, flaccid; leaves distantly placed, divergent, ovate-lanceolate, flat, entire, nerved halfway up; capsule oblong, nodding; lid conic, mamillate.* — Common on logs in swamps, and stones in rivulets; very variable in size.

5. **H. serrulatum**, Hedw. *Stems creeping, irregularly divided; leaves distantly placed, lanceolate, pointed, serrulate, the nerve extending beyond the middle; capsule oblong, nodding; annulus none; lid conic, long-beaked.* — Dry woods, in thin strata, on the ground; occasionally condensed, the branches becoming cylindrical.

§ 2. *Stems and branches elongated, flaccid, rather compressed: leaves loosely placed: pedicels minutely roughened.* — PRÆLÓNGA.

6. **H. prælongum**, L. *Stems and branches procumbent, loosely entangled, or assurgent and condensed; branches irregularly rather pinnate, the branchlets attenuated; leaves elongated-ovate, pointed, serrulate, nerved to near the apex; capsule oblong, nodding; lid conic, long-beaked.* — Woods, on shaded banks.

7. **H. hians**, Hedw. *Stems prostrate, very much extended, vaguely branched; branches ascending; leaves spreading, shining, ovate-heart-shaped, serrulate, the nerve of uniform size, stopping about midway; lid beaked, as long as the nodding capsule.* — Woods, on the ground, among decayed leaves and twigs.

§ 3. *Stems procumbent, fasciculately branched, the terete branches turgid: leaves heart-ovate, lurid green.* — ALPESTRIA.

8. **H. ruscifolium**, Necker. *Stems and branches floating,*

elongated; leaves occasionally somewhat 2-ranked, spreading, loosely imbricated, concave, *acute, serrulate*, the nerve vanishing below the apex; capsule ovate, oblique, nodding; *lid long-beaked*. — Mountain streams, frequent.

9. **H. mólle**, Dickson. *Branches almost erect*; leaves concave, *obtuse, entire*, indistinctly 2-nerved at the base; capsule short-ovate, nodding; *lid conic, obtuse*. — Alpine rivulets, New England.

§ 4. *Branches terete, plumose*: *pedicels smooth or rough*. — PLUMOSA.

10. **H. pseudo-plumòsum**, Bridel. Stems variously branched; leaves erect-spreading, imbricated, *ovate-lanceolate, entire, not striate*, the nerve reaching to the middle; capsule ovate, oblique; lid conic, acute; *pedicel muricate-roughened above*. — Rocky ravines, in mountainous districts.

11. **H. popùleum**, Hedw. Near No. 10; leaves *ovate, ovate-lanceolate, pointed, serrulate, heart-shaped at the base, striate*, the nerve rather excurrent; capsule rotund-ovate. — On the ground and on rocks, Alleghany Mountains.

12. **H. rutábulum**, L. Stems vaguely branched; leaves *ovate, pointed, concave, serrulate, nerved halfway up*; capsule *ovate, gibbous, oblique, annulate*; lid conic; *pedicel densely muricate-roughened its whole length*. — Larger than Nos. 10 and 11, affecting wet and springy places.

13. **H. salebròsum**, Hoffmann. Stems procumbent or ascending, variously branched; leaves *entire or slightly serrulate, ovate, long-pointed, with a broad and concave rather heart-shaped base*, more or less striate, the margins often reflexed; nerve extending beyond the middle; capsule *oblong, nodding*; lid conic, acute; *pedicel entirely smooth*. — On the ground, decayed logs, &c.; common and very variable.

§ 5. *Stems elongated, flaccid*; the branches *turgid, terete*: leaves *densely imbricated, obtuse*: *pedicels smooth*. — ILLÉCEBRA.

14. **H. Bóscii**, Schwægr. Stems rather fasciculately branched; branches *elongated, obtuse*; leaves *densely imbricated, ovate, apiculate, concave, serrulate, slightly auricled at the base*; nerve running two thirds the length; *lid conic, beaked*. — Rocky banks, in hilly districts. A large species, with *shining golden-yellow foliage*.

15. **H. trifàrium**, Weber & Mohr. Stems nearly erect, sparingly long-branched; leaves *closely imbricated, rather 3-ranked, round-ovate, very concave, entire*, the nerve vanishing at the middle. — Cranberry marshes, N. Ohio (without fruit). Foliage dark lurid color.

16. **H. stramíneum**, Dickson. Stems and branches nearly erect; leaves *loosely imbricated, oblong-ovate, obtuse, concave, shining straw-colored, entire, nerved to two thirds their length*; pedicel long and slender; capsule almost cylindrical, erect-nodding; *lid conic, acute*. — Springy places, on mountains, New England.

§ 6. *Stems ascending; the branches short, pinnately disposed: leaves shining, appressed, convolute at the pointed tips of the branches.* — CUSPIDÀTA.

17. **H. cuspidatum**, L. *Upper branches sharp pointed; leaves appressed, ovate, acute, entire, nerveless; pedicels elongated; capsule oblong, erect-nodding; lid conic, obtuse.* — Swamps, Ohio.

18. **H. Schrebèri**, Willd. *Branches rather compressed, tapering; leaves imbricated, shining, ovate, concave, entire, faintly 2-nerved at the base; pedicels aggregated, long and slender; capsule oblong, nodding; lid conic, acute.* — On the ground, in hilly districts. — Its red stems form a striking character.

19. **H. cordifolium**, Hedw. *Leaves loosely disposed, ovate-heart-shaped, obtuse, concave, entire, diaphanous, the reticulation at the base large, nerve slightly excurrent; capsule oblong, drooping; lid conic.* — Swamps.

§ 7. *Stems 2-3-4-pinnately branched; branches spreading, rigid, attenuated: leaves minute, fragile, with a dense areolation: pedicels aggregated.* — TAMARISCINA.

20. **H. tamariscinum**, Hedw. *Stems procumbent, 3-pinnately branched; leaves appressed when dry, heart-ovate, more or less pointed and acute, crenulate-serrate, papillose on the back, not shining, the nerve vanishing near the apex; capsule oblong, nodding; annulus very distinct; lid conic, with a long curved beak.* — On the ground and old logs; the most common of all.

21. **H. minutulum**, Hedw. *Near the last, but much smaller throughout; stems not so compound; leaves less evidently papillose, and more crisped when dry.* — In similar situations.

22. **H. gràcile**, Bruch & Schimper. *Stems procumbent, rooting; divisions simply and densely pinnate; leaves as in No. 20; capsule obovate-oblong, nodding; lid hemispherical-apiculate.* — Woods, on rotten logs, Ohio.

23. **H. scitum**, Beauv. *Mode of growth of No. 22 and the foliage of No. 20; but the capsule cylindrical, almost erect; lid conic, beaked.* — Hilly districts, on the base of trees, particularly the Beech.

24. **H. spléndens**, Hedw. *Stems ascending, 2-pinnate, the branches interruptedly crowded; leaves loosely imbricated, spreading, heart-ovate and ovate-lanceolate, pointed, serrulate at the apex, shining, 2-nerved at the base; pedicels clustered; capsule ovate, nodding; lid conic, beaked.* — On the ground, Alleghany Mountains and northward. Distinguished from No. 20 by its smooth shining leaves, and red stems (3' - 5' long).

25. **H. umbratum**, Ehrhart. *Stems ascending, loosely and irregularly 2-pinnate; branches elongated, flexuous; leaves heart-shaped, pointed, shining, plaited-striate, strongly serrulate, with two*

short nerves; capsule obovate, nodding; lid conic, acute. — Moist places, on the ground, in mountainous districts.

§ 8. *Stems prostrate; the divisions erect, naked below, fasciculately branched at their summits (tree-form).* — DENDROÍDEA.

26. **H. alopecûrum**, L. *Leaves erect-spreading, ovate, pointed, concave, serrulate, the strong nerve reaching to the apex; capsule on a short curved pedicel, oblong, almost equal-sided, slightly curved; lid hemispherical-conic, long-beaked.* (H. neckeroides, Hook.) — Rocky margins of mountain rivulets.

27. **H. strigòsum**, Hoffm. *Leaves heart-ovate, more or less elongated, rather obtuse, serrulate above, the strong nerve nearly percurrent; capsule ovate, oblique, nodding; lid conic, with an acute incurved beak.* — Wooded hill-sides, on the ground.

§ 9. *Stems irregularly branched: leaves squarrose or erect-spreading (mostly large and robust species).*

28. **H. triquètrum**, L. *Stems nearly erect, sparingly divided, firm, the divisions thickened at their tips, pinnate; branchlets somewhat recurved, attenuated; leaves squarrose, triangular-lanceolate, pointed, serrulate, striate, 2-nerved at base; capsule oblong-ovate, nodding; lid conic, apiculate.* — Woods, on the ground, not rare; the largest of our species.

29. **H. brevirostre**, Ehrhart. *Stems ascending, somewhat rigid and fasciculately branched; branches incurved; leaves rather squarrose, heart-ovate, contracted above into a long flexuous point, slightly serrulate, convolute at the base, striate with 2 short basal nerves; capsule ventricose-ovate; lid conic, short-beaked.* — Woods, on hilly ground.

