

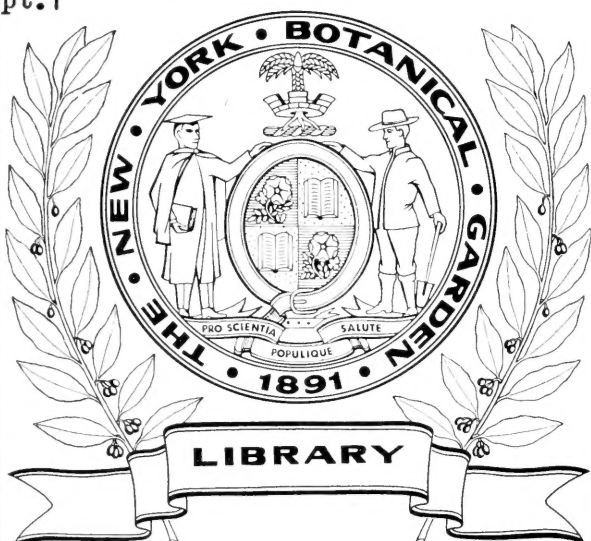


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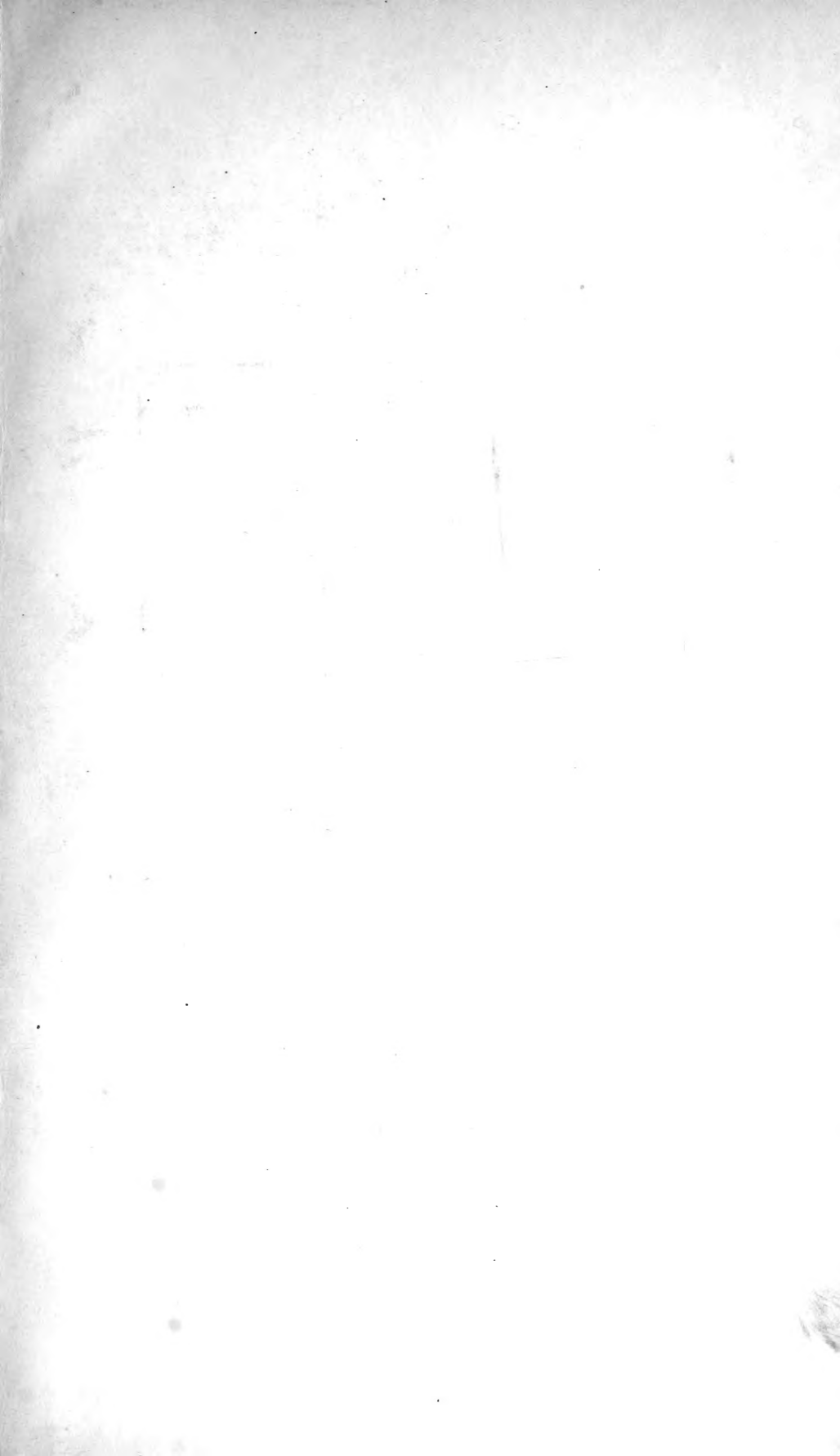
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DAVID H. FRO

# SYNOPTICAL FLORA OF NORTH AMERICA:

VOL. I.—PART I.

FASCICLES I AND II.

POLYPETALÆ FROM THE *RANUNCULACEÆ* TO THE *POLYGALACEÆ*.  
(*THALAMIFLORE ET DISCIFLORE.*)

BY ASA GRAY, LL.D.,

LATE FISHER PROFESSOR OF NATURAL HISTORY (BOTANY) IN HARVARD UNIVERSITY,

AND OTHERS.

EDITED BY

BENJAMIN LINCOLN ROBINSON, PH.D.,

CURATOR OF THE GRAY HERBARIUM OF HARVARD UNIVERSITY.

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1895-1897.

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## FASCICLE I.

RANUNCULACEÆ TO FRANKENIACEÆ (pages i-ix, and 1-208).

Issued October 10, 1895.

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## FASCICLE II.

CARYOPHYLLACEÆ TO POLYGALACEÆ (pages x-xv, and 208-506).

Issued June 10, 1897.

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# SYNOPTICAL FLORA OF NORTH AMERICA.

ISSUED FROM THE

HERBARIUM OF HARVARD UNIVERSITY.

A concise and critical treatment of the Flowering Plants of North America, with clear descriptions, synonymy, bibliography, and geographic range of the species and varieties, growing without cultivation on this continent, north of Mexico; also ordinal, generic, and specific keys to facilitate the identification of the plants included.

Of this extended treatise PROFESSOR ASA GRAY published, in 1878 and 1884, two parts including all the Gamopetalous Orders. These parts, reissued in 1886 by the Smithsonian Institution, and amounting to nearly 1,000 pages, imperial octavo, may be had for \$2.50 from the CAMBRIDGE BOTANICAL SUPPLY COMPANY. For some time before his death Professor Gray, continuing the work, was engaged in monographing the earlier Polypetalous Orders. After the death of Professor Gray the preparation of the Synoptical Flora was carried on by DR. SERENO WATSON, and then by his successor, DR. B. L. ROBINSON. Following the original plan of the Flora, the treatment of the Polypetalous Orders will form, when completed, Volume I, Part 1. Of this portion of the work,

## THE SECOND FASCICLE,

including the Orders *Caryophyllaceæ*, *Ficoideæ*, *Portulacaceæ*, *Tamariscineæ*, *Elatinaceæ*, *Hypericaceæ*, *Ternstroëmiaceæ*, *Cheiranthodendreeæ*, *Malvaceæ*, *Sterculiaceæ*, *Tiliaceæ*, *Linaceæ*, *Malpighiaceæ*, *Zygophyllaceæ*, *Geraniaceæ*, *Rutaceæ*, *Simarubaceæ*, *Burseraceæ*, *Anacardiaceæ*, *Meliaceæ*, *Aquifoliaceæ*, *Cyrillaceæ*, *Olinaceæ*, *Celastraceæ*, *Rhamnaceæ*, *Vitaceæ*, *Sapindaceæ*, and *Polygalaceæ*,

IS NOW READY.

(OVER.)



This Fascicle, comprising more than 275 pages, imperial octavo, has been printed from the manuscript of Professor Gray, continued and edited by Dr. Robinson, with the collaboration of PROFESSOR WILLIAM TRELEASE, Director of the Missouri Botanical Garden, PROFESSOR J. M. COULTER, of the University of Chicago, and PROFESSOR L. H. BAILEY, of Cornell University. It may be obtained postpaid on receipt of price, from the Herbarium of Harvard University, Cambridge, Mass., or of any of the following authorized agents: —

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## THE FIRST FASCICLE,

including the Orders *Ranunculaceæ*, *Magnoliaceæ*, *Anonaceæ*, *Menispermaceæ*, *Berberidaceæ*, *Nymphæaceæ*, *Sarraceniaceæ*, *Papaveraceæ*, *Fumariaceæ*, *Crucifereæ*, *Capparidaceæ*, *Resedaceæ*, *Cistaceæ*, *Violaceæ*, *Canellaceæ*, *Bixaceæ*, and *Frankeniaceæ*, was issued October 10, 1895.

Price: \$2.60 — 11 sh. — 11 M. — 13 fr. 50c.

With Fascicle II is issued a title-page and complete generic, specific, and synonymic index, for Fascicles I and II, which should be bound together.

## A THIRD FASCICLE,

to include the *Leguminosæ*, is now in preparation by DR. B. L. ROBINSON, Curator of the Gray Herbarium of Harvard University, Cambridge, Mass.

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## P R E F A C E.

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OF the SYNOPTICAL FLORA OF NORTH AMERICA Dr. Gray published, in 1878, Volume II. Part 1, comprising the gamopetalous orders after the *Compositæ*, and following rather closely, in the sequence and limitation of orders, Bentham & Hooker's *GENERA PLANTARUM*. The object in thus beginning with the second portion of the work was to monograph first such orders as had not been treated in Torrey & Gray's *FLORA OF NORTH AMERICA*. This earlier work, published between 1838 and 1843, included the polypetalous orders of North America and the *Gamopetalæ* through the *Compositæ*. In planning the Synoptical Flora, Dr. Gray left the orders thus treated to form the subject matter of Volume I. In 1884, he published Part 2 of this first volume, including the *Gamopetalæ* from the *Caprifoliaceæ* through the *Compositæ*. In 1886, the two portions, thus published, were revised and amplified by Dr. Gray, and reissued by the Smithsonian Institution.

In his last years Dr. Gray was engaged in monographing the earlier polypetalous orders for Volume I. Part 1. In this work he had finished at the time of his death most of the orders to, but not including, the *Leguminosæ*. The treatment of several large groups, however, such as the *Cruciferae*, *Caryophyllaceæ*, *Hypericaceæ*, *Rhamnaceæ*, &c., had for various reasons been deferred. After Dr. Gray's death the work was continued by Dr. Sereno Watson, who prepared eleven genera of the *Cruciferae*, including several of the largest and most difficult of the order. After the death of Dr. Watson, in 1892, the work was intrusted to the present editor.

The time which has necessarily elapsed since the inception of the work by Dr. Gray and the very considerable botanical activity throughout our

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Gift from Columbia

country have made it necessary to annotate and to some extent to revise the portions written by Drs. Gray and Watson. Every effort, however, has been made to indicate the place and extent of such alterations, and, wherever consistent with the brevity necessary in the work, to show the nature of the original manuscript and reason for change. Both Dr. Gray and Dr. Watson, in the course of their preparation of the present work, issued from time to time preliminary papers, such as their revisions of the genera *Ranunculus*, *Delphinium*, *Asimina*, *Viola*, *Lesquerella*, *Draba*, &c., so that their views upon these groups are already to a considerable extent known to science. The editor has therefore felt somewhat greater liberty in revising the manuscript of such groups in the light of later literature and recent collections. All species of which the names or descriptions have been altered in any way, as well as recent species which have been inserted by the editor, are marked with the asterisk (\*). The authorship of the different groups is indicated at the beginning of each order. For additional clearness in the *Cruciferae*, the authorship is also given in each genus.

In the citation of authorities and of literature, as well as in the matter of nomenclature, the present issue has been made as far as possible to conform to the portions of the work already published. Well known generic names have in some cases been conserved on the ground of usage, notwithstanding technical lack of priority. This is especially the case with names which have received the recent indorsement of the botanists of Kew and Berlin. In the matter of specific names, the aim has been to follow the so-called Kew Rule, except where it leads to indefiniteness. The recent efforts to place botanical nomenclature upon a different basis have led to the hasty restoration in American botany of a considerable number of names, such as *Neckeria*, *Capnorchis*, *Beurera*, &c., which have been again as quickly abandoned. The detailed citation of these names, and the numerous combinations to which they have led, forms no part of Dr. Gray's original plan, shown by the following words from his first Preface: "Compactness being essential, only the leading synonymy and most important references are given, and these briefly." An effort has been made, however, to cite as synonyms such names as are at present indorsed by the Rochester and Madison Rules, and are included in the

recently issued 'List of Pteridophyta and Spermatophyta growing without cultivation in Northeastern North America,' that is, if such names do not coincide with those in the text.

A second fascicle of the Flora will be issued at an early date, including the remaining polypetalous orders to the *Leguminosæ*. To complete Dr. Gray's manuscript of this second portion of the work the following specialists have most kindly consented to co-operate with the editor: President J. M. Coulter (*Hypericaceæ*), Professor Wm. Trelease (*Linaceæ*, *Ilicineæ*, *Geraniaceæ*, *Rhamnaceæ*, and *Celastraceæ*), and Professor L. H. Bailey (*Vitaceæ*). For temporary convenience a generic index is appended to the present issue, but the second fascicle will contain a full specific and synonymic index, as well as title page for both parts, which may be conveniently bound together.

It is a pleasure to acknowledge the cordial support and friendly assistance of the botanists throughout the country, who, by contributing valuable specimens and notes, have added greatly to the fulness and accuracy of the present work. The names of such contributors are frequently mentioned in the text, and to all heartfelt thanks are herewith tendered. For permission to make free use of the rich collections and libraries of Columbia College, the Philadelphia Academy of Natural Sciences, the Department of Agriculture, and the National Museum, the editor is especially indebted to Professor N. L. Britton of New York City, the late John H. Redfield, Esq., Messrs. Thomas Meehan and Stewardson Brown, of Philadelphia, and Mr. F. V. Coville, of Washington, respectively. Specimens of various difficult groups have also been lent by Professor John Macoun, Government Naturalist of Canada, and Mr. J. M. Macoun, Curator of the Government Herbarium at Ottawa, by Professor L. H. Pammel, of the Agricultural College, Ames, Iowa, Professor W. W. Bailey and Mr. J. F. Collins, of Brown University, as well as from the extensive private collections of Messrs. J. Donnell Smith, W. M. Canby, Mr. and Mrs. T. S. Brandegee, Messrs. Walter Deane, E. L. Rand, and Theodor Holm, to all of whom grateful acknowledgment is made. The labor of preparing for press the manuscript of the present issue has been greatly lightened by the very efficient and painstaking clerical and bibliographical work of Miss Mary A. Day,

librarian of the Gray Herbarium. Regarding the material support which has made it possible to continue this work, it is a pleasure again to express grateful appreciation of the liberality of the 'Visiting Committee of the Botanic Garden and Herbarium of Harvard University.'

THE EDITOR.

CAMBRIDGE, September, 1895.



# SYNOPTICAL

## FLORA OF NORTH AMERICA.

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### CLASS I. DICOTYLEDONES ANGIOSPERMEÆ.

#### DIVISION I. POLYPETALOUS DICOTYLEDONOUS PLANTS.

PERIANTH of both calyx and corolla, the latter of separate petals. (Exceptions numerous, especially by the absence of the petals, rarely by their union.)

#### GENERAL KEY TO THE ORDERS.

- \* THALAMIFLORÆ. Stamens free from the calyx and ovary, hypogynous (epigynous in some *Nymphæaceæ*; perigynous in some *Resedaceæ*, and in the genus *Eschscholtzia*): ovary superior: receptacle usually small, rarely developed into a discoid expansion (*Pæonia*, and some *Cupparidaceæ*), or glandular (*Resedaceæ*), occasionally elongated and columnar or (in *Nymphæaceæ*) much enlarged, cup-like, and enclosing the carpels.
- + Stamens free, usually indefinite, when definite opposite the inner divisions of the perianth. Carpels solitary or distinct (cohering in the *Magnoliaceæ*, and embedded in the fleshy receptacle or sometimes connate in the *Nymphæaceæ*).
- 1. RANUNCULACEÆ. Sepals 3 to 5 (rarely more numerous or indefinite), often petaloid. Petals as many, alternating with the sepals, or wanting. Stamens usually numerous; anthers innate. Carpels distinct, often numerous, sometimes solitary, in fruit achenial, follicular, or rarely baccate. Ovules 1 to several, anatropous. Seeds not arillate; albumen tough or horny; embryo minute. Herbs or shrubby climbers.
- 2. MAGNOLIACEÆ. Leaves simple, alternate, pinnately veined. Flowers usually large. Sepals and petals imbricated in 3 or more series, usually indefinite and passing into each other. Stamens with rare exceptions indefinite. Carpels cohering in a conical dry or somewhat fleshy fruit. Embryo small. Trees and shrubs, rarely climbing.

3. ANONACEÆ. Leaves simple, alternate, pinnately veined, exstipulate. Sepals 3, valvate, often coriaceous. Petals 6 in 2 dissimilar series. Stamens indefinite; anthers extrorse. Carpels free or more or less coalescent at maturity. Ovules 1 to several, anatropous. Seeds large, usually transverse in the pulpy fruit. Small trees or shrubs.
4. MENISPERMACEÆ. Leaves alternate, exstipulate, usually palmately veined or lobed. Flowers small, diœcious, 3-4-merous. Floral envelopes imbricated in bud. Sepals, petals, and stamens commonly biseriata, 6 (or more) of each. Carpels 3 to 6, distinct, uniovulate, berry-like but drupaceous in fruit. Putamen with a curved cavity. Seeds with scanty albumen and elongated crescent-shaped or annular embryo. Woody climbers.
5. BERBERIDACEÆ. Leaves alternate, stipulate or with a stipule-like dilation at the base of the petioles. Floral envelopes imbricated in bud. Sepals, petals, and stamens commonly 6, in two series each, the petals opposite the sepals and stamens (sepals uniseriata in *Jeffersonia*). Anthers dehiscent by uplifted valves (except in *Podophyllum*). Carpel single; ovules anatropous. Seeds with albumen; embryo straight or nearly so. Shrubs or herbs.
6. NYMPHÆACEÆ. Leaves cordate or peltate, involute in veneration. Flowers solitary, axillary, pedunculate or scapose. Sepals 3 to 4 or 6. Petals when definite of the same number, but usually indefinite and numerous, imbricated in several spiral series, often intergrading with the sepals or stamens. Stamens except in the *Cabombæ* indefinite and numerous. Carpels 3 to many, indehiscent, free or immersed in a fleshy receptacle or more or less coalescent into a fleshy fruit. Ovules solitary and pendulous or covering the walls of the cell, not springing from the ventral suture. Seeds arillate or not, with or without albumen. Embryo with thickish cotyledons, short radicle, and well developed plumule. Aquatic herbs.
  - + + Carpels 2 to many, more or less completely united (distinct at maturity in *Platystemon*); ovary unilocular with parietal placentæ or divided by a false partition or more rarely completely several-celled with axial placentæ (*Sarraceniaceæ*, and sometimes in *Papaveraceæ*, *Capparidaceæ*, and *Bixaceæ*).
  - + + Stamens free, numerous (sometimes subdefinite in *Platystigma*): sepals 2 to 5, imbricated: petals equal in number or more numerous, alike, rarely wanting: seeds exalbuminous with minute embryo near the hilum: flowers regular: leaves alternate or radical.
7. SARRACENIACEÆ. Sepals 5, persistent. Petals (in ours) 5. Anthers versatile. Style (in ours) dilated at the summit and pentagonal or 5-fid. Ovary (in ours) 5-locular. Bog plants with tubular trumpet-shaped or ewer-formed leaves (phyllodia).
8. PAPAVERACEÆ. Sepals 2 to 4, caducous. Petals usually more numerous. Anthers innate. Ovary unilocular or rarely many-celled by the intrusion of the placentæ-bearing sutures.
  - + + + Stamens definite, usually 6, diadelphous or tetradynamous: carpels 2: herbaceous or rarely suffrutescent plants with alternate leaves.

9. FUMARIACEÆ. Flowers dimerous, or unsymmetrical. Sepals 2. Petals 4, (in ours) erect and connivent in two dissimilar pairs. Stamens (in ours) 6, in two groups of 3 each. Ovary 1-celled.
10. CRUCIFERÆ. Flowers regular (except sometimes in *Streptanthus*). Sepals 4. Petals 4, rarely wanting. Stamens 6 (rarely 4, or only 2), tetradynamous. Ovary with few exceptions 2-celled by a false partition. Seeds with embryo usually folded.
- ++ ++ ++ Stamens indefinitely numerous or subdefinite but not diadelphous nor tetradynamous: seeds reniform, exalbuminous, with curved embryo; cotyledons incumbent: leaves alternate, often palmate or dissected.
11. CAPPARIDACEÆ. Floral envelopes 4-merous, usually regular. Stamens 6 to many. Ovary 1-celled (2-celled in *Wislizenia* and *Oxystylis*), often stipitate, with 2 or rarely more parietal placentæ. Leaves entire or more commonly palmately compound.
12. RESEDACEÆ. Flowers small, irregular. Sepals herbaceous, 4 to 7 (or 8), more or less unequal. Petals 2 to 6, commonly cleft or toothed. Stamens 3 to many, unsymmetrical, or declined, somewhat perigynous or borne upon an oblique discoid expansion of the torus. Capsules 3-6-lobed, 1-celled; placentæ 3 to 6. Introduced herbs, with entire dentate or lacinate leaves.
- ++ ++ ++ ++ Stamens indefinitely numerous or definite (*Violaceæ*): seeds albuminous and with rather large embryo (except in *Canellaceæ*). Fruit when dehiscent splitting between the placentæ: leaves undivided or rarely palmately lobed, opposite or alternate: stipules often present.
13. CISTACEÆ. Flowers regular, 3-5-merous. Stamens usually numerous, free; anthers introrse. Ovary 1-celled or imperfectly septate; placentæ parietal, 3 to 5. Ovules orthotropous. Leaves entire. Usually low shrubby plants.
14. VIOLACEÆ. Floral envelopes 5-merous, irregular. Stamens 5; filaments short or none; the subsessile anthers connivent or connate by the union of their prolonged connectives. Carpels 3. Style and stigma simple; ovary unicellular with 3 placentæ; ovules anatropous. Fruit a 3-valved capsule. Ours all herbs.
15. CANELLACEÆ. Flowers regular. Sepals (in ours) 3 and petals 5. Stamens monadelphous; anthers extrorse. Ovary 1-celled; carpels 2 to 4; fruit baccate. Seeds campylotropous or anatropous. Trees with entire punctate aromatic leaves.
16. BIXACEÆ. Flowers regular, perfect or unisexual. Sepals 2 to 6, in ours 5. Petals as many, rarely more numerous or none, in ours 5. Stamens indefinite (in certain foreign genera definite). Carpels 2 to many. Ovary 1-celled, or in ours 3-celled; ovules amphitropous or anatropous. Trees, shrubs (tropical) or ours low herbs or scarcely shrubby, with alternate sometimes palmatifid leaves.
17. FRANKENIACEÆ. Floral envelopes regular, perfect, 4-5(-6)-merous. Calyx tubular, persistent. Petals unguiculate. Stamens 5 to many, free or slightly connate at the base. Ovary 1-celled; placentæ 2 to 4; ovules anatropous. Saline herbs or low shrubs with opposite leaves and small flowers.
- + + + Carpels 2 to many (very rarely solitary), united; ovary unicellular or partially septate at the base or in most *Ficoideæ* completely several-celled; placentæ axial or basal (in *Fouquieria* parietal but so strongly in-

truded as to appear axial in a septate ovary, in *Mesembryanthemum* becoming parietal through secondary changes in the ovary) : stamens mostly definite, less frequently  $\infty$  ; filaments free or slightly united at the base, hypogynous or in many *Ficoideæ* and the genus *Fouquieria* distinctly perigynous.

++ Embryo (with rare exceptions) peripheral and curved about more or less copious albumen : herbs or rarely shrubs.

18. CARYOPHYLLACEÆ. Flowers perfect or through abortion polygamo-dioecious, commonly dichlamydeous ; floral envelopes regular, 4–5-merous. Calyx either gamosepalous (Tribe I.) or of distinct sepals. Petals as many as the sepals or calyx-lobes (rarely fewer or none), either unguiculate and often coronate (Tribe I.) or sessile and unappendaged, either entire or more or less deeply bifid or lacinate. Stamens as many or twice as many as the petals or rarely of some irregular number but never more numerous. Carpels 2 to 5 ; styles distinct or (Tribe III.) united below ; ovary free, completely unilocular or partially septate from the base ; embryo curved about the albumen (straight in *Dianthus* and *Tunica*). Leaves opposite or verticillate, entire or nearly so. Scarious stipules sometimes present.

19. FICOIDEÆ. Calyx regular, persistent (in N. American species), 4–5-lobed or -divided, free or more or less adnate to the ovary. Petals (modified stamens) in *Mesembryanthemum* numerous, narrow, in other N. American genera wanting. Stamens either hypogynous or perigynous, few or many, when as many as the calyx-divisions alternate with them, when numerous often slightly united near the base into phalanges. Cells of the ovary (except in *Cypselea* and sometimes in *Trianthema*) 2 or more, with as many styles or free stigmas ; placenta axial or basal, but in most species of *Mesembryanthemum* soon appearing parietal through a strong secondary radial or at length cupulate development of the base of the ovary. Fruit capsular or (in *Tetragonia*) indehiscent. Leaves opposite (when often unequal), pseudoverticillate, or (in *Tetragonia*) alternate. Scarious stipules sometimes present.

20. PORTULACACEÆ. Flowers regular or nearly so, perfect. Sepals (except in some species of *Lewisia*) 2, free or more or less adnate to the ovary, mostly ovate or orbicular. Petals mostly 5, sometimes fewer or none, very rarely more numerous, free or sometimes (in *Montia*, *Calyptridium*, and *Calandrinia*) more or less connate at the base, often deliquescent or fugacious. Stamens as many as the petals and opposite them or sometimes more numerous and indefinite, but rarely fewer. Ovary superior or (in *Portulaca*) half inferior, 1-celled ; stigmas (2 to) 3 ; ovules (1 to) 3 to  $\infty$ , on central placenta. Fruit a circumscissile or (2–)3-valved capsule. Leaves entire, opposite (rarely whorled) or alternate, often fleshy. Stipules when present scarious, often lacinate.

++ ++ Seeds hairy or wing-appendaged, with straight embryo and little or no albumen.

21. TAMARISCINEÆ. Flowers regular, perfect (rarely in foreign species dioecious). Sepals 4 or 5, distinct or nearly so, imbricated. Petals as many, free or (in *Fouquieria*) united into a 4–5-lobed tube. Stamens (4 to) 5 or 10 or  $\infty$ , inserted beneath and outside of a hypogynous or nearly hypogynous disk. Ovary free, unilocular, but in *Fouquieria* almost divided by the strongly intruded placenta ; styles and valves of the capsule 3 to 5.

+ + + + Carpels 2 to 7; cells of the ovary as many and with placentæ at the inner angles of the cells (i. e. axial; false dissepiments never present) or in the *Hypericaceæ* the ovary sometimes 1-celled with parietal placentæ.

++ Stamens free, definite, either as many or twice as many as the petals: ovary 2-5-celled, with as many introrsely stigmatose styles or sessile stigmas: stipules present.

22. ELATINACEÆ. Flowers regular, small, axillary, perfect. Sepals 2 to 5. Petals as many. Stamens hypogynous. Disk none. Ovules several to many in each cell, borne at the inner angle. Capsules septicidal. Small often aquatic or riparian herbs (rarely undershrubs) with opposite or verticillate dotless leaves.

++ ++ Stamens  $\infty$  (very rarely subdefinite but not of the same number as the petals), free or more commonly connate or gathered into 3 or 5 phalanges; anthers 2-celled, versatile: ovary 1-5-celled; stigmas capitate: stipules none.

23. HYPERICACEÆ. Flowers regular, perfect, cymose or cymose-paniculate (very rarely racemose); floral envelopes 4-5-merous. Stamens commonly in 3 or 5 bundles. Ovary 1-celled with parietal placentæ or completely 3-7-celled with axile placentæ. Fruit (in ours) capsular and septicidal; seeds without albumen. Herbs or shrubs with thin opposite or verticillate pellucid-punctate mostly sessile entire or serrulate leaves.

24. TERNSTRÆMIACEÆ. Flowers regular or nearly so. Sepals mostly 5, sometimes more or less unequal, the inner being larger. Petals as many as the sepals, free or somewhat connate at the base. Stamens distinct or partially united into bundles, hypogynous or adnate to the bases of the petals. Disk none. Ovary (in N. American genera) 3-6-celled. Trees or shrubs, ours with simple alternate impunctate leaves.

++ ++ ++ Stamens definite, as many as the persistent sepals and alternate with them; filaments connate into a tube; anthers 2-celled: ovary (4-)5-celled; style single; stigma undivided: petals none: stipules small, caducous.

25. CHEIRANTHODENDREÆ. Flowers regular, perfect, apetalous, normally 5-merous. Sepals colored, persisting. Bractlets 3, deciduous. Fruit a loculicidal 5-valved capsule. Trees or shrubs with rusty stellate pubescence and alternate palmately lobed leaves.

+ + + + + Carpels (1-)3- $\infty$ , united; ovary with as many cells; placentæ at inner angle of each cell: sepals valvate: stamens (except in *Sterculiaceæ*) mostly  $\infty$ .

++ Anthers 1-celled.

26. MALVACEÆ. Flowers regular, usually perfect; floral envelopes both present and 5-merous. Persistent calyx often subtended by an involucre. Petals slightly connate at the very base and there adnate to the staminal tube. Stamens  $\infty$ ; filaments connate. Carpels 3- $\infty$  (rarely in foreign genera 1 or 2); cells of the ovary as numerous, 1- $\infty$ -ovuled; style simple at the base and (with few exceptions) divided above into more or less elongated filiform or clavellate branches. Leaves alternate, stipulate, commonly palmately nerved. Pubescence often stellate.



++ ++ Anthers 2(-3)-celled.

27. STERCULIACEÆ. Flowers regular, mostly perfect. Petals sometimes wanting. Fertile stamens in N. American genera only as many as and alternate with the sepals or calyx-lobes, in foreign genera often  $\infty$ . Ovary (in ours) 5- or rarely 1-locular; ovules ascending or horizontal. Leaves alternate.

28. TILIACEÆ. Flowers regular, mostly perfect. Stamens  $\infty$ , quite free or slightly united at the base into 5 phalanges; anthers 2-celled. Ovules mostly pendulous and with rhaphe ventral. Sepals deciduous. Leaves (in ours) alternate, simple, serrate, dentate, or palmately lobed.

\* \* DISCIFLOREÆ. Stamens free from the calyx and ovary, variously inserted upon a more or less expanded or developed torus, mostly definite, being of the same number as the petals, or twice as many, or less frequently (through partial suppression of one or both cycles) of some other number; filaments free or slightly monadelphous at the base or rarely (as in *Meliaceæ*) united into a tube: torus commonly more or less developed into a disk-formed, cup-shaped, annular, crenate, angled, or lobed fleshy or often glandular expansion or pulvinus, but not rarely obscure or undeveloped (*Linaceæ*, *Ilex*, many species of *Polygala*, &c.): carpels 2 to 5 or rarely more numerous, more or less united; ovary 1-5(- $\infty$ )-celled, superior, surrounded by the disk, or rarely half inferior; ovules anatropous or nearly so: sepals or calyx-lobes mostly imbricated, rarely valvate in bud, mostly 4 or 5: petals usually of the same number, inserted at the base of the calyx or upon the disk. (N. B. Expanded disks or their glandular equivalents occur also in a few *Thalamifloræ*, notably in *Tamariscineæ*, *Resedaceæ*, *Pæonia*, and some *Capparidaceæ*.)

+ GERANIALES. Ovules 1 to 2 (rarely  $\infty$ ) in each cell, with few exceptions horizontal or pendulous (in *Rhus* pendulous from the recurved apex of an erect basilar funiculus) and with the rhaphe ventral, i. e. turned downward and toward the axis of the ovary: disk mostly small (in *Linaceæ* represented only by the glands of the receptacle, in *Geraniaceæ* often inconspicuous), annular or lobed.

++ Filaments free nearly or quite to the base.

= Herbs with simple mostly alternate entire impunctate leaves: calyx (sometimes with marginal but) without dorsal glands.

29. LINACEÆ. Flowers regular, perfect, dichlamydeous; envelopes (4-) 5-merous. Fertile stamens in ours 5, slightly monadelphous at the base and with as many minute interposed rudiments. Glands of the receptacle small, opposite the sepals. Carpels and styles 2 to 5; cells of the ovary as many or by the intrusion of false septa twice as many. Fruit in ours capsular; seeds oily, with scanty albumen, straightish embryo, and flat cotyledons.

= = Woody-stemmed: calyx-lobes or sepals (except in *Galphimia*) bearing one or two dorsal glands: leaves (in ours) opposite, simple, entire, impunctate.

30. MALPIGHIACEÆ. Flowers regular, 5-merous, 5-10-androus, in ours perfect

(sometimes dimorphous and in part cleistogamous) dichlamydeous. Ovules solitary in the cells of the mostly 3-locular ovary. Seeds exalbuminous with mostly curved or coiled embryo.

== = Herbaceous or woody: calyx eglandular: filaments commonly squamiferous: leaves pinnate or (1-)2-foliolate or (in *Peganum*) deeply pinnatifid, not pellucid-punctate (although sometimes superficially resinous-dotted).

31. ZYGOPHYLLACEÆ. Flowers solitary, 4-6-merous, perfect, dichlamydeous (or petals very rarely wanting), diplo(rarely triplo)-stemonous, borne on peduncles which often spring from the axils of the stipules. Ovules 1 to several in the cells of the 4-10-locular ovary. Fruit capsular or splitting into indehiscent cocci which may or may not leave a persistent stylerous axis. Embryo large, straight, or nearly so; albumen mostly scanty and tough.

== == = Herbs (a little suffrutescent in some species of *Oxalis*): calyx eglandular (sepals often with colored callosities in *Oxalis*): leaves palmately or pinnately lobed or divided, rarely only crenate, not pellucid-punctate.

32. GERANIACEÆ. Flowers perfect, 3-6- but mostly 5-merous, regular or strongly zygomorphic (then saccate-spurred), mostly showy. Carpels and glands of the receptacle as many and stamens mostly twice as many as the sepals. Fruit usually an elongated beaked capsule with elastic dehiscence or with indehiscent carpels at maturity usually separating from the axis and hygroscopically coiling; seeds exalbuminous except in *Oxalis* (where provided with horny albumen and special arilliform elastically dehiscent integument).

== == == = Trees, shrubs, or (in *Thamnosma* and some foreign genera) herbs: leaves mostly alternate and often compound: calyx (punctate in *Rutaceæ* but) without solitary or geminate glands: filaments unappendaged or nearly so.

a. Leaves dotted or punctate with mostly pellucid glands imbedded in their substance.