30. **H. Oakésii**, Sulliv. *Stems prostrate, flexile, rather pinnately and loosely branched; branches elongated; leaves erect-spreading, oval-oblong, gradually tapering into a long straight point which is strongly and laciniate-toothed, not convolute at base nor striate; the distinct nerve extending two thirds the length of the leaf; capsule on a long slender pedicel, ovate, gibbous, nodding; lid conic, short-beaked.* — White Mountains, New Hampshire, discovered by Mr. Oakes. A very distinct species, allied to H. brevirostre.

§ 10. *Leaves rather squarrose, stellately expanding at the summit of the branches.* — STELLÀTA.

31. **H. stellàtum**, Schreber. *Stems procumbent, the branches ascending; leaves ovate-lanceolate, long-pointed, entire, nerveless, or nerved halfway up; capsule nearly cylindrical, nodding; lid conic, mucronulate.* — Swampy places, on the ground.

32. **H. hispídulum**, Brid. *Stems and branches closely entangled; leaves distantly placed, heart-ovate, pointed, minutely crenate-denticulate, the point entire, indistinctly 2-nerved at the base; capsule*

oblong, nodding; lid conic, acute. — Woods; dry, rocky hill-sides, on the ground. Fruits abundantly; much smaller than the last.

§ 11. *Stems vaguely branched; leaves erect-spreading, elongated, acute (small species).* — SERPÉNTIA.

33. **H. sérpens**, L. *Leaves loosely placed, varying from ovate acuminate to linear-lanceolate, entire, the nerve vanishing short of the apex; capsule cylindrical, erect-nodding; lid convex-conic, acute.* (*Musc. Alleghan. Nos. 29, 30.*) — Everywhere, extremely variable.

34. **H. subsimplex**, Hedw. *Stems and branches prostrate; leaves loosely 2-ranked, spreading, oblong-lanceolate, slightly serrulate, nerveless, pellucid; capsule oblong, nodding; lid convex-conic, short-beaked.* — Moist places, on the ground and decayed wood.

35. **H. adnatum**, Hedw. *Stems creeping; branches crowded, terete; leaves closely imbricated, ovate-lanceolate, concave, entire, nerveless; perich. leaves eroded-denticulate at the apex; capsule ovate, nodding, annulate; lid short-conic, obtuse.* — Dry woods, on rocks near the ground.

36. **H. Conferva**, Schwægr. *Stems rather pinnately branched; branches rigid, terete; leaves distantly placed, when dry closely appressed, when wet erect-spreading, nearly entire, nerveless, loosely reticulated, those of the stems broadly ovate and pointed; branch-leaves much smaller, oblong-ovate, narrower than the branches; perich. leaves lanceolate, laciniately serrate; capsule obovate, nodding, annulated; lid hemispherical-conic, acute; inner peristome with single ciliolæ between the processes.* — Pennsylvania, in shady places, on limestone near the ground. Very minute, the smallest of our species; monœcious, probably different from the European plant.

§ 12. *Stems much elongated, irregularly branched: leaves hooked or curved (swamp species).* — ADÚNCA.

37. **H. aduncum**, L. *Leaves scythe-shaped, one-sided, lanceawl-shaped, entire, nerved beyond the middle, the margins of the upper portions involute; capsule nearly cylindrical, nodding; lid depressed-conic, acute.* — Swamps.

38. **H. uncinatum**, Hedw. *Leaves bristle-awl-shaped, scythe-shaped, one-sided, striate, serrate, the nerve vanishing below the summit; capsule cylindrical, curved; lid conic, apiculate.* — Wet places in mountainous districts. Foliage bright green or yellow, shining.

39. **H. fluitans**, L. *Leaves loosely placed, variously directed, the upper only one-sided and scythe-shaped, awl-shaped from an ovate base, scarcely serrulate, the nerve extending nearly to the apex; capsule oblong, nodding; lid elongated-conic, pointed.* — Standing water, &c.

40. **H. scorpioides**, L. *Stems and branches ascending, turgid, flaccid; leaves closely imbricated, erect, oblong, acute, entire, nerveless, the upper ones pointed, one-sided and curved; capsule oblong,*

curved; lid conic, acute. — Boggy places. One of the larger species; foliage brownish-green.

§ 13. *Stems pinnately branched or nearly so: leaves more or less one-sided and scythe-shaped (except No. 47). — CUPRESSIFÓRMIA.*

* *Leaves nerveless.*

41. **H. cupressifórmis**, L. Stems decumbent, divided, rather pinnately branched; leaves imbricated, ovate-lanceolate, pointed, entire; capsule cylindrical, erect-nodding; lid conic, cuspidate. — White Mountains, New Hampshire.

42. **H. impònens**, Hedw. Stems creeping, divided, pinnate; leaves lanceolate, pointed, nearly entire; perich. leaves long, reflexed, strongly serrulate; capsule slender, cylindrical, nearly regular, almost erect; lid elongated-conic, acute. — Woods, common on old logs.

43. **H. recúrvals**, Michx. Stems creeping, pinnately branched; leaves lanceolate, pointed, the point strongly serrulate, margins narrowly reflexed; capsule ovate, nodding; lid conic, long-pointed. — Rocks and decayed wood, near the ground.

44. **H. réptile**, Michx. Stems slender, creeping extensively, pinnate; leaves narrowly lanceolate, serrulate; capsule cylindrical, erect-nodding; lid conic, cuspidate. — Bark of trees, Alleghany Mountains, extremely common.

45. **H. praténse**, Koch. Stems compressed, ascending, sparingly branched, scarcely pinnate; leaves loosely imbricated, slightly scythe-shaped and one-sided, rather triangular-lanceolate, entire; capsule oblong, nodding; lid conic, acute. — Wet rocks, on the ground, forming loose spongy masses; rare.

46. **H. curvifólium**, Hedw. Stems prostrate, pinnately branched; leaves ovate-lanceolate, long-pointed, nearly entire; perich. leaves large, convolute, whitish, striate; capsule oblong, curved, ribbed when dry; lid hemispherical-conic, acute. — Woods, on decayed logs.

47. **H. Haldaniànium**, Greville. Stems prostrate, rather pinnately branched; the branches long, compressed; leaves broadly lanceolate, pointed, not scythe-shaped nor one-sided, entire; capsule elongated-cylindrical, erect-nodding; lid conic, with a long curved beak. (*H. Cooleyànium*, Spreng. — *Musc. Alleghan. No. 14.*) — Woods, on moist banks, decayed logs, &c.

48. **H. Crista-castrénsis**, L. Stems ascending, simply pinnate, the branches densely crowded; leaves imbricated, strongly scythe-shaped and turned to one side, lance-axel-shaped, striate, serrulate; capsule nearly cylindrical, curved; lid conic, acute. — On the ground; not rare in cold woods. A large, handsome species, remarkable for its feather-like stems.

49. **H. mollúscum**, Hedw. Stems procumbent, divided, simply pinnate, the plume-like branches revolute at their tips; leaves im-

bricated, scythe-shaped, *serrulate*, smooth; *capsule ventricose-ovate*; lid conic, acute. — Shady woods, on the ground.

* * *Leaves nerved to beyond the middle.*

50. **H. rugòsum**, Ehrhart. Stems ascending, rather pinnately branched; *leaves closely imbricated, ovate-lanceolate*, scythe-shaped and one-sided at the tips of the branches, *rugose*, serrulate, the margins narrowly revolute; *capsule cylindrical*, nodding; lid conic, short-beaked. — Exposed places; dry, rocky banks. A robust species, fruiting very rarely.

* * * *Leaves nerved to the apex, lanceolate from a heart-shaped base.*

51. **H. filicinum**, L. Stems ascending, pinnately branched; *leaves turned to one side, obliquely pointed, serrulate, flat on the margins*; perich. leaves striate; *capsule cylindrical, curved*; lid conic, acute. — Springy places, particularly among limestone rocks.

52. **H. paludòsum**, Sulliv. Stems procumbent, the ascending divisions simply pinnate; branches rather compressed; *leaves entire, pointed, erect-spreading, plaited, the margins reflexed*; fruit unknown. (*Musc. Alleghan. No. 7.*) — Cranberry marshes, N. Ohio.

47. **HOOKÉRIA**, Smith. HOOKERIA.

Calyptra mitriform, uneven at the base. Capsule lateral, unequal. Peristome double; the exterior of 16 linear-lanceolate teeth; the interior a keeled membrane divided into 16 cilia. Lid conic, beaked. Inflorescence monœcious or diœcious: sterile fl. axillary, gemmiform. (Dedicated to *Sir Wm. J. Hooker*, who began his distinguished botanical career with the study of Mosses.)

1. **H. lùcens**, Smith. Stems procumbent, sparingly branched; leaves imbricated, 2-ranked, spreading, ovate, obtuse or acute, entire, loosely reticulated, diaphanous, nerveless; capsule ovate, horizontal by the curving of the pedicel. — Ohio; on the ground beneath dripping rocks. A large Moss, well marked by its flat stems and branches, with pale shining-green foliage, of a membranous texture.

48. **CLIMÀCIUM**, Weber & Mohr. TREE-MOSS.