33. RUTACEÆ. Leaves exstipulate (or with stipular spines), commonly aromatic or graveolent. Flowers 4-5-merous, in ours regular, symmetrical but often diplostemonous. Disk present and usually conspicuous. Ovules 2 or more in each cell of a 4-5-locular often (especially in foreign genera) deeply parted or almost apocarpous ovary. Fruit various, capsular, samaroid, drupaceous, or in the *Aurantieæ* tough-rinded and baccate.

b. Leaves without glands in their substance.

34. SIMARUBACEÆ. Bitter-barked trees and shrubs (sometimes thorny) with technical characters of *Rutaceæ* but foliage devoid of glandular dots. Our species (except the cultivated and introduced *Ailanthus*) confined to Florida and the Arizona-Texas region.

35. BURSERACEÆ. Resiniferous trees and shrubs with alternate exstipulate odd-pinnate leaves and small polygamo-dioecious 3-5-merous flowers. Fruit a drupe, commonly with fleshy or leathery epicarp at length deciduous as 2 or 3 thickish valves; cotyledons thin and contortuplicate. Our species (confined to S. Florida and S. Arizona) with 3-celled ovary and 2 pendulous ovules in each cell.

36. ANACARDIACEÆ. Resiniferous trees or shrubs with alternate impunctate exstipulate leaves and small regular chiefly 5-merous flowers. Our only indigenous genus (*Rhus*) with unilocular ovary, a single ovule pendulous from the summit of an erect basilar funiculus, and drupaceous fruit.

++ ++ Filaments (in ours) completely united into a toothed cup or tube which bears the sessile or nearly sessile anthers upon the inner surface.

37. MELIACEÆ. Trees with dense hard wood and alternate pinnate impunctate leaves. Ours southern.

+ + OLACALES. Ovules 1 or 2 in each cell of the entire sometimes incompletely septate 2-5 (or rarely  $\infty$ )-celled ovary, pendulous but with rhaphe dorsal, i. e. turned away from the axis of the ovary: flowers small: petals often connate at the base: trees and shrubs with simple alternate or crowded leaves: disk cup-shaped or annular (in the *Aquifoliaceæ* wanting).

++ Petals imbricated or contorted: ovary completely 2-5-celled.

38. AQUIFOLIACEÆ. Flowers through abortion dicecious, solitary or in few-flowered axillary cymes. Disk none. Ovary 4-8-celled.

39. CYRILLACEÆ. Flowers perfect, borne in many-flowered racemes. Disk confluent with the base of the 2-5-celled ovary.

++ ++ Petals or lobes of a more or less gamopetalous corolla valvate: ovary partially 3-5-locular, the septa not reaching the apex.

40. OLACINACEÆ. Flowers regular, dichlamydeous. Stamens (in ours) as many or twice as many as the petals or lobes of the corolla, and when of the same number opposite them. Ovary 1-5-celled, but fruit a 1-seeded drupe.

+ + + CELASTRALES. Ovary superior, sessile on or more or less surrounded by a somewhat fleshy pulvinary disk, 2-5-locular (in *Glossopetalon* unilocular), commonly entire; ovules 1 or 2 in each cell, erect or nearly so and with rhaphe ventral, i. e. turned toward the axis of the ovary: stamens as many as the sepals (fewer in *Hippocratea*, twice as many in *Glossopetalon*).

++ Stamens alternate with the petals, i. e. opposite the sepals.

41. CELASTRACEÆ. Trees, shrubs, or woody climbers with simple unlobed leaves. Flowers small, regular, 4-5-merous, dichlamydeous. Petals spreading, imbricated in aestivation, white or green. Fruit a loculicidal capsule, a drupe, or rarely dry and indehiscent; seeds usually arillate or carunculate.

++ ++ Stamens as many as and alternate with the sepals, i. e. opposite the petals when these are present.

= Calyx-lobes valvate: petals when present narrow but imbricated: fruit capsular or drupaceous: leaves simple, not lobed, impunctate, stipulate.

42. RHAMNACEÆ. Trees or shrubs, often thorny, rarely climbing. Flowers small, regular, either perfect, polygamo-dicecious, or dicecious. Small often cuculate petals inserted on the throat of the calyx, sessile or unguiculate. Versatile anthers dehiscent by longitudinal sometimes confluent slits. Ovary free or surrounded by and adnate to the disk, 3 (2-4)-celled. Seeds solitary in the cells of the fruit.

= = Calyx small : petals valvate : fruit baccate : leaves (with rare exceptions) palmately lobed or palmately or pinnately compound, alternate.

43. VITACEÆ. Mostly woody vines climbing by prehensile or gland-bearing tendrils. Flowers small, regular, dichlamydeous. Petals 4 or 5, sometimes free, sometimes coherent, often caducous. Ovary (in ours) 2-celled ; ovules geminate in the cells.

+ + + + SAPIINDALES. Ovary superior, often strongly lobed or divided ; ovules 1 or 2 (very rarely  $\infty$ ) in each cell, mostly ascending or horizontal : stamens as many as the petals and alternate with them or twice as many or much more often of some irregular number.

44. SAPIINDACEÆ. Trees, shrubs, or woody (rarely herbaceous) tendriferous climbers, ours with compound or palmately lobed leaves and commonly polygamodiceous often irregular flowers. Disk annular or more or less deeply lobed, often unsymmetrical, rarely obsolete. Fruit various, most frequently samaroid, or a bladdery or coriaceous capsule. .

+ + + + + POLYGALINEÆ. Ovules pendulous, solitary (rarely and only in foreign genera 2 to 4) in the cells of the 2(-5)-locular ovary ; rhaphe ventral : disk glandular or none : stamens mostly 8 and monadelphous, more or less adnate to the petals : seeds mostly carunculate.

45. POLYGALACEÆ. Ours low herbs, undershrubs, or erect rarely thorny shrubs. Pubescence of simple hairs or none. Leaves entire, alternate, opposite, or whorled. Flowers pseudo-papilionaceous, dichlamydeous, rarely solitary, mostly in terminal racemose, spicate, or capitate inflorescences ; these sometimes corymbosely arranged. Calyx with sepals very unequal, three usually sepaloid and two larger showy and petaloid. Filaments short ; anthers dehiscent by terminal pores or oblique introrse slits.





ORDER I. RANUNCULACEÆ.

By A. GRAY.

[Descriptions of species and varieties of recent publication, which have been inserted, as well as those modified by the editor, in the light of literature and collections subsequent to the preparation of the original manuscript, are marked by asterisks (\*).]

Herbs, or some woody plants, with acrid colorless juice. All the parts of the flower distinct and free (hypogynous, except *Pæoniæ*), with carpels not uncommonly and stamens mostly indefinitely numerous, even the sepals or petals sometimes more than the normal four or five, the former very often petaloid, the latter in a large majority of the genera either wanting or rudimentary or converted into nectaries. Anthers continuous with the filament. Ovules solitary or several, anatropous. No disk nor arillus except in the last tribe. Seeds containing a hard albumen, with a minute or small embryo at its base: cotyledons usually very short. Base of petiole commonly dilated and thin, often stipule-like.

TRIBE I. CLEMATIDÆ. Sepals (normally 4) valvate in the bud, the margins often induplicate. Petals none or small, transitional into stamens. Stamens numerous, with adnate anthers. Carpels numerous in a head, long-styled, in fruit akenes. Seed suspended: rhaphe dorsal. Herbs, or when climbing often woody, with leaves all opposite!

1. CLEMATIS. Essentially the only genus.

TRIBE II. ANEMONÆ. Sepals few or numerous (3 or 4 to 20), imbricated in the bud, petaloid, or at least not green. Stamens for the most part indefinitely numerous. Carpels numerous, or occasionally few, capitate or spicate, one-ovuled, in fruit akenes or utricle. Herbs, with alternate leaves, or with uppermost opposite or whorled, never climbing. (*Anemoneæ* and *Ranunculeæ* of authors.)

\* Petals none, rarely some petaloid sterile stamens (staminodes): ovule and seed suspended: rhaphe dorsal.

+ Cauline or involucre leaves opposite or whorled: peduncles solitary or umbellate, one-flowered: sepals petaloid: fruit of true akenes.

2. ANEMONE. Stigma introrse-unilateral from the summit of the subulate or filiform style. Leaves compound or dissected; cauline ones or involucre distant from the flower.

3. HEPATICA. Stigma introrse-unilateral on the short subulate style. Involucre close to the flower and simulating a trisepalous calyx. true leaves only radical and simply lobed.

4. ANEMONELLA. Stigma strictly terminal, broad and depressed, at flowering time subsessile. Akenes terete, angulate-costate, 4 to 15, on a small receptacle. Radical leaves and involucre compound, the latter subtending an umbel of flowers.

+ + All the leaves alternate, none involucre: inflorescence paniculate, cymose, or racemose: flowers more commonly unisexual: akenes sometimes utricular.

5. THALICTRUM. Sepals completely or incompletely petaloid. Akenes not very numerous, sometimes few: receptacle small. Stigma unilateral on the style or sessile and elongated.

\* \* Petals none: sepals petaloid, caducous: ovule and seed ascending from near base of the cell: rhaphe ventral: akenes utricular: leaves all alternate.

6. TRAUTVETTERIA. Sepals 3 to 5, broad, concave, imbricated in the bud. Stamens numerous: filaments clavate: anthers didymous, pointless. Utricular akenes 20 or more,

capitate on the short receptacle, dolabriform-quadrangular and with a strong nerve or rib at each angle, abruptly tipped by the short introrsely stigmatose and recurved or revolute style. Seed not filling the cell. Embryo one third the length of the firm fleshy albumen.

\* \* \* Petals conspicuous and deciduous, or sometimes deformed or reduced to nectaries, or occasionally wanting: sepals 3 to 8, from herbaceous to petaloid: carpels numerous, capitate or spicate, in fruit akenes or sometimes utricles.

+ Ovule and seed suspended: rhaphe dorsal.

7. **ADONIS.** Sepals and (5 to 16) petals plane, unappendaged. Stamens numerous. Akenes capitate or short-spicate.

8. **MYOSURUS.** Sepals 5, produced dorsally into a spur or appendage at base. Petals as many, small and narrow, raised on a tubular-nectariferous filiform claw, sometimes merely staminodial or wholly wanting. Stamens 5 to 20. Akenes very numerous, spicate on a filiform receptacle, to which they are ventrally affixed, somewhat utricular, but the back thickened and firm.

+ + Ovule and seed ascending from the inner angle of the cell at or a little above the base: rhaphe ventral.

9. **RANUNCULUS.** Sepals and petals plane, normally 5; the latter with a nectariferous spot or pit within, on or above the claw, rarely reduced and glandular. Stamens numerous or occasionally few. Carpels numerous in a head, rarely few, in fruit coriaceous akenes, or in some utricular. Calyx and corolla usually deciduous.

**TRIBE III. HELLEBOREÆ.** Sepals few or several, imbricated in the bud, petaloid, mostly deciduous or caducous. Petals variously shaped and nectariferous, or reduced to staminodes, or wanting. Carpels several, few, or solitary, bearing from one to many pairs of horizontal ovules on the ventral suture, becoming follicles or in two genera berries in fruit. Herbs (with one exception), with alternate leaves. (*Helleboreæ* and *Cimicifugeæ* of authors.)

\* Ovules more than a single pair.

+ Sepals only tardily deciduous, regular: petals inconspicuous nectaries, or slender, or none: stigma introrse: flowers not racemose.

10. **CALTHA.** Sepals 4 to 10, broad, widely spreading. Petals none. Follicles 5 to 15 (rarely fewer, or still more numerous). Ovules and seeds indefinitely numerous, in two rows: rhaphe becoming almost wing-like. Leaves simple, cordate-rounded.

11. **TROLLIUS.** Sepals 5 to 20, broad, ascending and incurved or in ours spreading. Petals 5 to 20, fleshy, ligulate or linear-spatulate, with a nectariferous pit on the inner face above the short claw. Follicles 5 to 20, sessile. Ovules and seeds rather numerous in two rows. Leaves palmately lobed or dissected.

12. **ISOPYRUM.** Sepals 5 or 6, broad, widely spreading. Petals 5, small and nectariferous, but wanting in American species. Follicles 2 to 20, sessile, rarely short-stipitate. Ovules and seeds several or numerous, or in one species reduced to 3. Leaves 1-3-ternately compound.

13. **COPTIS.** Sepals 5 to 7, broad or narrow, widely spreading. Petals 5 or 6, unguiculate and cucullate or caudate. Follicles 3 to 10, slender-stipitate, 4-10 seeded. Leaves all radical and compound, and scapes one- or umbellately few-flowered.

13 a. **ERANTHIS.** Sepals 5 to 8, narrow, deciduous. Petals small bilabiate nectaries. Follicles few, stipitate, several-seeded. Radical palmately multifid leaf and simple scape from a globular tuber; the flower surrounded by an involucre consisting of a sessile multifid leaf. Only adventive.

13 b. **HELLEBORUS.** Sepals 5, broad and spreading, *persistent*. Petals small bilabiate nectaries. Follicles several, sessile or nearly so, many-seeded. Leaves palmate or pedate. Only adventive.

+ + Sepals and large spur-shaped nectariferous petals regular, each 5: stigma introrse.

14. **AQUILEGIA.** Sepals oval or oblong. Petals with small limb, produced backward into a large hollow spur. Stamens indefinite, some inner ones sterile with dilated filaments,

or reduced scarious scales. Carpels usually 5, sessile, with numerous ovules in two rows: styles filiform, above introrse-stigmatose. Seed-coat crustaceous, usually smooth and shining.

✦ ✦ ✦ Sepals (5) and petals (2 or 4) irregular; upper one of the former spurred or helmet-shaped: stamens numerous: stigma introrse: follicles 1 to 5, several-many-seeded, sessile, styliferous.

**15. DELPHINIUM.** Upper sepal extended posteriorly from the base into a spur. Petals 4 in two pairs, or the lateral pair wanting; these with a small spreading lamina on a claw of about equal length; upper produced backward into nectariferous spurs within the calyx-spur, in the annual species the two united into one body. Follicles 1 to 5.

**16. ACONITUM.** Upper sepal ample, helmet-shaped or prolonged-saccate; the others plane, lateral larger than the lower pair. Petals only 2 (the lateral and lower either wanting or minute rudiments), reduced to very long-unguiculate hood-shaped or hammer-shaped nectaries covered by the upper sepal. Follicles 3 to 5, rarely more.

✦ ✦ ✦ Sepals 3 to 5, regular, caducous: petals much smaller, plane, unguiculate, or reduced to staminodes, less showy than the white numerous stamens, or none: stigma terminal or nearly so: flowers racemose: leaves decomposed. (*Cimicifugeæ*.)

**17. CIMICIFUGA.** Carpels few or solitary, in fruit thin-walled follicles. Petals or staminodes when present notched or 2-cleft at top. Flowers in elongated often paniculately disposed racemes.

**18. ACTÆA.** Carpel solitary, sessile, crowned with a broad and obscurely 2-lobed depressed stigma, in fruit a berry filled with depressed horizontal seeds. Petals plane, entire. Flowers in a short raceme.

\* \* Ovules a single pair: flowers regular: roots and rootstocks yellow, bitter, charged with berberine. (*Xanthorrhizææ*.)

**19. HYDRASTIS.** Sepals 3, petaloid, very caducous. Petals none. Stamens very numerous, white, like those of *Actea*. Carpels 15 to 20, sessile and capitate: style short: stigma terminal, 2-lipped. Ovules ascending, at first collateral, borne on the middle of the placenta. Fruit baccate, the pulpy red 1-2-seeded carpels compacted in a globular head on an oblong receptacle. Herb, with few palmately lobed leaves and single flower.

**20. XANTHORRHIZA.** Sepals 5, petaloid, tardily deciduous. Petals 5, small and gland-like, consisting of a rounded and 2-lobed fleshy lamina on a short claw. Stamens 5, alternate with the petals and not surpassing them, or sometimes more. Carpels 5 to 10, sessile, 2-ovuled about the middle, tapering into a subulate style with introrse stigma, in fruit one-seeded oblong follicles of gibbous growth, the persistent style becoming dorsal and the seed pendulous from the apparent apex. Low shrub, with pinnate leaves and racemose-paniculate flowers.

**TRIBE IV (and indeed suborder). PÆONIÆ.** A perigynous fleshy disk adnate to the base of the strongly imbricated persistent calyx or concave receptacle, bearing the large plane petals and numerous stamens. Carpels few, becoming coriaceous many-seeded follicles. Style short or none. Sepals and petals regular, mostly 5, or the latter often more numerous. Embryo comparatively large in firm fleshy albumen. Perennial herbs or low shrubs, with alternate leaves, and no acidity.

**21. PÆONIA.** Stigma introrse, crest-like and revolute, bilamellar. Stamens very numerous: anthers entire at base. Seeds anatropous, oval or oblong, naked at base or the very short fleshy funiculus cupulate, the coat disposed to be externally fleshy. Embryo straight or slightly arcuate. Herbs with tuberous roots or shrubby, with ternately compound or divided leaves.

**22. CROSSOSOMA.** Stigma terminal, depressed-capitate, emarginate. Stamens 12 to 30: anthers deeply emarginate at base. Follicles 1 to 6 (to 9), when solitary stipitate, otherwise more or less elevated on a common stipe. Ovules amphitropous. Seeds campylo-tropous and reniform, crustaceous, furnished with a fimbriate-multifid fleshy arillus of their own length. Embryo semiannular, little shorter than the firm fleshy albumen: cotyledons linear, thrice the length of the radicle. Entire-leaved shrubs.

1. **CLÉMATIS**, L. (Name in Dioscorides, from κλήμα, a twig, early applied to this genus.) — Perennial herbs or more or less woody climbers (climbing by incurvation and grasping of leafstalks), of wide distribution, the large-flowered species hermaphrodite. Sepals in native plants almost always 4. Styles elongated, either feathery or naked in fruit. The cultivated species largely hybridized. — Gen. no. 460; DC. Syst. i. 131. *Clematis* & *Atragene*, L. Gen. ed. 5.

§ 1. **FLÁMMULA**, DC., partly. Flowers comparatively small and commonly cymose-paniculate, white or whitish: sepals petaloid and thin, widely spreading: no petals: persistent styles in fruit forming long plumose tails: anthers blunt, mostly short.

\* **VIRGIN'S BOWER**. Half-woody climbers; the flowering shoots from naked buds, dioecious; sterile flowers more showy, having bright white stamens; fertile with a series of sterile subulate or filiform filaments bearing rudimentary or non-polliniferous anthers. — All the American species and more are referred to *C. dioica*, L., by Kuntze, Verh. Bot. Brandenburg, 1885, 102.

+ Panicles floribund, and peduncles short: leaves once or twice ternate or quinate: leaflets ovate or subcordate, acute or acuminate, mostly incisely few-lobed or toothed: sepals about a third inch and mature fruit-tails an inch and a half long.

**C. Virginiana**, L. (**VIRGIN'S BOWER**.) Almost glabrous: leaves simply 3-foliolate (very rarely pinnately 5-foliolate); leaflets thin, ovate and subcordate (2 or 3 inches long), incisely few-toothed or somewhat lobed. — Amœn. Acad. iv. 275, & Spec. ed. 2, ii. 766; P. W. Wats. Dendr. t. 74; Sprague & Goodale, Wild Flowers, 61, t. 12. *C. Virginica*, Pursh, Fl. ii. 384. *C. cordifolia*, Mœnch, Meth. Suppl. 104. *C. cordata*, Pursh, l. c., unusual state with some 5-foliolate leaves. — Low grounds, Nova Scotia to Upper Georgia, west to Minnesota and Winnipeg; fl. summer.

**C. Catesbyana**, PURSH. Pubescent or glabrate: leaves twice ternately divided, and leaflets (inch or two long) commonly 3-lobed, otherwise entire or very few-toothed, occasionally a leaf only quinate by the confluence of lateral leaflets; only uppermost simply 3-foliolate. — Fl. ii. 736; DC. Syst. i. 142. *C. holosericea*, Pursh, Fl. ii. 384, founded on an upper leaf of three leaflets and a head of fruit taken from herb. Walter, most probably of this species. — Dry ground along and near the coast, S. Carolina to Florida and Mississippi; <sup>1</sup> fl. late summer, in cult. northward not before October.

*C. PLUKENÉTII*, DC. Syst. i. 153, which has been referred here, founded on a specimen from Catesby, is obscure, and probably not of United States.

**C.\* ligusticifolia**, NUTT. Pubescent or nearly glabrous: leaves pinnately 5-7-foliolate, or sometimes lowest pair of leaflets again trisected: leaflets of firmer texture than in the preceding, from cordate-ovate to oblong-lanceolate, from 3-lobed and incised to few-toothed or nearly entire, also very variable in size: carpels numerous, densely silky-pubescent with long straight hairs: fruiting heads an inch and a half or two inches in diameter including the tails. — Nutt. in Torr. & Gray, Fl. i. 9; Brew. & Wats. Bot. Calif. i. 3. — Saskatchewan to New Mexico,<sup>2</sup> to Brit. Columbia and S. California. Runs into many forms: vars. *brevifolia*, Nutt., *bracteata*, Torr., *Californica*, Wats., &c., which are not distinctly definable.<sup>3</sup>

**C.\* Suksdórfii**, ROBINSON, n. sp. Habit and foliage of the preceding: leaves quinate, glabrous; leaflets an inch to an inch and a half long: sepals widely spreading or reflexed in anthesis, velvety pubescent upon the outer surface: heads of fruit much smaller and fewer-

<sup>1</sup> Doubtful specimens from S. Missouri, *Bush*, make the distinctions between this and the preceding obscure.

<sup>2</sup> Eastward to Greene Co., Missouri, *Bush*.

<sup>3</sup> A form with perfect flowers is reported by M. E. Jones, Bull. Torr. Club, ix. 125, and another with exceptionally copious production of axillary shoots in the inflorescence has been characterized as var. *perulata*, by Freyn, Deutsche Bot. Monatsschr. viii. 75. Dr. Gray's description of *C. ligusticifolia* has been slightly amplified to exclude more clearly the next species.

carpelled, not over an inch in diameter at full maturity including the curling tails: pubescence of the young akenes woolly or felt-like, the hairs crinkly, not straight nor silky as in the last; the mature akenes with broadly ovate nearly orbicular body and filiform sparsely pubescent tails. — Klikitat River, Washington, collected and first recognized as distinct by *W. N. Suksdorf*, 15 July, 1881, in flower, and 11 September of same year in fruit, no. 1.

+ + Sparsely flowered, small leaved, and with very long-tailed carpels.

**C. Drummondii**, *Torr. & Gray*. Cinereous-pubescent: leaves mostly pinnately 5-7-foliate and the leaflets (half inch to inch long) all or most of them divergently 3-cleft or sometimes parted; principal lobes oblong-ovate to lanceolate, acute or acuminate, entire or incisely 1-3-toothed; uppermost leaves simple and 3-cleft: peduncles sometimes simple and with a pair of leafy bracts next the base, commonly trichotomous and with higher bracts on the lateral pedicels: sepals sericeous externally, half inch long: narrow and copious sterile filaments of the fertile flowers as long, inane-antheriferous: tails of the carpels becoming 3 or 4 inches long and very slender. — Fl. i. 9. *C. nervata*, Benth. Pl. Hartw. 5. *C. dioica*, var. *sericea*, sub-var. *Drummondii*, &c., Kuntze, l. c. 103. — Dry ground, Texas to Arizona, first coll. by *Berlandier* and *Drummond*. (Mex.)

\* \* Woody or half-woody climbers (of California), producing flowering shoots of the season from scaly buds, polygamo-dioecious, the filiform filaments of the fertile flowers mostly bearing well-formed and sometimes polliniferous anthers: peduncles solitary and bibracteolate below or in threes: leaves 3-7-foliate: leaflets roundish, rarely cuneate, not acuminate, mostly obtusely 3-lobed or incised or few-toothed.

**C. pauciflora**, *Nutt.* Minutely pubescent or nearly glabrous: leaves pinnately or somewhat biternately 5-9-foliate, mostly quinate, but some trifoliate: leaflets half inch long, thickish, somewhat lucid: sepals tomentulose outside, half inch long: ovary and akene glabrous. — *Nutt.* in *Torr. & Gray*, Fl. i. 9 (by error *parviflora*); *Brew. & Wats. Bot. Calif.* i. 3. — S. California, near San Diego and southward; first coll. by *Nuttall*. A form of it (male only) near San Bernardino, *W. G. Wright*.

**C. lasiantha**, *Nutt.* l. c. Tomentulose-pubescent: leaves simply 3-foliate; leaflets an inch or two long, more veiny: sepals two thirds or three fourths inch long, tomentulose both sides, or glabrate above: ovary and akene more or less pubescent: peduncles 3 or 4 inches long. — *Torr. Bot. Mex. Bound.* 29, t. 1; *Brew. & Wats. l. c.* — Common throughout the western part of California.

§ 2. **VIÓRNA**. The Leathery-flowered species. Flowers large, hermaphrodite, solitary and mostly nodding on rather long peduncles: sepals thick or thickish, from blue to red or dull purplish, erect and connivent at base or throughout: neither petals nor staminodes: anthers long and linear, pointed: filaments hirsute or pubescent. — *Viorna*, and part of *Viticella*, *Spach*.

\* Calyx ovate in anthesis, connivent throughout or at length recurved at apex only, very thick, of cellular and when dried leathery texture, destitute or nearly so of inflexed and at length explanate thin margins even at the apex: styles wholly persistent, forming densely plumose carpel-tails: herbaceous or slightly woody climbers, glabrous or almost so: shoots from naked buds: leaves pinnately 3-9-foliate with broad and entire or 2-3-lobed leaflets, or occasionally all the secondary petioles 3-foliate, the flowering shoots or peduncles bearing one to several pairs of simple and entire leaves or bracts.

**C. Viórna**, *L.* (LEATHER-FLOWER.) Leaves not glaucous nor coriaceous; leaflets from subcordate-ovate to ovate-lanceolate, often acute, inconspicuously reticulated, those of the peduncle or inflorescence ovate or cordate: calyx barely inch long, glabrous or minutely furfuraceous-canescens outside, dull reddish or purplish. — *Spec. i.* 543 (*Dill. Elth.* 144, t. 118); *Michx. Fl. i.* 318; *Jacq. f. Ecl. i. t.* 32; *Torr. & Gray, Fl. i.* 9 (excl. syn. *Bot. Mag.*; *Gray, Bot. Mag.* under t. 6594; *Lavallée, Clem.* 57, t. 17. *Viorna urnigera*, *Spach, Hist. Veg.* vii. 270. — Moist ground, S. Pennsylvania and Missouri to Alabama.

**C.\* Addisónii**, *Britton*. More bushy and less spreading: leaves deep green above, pale and very glaucous beneath; the lower simple, sessile or nearly so, broadly oval, entire or with one or two rounded lateral lobes; the upper leaves pinnately divided; leaflets elliptic-oval.

obtuse or rounded at each end: flower and fruit essentially as in the preceding. — Mem. Torr. Club, ii. 28, t. 3. *C. ovata*, Torr. & Gray, Fl. i. 8, not Pursh, *vide* Britton, l. c. — Virginia to Florida. Notwithstanding the striking differences of foliage nearly related to the preceding, intermediate forms occasionally occurring. One of these forms is regarded as a hybrid by Dr. Britton.

- C. coccinea**, ENGELM. Leaves glaucous or pale, subcoriaceous; leaflets roundish or broadly ovate, obtuse or retuse; veinlets at length conspicuously reticulated: calyx bright carmine or scarlet, glabrous, otherwise as the preceding. — Engelm. in Gray, Pl. Wright. ii. 7 (where the char. is indicated); Hook. f. Bot. Mag. t. 6594; Gray, Bot. Mag. under t. 6594. *C. Viorna*, var. *coccinea*, Gray, Pl. Wright. ii. 7. *C. Texensis*, Buckley, Proc. Acad. Philad. 1861, 448, & 1870, 135; Lavallée, l. c. 63, t. 19. *C. Pitcheri*, Carrière, Rev. Hort. 1878, 10, with figure, not Torr. & Gray. — Rocky and shaded banks, Texas; first coll. by Wright, next by Lindheimer.<sup>1</sup>

- C. reticulata**, WALT. Leaves coriaceous and exceedingly reticulated; leaflets ovate to oblong; simple leaves or bracts of the peduncle oblong: sepals dull colored, externally canescent. — Car. 156; Michx. Fl. i. 318; Torr. & Gray, Fl. i. 10; Hook. f. Bot. Mag. t. 6574; Lavallée, l. c. 55, t. 16. *C. Viorna*, var. *reticulata*, Kuntze, l. c. 133. — Dry thickets, S. Carolina to Alabama and Florida, and perhaps Texas.

\* \* Calyx ovate or campanulate in anthesis, the upper part of the sepals soon recurved-spreading and thin margined, the externally tomentose-canescant margins inflexed in the bud, explanate in the flower, at least near the tip: herbaceous or nearly so.

+ Freely climbing, and with the compound leaves of the preceding division, thin or thinnish, minutely pubescent or nearly glabrous.

- C. Pitcheri**, TORR. & GRAY. Leaflets from ovate or roundish, or rarely subcordate to oblong, reticulated (more coarsely and less conspicuously than in *C. reticulata*): usually a pair of simple ovate sessile leaves on the peduncle or subtending three peduncles: calyx two thirds to full inch long, dull purplish or violet, somewhat canescent or puberulent outside; the inflexed margins of the sepals narrow and tardily explanate near the apex: persistent styles either naked or very short-plumose (in the original), the lower part and the akenes pubescent. — Fl. i. 10; Gray, Pl. Fendl. 4, & Bot. Mag. under t. 6594; Wats. Proc. Am. Acad. xvii. 317; Lavallée, Clem. 52, t. 15, var. *Coloradoensis*, a large flowered form. *C. reticulata*, Gray, Pl. Lindh. i. 3, & Pl. Wright. ii. 7, not Walt. *C. Sargenti*, Lavallée, l. c. 60, t. 18, a small-flowered form. *C. Coloradoensis*, Buckley, Proc. Acad. Philad. 1861, 448.<sup>2</sup> — S. Indiana to Missouri, and thence to Texas. (Mex.)

**Var. leiostylis**, GRAY, Bot. Mag. under t. 6594. Styles completely glabrous from the first, except their very base.

**Var. lasiostylis**, GRAY, l. c. Styles villous or even short-plumose.

**Var.\* Bigelovii**, ROBINSON, n. var.<sup>3</sup> Leaves more compound; leaflets glabrous, pale and sometimes glaucous, scarcely or not at all reticulated, generally smaller and more cleft; segments obtusish or rounded: sepals lanceolate, usually more spreading than in the typical form: tails of akenes plumose. — *C. Bigelovii*, Torr. Pacif. R. Rep. vi. 61. *C. Palmeri*, Rose, Contrib. U. S. Nat. Herb. i. 118. — New Mexico, Bigelow, Palmer, Greene, Mathews; Arizona, Palmer.

**Var.\* filifera**, ROBINSON, n. var. Leaves considerably divided and leaflets rather small and obtuse, as in the last, but more reticulated and more or less densely pubescent or tomentose beneath: tails of the akenes very slender, nearly naked. — *C. filifera*, Benth. Pl. Hartw. 285. *C. filifera*, var. *incisa*, Hemsl. Biol. Cent.-Am. Bot. i. 2, a form with leaflets more or less trifid. *C. reticulata*, Seem. Bot. Herald, 267, in part, not Walt. — Near the

<sup>1</sup> Also reported on Lookout Mt., Tenn., by J. F. James, Bull. Torr. Club, x. 82. Doubtful specimens collected by Heller, distributed as "*C. Texana*, Buckley," and mentioned in Contrib. Frankl. & Marsh. Coll. Herb. i. 37, are apparently only a form of the same species.

<sup>2</sup> Add. syn. *C. Viorna*, var. *Pitcheri*, J. F. James, Clem. 5. *C. Simsi*, Britton, Mem. Torr. Club, v. 158, and others, not Sweet, which, being the *S. cordata*, Sims, Bot. Mag. t. 1816, was acc. to Gray, Bot. Mag. under t. 6594, a form of *S. crispa*.

<sup>3</sup> *C. Bigelovii*, Torr. was included in *C. Pitcheri*, var. *lasiostylis*, by Dr. Gray. In the light of later material it should have at least varietal distinction.

Mexican border, Chenati Mts., W. Texas, *Havard*, and Santa Rita del Cobra, *Bigelow*. (Mex: *Coulter*, *Hartweg*, *Parry* & *Palmer*.)

- C. crispa**, L. Glabrous or nearly so, climbing freely, but often flowering when only a foot or a yard high: leaflets from ovate or even cordate to lanceolate, acute or acuminate, membranaceous, little reticulated: peduncle naked, between a pair of compound or rarely simple leaves: calyx rose colored varying to violet: sepals from an inch to almost 2 inches long, recurved or spreading from near the middle, the spreading portion with broad undulate margins: styles canescent to villous in flower, in fruit either almost glabrate (and the upper part falling away in age) or villous with erect hairs. — Spec. i. 543 (founded wholly on *C. flore-crispa*, Dill. Elth. 86, t. 73); Willd. Spec. ii. 1289; Sims, Bot. Mag. t. 1892; Lindl. Bot. Reg. xxxii. t. 60; Torr. & Gray, Fl. i. 10; Gray, Gen. III. i. 16, t. 2, & Bot. Mag. l. c.; Lavallée, Clem. 49, t. 14, not DC. (which is European near or a var. of *C. viticella*). *C. Viorna*, Andr. Bot. Rep. t. 71, not L. *C. cylindrica*, Sims, Bot. Mag. t. 1160; Torr. & Gray, l. c.; Lavallée, l. c. 43, t. 13. *C. divaricata*, Jacq. f. Ecl. i. 51, t. 33. *C. cordata*, Sims, Bot. Mag. t. 1816, not Pursh. *C. distorta*, Lavallée, l. c. 37, t. 11. *C. Simsii*, Sweet, Hort. Brit. 1; Kuntze, Verh. Bot. Brandenburg, 1885, 134, in part. *Viticella crispa* (partly) & *Viorna cylindrica*, Spach, Hist. Veg. vii. 267, 269. (Perhaps the *C. Viorna*, Andr., *C. cylindrica*, Sims, & *C. divaricata*, Jacq. f., originated in a cross with *C. viticella*.) — Low ground, S. Virginia to Florida and Texas.<sup>1</sup>

**Var. Walteri**, GRAY. Flowering when low: leaflets from lanceolate (3 or 4 lines wide) to almost linear. — Bot. Mag. under t. 6594. *C. Walteri*, Pursh, Fl. ii. 384. *C. cylindrica*, var. *Walteri*, Torr. & Gray, Fl. i. 10. *C. lineariloba*, DC. Syst. i. 155, & Deless. Ic. Sel. t. 3, a most attenuate form, with sepals artificially outspread. — S. Carolina to Texas, passing freely to broader-leaved form.

+ + Low and erect herbs, simple or simply branched: flowers solitary and terminal.

+ + Leaves narrow, at least the lower simple and sessile, with narrow base, thinish, not reticulated.