Calyptra cuculliform. Capsule lateral, equal and symmetrical. Peristome double; the exterior of 16 linear-lanceolate teeth; the interior of 16 keeled processes splitting along the keel, arising from a very narrow membrane. Lid convex-conic, short-beaked. Inflorescence diœcious: sterile fl. axillary, gemmiform. (*Κλιμάκιον*, a small ladder; from the appearance of the inner peristome.)

1. **C. dendroïdes**, Weber & Mohr. Stems creeping, subterranean, throwing up erect tree-like innovations, which are nearly

naked below, with the branches clustered above; leaves crowded, erect-spreading, ovate-lanceolate, concave, plaited, the upper half denticulate, nerved to near the apex; capsule erect, cylindrical. — Woods and banks, on the ground, &c.

FONTINALEÆ.

49. FONTINALIS, L. FOUNTAIN-MOSS.

Calyptra mitriform, somewhat lacerate at the base. Capsule lateral, sessile, immersed. Peristome double; the exterior of 16 linear-lanceolate teeth; the interior a conical tessellated membrane. Lid conic, pointed. Inflorescence diœcious: sterile fl. axillary, gemmiform. (A Latin name, indicating the place of growth, namely, in fountains and rivulets.)

1. **F. antipyrética**, L. Stems floating, elongated, flexible, vaguely branched; *leaves 3-ranked, broadly ovate, pointed, nerveless, entire, infolded-keeled; capsule ovate, or oval, immersed in the broad obtuse and closely imbricated perich. leaves.* — Common northward, New England. Stems 8' to 12' long.

2. **F. squamòsa**, L. Rather smaller than No. 1; the *leaves elongated-lanceolate, concave, not infolded-keeled; antheridia larger.* — New England.

3. **F. disticha**, Hook. & Wilson. Stems rigid, rather pinnately branched; *leaves imbricated in 3 ranks, lanceolate, concave, nerveless; capsule oblong-cylindrical.* — Woodland brooks, Ohio.

50. DICHELÝMA, Myrin. BROOK-MOSS.

Calyptra cuculliform, entire at base. Capsule lateral, pedicelled, emergent or immersed. Peristome double; the exterior of 16 linear teeth; the interior of 16 free cilia, or as in Fontinalis. Lid conic, short-beaked. Inflorescence and aspect as in the last. (Name formed of *διχάω, to halve, ἔλυμα, a covering; from the one-sided calyptra.*)

1. **D. capillàceum**, Myrin. Stems elongated, sparingly branched; branches squarrose; *leaves awl-shaped by the long excurrent nerve from an ovate base, one-sided; capsule oval and, together with its pedicel, shorter than the perichæth.* — Penn., in rivulets.

* * Fruit of the following Mosses entirely unknown.

1. **Leucóphanes?** **Leánium**, Sulliv. Stems compactly tufted, fastigiately branched, the branches terminated by dense heads of minute oblong bodies (probably abortive leaves); leaves linear-awl-shaped, convolute, nerveless, rather one-sided, shining, whitish-

green.—Ohio and Penn., not rare; on very much decayed stumps and logs: resembles the young growth of *Dicranum flagellare*. (*Musc. Alleghan. No. 171.*)

2. **Phyllogonium Norvégicum**, Bridel. Stems frond-like, flat, mostly simple (about 1' long and 1" wide), bulbous at the base; leaves imbricated, 2-ranked, folded together, nerved to the apex, those in the middle of the stem erect, oblong, obtuse, obliquely apiculate; the perich. and perigonal leaves attenuated into a long flexuous spreading pellucid and slight point; diœcious; flowers of both kinds terminal.—On sandstone rocks, Fairfield county, Ohio. Has very much the habit of a *Fissidens*. (*Musc. Alleghan. No. 188. Mem. Amer. Acad. 3, n. ser., p. 57, t. 1.*)

ORDER 135. HEPÁTICÆ. (LIVERWORTS.)*

Moss-like plants, of a loose cellular texture, usually procumbent and emitting rootlets from beneath; the calyptra not separating from the base, but usually rupturing at the apex; the capsule not opening by a lid, containing spores usually mixed with elaters (which are thin thread-like cells, containing one or two spiral fibres, uncoiling elastically at maturity).—Vegetation sometimes frondose, i. e. the stem and leaves confluent into an expanded leaf-like mass; sometimes foliaceous, when the leaves are distinct from the stem as in true Mosses, entire or cleft, 2-ranked, and often with an imperfect or rudimentary row (amphigastria) on the under side of the stem. Reproductive organs of 2 kinds, viz. antheridia and pistillidia, much as in Mosses (p. 642), variously situated. The matured pistillidium forms the capsule, which is either sessile or borne on a long cellular pedicel, and dehiscent by irregular openings, by teeth at its apex, or lengthwise by 2–4 valves. A columella is rarely present. The perianth is a tubular organ inclosing the calyptra, which directly includes the pistillidium. Surrounding the perianth are involucral leaves of particular forms. The antheridia in the foliaceous species are situated in the axils of perigonal leaves.

* Contributed, as also the preceding Order, by WM. S. SULLIVANT, Esq.

Artificial Analysis.

I. Vegetation frondose (stem and leaves confluent in a frond).

* Elaters and columella wanting.

1. RICCIA. Capsule valveless, globular, immersed in the frond.

* * Elaters none or imperfect: columella present!

2. NOTOTHYLAS. Capsule 2-valved, sessile on the frond.

3. ANTHOCEROS. Capsule 2-valved, elongated-linear, peduncled.

* * * Elaters with 1 or 2 spiral fibres: columella none.

+ Capsule nearly sessile, opening irregularly: fertile recept. peduncled.

4. MARCHANTIA. Fruit-bearing receptacle disk-shaped, 8-10-rayed.

5. FEGATELLA. Fruit-bearing receptacle conical, smooth at the apex.

6. REBOUILLIA. Fruit-bearing receptacle disk-shaped, 4-5-lobed.

7. FIMBRIARIA. Fruit-bearing recept. conical, tuberculate at the apex.

+ + Capsule pedicelled, dehiscent by 4 valves.

8. METZGERIA. Frond with a midrib. Fruit ventral.

9. ANEURA. Frond without a midrib. Fruit underneath the margin.

10. PELLIA. Frond without a midrib. Fruit dorsal.

11. HOLLIA. Frond with a midrib. Fruit dorsal.

II. Vegetation foliaceous (i. e. leaves distinct and separate).

* Leaves *incubous*, i. e. their bases covered severally by the apex of the preceding.

+ Leaves complicate - 2-lobed.

12. LEJEUNIA. Amphigastria present. Perianth terete or angular.

13. FRULLANIA. Amphigastria present. Perianth compressed-keeled.

14. MADOTHECA. Amphig. present. Perianth compressed, 2-lipped.

15. RADULA. Amphigastria absent. Perianth compressed.

16. PTILIDIUM. Amphig. present. Perianth terete. Leaves ciliate.

17. TRICHOCOLEA. Amphigastria present. Perianth none. Leaves capillary-many-cleft.

+ + Leaves not complicate - 2-lobed: amphigastria present.

18. SENDTNERA. Perianth 6-angular, tubular, deeply many-cleft.

19. LEPIDOZIA. Perianth 3-plaited, elongated; mouth denticulate.

20. MASTIGOBRYUM. Perianth 3-angular, long; the mouth 3-toothed.

21. CALYPOGEIA. Perianth oblong, sac-like, truncate, hairy, attached by one side of its mouth to the stem.

* * Leaves *succubous*, i. e. their bases severally covering the apex of the preceding.

+ Amphigastria present.

22. GEOCALYX. Perianth wanting. Involucre tubular.

23. CHILOSCYPHUS. Perianth deeply 2-3-lobed. Calyptra chartaceous.

24. LOPHOCOLEA. Perianth 3-lobed, triangular; lobes crest-toothed.

25. SPHAGNICÆTIS. Perianth 3-angular at the apex; mouth denticulate.

26. JUNGERMANNIA. Perianth tubular, plaited-denticulate, the mouth 3-6-cleft.

+- Amphigastria absent.

27. SCAPANIA. Perianth compressed, truncate. Leaves 2-lobed.
 28. PLAGIOCHILA. Perianth compressed, truncate. Leaves not 2-lobed.
 29. SARCOSYPHUS. Perianth and involucre united. Leaves 2-lobed.
 30. GYMNOMITRIUM. Perianth wanting. Leaves 2-lobed.

Suborder I. RICCIACEÆ. THE RICCIA FAMILY.

Mostly floating, frondose little annuals, with both kinds of flowers and the fruit immersed in the frond. No involucre, perianth, nor elaters. Capsule irregularly bursting.

1. **RÍCCIA**, Micheli. FLOATING LIVERWORT.

Fruit immersed in the lobed or cleft frond. Calyptra coherent with the sessile globose capsule, crowned with the persistent style. Spores angular. Inflorescence monœcious or diœcious. (Named for Ricci, an Italian botanist.)