- C. Baldwinii**, TORR. & GRAY. Somewhat pubescent, glabrate: stems slender, simple or branched from near the base, few-leaved, terminating in a long strict peduncle: leaves from lanceolate-oblong to linear and entire, or upper ones 3-5-cleft or parted into lanceolate or linear divisions, these more or less petioled: flower nearly of *C. crispa*: carpel-tails much elongated (3 inches long), filiform, conspicuously plumose throughout. — Fl. i. 8; Chapm. Fl. 3. — Open pine woods, Florida; first coll. by *Baldwin*.

+ + + Leaves broadly ovate (2 to 5 inches long), sessile or subsessile by a broad base, all undivided, exceedingly reticulated: flower dull colored: sepals with narrow explanate margins only at tip.

- C. ochroleuca**, AIR. Densely sericeous-pubescent, glabrate in age: leaves about the length of the internodes, pale, chartaceous in age, quite entire or upper occasionally 3-cleft or incised: peduncle equalling or surpassing the uppermost pair of leaves: calyx externally sericeous-canescens, greenish yellow or purplish, the tips within dull yellowish: akenes pubescent, the styles (about inch long) very plumose. — Kew. ii. 260; Lodd. Bot. Cab. t. 661; Torr. & Gray, Fl. i. 7; Torr. Fl. N. Y. i. 6, t. 1. *C. sericea*, Michx. Fl. i. 319. *C. ovata*, Pursh, Fl. ii. 736, a very glabrate form!<sup>2</sup> *C. integrifolia*, var. *tomentosa*, &c., Kuntze, l. c. 176. — Dry ground, Long Island, New York, to Upper Georgia.

- C. Fremontii**, WATSON. Loosely villous-pubescent, soon glabrate: leaves longer than the internodes, coriaceous in age, entire, or some with few or several coarse teeth; uppermost exceeding the short peduncle: calyx purplish, nearly glabrous except the tomentose edges of the sepals: carpels in fruit forming a very dense head, villous; the styles sometimes villous below and naked or even glabrous above, sometimes villous-plumose throughout. — Proc. Am. Acad. x. 339, & Bot. Gaz. ii. 123.<sup>3</sup> *C. integrifolia*, var. *Fremontii*, Kuntze, l. c. 177, in part. — Plains of Kansas and Missouri, *Fremont*, *Dr. L. Watson*, *Letterman*.

+ + + + Leaves twice pinnately or in part ternately compound, and with narrow divisions: divisions of the upper petioles not rarely tortuous: flower dull colored.

<sup>1</sup> Butler Co., Missouri, *Eggert*, 1892.

<sup>2</sup> A species recently reinstated by Prof. Britton, Mem. Torr. Club, ii. 30, but apparently upon insufficient grounds.

<sup>3</sup> Add Gard. and For. iii. 380, f. 49, and syn. *C. ochroleuca*, var. *Fremontii*, J. F. James, Clem. 4.

**C. Douglásii**, Hook. A foot or two high, villous-pubescent when young, glabrate, leafy: stem and petioles angled and striate: divisions and lobes of the leaves linear or lanceolate (from half line to 3 or 4 lines broad): peduncles sometimes slightly sometimes very much surpassing the uppermost leaves: calyx an inch to inch and a half long, villous outside, more or less glabrate in age, purple within: akenes pubescent: persistent styles slender, inch long, very plumose. — Fl. Bor.-Am. i. 1, t. 1; Torr. & Gray, l. c. 8. *C. Wyethii*, Nutt. Journ. Acad. Philad. vii. 6; Torr. & Gray, l. c. — Rocky Mountains from Montana, Idaho, and north of the British boundary to Colorado and New Mexico, and west to Oregon and Washington; first coll. by Douglas. Varies greatly in foliage, in the degree and coarseness or fineness of the dissection; a southern form (S. Colorado and N. New Mexico) with very narrow leaflets most distinctly showing tortuous petioles, as if disposed to climb. The broad-leaved extreme is

**Var. Scóttii**, Coulter. Leaves large, pinnate with some or all the divisions 3-5-parted or 3-5-foliolate; lobes or leaflets oblong- or ovate-lanceolate (4 or 5 lines wide by an inch in length); some upper leaves with distinctly tortuous partial petioles. — Man. Rocky Mt. Reg. 3. *C. Scottii*, Porter in Porter & Coulter, Fl. Col. 1. — Rocky Mountains of Colorado;<sup>1</sup> first coll. by John Scott, and by Porter. Also Beaver Cañon, Idaho, Watson.

§ 3. **ATRÁGENE**, DC. Flowers large, hermaphrodite, solitary on naked peduncles: sepals much exceeding the stamens and pistils, spreading from the base, thin, petaloid, marginless: anthers short on long pubescent filaments: outermost stamens with more or less dilated filaments bearing inane anthers or none, or some converted into "petals," rather petaloid staminodes: styles wholly persistent, becoming long plumose carpel-tails: half-woody climbers (but ours low), the shoots of the season from scaly buds, early flowering: leaves ternately compound. — *Atragene*, L. (The verticillate appearance of the foliage on the flowering shoots, which gives an inappropriate name to one of the species, comes from the pair of leaves from the opposite axils arising close to the main axis.)

**C. verticilláris**, DC. Leaves simply 3-foliolate, slender-petioled; leaflets slender-petiolulate, ovate, mostly acuminate, entire or sparingly dentate: sepals violet, inch or two long, oblong, more or less acute: staminodes little longer than the fertile stamens, sometimes all linear and more or less antheriferous, often outermost petaloid and spatulate. — Syst. i. 166; Hook. Fl. Bor.-Am. i. 2; Torr. & Gray, Fl. i. 10. *Atragene Americana*, Sims, Bot. Mag. t. 887; Gray, Gen. III. i. 14, t. 1. — Shaded and rocky soil, Hudson Bay to the Winnipeg district, Minnesota, &c., and south to Pennsylvania;<sup>2</sup> fl. early spring.

**Var. Columbiána**, Gray, n. var. Sepals "blue," ovate-lanceolate or narrow, soon attenuate-acute or acuminate. — *C. Columbiána*, Torr. & Gray, l. c. 11. *C. alpina*, var. *occidentális*, forma *verticillaris*, Kuntze, l. c. 161. *Atragene Columbiána*, Nutt. Journ. Acad. Philad. vii. 7. — Rocky Mountains, N. Utah and north to lat. 58°, and west to Brit. Columbia. (Cape Mendocino, lat. 40°, Douglas, acc. to Hook., probably a mistake.)

**C. alpína**, Mill. Leaves twice ternate with ovate or ovate-lanceolate leaflets short-petiolulate and irregularly serrate or incised, or simply 3-foliolate with some or all the leaflets 2-3-parted: staminodes in the Old World plant numerous and conspicuous, spatulate, and most of them not at all antheriferous. — Dict. ed. 8, no. 9; Lam. Dict. ii. 44; DC. Syst. i. 165. *Atragene alpina* & *A. sibirica*, L. Spec. i. 542, 543; Sims, Bot. Mag. t. 530, 1951. (Eu., N. Asia.)

**Var. occidentális**, Gray. Spatulate and petaloid staminodes few and usually with rudiment of anthers, or none, most or all of the dilated filaments linear and more or less antheriferous. — Gray in Powell, Geol. Surv. Rep. Dakota (1880), 531. *C. alpina*, var. *Ochotensis*, Wats. Bot. King Exp. 4. *Atragene occidentális*, Hornem. Hort. Hafn. 1813, 520. *A. Ochotensis*, Gray, Pl. Fendl. 4. *A. alpina*, Gray, Proc. Acad. Philad. 1863, 56. *A. alpina*,

<sup>1</sup> Reported from Sheridan Co., Neb., by Swezey, Bull. Torr. Club, xix. 94.

<sup>2</sup> Eastward to Maine and New Brunswick (acc. to Fowler); also reported from Monongalia, W. Va., by Millsbaugh, Fl. W. Va. 318, and at Steamboat Springs, Col., by Miss Eastwood, Zoe, ii. 226.



var. *Ochotensis*, Gray, Am. Jour. Sci. ser. 2, xxxiii. 241. *Clematis Pseudo-Atragene*, Kuntze, l. c. 160, with some of *C. alpina* also. — Rocky Mountains, from New Mexico to Dakota and Washington.

Var. *tenuiloba*, GRAY. Apparently very low: leaflets dissected into narrow lanceolate divisions and lobes: otherwise as in the ordinary Am. plant. — Gray in Powell, Geol. Surv. Rep. Dakota (1880), 531, as subvar. — Black Hills of Dakota, *Jenney*.<sup>1</sup>

2. ANEMÓNE, Tourn. ANÉMONE, ANÉMONY, WIND-FLOWER. (The ancient Greek and Latin name, from ἀνεμώ, to be blown upon or shaken by the wind.) — Perennial herbs of the cooler parts of the world, mostly low, and showy flowered. — DC. Syst. i. 188.<sup>2</sup> *Anemone* & *Pulsatilla*, Tourn. Inst. 275, 284, t. 147, 148. L. Gen. nos. 458, 459.

§ 1. PULSATÍLLA, Tourn. (as genus). Carpels with long filiform styles, very villous, becoming plumose tails to the akenes: flower large, solitary on a scape bearing a whorled involucre. — Inst. 284, t. 148; Gray, Gen. Ill. i. 17. §§ *Pulsatilla* & *Prenanthus*, DC. Prodr. i. 16, 17.

\* Involucre wholly sessile and mostly connate at base by the union of its three simply palmately multifid reduced leaves: a few small spatulate staminodes outside of the true stamens. — § *Pulsatilla*, DC., &c.

A. *pátens*, L. Soft-villous, glabrate in age: scapiform stem a span high and in fruit much taller: flower erect: sepals 5 to 7, violet, sometimes whitish, widely spreading in sunshine: mature carpel-tails inch and a half long: involucre connate at base, parted into numerous narrowly linear lobes: radical leaves developed a little later than the flower, palmately 3-foliolate, with the divisions 3-parted and commonly again 3-cleft into lanceolate lobes. — Spec. i. 538; DC. Syst. i. 191; Sims, Bot. Mag. t. 1994 (var. *ochroleuca*). *Pulsatilla patens*, Mill. Dict. ed. 8; Reichenb. Ic. Fl. Germ. iv. t. 57. (Eu., N. Asia.)

Var. *Nuttalliána*, GRAY. Lobes of the leaves linear or nearly so: flower mostly pale. — Man. ed. 5, 36; Meehan, Native Flowers, ser. 1, i. t. 13. *A. patens*, Hook. Fl. Bor.-Am. i. 4; Torr. & Gray, Fl. i. 11, &c. *A. Ludoviciana*, Nutt. Gen. ii. 20. *A. Nuttallii*, DC. Syst. i. 193; Nutt. Journ. Acad. Philad. v. t. 8. *Pulsatilla Nuttalliana*, Spreng. Syst. ii. 663; Gray, Man. ed. 2, 4. *P. patens*, Gray, Gen. Ill. i. 18, t. 3. *P. patens*, var. *Wolfgangiana*, Regel, Bull. Soc. Nat. Mosc. xxxiv. 1861, pt. 2, 21. *Clematis hirsutissima*, Pursh, Fl. ii. 385.<sup>3</sup> — Prairies and plains, Illinois and Missouri to Colorado, Montana, and north to the Arctic Circle; fl. early spring. (N. Asia.)

\* \* Involucre of two or three compound more or less petiolate and petiolulate leaves: no staminodes: sepals thin, brightly colored, widely spreading. — § *Prenanthus*, DC. Prodr. i. 17.

A. *occidentális*, WATSON. From a span or two becoming 2 feet high, soft-villous, in age glabrate: radical and involucral leaves biternately compound and the divisions once or twice pinnately cleft into narrowly lanceolate or linear lobes: sepals 6 or 7, oval, white or purplish, often inch long: receptacle oblong-conical, becoming cylindrical (an inch or more long) in fruit: carpel-tails often inch and a half long, at length recurved. — Proc. Am. Acad. xi. 121, & Brew. & Wats. Bot. Calif. i. 3. *A. alpina*, Hook. Fl. Bor.-Am. i. 5; Torr. & Gray, Fl. i. 11, not L.<sup>4</sup> — High mountains of the Sierra Nevada (Lassen, Shasta, &c.),<sup>5</sup> California, first coll. by *Brewer*, to the Cascades, and Northern Rocky Mountains near British boundary to Kotzebue Sound.

§ 2. EUANEMÓNE. Carpels with short and not plumose styles: no obvious staminodes. — *Anemone*, Tourn. Inst. 275, t. 147.

<sup>1</sup> And recently rediscovered in the same region by *Rydberg*.

<sup>2</sup> Further important literature: Pritzel, Anem. Revis. Linnæa, xv. 561-698; Prantl in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 2, 61, 62; Britton, Ann. N. Y. Acad. Sci. vi. 215.

<sup>3</sup> Add syn. *Pulsatilla hirsutissima*, Britton, l. c. 217.

<sup>4</sup> Add syn. *Pulsatilla occidentális*, Freyn, Deutsche Bot. Monatsschr. viii. 78.

<sup>5</sup> Southward to Mineral King, Tulare Co., Calif., *Coville* & *Funston*.

\* Akenes densely long-woolly (except in *A. Tetonensis*), in ours much compressed. — § *Eriocephalus*, Hook. f. & Thoms. Fl. Ind. i. 20.

— Plants mostly low, from a multicapital caudex or in the first species from slender rootstocks: sepals 5 or 6, rarely 8, oval, half inch long or less: style filiform, longer than the ovary, at length wholly or partly deciduous: head of carpels globose or oval.

**A. parviflora**, Michx. A span or two high from slender somewhat creeping rootstocks, simple, one-flowered: leaves 3-parted into cuneiform 2-3-lobed and crenate-dentate divisions: sessile involucre 2-3-leaved somewhat similar: sepals white, not over 6: style not longer than the semi-obovate akene, erect. — Fl. i. 319; Torr. & Gray, Fl. i. 12. *A. cuneifolia*, Juss. Ann. Mus. iii. 248, t. 21, f. 1. *A. borealis*, Richards. in Frankl. 1st Journ. ed. 1, App. 740 (reprint, p. 12), & ed. 2, App. 750 (reprint, p. 22). — Labrador and Anticosti to the Arctic Sea and the Aleutian Islands, south to L. Superior and the Rocky Mountains in Colorado. (Adj. N. E. Asia.)

**A. Drummondii**, Watson. A span or two high from a thick multicapital caudex, glabrate: stems 1(-2)-flowered: leaves small, of rounded circumscription, 2-3-ternately dissected; the lobes from linear to cuneate-lanceolate: involucre usually similar: sepals bluish: styles almost capillary, prominently exserted: akenes semi-ovate, apiculate with the thickened and persistent inflexed base of the style. — Bot. Calif. ii. 424; Engelm. Bot. Gaz. vi. 237. *A. Baldensis*, Hook. Fl. Bor.-Am., i. 5; Torr. & Gray, l. c. 12, not L. — Alpine region of the Rocky Mountains about lat. 49°, *Drummond*, *Lyall*;<sup>1</sup> and in the Cascade Range, Mount Adams, *Suksdorf*, and Mount Hood, *Henderson*; thence south to California on Scott's Mountains, *Greene*, and Lassen, *Mrs. Austin*, *Lemmon*.

**A. multifida**, Poir. A foot or less high, from a multicapital caudex, villous-pubescent: stems 1-3-flowered, the lateral peduncles commonly with partial involucre: leaves 2-3-ternately dissected into narrow lanceolate or linear lobes; those of the involucre similar, more or less petiolate: sepals from dull crimson to yellowish or whitish, varying from a quarter to full half inch long: style about half the length of the obliquely obovate mature carpel, at length inflexed, somewhat persistent. — Suppl. i. 364 (the subantarctic plant); DC. Syst. i. 209; Deless. Ic. Sel. i. t. 16; Torr. & Gray, Fl. i. 13; Torr. Fl. N. Y. i. t. 2. *A. Comersoniana*, DC. in Deless. l. c. i. 4, t. 17, larger-flowered antarctic form. *A. Hudsoniana*, & var. *sanguinea*, Richards. in Frankl. 1st Journ. ed. 1, App. 741 (reprint, p. 13); Torr. & Gray, Fl. i. 658, the N. Am. plant. *A. lanigera*, Gay, Fl. Chil. i. 22, Chilean. *A. decapetala*, Hook. f. Fl. Antarc. ii. 223, partly, & Arc. Pl. 283. — On rocks, &c., N. E. Maine, *Miss Furbish*, to L. Superior, Nebraska, and thence to the Rocky Mountains (and south to those of Arizona), Brit. Columbia, Alaska, and north to the arctic coast.<sup>2</sup> (Chili, Patagonia)

**A.\* Tetonensis**, Porter. Nearly related to the last, but lower and more slender: leaf-segments somewhat broader, obtusish, glabrate: flowers deep purple or (?) pale: akenes dorsally glabrate. — Porter in Britton, Ann. N. Y. Acad. Sci. vi. 224. — Idaho, Teton Range, 10,000 feet, *J. M. Coulter*, and Needle Peak of Lost River Mountains, *V. Bailey* (fls. apparently white or nearly so). A white-flowered form with longer and persisting styles, and scarcely pubescent akenes, discovered in Utah by *M. E. Jones*, is doubtfully referred to this species, although both may prove to intergrade with *A. multifida*.

— Plants low, single, from a small tuber or tuberiform root: sepals 9 to 20, linear-oblong or spatulate, half to three fourths inch long: style filiform, as long as the ovary, straight, hardly persistent: head of carpels from short-oblong to cylindrical: leaves varying in the same species from simply to thrice ternately compound or parted: leaflets when undivided obovate-cuneate and incised, when much dissected cut into lanceolate or linear lobes.