* *Terrestrial: frond without air-cavities.*

1. **R. glaüca**, L. *Frond somewhat starry-lobed; divisions linear-obovate, emarginate-lobed, channelled, dotted, glaucous, membranous along the margin. — On moist ground.*

* * *Floating (on still waters): frond with large air-cavities.*

2. **R. nâtans**, L. *Frond inversely heart-shaped, channelled ($\frac{1}{2}$ ' to $\frac{3}{4}$ ' broad), clothed beneath with long and pendent roots, in the form of linear-lanceolate serrate purple fringes.*

3. **R. flûitans**, L. *Frond radiately expanding from a centre (1' wide or more); divisions narrowly linear, repeatedly forking, nearly membranaceous, thickened, emarginate and cavernous at the apex.*

Suborder II. ANTHOCERÔTEÆ. THE ANTHOCEROS FAM.

Terrestrial frondose annuals, with the fruit protruded from the upper surface of the frond. Perianth none. Capsule pod-like, 1-2-valved, with a free central columella. Elaters none or imperfect.

2. **NOTOTHÝLAS**, Sulliv. (Carpobolos, Schweinitz.)

Involucre a protrusion of a portion of upper stratum of the frond, opening irregularly at the apex. Perianth none. (Calyptra none?) Capsule included in the involucre, oblong, spheroidal, flattish, or ovate-cylindrical, slightly pedicelled, dehiscing either in a 2-valved manner from the apex halfway down by a suture, or

(suture absent) rupturing irregularly. Columella linear. Elaters wanting. Spores produced in fours. Inflorescence monœcious: antheridia globular, immersed in the frond; which is orbicular, laciniate, tender, papulose-reticulate, undulate-cripsed on the margin, with dark-green oval grains (gemmae) scattered within its substance. (*Mem. Amer. Acad.* 3, n. ser., p. 64, t. 4.) (Name formed of *νωτος*, *back*, and *θυλάς*, *a purse or bag*; from the shape of the involucre on the back of the frond.)

1. **N. valvata**, Sulliv. Frond 3''-8'' wide; involucre horizontal, elongated, tapering-deflexed; capsule elongated-cylindrical, somewhat curved, with a dark-colored suture; spores light yellowish-brown. (*Musc. Alleghan.* No. 289.)—Moist ground, Central Ohio.

2. **N. melanóspora**, Sulliv. Capsule without any suture; columella with short hooked appendages; spores dark brown, larger than in the preceding species, which in other respects it resembles. (*Musc. Alleghan.* No. 290.)—Grows in the same localities.

3. ANTHÓCEROS, Micheli. ANTHOCEROS.

Involucre tubular. Perianth none. Calyptra conical, with a nearly sessile stigma. Capsule narrowly linear, siliquæform, 2-valved, peduncled, with a free central columella. Elaters flexuous, the spiral fibre imperfect or none. Spores minutely muricate. Inflorescence monœcious: antheridia sessile in a cup-shaped involucre, on the back of the frond. Vegetation frondose, orbicular, radiate, lacerate, with immersed gemmae as in *Notothylas*. (Name formed of *ἄθος*, *a blossom*, and *κέρας*, *a horn*; from the shape of the involucre and capsule.)

1. **A. punctatus**, L. Surface of the frond papulose-reticulated; involucre erect, cylindrical, the mouth obliquely truncate, scarios. — Wet slopes and sides of ditches.

2. **A. lævis**, L. Surface of the frond smooth; mouth more broadly scarios. — In similar places.

Suborder III. MARCHANTIACEÆ. TRUE LIVERWORTS.

Frondose and terrestrial perennials, growing in wet places, with the fertile receptacle raised on a peduncle, capitate or radiate, bearing pendent calyptrate capsules from the under side, which open variously, not 4-valved. Elaters with 2 spiral fibres (in No. 7 sometimes with only one).

4. MARCHÁNTIA, L. BROOK-LIVERWORT.

Peduncled fertile receptacle radiated. Involucres alternate with the rays, 2-valved, lacerate, inclosing 3–6 one-flowered 4–5-cleft perianths. Calyptra opening at the apex, persistent. Capsule globular, pendulous, exsertly pedicelled, dehiscing at the apex by several revolute segments. Inflorescence diœcious. Sterile receptacle peduncled, shield-like, lobed or rayed, papillose on the upper surface by the apices of the immersed antheridia. Lentil-shaped gemmæ in cup-like receptacles on the back of the frond. Frond expanded, forking, with a broad diffused midrib. (Named for *Marchant*, a French botanist.)

1. **M. polymórpha, L.** Fertile receptacle deeply divided in a star-like manner, the rays 8–10, terete. — Shaded, moist places; very common.

5. FEGATÉLLA, Raddi. GREAT LIVERWORT.

Fertile receptacle conical-mitriiform, membranaceous, peduncled. Involucres 5–8, tubular, 1-flowered, suspended from the apex of the peduncle, and coherent with the interior surface of the receptacle, opening by a longitudinal slit. Perianth none. Calyptra persistent, bell-shaped, opening at the apex by 2–4 lobes. Capsule globular, dehiscing by 5–8 revolute segments, deciduous with its short pedicel. Inflorescence diœcious. Antheridia immersed in sessile roundish disks near the apex of the forking frond. Midrib distinct, narrow. (Apparently a personal name.)

1. **F. cónica, Corda.** Fronds 3'–6' long, 5''–9'' wide. — Springy places; the largest of our Hepaticæ; seldom in fruit. — A variety occurs with sessile fertile receptacles.

6. REBOUÍLLIA, Raddi. REBOUILLIA.

Fertile receptacle conic-hemispherical or flattened, 1–5-lobed, peduncled. Involucres 1–5, opposite to and coherent with the lobes of the receptacle on the under side, 2-valved. Perianth none. Calyptra minute, lacerate, persistent at the base of the capsule. Capsule globose, nearly sessile, rupturing irregularly at the apex. Spores muricate. Inflorescence monœcious. Antheridia immersed in sessile crescent-shaped disks. Frond rigid; the midrib broad, strong, and distinct. (A personal name.)

1. **R. hemisphérica, Raddi.** Frond forking and growing

by joints from the extremities, green above, purple beneath; the peduncle bearded at its base and apex; fertile receptacle papillose on the summit. — Mountain districts, in shady, moist places.

7. FIMBRIARIA, Nees. SMALL LIVERWORT.

Fertile receptacle hemispherical, peduncled, concave beneath, expanded at the margin into 4 large and pendent bell-shaped truncate 1-flowered involucre. Perianth 1-flowered, oblong-oval, projecting for half of its length beyond the rim of the involucre, the projecting portion splitting lengthwise into 8 – 12 free fringe-like segments. Calyptra with a long style, fugacious. Capsule sessile, globose, dehiscing by an irregular circumscissile line near the middle. Inflorescence monœcious. Antheridia immersed in the substance of the frond, not collected into disks. Frond much thickened in the middle, with a keel-like midrib. (Name from *fimbria*, a fringe, alluding to the perianth.)

1. **F. tenella**, Nees. Frond elongated-wedge-shaped, nearly simple, notched at the end (6'' – 10'' long, 2'' – 4'' wide), green above, purple on the margins and underneath. — Alleghany Mountains, in shady places on the ground.

Suborder IV. JUNGERMANNIACEÆ. SCALE-MOSSES.

Frondose (Nos. 8 – 11) or foliaceous plants, terrestrial or on trees. Capsule dehiscent lengthwise into 4 valves. Spores mixed with elaters.

8. METZGERIA, Raddi. METZGERIA.

Fertile fructification arising from the lower surface of the midrib. Involucre 1-leaved, scale-like, at length ventricose and 2-lobed. Perianth none. Calyptra ascending, oblong-obovate, rather fleshy. Capsule pedicelled, ovate, dehiscing by four equal valves. Elaters with one spiral fibre, adherent to the tip of the valves. Inflorescence diœcious: antheridia 1 – 3, inclosed by a 1-leaved involucre on the under side of the midrib. Ovate gemmæ aggregated on the attenuated tips of the linear frond: midrib distinct. (Named for *Metzger*, a German botanist.)

1. **M. furcata**, Nees. Fronds linear, thin and membranaceous, forking or proliferous, with white pellucid hairs. Hilly districts, on rocks and the bark of trees.

9. ANEURA, Dumortier. ANEURA.

Fructification arising from the under side near the margin of the frond. Involucre cup-shaped, very short and lacerate, or none. Perianth none. Calyptra ascending, nearly cylindrical, fleshy. Capsule pedicelled, oval or oblong, 4-valved. Elaters adherent to the apex of the valves, containing a single broad spiral fibre. Inflorescence monœcious. Antheridia immersed in the upper surface of receptacles proceeding from the margin of the frond; which is fleshy and destitute of a midrib (whence the name, from *a* privative, and *νεῦρον*, *a nerve*).

1. **A. séssilis**, Sprengel. Fronds *irregularly lobed* (1' - 2' long, 3'' - 5'' wide); involucre none; *calyptra papillose at the apex*; pedicel 9'' - 12'' high; sterile receptacles elongated and tapering deflexed processes. — Rotten logs, margins of swamps, Ohio, rare as high as Lat. 40°; very common in the Southern States.