**A.\* decapetala**, Ard.<sup>3</sup> A span to a foot high from an oblong tuberous root: leaves usually appressed-pubescent or at least ciliate-hirsute, 3-foliate; leaflets petiolulate or sessile, broad, ovate or ovate-oblong, crenate-dentate or shallowly and obtusely cleft: involucre very dissimilar, borne at or above the middle of the 1-flowered stem, subsessile, its three leaves

<sup>1</sup> S. Brit. America, *Macoun*.

<sup>2</sup> Eastward to New Brunswick and Anticosti, and southward in Rocky Mts. to Arizona according to Britton, l. c. 222.

<sup>3</sup> Dr. Gray's description of this species has been altered to exclude the following clearly distinguishable plant.

short, once (or more rarely twice) palmatifid-cleft to below the middle; segments linear, mostly entire: sepals greenish white to pink: head of carpels in fruit cylindraceous (three fourths to one and a half inches long): style not half the length of the orbicular flat akene, at length inflexed, completely covered by the wool of the akene. — *Animad.* Alt. 27; *L. Mant.* 79; *DC. Syst.* i. 200; *Britton*, l. c. 218. *A. trilobata*, Juss. *Ann. Mus.* iii. 248, t. 21, f. 3. *A. heterophylla*, Nutt. in *Torr. & Gray, Fl.* i. 12 (under *A. Caroliniana*, var. *heterophylla*). *A. Berlandieri*, Pritz. *Linnaea*, xv. 628. *A. Caroliniana*, Coulter, *Contrib. U. S. Nat. Herb.* ii. 8, at least in part. — Arkansas and Texas, *Berlandier*, *Wright*, *Thurber*, *Reverchon*, and according to Prof. Britton east to Alabama and north to the Great Plains. (Mex., Extr. Trop. S. Am.)

**A. \* sphenophylla**, PÆPP. Habit and most of the characters of the last: leaves glabrate or nearly so, 3-foliolate; divisions commonly cleft into rather narrow sometimes even linear-lanceolate acutish segments; leaves of the involucre (with rare exceptions) sub-similar to the basal leaves in outline and segmentation, and not so strikingly reduced in size as in the preceding: flowers sometimes solitary but more commonly 2-3(-4) from the same involucre. — *Frag. Syn.* 27; *Britton*, l. c. 220; *Coville, Contrib. U. S. Nat. Herb.* iv. 56. *A. decapetala*, Hook. & Arn. *Bot. Beech.* 3, t. 1; *Gray in Ives, Colorado Rep. Bot.* 5, excl. syn. in part, not *Ard.* — W. Arkansas, *Harvey*; W. Texas, *Thurber*, to Arizona, *Smart*, *Pringle*; Utah, *Watson*, *Parry*, *Johnson*, and Panamint Mts., S. Calif., *Coville & Funston*. (Chili.)

**A. Caroliniána**, WALT. A span or two high from a globular small tuber (which is produced at the apex of a flagelliform subterranean shoot): slender stem one-flowered, usually bearing the simply palmatifid involucre much below the middle: sepals purple, blue, or white: head of carpels short-oblong or barely cylindraceous in fruit (usually half inch long): style about the length of the ovate rather turgid akene, erect, its slender tip projecting from the wool, more deciduous. — *Car.* 157; *Torr. & Gray*, l. c. 12 (excl. var. *heterophylla*); *Torr. in Marcy, Rep.* t. 1; *Meehan, Native Flowers*, ser. 1, i. 165, t. 42. *A. tenella*, Pursh, *Fl.* ii. 386. — Sandy soil, Florida to N. Carolina, Illinois, Dakota, and southwest to Texas, thus partly accompanying the preceding but in different soil; fl. early spring.

*A. WALTERI*, Pursh, *Fl.* ii. 387, founded wholly on Walter's character of his *Thalictrum Carolinianum*, is quite obscure, no specimen being extant. If an *Anemone* it might be referred to *A. Caroliniana*, except for the pentasepalous flower.

+ + + Plants 1 to 3 feet high from a caudex, few-several-flowered: sepals mostly 5, oval or obovate, seldom over half inch long, white or greenish white, sericeous-canescens on the outside: style subulate, shorter and stout, wholly or mainly persistent on the semi-obovate akene: involucreal leaves similar to the radical and petioled, palmately or pedately 3-5-divided and the divisions 2-3-cleft and incisely toothed; fl. summer.

**A. cylindrica**, GRAY. Somewhat silky-pubescent, strict: divisions and lobes of the leaves mostly cuneate-lanceolate: involucre in depauperate plants 3-5-leaved and 1-2-flowered, but usually 5-9-leaved and 2-6-flowered, with very long and naked umbellate peduncles (the involucreal leaves if any being basal and making a part of the general involucre), or occasionally one of the peduncles involucreal at the middle: head of carpels in fruit cylindrical, inch or more long, very woolly; the short somewhat recurved styles slightly projecting. — *Ann. Lyc. N. Y.* iii. 220; *Torr. & Gray, Fl.* i. 13. — Dry ground, New Brunswick to Montana and Saskatchewan, south to New Jersey and New Mexico.

**A. Virginiána**, L. More loosely pubescent or glabrate: divisions and lobes of the leaves rhombic-ovate or ovate-lanceolate: involucre 2-3-leaved, subtending a solitary and elongated naked peduncle and one or sometimes two proliferous ones, i. e. involucreal at the middle, and these again often proliferous, thus continuing long in blossom: sepals usually greenish white and only half inch long, sometimes enlarging and bright white: head of carpels in fruit ovate or oblong, thick, as it were mucicate by the projection of the conspicuous stout styles, the apex of the akenes also naked. — *Spec.* i. 540; *Gærtn. Fruct. i.* t. 74; *Hook. Fl. Bor.-Am.* i. 7, t. 4; *Torr. & Gray, l. c.*; *Meehan, Native Flowers*, ser. 2, i. 93, t. 23. *A. hirsuta*, Mœnch, *Meth. Suppl.* 105. — Moist ground, New Brunswick to S. Carolina, and northwest to the Rocky Mountains and lat. 55°.

\* \* Akenes naked (when mature), orbicular, much compressed, wing-margined: sepals 5, obovate, white, half inch or more long: involucre closely sessile, palmately parted or cleft.

**A.\* Canadensis**, L.<sup>1</sup> - A foot or two high from deep filiform rootstocks, pubescent: stem rather slender, prolifero-dichotomous from the involucre after producing the slender-peduncled primary flower, sometimes again or even again similarly proliferous from the secondary involucre: leaves very veiny; radical long-petioled, 5-7-parted or deeply cleft into narrowly cuneate divisions; these partly 2-3-cleft and incised or sharply toothed toward the apex: primary involucre 2-3-leaved; secondary 2-leaved, smaller, less cut, ascending: sepals bright white: head of rather numerous carpels globose; carpels hirsute when young, glabrate in age, abruptly tipped with a rigid soon straight and mainly persistent subulate style of nearly the length of the orbicular akenes. — Syst. Nat. ed. 12, iii. App. 1, 431 (1768). *A. dichotoma*, L. Spec. i. 540, in part; Pursh, Fl. ii. 387 (with *A. Pennsylvanica*); Lloyd Bros. Am. Drugs & Med. i. 22, f. 8. *A. Pennsylvanica*, L. Mant. ii. 247 (where distinguished from the E. Asian *A. dichotoma*, which besides has the short-styled carpels ovate at maturity); Hook. Fl. Bor.-Am. i. 8, t. 3; Torr. & Gray, Fl. i. 14; Gray, Gen. III. i. 20, t. 4, not Ledeb. *A. irregularis*, Lam. Dict. i. 167. *A. aconitifolia*, Michx. Fl. i. 320.<sup>2</sup> — Low grounds, Nova Scotia and Hudson Bay to Saskatchewan, and south to S. Pennsylvania, Illinois, and along the Rocky Mountains to S. Colorado;<sup>3</sup> fl. early summer.

**A. narcissiflora**, L. A span or at length a foot or more high from a thick caudex, villous: radical leaves of orbicular outline, 3-5-parted or divided into cuneate multifid divisions; lobes narrowly lanceolate or linear: involucre similar but closely sessile and usually more simply cleft, subtending solitary or usually several umbellate peduncles: akenes glabrous, apiculate with short soon inflexed style. — Spec. i. 542; Pursh, l. c. 387; Hook. Fl. Bor.-Am. i. 8; Torr. & Gray, l. c.; Reichenb. Ic. Fl. Germ. iv. t. 48. — Alpine regions, Rocky Mountains of Colorado (first coll. by James) and northward, and Alaska to Bering Strait.<sup>4</sup> (Eu., Asia.)

\* \* \* Akenes naked or merely pubescent, less flattened, ovate-oblong or narrower, wingless, comparatively few in the head: sepals 4 to 6, commonly 5, obovate or oval, half inch or more long: slender and glabrous or pubescent plants, simple and one-flowered, a span to a foot high, with few radical leaves, or these remote and separate from the scape.

— From elongated filiform or flagelliform rootstocks: involucre of 2 or 3 simple subsessile leaves, and radical leaves at most trifoliate.

**A. deltoidea**, Hook. Radical leaves trifoliate; leaflets sessile or nearly so, ovate or rhombic-ovate, acutish, obtusely dentate, somewhat incised or the lateral 2-3-lobed: involucre of 2 or 3 ovate similarly toothed or incised leaves: sepals white, often an inch long: carpels pubescent, glabrate in age, ovate, pointed with a very short at length straight subulate style. — Fl. Bor.-Am. i. 6, t. 3; Torr. & Gray, l. c. 13; Wats. Bot. Calif. ii. 424. — Western part of Washington and Oregon in woods (type specimens coll. by Douglas and by Scouler) to N. California, Greene, Rattan. Stem at length a foot high.

**A. Richardsoni**, Hook. Radical leaves round-reniform, deeply and somewhat palmately 5-cleft into cuneate-obovate incised lobes: involucre of 3 dilated cuneate 3-lobed and incisely dentate leaves: sepals sulphur-color: carpels glabrous; persistent style very long, filiform, recurved-spreading in age, hooked at tip. — Fl. Bor.-Am. i. 6, t. 4; Schlecht. Linnæa, vi. 575; Torr. & Gray, l. c., printed *Richardsoniana*. *A. ranunculoides*, var., Richards. in Frankl. 1st Journ. ed. 1, App. 740 (reprint, p. 12). *A. Vahlîi*, Hornem. Fl. Dan. t. 2176. — Shores of Hudson Bay to Alaskan Islands, and through arctic America. (Adj. N. E. Asia, Greenland.)

— Rootstocks horizontal, thickish: involucre 2-3-phyllous, and 3-5-foliate; the leaves slender-petioled.<sup>5</sup>

<sup>1</sup> Dr. Gray employs *A. Pennsylvanica*, L., for this species, but it is a later name.

<sup>2</sup> Add syn. *A. dichotoma*, var. *Canadensis*, MacMillan, Metasp. Minn. Val. 237.

<sup>3</sup> Westward in Brit. America to the Pacific, according to Hooker, l. c. 8, and southward to Maryland according to Britton, l. c. 228.

<sup>4</sup> Reported in W. Newfoundland, by Reeks, List Fl. Pl. Nfld. 2, but probably erroneously.

<sup>5</sup> *A. nudicaulis*, Gray, Bot. Gaz. xi. 17, described from imperfect specimens and placed in this part of the genus, has subsequently been conclusively identified with *Ranunculus Lapponicus*, L. See Britton, Ann. N. Y. Acad. Sci. v. 233.

**A.\* quinquefólia**, L.<sup>1</sup> A span to a foot high: radical leaf and the three of the involucre 3-foliolate or by the division of the lateral leaflets often 5-foliolate; divisions or leaflets from obovate-cuneate or rhombic-ovate to lanceolate-oblong, mostly acute or acuminate, serrate or somewhat incised; the lateral ones commonly 2-parted or completely divided and middle one 3-cleft: sepals from white, or with purplish tinge outside, to pale violet or blue: akenes puberulent, tapering into the short recurving style. — Spec. i. 541; Bart. Fl. N. A. ii. 10, t. 39; Britton, l. c. 225. *A. nemorosa* of Amer. authors, but differing from the European species in its generally smaller flowers, less incised leaves and more slender stem and petioles. *A. pedata*, Raf. Med. Rep. hex. 2, v. 361, & in Desv. Journ. Bot. i. 230 (1808); DC. Syst. i. 214. *A. minima*, DC. l. c. 206. *A. Grayi*, Behr, Bull. Calif. Acad. Sci. i. 5. *A. nemorosa*, var. *Grayi*, Greene, Fl. Francis. 295, a broad-leaved Pacific form with white or pale blue flowers. — Open woods, New Brunswick to coast of Brit. Columbia; in the Atlantic States to the mountains of Georgia; fl. early spring.

**Var.\* Oregána**, ROBINSON, n. var. Leaflets obovate to oval-oblong and obtusish, undivided, unequally or sparingly serrate or slightly incised: flowers rather short-peduncled: sepals bright blue, oval or oblong, larger than in the typical form half to three fourths inch long: filaments also blue and longer than in the type. — *A. Oregana*, Gray, Proc. Am. Acad. xxii. 308. *A. cyanea*, Freyn, Deutsch. Bot. Monatsschr. viii. 176. *A. Grayi*, Britton, l. c. 226, in part, not Behr. — Open woods, on both sides of the Columbia River, Klikitat Co., Washington, *Suksdorf*; about the Hood River, *Mrs. Barrett*; on Mt. Adams, *Henderson*. A striking and beautiful variety or perhaps species, apparently intergrading, however, both with typical form and the following.

**Var.\* Lyállii**, ROBINSON, n. var. Dwarfish: leaves 3-foliolate; leaflets ovate, more obtusely toothed than in the type: flowers usually very small, white or pale blue, a third to half inch in diameter. — *A. Lyallii*, Britton, l. c. 227. — From Portland, Oregon, *Henderson*, and the Willamette Valley, *Cusick*, to Vancouver Isl., *Macoun*, and Salmon River, Brit. Columbia, *Dawson*. Very similar forms are common in the Redwoods of California, *Bolander*.

**A.\* trifólia**, L. Usually larger than the preceding species: involucreal leaves with rare exceptions regularly 3-foliolate; leaflets ovate-lanceolate rather regularly serrate, large, in well developed specimens 2 to 3 inches in length, and more than an inch in breadth; radical leaves subsimilar to the involucreal but sometimes 5-foliolate: peduncle long and slender, usually more than 2 inches in length: flowers large, 15 to 16 lines in diameter: sepals white or pinkish: carpels in a globular head, much as in the preceding species. — Spec. i. 540; Reichenb. Ic. Fl. Germ. iv. t. 48; Britton, l. c. 226; Vail, Mem. Torr. Club, ii. 33, t. 4. Millsbaugh, Fl. W. Va. 319; Heller, Bull. Torr. Club, xxi. 22. *A. lancifolia*, Pursh, Fl. ii. 386. *A. nemorosa*, var., Gray, Am. Nat. vii. 422. — Mountains of S. Pennsylvania and Virginia, *Curtiss*, *Small*, *Heller*, to Georgia, *Chapman*. (Eu.) The American plant does not differ by any constant or satisfactory character from the European, which is regarded as a good species. It appears, however, in some instances to intergrade or perhaps hybridize with *A. quinquefolia*.

**3. HEPÁTICA**, Dill. LIVERLEAF. (Latinized from *ἡπατικός*, affecting or belonging to the liver, suggested by the shape of the leaf.) — Acaulescent low perennials (of the northern hemisphere); with elongated and villous or at length glabrate petioles and peduncles from a short crown or caudex, 3-lobed but otherwise entire leaves, and solitary blue or purple or sometimes white flowers, produced in earliest spring, followed later by the foliage of the season, which lasts over winter. Sepals 6 to 9, rarely more. Akenes pubescent, tipped with very short style. — Cat. Plant. Giss. App. 108; DC. Syst. i. 215. *Anemone* §-*Hepatica*, Koch, and authors; but may be fairly well kept as a genus.

**H. tríloba**, CHAIX. Leaves with 3 rounded or ovate and obtuse lobes; those of involucre also obtuse. — Chaix in Vill. Dauph. i. 336; Bart. Fl. N. A. iii. 45, t. 87; Torr. & Gray, Fl.

<sup>1</sup> Dr. Gray regarded this and the following species as forms of the European *A. nemorosa*, while the var. *Oregana* he considered as distinct. In the light of recent publications and additional material it seems best to modify this treatment to the one of the text.

i 15. *H. Americana*, Ker, Bot. Reg. t. 387. *H. triloba*, var. *Americana*, DC. l. c. 216.<sup>1</sup> *Anemone Hepatica*, L. Spec. i. 538.—Open woods, Nova Scotia to the northern Rocky Mountains, lat. 55°, and Sitka, according to Bongard, south through the upper country to the border of Florida, west to Missouri and Minnesota. (Eu., N. Asia.) Passes into

**H. acutiloba**, DC. Lobes of the leaves ovate and acute, occasionally lateral lobes 2-cleft: akenes slightly stipitate.—Prodr. i. 22; Gray, Gen. Ill. i. t. 5. *H. triloba*, var. *acuta*, Pursh, Fl. ii. 391.<sup>2</sup> *Anemone acutiloba*, Lawson, Rev. Canad. Ranunc. 30.—Quebec to upper part of Georgia, and Iowa. Rarely has the middle lobe or all of them incised.

**4. ANEMONÉLLA**, Spach. (A diminutive of *Anemone*.)—Hist. Veg. vii. 239; Gray, Bot. Gaz. xi. 39. *Syndesmon*, Hoffmanssegg, Flora, 1832, ii. Intell.-Blatt. 34, name only, referring to this and to a *Thalictrum*.—Single species, flowering in early spring.