2. **A. palmâta**, Nees. Fronds usually crowded (2'' - 3'' high), ascending, *palmately divided*, the divisions linear and obtuse; sometimes prostrate and creeping extensively; *calyptra tuberculate*. — Rotten logs, &c., common.

3. **A. multífida**, Dumort. Fronds prostrate, *2-pinnately divided*, the divisions linear, narrow; whole plant *brownish-green*. — Alleghany Mountains, on moist, rocky banks.

10. PÉLLIA, Raddi. PELLIA.

Fructification proceeding from the back of the frond near the apex. Involucre cup-shaped, short, the margin lacerate. Perianth none. Calyptra oval, membranaceous, longer or shorter than the involucre. Capsule globose, pedicelled, 4-valved. Elaters long, free, with two fibres. Inflorescence monœcious. Antheridia globose, immersed in the upper surface of the broad indeterminate midrib of the frond. (A personal name.)

1. **P. epiphýlla**, Nees. Frond rather membranaceous, sparingly divided; divisions oblong, somewhat wedge-shaped, repand-lobed; calyptra exerted. — Moist, shady places, on the ground, forming patches 2° - 3° broad.

11. HÓLLIA, Endl. HOLLIA.

Involucre at first terminal, arising from the midrib of the frond, at length by the growth of the frond-dorsal, cup-shaped, short, lacerate. Perianth elongated-tubular, the mouth denticulate. Ca-

lyptra equalling the perianth, irregularly torn at the apex. Capsule oval, 4-valved. Elaters filiform, free, with two fibres. Inflorescence diœcious. Antheridia dorsal, on the midrib, covered by minute fimbriated perigonial leaves. Frond with a distinct midrib. (A personal name.)

1. **H. Lyëllii.** (Jungermánna, *Hook.*) Frond simple or 2-cleft, delicate in texture, oblong-linear, the margin slightly waved, entire or obscurely serrate (1'-4' long, 3''-5'' wide.)—On the ground, in wet, springy places.

12. LEJEÚNIA, Libert. LEJEUNIA.

Fructification lateral or terminal, on proper branches. Involucral leaves two, deeply 2-lobed. Perianth oval or obovate, terete or angular, winged or ciliate-crested on the angles, the mouth 3-4-lobed; pistillidium single. Calyptra obovate, persistent, furnished with a style, rupturing below the apex. Pedicel short, jointed in rings, when dry zigzag. Capsule globose, membranaceous, pale, 4-cleft to the middle; valves connivent. Elaters persistent, adherent to the tips of the valves, erect, the upper end truncate-dilated, with a single spiral fibre. Spores large, irregular. Inflorescence diœcious. Antheridia on proper branches lodged in the ventricose base of imbricated 2-lobed perigonial leaves.—Foliaceous: stem-leaves 2-ranked, incubous: amphigastria present. (A personal name.)

* *Leaves 2-lobed, the lower lobe smaller.*

1. **L. serpyllifolia,** Libert. Stems *vaguely branched*; leaves with the *upper lobe roundish-ovate, convex*, the lower much smaller, obliquely ovate, involute; amphigastria rounded, 2-cleft, its segments obtuse; perianth obovate, acutely 5-angled.—On moist rocks and trees, Alleghany Mountains.—A small pale-green species, with transparent loosely reticulated leaves.

2. **L. clypeata,** Schweinitz. Stems procumbent, *somewhat pinnately branched*; leaves with the *upper lobe round-obovate and deflexed*, the lower oblong, quadrate; amphigastria orbicular, approximated; perianth lateral, sessile, obovate, obtusely keeled on the back, 2-keeled underneath, the margin rather compressed.—Alleghany Mountains; somewhat larger than No. 1, and firmer in texture: leaves whitish-green.

* * *Leaves undivided, inflexed beneath at the base, saccate or hooded.*

3. **L. calcarea,** Libert. Stems *loosely and divaricately branched*; leaves *ovate, pointed, decurved, cellulose-echinate*, inflexed at the base,

saccate; amphigastria oblong, 2-cleft; perianth pear-shaped, with 5 crested wings. — On roots of trees, Ohio. A very minute species, scarcely visible to the naked eye.

4. **L. cucullata**, Nees. Stems filiform, rather pinnately branched; leaves oblong-ovate, distant, the lower margin inflexed-hooded; amphigastria oval, 2-cleft, perianth obovate, rather compressed, obtusely keeled beneath, convex on the back and 2-keeled near the apex. — Moist rocks near the ground, Alleghany Mountains. A minute, flaccid species, with light pea-green foliage.

13. FRULLÀNIA, Raddi. FRULLANIA.

Fructification terminal on proper branches. Involucral leaves 2 or 4, two-lobed, not auriculate. Perianth oval or obovate, terete or 3-4-angled, mucronate at the apex by a tubular mouth: pistillidia 2 or 4. Calyptra pear-shaped, persistent, furnished with a style, rupturing below the apex. Capsule pedicelled, globular, 4-cleft halfway down; the valves erect-spreading. Elaters truncate at both ends, with one spiral fibre, adherent to the valves, erect. Spores large, irregular, minutely muricate. Inflorescence diœcious. Antheridia in the saccate base of closely imbricated 2-lobed perigonal leaves. Stem-leaves 2-ranked, incubous, 2-lobed, the lower lobe usually an inflated helmet-shaped appendage (auricle). Amphigastria entire or 2-toothed, throwing out rootlets from their base. (A personal name.)

1. **F. Grayana**, Montagne. Stems creeping, simply pinnate; leaves nearly orbicular, concave, decurved, marked in the middle by a necklace-form line; auricle oblong-club-shaped, emarginate at the lower end; involucral leaves unequally 2-cleft, the dorsal segment oblong, pointed, nearly entire, the ventral awl-shaped; amphigastria oblong, flat, 2-cleft, the sinus obtuse; perianth pear-shaped, 3-sided, obtusely keeled beneath. — On trees and rocks, frequent. Foliage glossy, varying from deep purplish-brown to dark green. — (Very near *F. Tamarisci*, if not a form of it.)

2. **F. Virgínica**, Lehm. Stems creeping, vaguely branched; leaves nearly ovate, entire, concave, auricle expanded into a lanceolate lamina; amphigastria round-ovate, double the width of the stem, 2-cleft; perianth pear-shaped, rather compressed, tuberculate, 4-keeled beneath, 2-4-keeled on the back, the keels crested. (*F. dilatata*, *Musc. Alleghan. No. 267*, partly.) — Rocks and trees, common.

3. **F. Eboracensis**, Lehm. Stems creeping, fasciculately branched; stem-leaves loosely disposed (the rameal imbricated), round-ovate; amphigastria ovate, a little wider than the stem; perianth

smooth, pear-shaped, slightly compressed and repand, beneath *obtusely keeled* and gibbous near the apex. (F. dilatata, *Musc. Alleghan. No. 267*, partly.) — Bark of trees.

4. **F. saxatilis**, Lindenberg. Near the last, but separated by its *pinnately branched and more rigid* stems, more crowded leaves, much larger amphigast and shorter perianth. — Trees, Massachusetts.

5. **F. æolòtis**, Nees. *Stems procumbent, vaguely or rather pinnately branched; leaves half-vertical, spreading, obliquely heart-ovate; auricle expanded into an ovate-lanceolate lamina; amphigastria ovate or obovate, entire or angularly toothed above, acutely 2-cleft; the ventral lobe of the involucre leaf incised; perianth unknown.* — Trees, Pennsylvania and southward. (It is questionable if Nos. 2-5 are not mere forms of F. dilatata.)

14. MADOTHÈCA, Dumortier. TREE SCALE-MOSS.

Fructification lateral, nearly sessile. Involucre leaves 2 or 4, two-lobed. Perianth ovate, biconvex, the mouth 2-lipped, incised or entire. Pistillidia numerous. Calyptra globose, persistent, rupturing below the apex. Capsule short pedicelled, globose, 4-parted, the valves erect, incurved. Elaters free, attenuated at both ends, with two spiral fibres. Spores large, rather angular. Inflorescence diœcious. Antheridia in the saccate base of closely imbricated 2-lobed perigonial leaves. Stem-leaves 2-ranked, incurved, deeply and unequally 2-lobed. Amphigastria large, decurrent. (Name formed of *μαδός*, *bald*, and *θήκη*, *capsule*; the elaters falling away from the valves.)

1. **M. platyphýlla**, Dumort. Stems irregularly 2-pinnate or nearly so; dorsal lobe of the leaf roundish-ovate, the basal margin more or less undulate; the *ventral lobe* smaller, *oblique, heart-oval, margins reflexed*; amphigastria round-obovate with reflexed margins; mouth of perianth nearly entire. — Trees and rocks, common; a large and variable species.

2. **M. porélla**, Nees. Stems 2-3-pinnate; the forked branches divergent; *leaves distantly placed*; the dorsal lobe oblong-ovate, obtuse; the *ventral* much smaller, *appressed to the stem, oblong, flat*; amphigastria quadrate; mouth of the perianth crenulate. — Stones and roots of trees subject to inundation. Stems 2'-4' long.

15. RÁDULA, Nees. RADULA.

Fructification terminal on short branches, or in a fork. Involucre leaves 2, deeply 2-lobed. Perianth compressed or nearly terete, the mouth dilated. Pistillidia numerous. Calyptra pear-

shaped, persistent, with a style, opening below the apex. Capsule pedicelled, oval, 4-parted; the valves erect-spreading, within nodulose striate. Elaters attenuated at both ends, with two spiral fibres. Spores large, globose. Inflorescence monœcious. Antheridia in the ventricose base of minute perigonal leaves. Stem-leaves 2-ranked, incubous, 2-lobed, the small inflexed ventral lobe producing rootlets. Amphigastria none. (Name from *ῥαδαλός*, *pliant*, for these flaccid plants.)

1. **R. complanata**, Dumortier. Stems flat, irregularly and somewhat pinnately branched, flaccid; *leaves imbricated*; dorsal lobe roundish; the ventral much smaller, triangular-ovate, appressed; *perianth oblong*, compressed, the mouth truncate and entire. — A large, pale-green species, growing in orbicular patches on the bark of trees, &c.

2. **R. obcónica**, (n. sp.) Stems indeterminately branched; *leaves distantly placed*; dorsal lobe obovate-roundish, convex; *perianth clavate-obconic*, the mouth obliquely truncate and entire. (*R. complanata*, var.? *Musc. Alleghan. No. 260.*) — Trees, Cedar swamps, Ohio. — Much smaller than the last, well marked by the shape of its perianth.

3. **R. pallens**, Nees. Stems rigid, divaricately fork-branched; *leaves imbricated*; dorsal lobe roundish, decurrent, the ventral with an inflexed apex; *perianth elongated funnel-form*, the mouth entire. — Old logs, &c., Alleghany Mountains.

16. PTILÍDIUM, Nees. FRINGED SCALE-MOSS.

Fructification terminal on short branches. Involucral leaves 2-4, four-cleft. Perianth terete, obovate; the mouth connivent, plaited, denticulate. Pistillidia numerous. Calyptra pear-shaped, coriaceous, style-bearing. Capsule pedicelled, ovate, 4-valved to the base. Elaters with two spiral fibres. Inflorescence diœcious. Antheridia covered by closely imbricated perigonal leaves. Stem-leaves 2-ranked, incubous, complicate-2-lobed, each lobe divided. Amphigastria 4-5-lobed. (Name a diminutive of *πτίλον*, a *downy feather*; from the cut-fringed foliage.)

1. **P. ciliare**, Nees. Stems crowded, rather pinnate; leaves 4-cleft and amphigastria both lacerately ciliate, the fringe long and setaceous. — Rotten logs, in woods.

17. TRICHOCOLEA, Nees. DOWNY SCALE-MOSS.

Fructification situated in a fork. Involucral leaves numerous, coalescent into an oblong and truncate coriaceous hairy tube.

Perianth and calyptra none. Capsule pedicelled from the bottom of the tube, 4-valved to the base. Elaters with two spiral fibres, free. Antheridia on the upper side of the stem in the axils of leaves. Leaves incubous, palmately divided, the divisions laciniate. Amphigastria present. (Name composed of *θρίξ*, *hair*, and *κολεός*, *a sheath*; from the hairy involucre.)

1. **T. Tomentélla**, Nees. Stems forked, 2-3-pinnately branched; divisions of the 4-5-divided leaves capillary-many-cleft; amphigastria setaceously many-cleft. — Moist places, in large patches. Foliage pale green, soft-hairy.

18. SENDTNERA, Endl. SENDTNERA.

Fructification terminal. Involucral leaves numerous, incised, free or connate at the base. Perianth tubular, deeply many-cleft. Calyptra chartaceous. Capsule pedicelled, globular, 4-valved. Elaters free, with two spiral fibres. Antheridia upon proper branches in the axils of ventricose perigonal leaves. Stem-leaves incubous, 2-5-cleft or entire. Amphigastria 2-many-cleft. (Named for *O. Sendtner*, a German botanist.)

1. **S. junipérina**, Nees. Stems erect, nearly simple, slender, elongated; leaves and amphigastria almost alike, oblong, curved and one-sided, 2-cleft to the middle, the lobes lanceolate. — High mountains. Plant rigid, reddish-brown.

19. LEPIDÒZIA, Nees. CREEPING SCALE-MOSS.

Fructification terminal, on short proper branches arising from the under side of the stem. Involucral leaves numerous, small, broad, 2-4-toothed at the apex. Perianth elongated, obtusely 3-plaited, the mouth denticulate. Calyptra membranaceous. Capsule pedicelled, 4-valved. Elaters with two spiral fibres. Antheridia on short spike-like branches, arising from the under side of the stem, singly lodged in the base of conduplicate 2-3-cleft perigonal leaves. Stem-leaves incubous, 4-toothed or 4-parted. Amphigastria present. Branches pinnate, obtuse, or attenuated into runners. (Name from *λεπιδώω*, *to cover with scales*; from the scale-like foliage.)

1. **L. réptans**, Nees. Stems creeping, pinnately compound or decomposed; leaves decurved, quadrate, acutely 3-4-toothed; amphigastria 3-4-cleft. — Hilly districts, on the ground.

20. MASTIGÒBRYUM, Nees. GREAT SCALE-MOSS.

Fructification terminal, on short proper branches, arising from the axils of the amphigastria. Involucral leaves small, narrow, acutely incised at the apex. Perianth elongated, 3-angular, the mouth 3 toothed. Calyptra membranaceous. Capsule pedicelled, 4-valved. Elaters with two spiral fibres. Antheridia on short branches from the axils of the amphigastria, 2 in each perigonal leaf. Stem-leaves incubous, imbricated, oblique, decurved, usually 3-toothed at the apex. Stems forked and sparingly branched; the branches obtuse; rootlet-like runners (furnished with minute leaves) proceeding from the axils of the amphigastria (whence the name, from *μάστιξ*, a whip or lash, and *βρύον*, Moss).

1. **M. trilobàtum**, Nees. Leaves ovate, antrorsely gibbous at the dorsal base, broad and acutely 3-toothed at the apex; amphigastria 4-6-toothed, the teeth denticulate. — On the damp ground, Alleghany Mountains and northward. Stems 3'-5' long; the foliage firm, varying from olive-green to brownish-yellow.

2. **M. defléxum**, Nees. Leaves ovate or ovate-oblong, the dorsal margin arched, the narrow apex 2-3-toothed or entire; amphigastria 2-cleft, crenate or entire. — Rocky places. Variable, much smaller than the last; fragile, of a dark brownish hue.

21. CALYPOGEÏA, Raddi. CALYPOGEIA.

Involucral leaves none. Perianth oblong, saccate, truncate, fleshy, hairy, attached by one side of its mouth to the stem, pendulous. Calyptra membranaceous, partly connate with the perianth. Capsule pedicelled from the bottom of the perianth, oblong, twisted, 4-valved; the valves narrow and contorted. Elaters with two spiral fibres. Antheridia on short lateral capitate branches, one in each of the scale-like perigonal leaves. Stem-leaves incubous, entire or 2-toothed. Amphigastria 2-cleft. (Name compounded of *κάλυξ*; flower-cup, *ὑπό*, under, and *γαία*, the ground; from the position of the fructification.)

1. **C. Trichómanis**, Corda. Leaves roundish-ovate, obtuse, spreading, imbricated; perianths imbedded in the soil. — Moist, springy places, on the ground. Foliage delicate, pale glaucous-green.

22. GEÓCALYX, Nees. GEOCALYX.

Fructification, &c., nearly as in No. 21, but the valves of the capsule straight. Antheridia on spike-like lateral branches, in

the axils of scale-like perigonial leaves. Stem-leaves *succubous*. (Name formed of *γέα*, *the earth*, and *κάλυξ*, *flower-cup*; from the fructification becoming subterranean.)

1. **G. gravèolens**, Nees. Leaves ovate-quadrate, 2-toothed (light-green); amphigastria oval-lanceolate, 2-cleft to the middle; perianth subterranean. — On the ground, rotten logs, &c.

23. CHILOSCYPHUS, Corda. CHILOSCYPHUS.

Fructification terminal upon a short lateral branch. Involucral leaves 2–6, different from and smaller than the stem-leaves. Perianth usually short, deeply 2–3-cleft. Calyptra globose or somewhat club-shaped, slightly chartaceous, often longer than the perianth, rupturing irregularly at the apex. Capsule pedicelled, 4-valved. Elaters with two spiral fibres. Perigonial leaves like the cauline, concealing antheridia in their saccate dorsal bases. Stem-leaves succubous, decurrent on the back of the stem, rather horizontal; rootlets proceeding only from the base of the deeply 2-cleft amphigastria. (Name formed of *χίλος*, *herbage*, and *σκύφος*, *cup*; from the herbaceous calyptra.)

1. **C. polyánthos**, Corda. Stems procumbent; leaves ovate-quadrate; involucral leaves 2, slightly 2-toothed; perianth 3-lobed, the lobes short and nearly entire. — Rocks, &c.