**A. thalictroides**, SPACH, l. c. 240. Low and very glabrous perennial: roots tuberiform and fascicled: slender and simple scapiform stems and radicle petioles a span or two high; the latter twice ternate into slender petiolules, bearing roundish leaflets with mostly subcordate base and 3-lobed broad apex: involucre of 6 to 9 similar filiform-petiolulate leaflets (i. e. belonging to 2 or 3 trifoliolate leaves with primary petiole wanting or obsolete), subtending an umbelliform cyme of few or several (rarely solitary) slender-stalked flowers: sepals 5 to 10, oval, white, sometimes pinkish, 4 or 5 lines long, tardily deciduous, much longer than the stamens and carpels: anthers oval: disciform stigma horizontal or nearly so, obscurely 2-lobed, sessile, but in fruit comparatively small and slightly elevated on the pointed apex of the oblong-fusiform 8–10-ribbed akene.—*Anemone thalictroides*, L. Spec. i. 542; Hill, Veg. Syst. 25, t. 46, f. 5; Willd. Hort. Berol. t. 44; Juss. Ann. Mus. iii. 249, t. 21; Sims, Bot. Mag. t. 866; Bart. Fl. N. A. ii. t. 44.<sup>3</sup> *Thalictrum anemonoides*, Michx. Fl. i. 322; DC. Syst. i. 186; Sweet, Brit. Fl. Gard. ser. 2, t. 150; Gray, Gen. Ill. i. 24, t. 6; Meehan, Native Flowers, ser. 1, ii. t. 30; Lecoyer, Bull. Soc. Roy. Bot. Belg. xxiv. 223. *Syndesmon thalictroides*, Hoffmanssegg, l. c., name only;<sup>4</sup> Lawson, Monog. Ranunc. Canad. 31.—Dry woods, New England and Ontario district of Canada to Minnesota, to Maryland, and south along the mountains and upper country to W. Florida. A *flore pleno* form has been found wild.

**5. THALÍCTRUM**, Tourn. MEADOW-RUE. (Old Greek and Latin name, of uncertain derivation.)—Perennial herbs of temperate regions, largely northern, usually glabrous, with alternate compound or decompound leaves, petioles dilated at base, and paniced or corymbiform cymose or rarely racemose small flowers, in most of ours diœcious or polygamous and with dull colored sepals, these 4 or sometimes 5 in number and deciduous. There are not rarely small appendages to some partial petioles or leaflets, which have been called *stipels*, but they are inconstant.—Inst. 270, t. 143; Benth. & Hook. Gen. i. 4; Lecoyer, Bull. Soc. Bot. Belg. xxiv. 1885, 78–325.<sup>5</sup>

\* Flowers hermaphrodite, on a low scapiform stem: filaments capillary and drooping.

**T. alpinum**, L. A span or more high: leaves all or chiefly radical, inch or two long, pinnately 5–7-foliolate, with lower pinnæ similarly 3–5-foliolate: leaflets cuneate-obovate, few-lobed, prominently veined beneath: flowers drooping, purplish: anthers linear-oblong:

<sup>1</sup> Add syn. *Hepatica Hepatica*, Karst. Deutschl. Fl. 559.

<sup>2</sup> Add syn. *Hepatica acuta*, Britton, Ann. N. Y. Acad. Sci. vi. 234.

<sup>3</sup> Add Garden, xxxv. 409, t. 699.

<sup>4</sup> See also Gray, Bot. Gaz. xi. 39.

<sup>5</sup> In accordance with the expressed intention of Dr. Gray, his manuscript relating to the genus has been freely revised in the light of Prof. Trelease's careful treatment of the group (Proc. Bost. Soc. Nat. Hist. xxiii. 293–304); and plants of subsequent description have been inserted where necessary.

akenes very few, oblong, slightly ancipital, subulate-tipped. — Spec. i. 545; Lightf. Fl. Scot. i. t. 13; Fl. Dan. t. 11; Sims, Bot. Mag. t. 2237; Torr. & Gray, Fl. i. 39; Wats. Bot. King Exp. 4. — Newfoundland and Anticosti, arctic Alaska, mountains of N. Nevada, and alpine region of Rocky Mountains to Colorado.<sup>1</sup> (Greenland, Eu., N. Asia.)

\* \* Flowers hermaphrodite, in loose panicles on leafy stem: sepals caducous, greenish: filaments capillary and weak: anthers linear: akenes terete, tipped with oval stigma.

**T. minus**, L., var. **Kemense**, TRELEASE. Stem 1 to 3 feet high, sulcate-striate: leaves thrice ternate: fruiting pedicels filiform: carpels few. — Proc. Bost. Soc. Nat. Hist. xxiii. 300. *T. Kemense*, Fries, Fl. Halland, 94; Ledeb. Fl. Ross. i. 13; Regel, Bull. Soc. Nat. Mosc. 1861, pt. 2, 36, t. 3. *T. minus*, var. *elatum*, Lecoyer, l. c. 283, in part. — Unalaska. (Adj. N. E. Asia, N. Eu.)

\* \* \* Flowers hermaphrodite, not very numerous, panicle on leafy stem, slender-pedicelled: sepals tardily deciduous, white or whitish: filaments clavate, erect: anthers oval or short-oblong, pointless: akenes compressed, gibbous, one edge either straight or concave, thin-walled, not filled by the seed, the sides with few nerves or veins.

† Akenes slender-stipitate, dorsally gibbous, the ventral edge concave at maturity, apiculate with very short style or stigma.

**T. clavatum**, DC. Stems slender, 1-2-leaved: leaves biternate: leaflets membranaceous, large, roundish, very obtusely lobed: flowers loosely cymose: filaments bright white, the petaloid-dilated summit quite as wide as the oval anther: akenes somewhat lunate-oblong, almost equalled by the filiform stipe. — Syst. i. 171; Deless. Ic. Sel. i. t. 6; Gray, Am. Jour. Sci. xlii. 17, & Man. 39. *T. filipes*, Torr. & Gray, Fl. i. 38. *T. nudicaule*, Schweinitz in Torr. & Gray, Fl. i. 39. — Wet soil on mountains, Virginia<sup>2</sup> to Alabama and Georgia; first coll. by Michaux, but not published.

† — Akenes short-stipitate, ventrally very gibbous, tipped with subulate long stigmatose style.

**T. sparsiflorum**, Turcz. Stem a foot to a yard high, striate-angled, leafy to the top: leaves twice or thrice ternate or quinate, upper gradually diminished and sessile: leaflets rather small, often pulverulent-glandular beneath: flowers sparse and narrowly paniculate: filaments filiform with narrowly clavate summit, much longer than the often glandular-puberulent ovaries: akenes half rhombic-ovate (a line and a half wide), very flat, the dorsal edge straight. — Turcz. in Fisch. & Meyer, Ind. Sem. Petrop. i. 40 (1835); Regel, l. c. t. 1; Gray, Pl. Wright. ii. 8; Wats. l. c. 4; Lecoyer, l. c. 155. *T. clavatum*, Hook. Fl. Bor.-Am. i. 2; Torr. & Gray, l. c. 37, not DC. — Moist grounds, Hudson Bay district, from lat. 57° to the Aleutian Islands, and southward in the Rocky Mountains to Colorado, in the Sierra Madre to San Bernardino Co., Calif. (N. Asia.)

\* \* \* \* Flowers diœcious, in two species polygamo-diœcious, paniculate on a leafy stem: sepals whitish, greenish, or dull purplish, early deciduous: stigmatose style slender-subulate and more or less persistent: akenes either sessile or short-stipitate, moderately or sometimes not at all gibbous.

† Western species: akenes compressed but more or less tumid, manifestly ancipital, thin-walled (except in *T. venulosum*): filaments all capillary and weak: anthers linear, mucronate or apiculate: leaves 2-3- or lowest 4-ternately compound, or last divisions quinate, at least the lower cauline petioled: leaflets (as in all our species) obovate or rounded, or cuneate at base, or subcordate.

**T. Fendleri**, ENGELM. A foot to a yard high, with 3 to 5 cauline leaves; upper ones short-petioled or sessile: leaflets of rather firm texture, commonly half inch long, with lobes rounded or sometimes mucronate-acuminate: carpels either numerous or few in the head; akenes ovate or oblong-ovate, 2 or 3 lines long, moderately oblique, the ventral edge more gibbous, each face mostly 3-nerved or ribbed, the central rib more salient, and the lateral sometimes branched; seed linear-oblong or elongated-oblong. — Engelm. in Gray, Pl. Fendl. 5, & Pl. Wright. ii. 7; Wats. Proc. Am. Acad. xiv. 289; Lecoyer, l. c. 134. — Mountains of W. Texas, New Mexico, and Arizona, and north through California and the Rocky Moun-

<sup>1</sup> Uinta Mts., Utah, Porter, and White Mts. of Mono Co., Calif., Coville & Funston.

<sup>2</sup> Near Nuttallburg, West Virginia, acc. to Millsbaugh, Fl. W. Va. 320, also E. Tennessee, Parry, Kearney.

tains to Montana and Wyoming. Variable species, passing into the two following extreme forms.

**Var. Wrightii**, TRELEASE. Slender and small-leaved: all or most of the cauline leaves conspicuously petioled; leaflets from a quarter to over half inch long: akenes smaller, usually few, more angulate-tumid, the midnerve being carinate-salient at maturity: seed oval-oblong, almost completely filling the cell. — Proc. Bost. Soc. Nat. Hist. xxiii. 304. *T. Wrightii*, Gray, Pl. Wright. ii. 7. — New Mexico and S. Arizona, a form of a drier district, first coll. by Wright. (Adj. Mex.)

**Var.\* platycarpum**, TRELEASE, l. c. Inflorescence sparsely glandular-puberulent: akenes large and flat, erect, 2 to 3 lines long and often fully 2 lines broad, acuminate: veins scarcely reticulated. — Coville, Contr. U. S. Nat. Herb. iv. 55. *T. hesperium*, Greene, Pittonia, ii. 24. — Foothills and high sierras of Centr. and S. California, Kellogg & Harford, Greene, Gray, Parish Bros.

**T.\* polycarpum**, WATSON. Mostly robust and tall, thinner-leaved and glabrous throughout: akenes more numerous, in fruit forming a globular head, larger (3 lines long including the stipe-like base, and two lines wide), flatter, but vesicular when fresh, obovate or somewhat orbicular, only the midnerve usually apparent and that with some branching veins, the cell by no means filled by the oblong-linear seed. — Proc. Am. Acad. xiv. 288, & Bot. Calif. ii. 424. *T. Fendleri*, var. ? *polycarpum*, Torr. Pacif. R. Rep. iv. 61, mainly. *T. Fendleri*, Brew. & Wats. Bot. Calif. i. 4, mainly. *T. cesium*, Greene, Fl. Francis. 309, a form with leaves incised nearly as in the original specimens collected by Bigelow. — Shady grounds, through California, especially along the coast, apparently to Montana. Seemingly the fruit is a monstrous condition, but it matures seed.

**T. occidentale**, GRAY. A foot or two high, with 2 or 3 usually slender-petioled cauline leaves: leaflets membranaceous, glaucescent, commonly an inch or more long, the lobes rounded: akenes rather few or few maturing, lanceolate or oblong-lanceolate and acuminate, hardly at all oblique, 3 to 5 lines long, hardly over a line wide, prominently 3-nerved on each convex face, the midnerve slightly more salient: seed nearly linear and filling the cell. — Proc. Am. Acad. viii. 372; Wats. ibid. xiv. 288. *T. dioicum*, var. *oxycarpum*, Torr. Bot. Wilkes Exped. 212. — Moist and shaded ground, Brit. Columbia, east to Montana, and south to Plumas Co., California. *T. megacarpum*, Torr. in Frém. Rep. 87 (name only) & Trelease, l. c. 303, is probably a form of this species with shorter broader akenes and somewhat thicker leaflets, thus forming a transition to some forms of *T. Fendleri* or perhaps the following.

**T.\* venulosum**, TRELEASE. Quite smooth and very glaucous, 10 inches to 3 feet high: stem and petioles often purplish and finely mottled: leaves 3-4-ternately divided, borne upon rather long but stoutish and firm petioles; primary divisions well stalked but leaflets approximate, with short petiolules, rather more firm of texture and smaller than in the preceding species and veiny upon the pale or whitened lower surface, suborbicular in outline, crenately lobed: inflorescence commonly narrow: achenia 6 to 8, ovate, not strongly flattened, almost sessile, narrowed to a slender straight or moderately curved beak, walls thickish, at least firmer than in the neighboring species; ribs forming at maturity prominent free angles not connected by reticulation. — Proc. Bost. Soc. Nat. Hist. xxiii. 302. ? *T. Fendleri*, J. M. Macoun, Bot. Gaz. xvi. 285. — Mountainous districts from Colorado, Parry, Vasey, and S. Dakota, Rydberg, to Oregon, Cusick; Washington, Vasey, Piper, Hull, Henderson, and Rocky Mts. of Brit. Columbia? Macoun. A species nearly related to the eastern *T. dioicum*. A doubtful specimen with more expanded inflorescence has been collected on the plains of the Saskatchewan, Bourgeau.

++ Eastern species: akenes terete or nearly so, costate-angled (some of the ribs rarely branching or anastomosing), little or not at all gibbous, either sessile or short-stipitate (in the same species), thick-walled, the cell filled by the seed: filiform-subulate styles elongated, surpassing the sepals.

++ Mostly tall (2 to 8 feet high): leaves 3 or 4 times ternate; cauline several, upper or all of them sessile or subsessile by a spatheaceous base; leaflets from roundish to oblong, commonly with mucronate lobes or tip, of rather firm texture: akenes ovoid or short-oblong, seldom over 2 lines long, with 5 or 6 acute angulate ribs, the sutural ones slightly more salient: sepals caducous: filaments white in anthesis, or sometimes purplish: styles tardily breaking away.



**T. polygamum**, Muhl. Stem tall, mostly green, glabrous, not manifestly glandular: leaflets sometimes minutely and sparsely pubescent beneath (the hairs simple and paucicellular): panicles naked and mostly corymbose: flowers polygamous, developed toward midsummer, more corymbosely clustered than in the following: sepals and stamens mostly white; the latter comparatively short, erect, with strongly clavate and rugulose filaments broader than the oval or oblong pointless (or rarely apiculate) anthers. — Cat. 54 (1813), & ed. 2, 56 (1818), with char. "smooth, *polygamous*." *T. pubescens*, Pursh, Fl. ii. 388, by part of char. but not as to pubescence. *T. corynellum*, DC. Syst. i. 172; Lecoyer, l. c. 143. *T. Cornuti*, Hook. Fl. Bor.-Am. i. 3, partly (var.  $\beta$ ); Torr. & Gray, Fl. i. 38. *T. Cornuti*, Gray, Man. eds. 1-5, not L., of which see below. *T. leucostemon*, Koch & Bouché, Ind. Sem. Hort. Berol. 1854; Walp. Ann. iv. 12. — Low or wet grounds, New Brunswick and Lower Canada to upper parts of Carolina and Florida; at the north flowering in July and Aug. There are male plants with sterile ovaries, and female with some polliniferous stamens. A variety (from N. New York to mountains of Carolina) has akenes rather conspicuously stipitate.

**Var.\* macrostylum**, Robinson, n. var. Very slender: leaflets small, subentire: flowers nearly diœcious, the fertile less numerous and in a more spreading panicle than in the typical form: heads of akenes small, dense, and spherical. — *T. Cornuti*, var. *brevifolium*, Shuttleworth in herb. *T. Cornuti*, var. *macrostylum*, Shuttleworth in distr. Rugel. *T. macrostylum*, Small & Heller, Mem. Torr. Club, iii. 8. — Mountains of North Carolina to Georgia, Rugel, Small & Heller. A well marked variety, but passing into the type.

**T. purpurascens**, L. Stem 2 to 4 feet high or taller, often purplish: leaflets mostly oblong or oblong-cuneate, more veiny and reticulated, beneath with or without some glandless or gland-tipped minute hairs or with waxy atoms: panicles loose and more pyramidal: flowers nearly diœcious (rarely with a few imperfect anthers to the female flowers): sepals usually greenish or purplish: filaments white or purplish, capillary, yet occasionally clavellate at summit, soon drooping: anthers linear or oblong-linear, mucronate or mucronulate. — Spec. i. 546, & ed. 2, i. 769 (*T. Virginianum elatius glaucum*, Morison); Gray, Man. ed. 3, 39. *T. purpurascens*, & *T. rugosum* (not Ait.), Pursh, l. c. 388, 389; Spreng. Pugill. i. 38. *T. pubescens*, Pursh, l. c. 388, in part. *T. purpurascens*, & *T. revolutum*, & partly *T. Carolinianum*, DC. Syst. i. 174. *T. Cornuti*, Hook. Fl. Bor.-Am. i. 3, t. 2 (var.  $\alpha$ ), &c. *T. dasycarpum*, Fisch. & Lall. Ind. Sem. Hort. Petrop. 1841, 72; Walp. Rep. i. 13; Lecoyer, l. c. 145, form with akenes sparsely pubescent, and some of its ribs not rarely interrupted or branching. *T. revolutum*, Lecoyer, l. c. 146, the form with lower face of leaves and sometimes other parts copiously glandular, the glands or waxy atoms some surmounting short hairs, some sessile. This is *T. purpurascens*, var. *ceriferum*, C. F. Austin in Gray, Man. ed. 5, 39; but all the varieties freely run together. Muhlenberg, Fl. Lancast. ms., well described the species under the name of *T. graveolens*, on account of the heavy scent, which is greater in the more glandular form. — On drier ground, Canada and Saskatchewan to Florida, Texas, New Mexico, and Arizona; fl. spring and earliest summer.