2. **C. ascéndens**, Hook. & Wils. Stems prostrate; leaves ascending, roundish-oblong, slightly emarginate; involucral leaves 2, two-cleft; perianth 2–3-lobed; the lobes long and irregularly lacerate-toothed. — Rotten logs, &c. A large species, with pale-green foliage.

24. LOPHOCOLEA, Nees. LOPHOCOLEA.

Fructification terminal on the main stem or primary branches. Involucral leaves 2–4, large. Perianth tubular below, acutely 3-angular above, 3-lobed; the lobes tooth-crested. Calyptra short, membranaceous, circumscissile at the base or rupturing irregularly at the apex. Capsule pedicelled, oval, 4-valved. Elaters with two spiral fibres. Antheridia in the saccate bases of small imbricated perigonial leaves. Stem-leaves succubous, nearly horizontal, decurrent on the dorsal side of the stem, flaccid, 2–several-cleft at the apex. Amphigastria 2–4-divided; the divisions more or less incised. (Name composed of *λόφος*, *a crest*, and *κολεός*, *a sheath*; from the crested calyptra.)

1. **L. bidentàta**, Nees. Stems elongated (3'–6' long), spar-

ingly branched; leaves ovate-triangular, spreading, loose, pale, 2-toothed; the teeth oblique, acute, with a crescent-like sinus; involucreal leaves acutely 2-cleft and somewhat toothed. — Moist places, among Mosses, &c.

25. SPHAGNICËTIS, Nees. PEAT SCALE-MOSS.

Fructification terminal, upon a short proper branch arising from the ventral side of the stem. Involucreal leaves small, few, incised. Perianth ascending, terete, 3-angled at the apex; the mouth denticulate. Calyptra membranaceous. Capsule oblong, 4-valved. Elaters with two spiral fibres. Antheridia unknown. Stem-leaves succubous, orbicular. Gemmæ collected in heads upon the attenuated tips of the branches. Amphigastria none, except upon the gemmiferous branches. Stems furnished with runner-like rootlets. (Name composed of *Σφάγνος*, *Peat-Moss*, and *κοίτις*, a *little bed*; from the appearance and growth.)

1. **S. communis**, Nees. Stems creeping; leaves elliptical-orbicular, entire, ascending. (I. *Sphagni*, *Auct.*) — Upon moss and decayed wood.

26. JUNGERMANNIA, L. SCALE-MOSS.

Fructification terminal. Involucreal leaves free, like or unlike the stem-leaves. Perianth membranaceous, tubular, plaited-denticulate at the apex; the mouth 3-6-cleft. Calyptra included, rarely projecting. Capsule 4-valved. Elaters with two spiral fibres. Antheridia in the base of inflated perigonal leaves. Stem-leaves succubous. Amphigastria present or absent. (Dedicated to *Jungermann*, a German botanist of the 17th century.)

* *Leaves and amphigastria alike, 2-4-parted.*

1. **J. trichophýlla**, L. Stems flaccid, branched; *leaves and amphigastria 3-4-parted; the divisions straight*, spreading, bristle-form, each composed of a single row of tubular cells; *fruit-bearing branch lengthened*; perianth nearly cylindrical, contracted and toothed at the mouth. — Decayed wood, &c. A minute, pale-colored species.

2. **J. setàcea**, Weber. *Leaves and amphigastria 2-3-cleft; the divisions incurved*, each composed of two rows of cells; *fruit-bearing branch short*; mouth of perianth ciliate. — On the ground, &c. Smaller than No. 1, brownish-colored.

* * *Leaves 2-cleft, or (from Nos. 7-11) 2-6-cleft: amphigastria none, except in Nos. 7 and 8.*

3. **J. connivens**, Dickson. Stems creeping, flexuous; *leaves nearly orbicular*, with a broad decurrent base, *distant*, a little wider than the stem, 2-cleft to $\frac{1}{4}$ or $\frac{1}{3}$ of their length, the sinus obtuse; *segments acute, connivent*; reticulations large; involucral leaves 3-5-cleft; perianth slender, the mouth lacerate-ciliate. — On rotten wood.
4. **J. curvifolia**, Dickson. Fruit-bearing branch short; stems creeping; *leaves imbricated, ascending, nearly orbicular, inflated at the ventral base*, lunately 2-cleft; the *segments long-linear, inflexed*; involucral leaves erect, 2-3-cleft, serrate; perianth narrow, plaited-triangular, the mouth denticulate. — Rotten logs, &c.
5. **J. bicuspidata**, L. Fruit-bearing branch short; stems loose, procumbent; *leaves distant or crowded, half vertical, ovate*, a little wider than the stem, 2-cleft to the middle, the sinus obtuse; *segments acute*; involucral leaves spreading at the apex, 2-5-cleft, repand-serrulate; perianth elongated, the mouth denticulate. — On various substances: a small and common species.
6. **J. divaricata**, Engl. Bot. Fruit-bearing branch elongated; stems prostrate, rigid, thick; *leaves distant, spreading, rather fleshy*, equalling the stem in diameter, *oblong, the sinus and segments acute*; involucral leaves numerous, imbricated, 2-3-cleft, serrulate; perianth oval, plaited above; the mouth membranaceous, denticulate. (*J. byssacea*, Auct.) — Among mosses and on decayed wood: a minute, dark-green species.
7. **J. setiformis**, Ehrhart. *Stems erect or ascending*, and, with the leaves, *terete-sulcate*; *leaves toothed at the base, 3-4-cleft*; the lobes *channelled, ovate-oblong, acute*; *amphigastria ciliate-toothed at the base, deeply 2-cleft*, with lanceolate segments; perianth oval, plaited. — Alpine regions of the White Mountains, *Oakes*.
8. **J. barbata**, Schreber. *Stems procumbent*, sparingly branched; *leaves roundish-quadrate, 3-5-lobed*, the sinuses obtuse and undulate; lobes obtuse, acute, or mucronulate, variously directed; *amphigastria (when present) broad, entire or 2-toothed*; perianth angularly plaited to near the apex, the mouth denticulate. — Hilly districts, on the ground, rocks, &c. Subject to many varieties.
9. **J. Michaëxii**, Weber. *Stems ascending*, flexuous by repeated innovations from below the summit; *leaves crowded*, erect-spreading, rather saccate at base, and *quadrate, 2-cleft*, the sinus narrow; the lobes *acute, incurved*; exterior involucral leaves large, serrulate, the inner smaller; perianth oval, rather club-shaped, the obtuse apex plaited, the *mouth fringed*. — Alleghany Mountains.
10. **J. incisa**, Schrader. *Stems prostrate*, thick, rather flat, rooting copiously; *leaves densely crowded, somewhat quadrate, waved, 2-6-cleft, the segments unequal*; perianth oval or obovate, the *mouth plaited, denticulate*. — Damp, shaded places, on the ground. A small species, with pale glaucous-green foliage.

11. **J. intermèdia**, Lindenberg. *Stems prostrate, almost simple; leaves roundish-quadrate, 2-cleft; the upper ones crowded into heads and 3-4-cleft; involucreal leaves 3-4-cleft, slightly serrate, connate at the base; perianth short, ovate-triangular, the mouth plaited, denticulate.* — On the ground: a small species.

* * * *Leaves nearly orbicular, undivided; amphig. different or obsolete.*

12. **J. scutàta**, Weber. *Stems procumbent; leaves half vertical, emarginate-2-toothed; the teeth straight and acute; involucreal leaves 2-3-toothed; amphigastria large, ovate-triangular, 1-2-toothed on the margin near the base; perianth obovate, the mouth plaited, denticulate.* — Old logs, &c.: a minute species.

13. **J. Schradèri**, Martius. *Stems creeping, flexuous; leaves elliptical-orbicular, ascending; outer involucreal leaves large, elongated, entire or emarginate, spreading at the apex; the inner smaller, more or less lacinated; amphigastria obsolete; perianth oval-obovate; the mouth plaited-lobed, its lobes ciliate.* — Decayed logs, &c., common. Foliage often dark purple.

* * * * *Leaves unequally complicate-2-lobed (i. e. infolded together): the involucreal 3-5-cleft: perianth oblong, obtuse, plaited.*

14. **J. exsècta**, Schm. *Stems ascending; dorsal lobe of the leaves small, acute; ventral lobe concave, acute or 2-toothed.* — Boggy places, decayed wood, &c.

15. **J. obtusifòlia**, Hook. *Stems ascending, simple; lobes of the leaves oblong, obtuse or acute, minutely denticulate, the ventral scymetar-shaped; the dorsal smaller, oblique.* — Dry, hilly situations, on the ground.

27. SCAPÁNIA, Lindenberg. SCAPANIA.

Fruetification terminal. Involucreal leaves 2, larger than the cauline. Perianth compressed, parallel to the plane of the stem, the mouth entire or ciliate-toothed. Pistillidia few. Calyptra membranaceous. Capsule 4-valved. Elaters with 2 spiral fibres. Antheridia in the angles of small and saccate equally 2-lobed perigonal leaves. Stem-leaves succubous, complicate-2-lobed, the dorsal lobe smaller. Amphigastria none. (Name probably from *σκαπάνη*, a shovel; from the shape of the lobes of the leaves.)

1. **S. nemoròsa**, Nees. *Stems ascending, crowded; leaves ciliate-toothed, each lobe convex, obtuse; the ventral obovate, oblique, twice as large as the other.* — Common on moist banks, &c. A variable species, $\frac{1}{2}$ ' to 3' long, pale yellow, green or purple: texture of the leaf rather firm.

2. **S. undulàta**, N. & M. *Leaves ciliate-denticulate or entire, loose, spreading; lobes rounded-trapezoidal, the upper half the size of*

the lower, except at the summit of the stem, where they are equal; of thin and flaccid texture (green or purple).— Mountainous districts.

28. PLAGIOCHILA, Nees & Montagne.

Fructification terminal or lateral. Involucral leaves 2, larger than the cauline. Perianth compressed at right angles to the plane of the stem; the mouth truncate, entire or ciliate-toothed. Pistillidia numerous. Calyptra membranaceous. Capsule 4-valved. Elaters with two spiral fibres. Antheridia covered by small and ventricose-imbricated perigonal leaves. Stem-leaves succubous, with the dorsal margin decurrent and reflexed, often turned to one side (whence the name, from *πλάγιος*, turned to one side, and *χίλος*, herbage).

* *Amphigastria none*: orifice of the perianth toothed-ciliate.

1. **P. spinulosa**, N. & M. Stems creeping, the branches ascending; leaves remote, oblique, spreading, obovate-wedge-shaped; the dorsal margin entire, the ventral and the apex spinulose-toothed; perianth lateral.— Banks of rivulets, Alleghany Mountains.

2. **P. asplenioides**, N. & M. Leaves somewhat imbricated, oblique, spreading, rounded-obovate, entire or denticulate; perianth terminal.— Grows with No. 1.

* * *Amphigastria fugacious*, 2-3-cleft.

3. **P. porelloides**, Lindenber. Stems divided; the branches ascending; leaves rather imbricated, convex-gibbous, rounded-obovate, those at and near the summit of the stem repand-denticulate, the others entire; perianth oblong, the mouth denticulate.— Among Mosses, at the base of trees in swamps.

4. **P. macróstoma**, Sulliv. Stems prostrate, rooting copiously, branched; branches not ascending; leaves nearly oval, horizontal, entire or slightly repand; perianth broadly obconic, the mouth compressed, margin repand, amphigastria lanceolate, 2-3-cleft.— Moist banks and decayed logs, Ohio.

29. SARCOSCYPHUS, Corda. SARCOSCYPHUS.

Fructification terminal. Involucral leaves united nearly to the top into an oblong tube. Perianth 4-6-toothed, connate except the teeth with the interior surface of the involucral leaves. Calyptra membranaceous. Capsule 4-valved. Elaters with two spiral fibres. Antheridia in the saccate base of perigonal leaves. Stems erect, producing from their base runner-like rootlets. Stem-leaves indefinitely succubous, 2-lobed. Amphigastria none.

(Name composed of *σάρξ*, *flesh*, and *σκύφος*, *a cup*; from the fleshy tubular involucre.)

1. **S. Ehrhárti**, Corda. Leaves erect-spreading, rather quadrate, embracing the stem by the broad base, lobes obtuse. — Mountains. Plant of a firm texture, dark green or brownish-purple.

30. GYMNOMÍTRIUM, Corda. GYMNOMITRIUM.

Fructification terminal. Involucral leaves 2-4, convolute, emarginate. Perianth none. Calyptra short. Capsule globose, 4-valved. Elaters with two spiral fibres. Antheridia obovate, axillary. Stem-leaves indefinitely succubous, 2-lobed. Amphigastria none.

1. **G. concinnàtum**, Corda. Stems erect, filiform, brittle, sparingly branched; branches thickened at the apex, obtuse; leaves densely imbricated, ovate, 2-cleft at the apex, with a narrow membranaceous margin. — Alpine regions of the White Mountains, *Oakes*. A small species, growing in compact masses, of a whitish or silvery hue.

A D D I T I O N S .

To **RHAMNUS**, p. 84, add

3. **R. lanceolatus**, Pursh. Leaves oblong-lanceolate, taper-pointed (the floral obtuse, mostly ovate or roundish), closely serrulate, minutely downy underneath; *petals* 4, *deeply obcordate, about as long as the (short) stamens*; *seeds* 2. (*R. parvifolius*, Torr. & Gr.; not of Bunge.)—Hills and river-banks, from Mercersburg, Penn. (*Prof. Traill Green!*), southward through Virginia! to Alabama (*Buckley!*) and southwestward. May.—A tall shrub, not thorny, with Plum-like leaves; the floral ones, at the base of the annual shoots (from the axils of which the short pedicels arise) $\frac{1}{2}$ ' - $\frac{3}{4}$ ' long; the later 2' - 3' when grown, often oblong-ovate. Flowers yellowish-green, diœciopolygamous: the pedicels usually single in the more fertile plant, which has the 2-cleft style exserted, and produces abundant globular drupes about the size of a pepper-corn. The less fertile plant bears rather larger flowers, on clustered pedicels, with a very short and included style: the ovaries that ripen produce a rather larger drupe, more turbinate, and distinctly pointed with the remains of the short style. Seed obovate, deeply grooved.—The two forms were detected and well pointed out by Prof. Green. I have gathered very fruitful specimens of the second form near Huntersville, Virginia. No doubt this is the *R. lanceolatus* of Pursh. The smoother Western plant, if a distinct species (which I think it is not), must bear the name of *R. Shortii*, Nutt.

To p. 98, before *Desmodium*, add

9^a. **HEDÝSARUM**, L., DC. HEDYSARUM.

Calyx about equally 5-cleft; the lobes linear-awl-shaped. Wings of the corolla much shorter than the obliquely truncate keel. Stamens diadelphous (9 and 1). Pod of several equal-sided orbicular flat joints which are connected by the middle.—Leaves odd-pinnate, not stipellate: leaflets small. Otherwise much as in *Desmodium*. (An ancient Greek name.)

1. **H. boreale**, Nutt. Leaves nearly sessile; leaflets 8-12 pairs, oblong, smoothish; stipules united; raceme elongated, long-peduncled, bearing numerous deflexed (violet-purple) flowers; standard much shorter than the keel; joints of the pod 3 or 4, smooth or pubescent, reticulated (stem 1^o-2^o high). ♀—Willoughby Mountain, Vermont, *Mr. Alphonso Wood*. July.—A fine discovery. I have not seen a specimen.

To **SAXIFRAGA**, p. 148, add

* * * *Sterile branches very leafy: leaves opposite, persistent: calyx free.*

7. **S. oppositifolia**, L. Low and diffuse, tufted; leaves small, crowded or imbricated, obovate, thickened towards the apex and furnished with a few impressed dots, ciliate, keeled; flower-stems peduncle-like, bearing a single showy (purplish) flower; sepals united to the middle, shorter than the large obovate 5-nerved petals.—Willoughby Mountain, Vermont (with *S. aizoides* also), *Mr. A. Wood*. July.—A dwarf, alpine plant, which it is surprising has not been found on the White Mountains.

To **ASTER**, on p. 203, add

27^a. **A. oblongifolius**, Nutt. Stem much branched above, rigid, paniculate-corymbose (1°–2° high); the branchlets with the uppermost leaves and involucre minutely roughish-glandular with resinous granules; leaves narrowly oblong or lanceolate, mucronate-pointed, entire, partly clasping, roughish, thickish (1'–2' long by 2''–5'' wide); scales of the involucre broadly linear, imbricated, appressed at the base, with long and spreading foliaceous tips; rays violet-purple; achenia canescent.—Banks of the Juniata River, Huntingdon county, Penn., *Dr. Porter!* thence southward (Harper's Ferry) and westward, on rocky banks.—Heads fewer and much smaller than in *A. Novæ-Angliæ*.

To **MIMULUS**, p. 299, add

3. **M. Jamèsii**, Torr. & Gr. Spreading or creeping, smooth; leaves rounded or kidney-shaped, obscurely toothed or entire, almost sessile, many-nerved, the lower somewhat ovate and petioled; peduncles about the length of the leaf; corolla small, yellowish. (*M. Geyeri*, Torr.)—Springs, Mackinaw and westward. July. ①.

To **GERARDIA**, p. 306, add

3^a. **G. setacea**, Walt. Very slender; branchlets and leaves setaceous, roughish; peduncles very much longer than the leaves; calyx-teeth awl-shaped; pod at length exerted; corolla small (4'–½' long): otherwise resembles *G. tenuifolia*.—Penn., Michigan, and southward. August.

Ligusticum actæifolium, p. 160. The New England plant so called in Bigelow's *Florula* is *Archangelica peregrina!* (p. 159): common on the New England coast.

Solidago Virgaurea, *Campanula linifolia*, and *Eutoca Franklinii* have been gathered on Isle Royal, Lake Superior, during the past summer, by *Mr. Joy*, an assistant of *Dr. C. T. Jackson* in the Government Survey.

INDEX

OF THE CLASSES, ORDERS OR FAMILIES, GENERA, AND
PRINCIPAL SYNONYMES.

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