**T.\* coriaceum**, Small. Diœcious, 3 to 6 feet high: roots of stout bright yellow fibres: the short petioles much dilated: leaflets obovate or suborbicular in outline and crenate-toothed or lobed nearly as in the following, pale beneath, thickish for the genus but scarcely at all coriaceous: akenes more or less strongly stipitate. — Mem. Torr. Club, iv. 98. *T. dioicum*, var. *coriaceum*, Britton, Bull. Torr. Club, xviii. 363. — Mountains of Southwestern Virginia and North Carolina, Porter, Small, Heller.

++ ++ Comparatively low, wholly diœcious, and the fewer cauline leaves slender-petioled: leaflets with rounded and pointless lobes or teeth: akenes small (less than 2 lines long), completely terete and with equal ribs; the stigma or style deciduous.

**T. dioicum**, L. Fibrous-rooted, glaucous or pale: stem a foot or two high, only 2-3-leaved: leaves thrice or lowest four times ternate; leaflets mostly slender-petiolulate and drooping, roundish and subcordate: panicles rather small and pedicels umbellate: flowers greenish with dull purplish tinge; the male drooping, with capillary filaments little longer than the linear fuscous mucronate anthers: carpels 5 to 13: linear stigma occupying the whole length of the style and broader, much longer than the ovary: akenes strongly 10-12-costate. — Spec. i. 545; Torr. & Gray, Fl. i. 38; Meehan, Native Flowers, i. 45, t. 12. *T. levigatum*, Michx. Fl. i. 322. *T. Carolinianum*, Bosc in DC. Syst. i. 174, excl. var. — Wooded hillsides, New

Brunswick and Canada, north to lat. 67°, west to the base of the northern Rocky Mountains, and south to Carolina, Alabama, &c.; fl. early spring.

**T. débile**, BUCKL. Fascicled roots tuberous: stems weak and slender or filiform, a span to a foot long, 2-4-leaved: leaves mostly twice ternate; leaflets small (2 to 8 lines long), roundish: panicle loosely few-flowered, slender and racemiform: flowers greenish yellow; male with 7 to 11 stamens with slender filaments shorter than the oblong-linear mucronulate anthers; female with 3 to 9 carpels: stigmas subulate: akenes sessile and subtended by the marcescent calyx, oblong, 6-8-costate. — Am. Journ. Sci. xlv. 175; Gray, Pl. Wright. ii. 8; Chapm. Fl. 5; Lecoyer, l. c. 139. — Woods and moist prairies, Alabama, *Buckley*, N. W. Georgia, *Chapman*, and E. Texas, *Wright*. Var. **TEXANUM**, Gray (Cat. Coll. Hall, Pl. Tex. 3), is a form with firmer stem and thicker smaller leaflets much whitened beneath and but 1 to 2½ lines in breadth; collected on moist prairies about Houston, *Hall*.

**T. CORNÚTI**, L. Spec. i. 545. It becomes evident that this name ought to subside, as De Candolle suggested. It rests wholly on the descriptions and figures of Cornuti and of Morison, the latter apparently taken from the former; which, though mentioned as “in Canadensi solo nascitur,” was almost certainly figured and described from a plant of the European *T. aquilegifolium*, L.

**T. RUGÓSUM**, Ait. Kew. ii. 262, said to be a native of North America, and to have been introduced into cultivation in England by Dr. Fothergill in 1774, has hermaphrodite flowers and is a form of *T. glaucum* of Europe. *T. discolor*, Willd. acc. to Spreng. Pugill. i. 39, is also *T. glaucum*, and not American.

**6. TRAUTVETTÉRIA**, Fisch. & Meyer. (*Prof. Ernst Rudolph Trautvetter*, Russia.) — Perennial herbs; with palmatifid and reticulate-veiny leaves, the radical ample and long-petioled, the few cauline short-petioled or sessile; the stem branching at summit and bearing loose corymbose cymes of white flowers, the filaments being white and conspicuous in the manner of *Thalictrum*, the greenish white sepals falling when they open. — Ind. Sem. Hort. Petrop. 1835, 22; Torr. & Gray, Fl. i. 37; Gray, Gen. III. i. 25, t. 7.<sup>1</sup> *Hydrastis*, Lam. III. t. 500, not L. — Three species, much alike, the third in Japan and Amur; fl. summer.

**T. palmáta**, FISCH. & MEYER, l. c. Two or three feet high, puberulent or glabrous: radical leaves a span to a foot in diameter, 5-11-cleft, with lobes irregularly and acutely incised and serrate, or some again 2-3-lobed, extremely and conspicuously reticulate-veiny; cauline leaves sessile or the lowest petioled: akenes 2 or 3 lines long, obliquely obovate in outline, tipped with very short style. — Torr. & Gray, l. c.; Gray, l. c. 26, & Man. 40.<sup>2</sup> *Hydrastis Carolinensis*, Walt. Car. 156. *H. Canadensis*, Poir. Suppl. iii. 71, not L. *Cimicifuga palmata*, Michx. Fl. i. 316; Sims, Bot. Mag. t. 1630. *Thalictrum ranunculinum*, Muhl. in Willd. Enum. 585; DC. Syst. i. 186. *T. palmatum*, Spreng. Syst. ii. 674. *Actæa palmata*, DC. Syst. i. 383. — Moist ground along streamlets, Indiana<sup>3</sup> and E. Kentucky, and along the Alleghanies from Maryland to Georgia.

**T. grándis**, NUTT. Not larger: leaves thinner, inconspicuously reticulate-veined; cauline usually petioled: akenes smaller, broader and more rounded at base, tipped with a longer style. — Nutt. in Torr. & Gray, l. c. 37; Wats. Bot. Calif. ii. 425; Lawson, Rev. Canad. Ranunc. 43. *T. palmata*, var. *occidentalis*, Gray, Proc. Am. Acad. viii. 372. *Actæa palmata*, Hook. Fl. Bor.-Am. i. 26. *A. grandis*, Dietr. Syn. Pl. iii. 233. — Woods, W. Idaho and Brit. Columbia to Plumas Co., California, *Mrs. Austin*; first coll. by *Menzies*.

**7. ADÓNIS**, DILL. PHEASANT'S-EYE. (*Adonis*, the youth loved by Venus, and after his death changed into a flower.) — Caulescent herbs of the Old World; with finely dissected leaves and handsome flowers; a perennial vernal species

<sup>1</sup> Recent literature: E. Huth, Revision, in Engl. Jahrb. xvi. 286.

<sup>2</sup> Add syn. *T. Caroliniensis*, A. M. Vail, Mem. Torr. Club, ii. 42.

<sup>3</sup> Westward to Beardstown, Ill., *Geyer* (a thickish-leaved form, the var. *coriacea* of Huth, l. c. 288).

(*A. vernalis*) sometimes cultivated for ornament, and the following a precariously naturalized weed. — Cat. Pl. Giss. App. 109, t. 4; L. Gen. no. 465.

**A. AUTUMNALIS**, L. Low annual, summer-flowering, leafy: petals scarlet or crimson or paler, with a dark spot at base: mature akenes rugose-reticulate, short-pointed. — Spec. ed. 2, i. 771; Schk. Handb. t. 152; Hook. Fl. Bor.-Am. i. 9; Torr. & Gray, Fl. i. 15. *A. annua*, L. Spec. i. 547, in part. — Labrador, herb. Hooker, doubtless a transient introduction. Sparingly and occasionally met with in and near fields, especially in S. Atlantic and Gulf States. (Nat. from Eu.)

**8. MYOSÚRUS**, Dill. **MOUSETAIL**. (Name from  $\mu\upsilon\varsigma$ , a mouse, and  $\omicron\upsilon\pi\acute{\alpha}$ , tail, alludes to the shape of spike of pistils.) — Very small annuals, of temperate countries; with linear or filiform or at first spatulate entire leaves in a radical tuft, and simple one-flowered scapes; the yellowish or whitish flower succeeded by the slender spike or (in depauperate specimens) oblong head of carpels. These are in all the species more or less follicular, dehiscing suturally when they separate from the axis, liberating the seed! Spur or appendage to the sepals variable, in some flowers obsolete. — Cat. Pl. Giss. App. 106, t. 4 (as *Myosuron*); L. Gen. no. 257.<sup>1</sup>

\* Mature carpels with back carinate from base to apex (and commonly but variably prolonged into a tip or beak), not suberose- or cellular-thickened.

**M. apétalus**, GAY. Petals not rarely wanting: body of the akene oblong, or semi-ovate, utricular, thin or even scarious; the narrow thickened back traversed by a salient greenish keel: seed oblong. — Fl. Chil. i. 31, t. 1; Gray, Bull. Torr. Club, xiii. 2. *M. aristatus*, Benth. in Hook. Lond. Journ. Bot. vi. 458; Wats. Bot. King Exp. 5; Brew. & Wats. Bot. Calif. i. 5; Hook. f. Fl. N. Zeal. i. 8. — Mountains of Colorado, Utah, and Idaho to Brit. Columbia, California, and Arizona; first coll. by *Geyer*. (Chili, New Zealand, &c.) The typical form has carpel-spike from near an inch long and linear-cylindrical down to quarter inch and ovoid-oblong, and more or less squarrose by the prolongation of the salient keel of the carpels into a subulate ascending or spreading beak, which is sometimes as long as the body of the akene itself, but is occasionally erect and much shorter.<sup>2</sup>

**Var. leptúrus**, GRAY. Slender: carpel-spike narrower; carpels mostly smaller, beakless or very short-pointed: seed elongated-oblong. — Bull. Torr. Club, xiii. 2. *M. minimus*, var. *jiliformis*, Greene, Bull. Calif. Acad. Sci. i. 277, in small part. *M. australis*, Muell. Trans. Phil. Soc. Victoria, i. 6 (1855), & *M. minimus*, Benth. Fl. Austral. i. 8? — Same range, or nearly, from many collectors, and with intermediate forms; passed in various collections as *M. minimus*.

**M. minimus**, L. Carpel-spike commonly elongated, inch or two long: mature carpels somewhat quadrate, with broader usually rhomboidal and flat back, traversed by very low keel, ending in a short and appressed or often obsolete pointed tip (in eastern specimens the tip often wholly wanting, as in fig. Schk. Handb. t. 88, & Gray, Gen. III. i. 28); the body less utricular and thicker-walled: seed oval. — Spec. i. 284; Gray, l. c. i. 28, t. 8; Baill. Hist. Pl. i. 42, f. 71-75. *M. Shortii*, Raf. Am. Journ. Sci. i. 379. — Low ground, Illinois to Florida and west to Washington and California. A variety from California (also Sicilian) has fruiting scapes only 2 to 6 lines long.<sup>3</sup> (Eu., N. Afr.)

**M. sessilis**, WATSON. Flowers and cylindrical (half inch long and a line thick) carpel-spikes sessile at the crown; the latter in a spreading tuft, much shorter than the leaves: carpels with oval scarious utricular body and narrow acutely carinate green back, continued

<sup>1</sup> Further literature: E. L. Greene, Revision, Bull. Calif. Acad. Sci. i. 276-279; A. Gray, Notes on *Myosurus*, Bull. Torr. Club, xiii. 1-4; E. Huth, Revision, in Engl. Jahrb. xvi. 283-286.

<sup>2</sup> *M. aristatus*, var. *sessiliflorus*, E. Huth l. c. 286, from N. W. Solano, Calif., *Jepson*, differs only in its sessile flowers.

<sup>3</sup> This is the *M. breviscapus*, var. *Californicus* of Huth, l. c. 285, but appears to be thoroughly confluent with *M. minimus*.

into a prominent erect or slightly spreading subulate beak: seed oval. — Proc. Am. Acad. xvii. 362; Greene, l. c. 278. — Alkaline flats in Umatilla Co., N. E. Oregon, *Howell*.<sup>1</sup>

\* \* Mature carpels with back developed into a whitish cellular- or suberose-cartilaginous border around the salient and laterally compressed-beaked keel.

**M. alopecuroides**, GREENE. Scapes short and thickish, bearing a thickish fruiting spike: mature carpels somewhat quadrate, with cellular-scarious body, and oblong thickened cellular-bordered somewhat concave back, the short keel projecting into a prominent and spreading subulate beak: seed oblong-oval. — Bull. Calif. Acad. Sci. i. 278. — California, near Antioch, *Mrs. Curran*.<sup>2</sup> Spur or appendage of sepals (as in other species) of variable length, not rarely short or almost obsolete.

**M. cupulatus**, WATSON. Scapes elongated and slender, bearing a mostly elongated and slender fruiting spike: mature carpels roundish, slightly compressed within, the almost cartilaginous much-thickened portion projecting into a shallow dorsal cup around the base of the laterally much flattened triangular-subulate or gladiate erect or slightly spreading green beak; the proper cell small and narrow, filled with the oval seed. — Proc. Am. Acad. xvii. 362; Greene, l. c. — Hills and mountains of Arizona and adjacent New Mexico, *Greene, Lemmon, Pringle*.

**9. RANÚNCULUS**, Tourn. CROWFOOT, BUTTERCUP. (Latin name of a tadpole, applied by Pliny to aquatic species of this genus.) — A large and much diversified cosmopolitan genus of perennial or annual herbs, of various habit. — Inst. 285, t. 149; L. Gen. no. 464; Torr. & Gray, Fl. i. 15, incl. *Cyrtorhyncha*, Nutt.; Benth. & Hook. Gen. i. 5, incl. *Oxygraphis*, Bunge; Gray, Proc. Am. Acad. xxi. 363–378.

**R. FICÁRIA**, L. (representing the section FICÁRIA, which has roots tuberous-thickened downward, *Caltha*-like leaves, and scapiform peduncle bearing a 3-sepalous and about 9-petalous flower) has been collected at Flushing, Long Island, and on the Wissahickon near Philadelphia<sup>3</sup> escapes from cultivation. There is no telling what Walter's *R. Ficaria* may be, perhaps *Caltha*.

**R. HORNEMÁNNI**, Schlecht. Animad. Ranunc. ii. 36; DC. Prodr. i. 44 (*R. tuberosus*, Hornem. Hort. Hafn. ii. 527) is purely *R. bulbosus*, *fide* Lange.

**R. DÉBILIS**, Raf. in Desv. Journ. Bot. i. 225 (1808), coll. near Germantown, Penn., is not to be made out.

**R. OBUSTUSCULUS**, Raf. l. c. is equally indeterminable, even with the help of a tracing from an original sketch, possessed by the N. Y. Academy of Sciences, which is probably not true to nature, representing cauline foliage of *R. pusillus*, from an annual root, 5-merous polyandrous flowers with persistent linear-lanceolate sepals and a long style.

§ 1. **BATRÁCHIU**M, DC. Petals white with yellow base and a naked (not scale-covered) nectariferous pit: akenes of *Euranunculus* but transversely rugose, marginless: stamens often few: aquatic or occasionally subaquatic, either perennial by rooting from the nodes or winter-annuals, with submersed leaves filiform-dissected and either with or without emersed dilated leaves; the stipular-dilated base of petiole membranous: peduncles solitary, opposite the leaves. — Syst. i. 233. *Batrachium*, S. F. Gray, Brit. Pl. ii. 720; Wimmer, Fl. Schles. 8, *fide* Fries, Bot. Not. 1842, no. 8, & Novit. Mant. iii. 51. *Ranunculus hydrocharis*, Spenner, Fl. Frib. 1007; Hiern in Seem. Journ. Bot. ix. 44. Between this

<sup>1</sup> Also San Joaquin Val., Calif., *Greene*, acc. to Huth, who places in this species also Prof. Greene's *M. minimus*, var. *apus* (Bull. Cal. Acad. Sci. i. 277).

<sup>2</sup> Also near Vacaville, Calif., *Greene*.

<sup>3</sup> Also at Hingham, Mass., *Crushing*, and Willow Brook, Richmond Co., N. Y. acc. to Hollick & Britton, Bull. Torr. Club, xviii. 213.

reduction to one species and the admission of 35, probably the better choice is to admit the following along with *R. fluitans*, Lam., and thus preserve the earliest names.

\* Styles subulate, not longer than the ovary, introrsely stigmatose for part or all of their length: petals deciduous.

+ Carpel-receptacle more or less hairy: submersed capillary-multifid foliage always present, oftener no other in American plants: petals several-nerved.—*R. aquatilis*, L.

**R. circinatus**, Sibth. Wholly submersed and destitute of emersed foliage: leaves sessile (down to the very short stipular-dilated base) and dissected into rigid lobes, all spreading in one plane (at right angles to stem) in an orbicular outline of about an inch in diameter, not at all collapsing when drawn out of water: style as long as the ovary, stigmatose above, not rarely persisting as a subulate beak. — Fl. Oxon. 175; Eng. Bot. Suppl. iv. t. 2869; Reichenb. Ic. Fl. Germ. iii. t. 2; Fl. Dan. t. 2236. *R. aquatilis*, β, L. Spec. i. 556, in part; Schk. Handb. t. 152. *R. stagnatalis*, Wallr. Sched. Crit. 285. *R. rigidus*, Roth. En. Pl. Phænog. Germ. i. sec. 2, 633. *R. divaricatus*, Koch in Sturm, Deutsch. Fl. xvi. Heft 67, &c. (not, it is said, of Schrank, nor of Mönch); Godron, Ess. 27, f. 7, Gray, Man. ed. 5, 40, & Pl. Wright. ii. 8. *R. aquatilis*, var. *divaricatus*, Gray, Man. ed. 2, 7. *R. longirostris*, Godron, l. c. 32, f. 9. *R. aquatilis*, var. *longirostris*, Lawson, l. c. 43. *Batrachium circinatum*, Spach, Hist. Veg. vii. 201; Fries, Herb. Norm. 1842, &c.<sup>1</sup> — In still water, Canada and Hudson Bay to Brit. Columbia, and W. Texas, but mainly northeastward. (Eu.)

**R. aquatilis**, L. Leaves petioled; the emersed ones present in the type, reniform or orbicular, 3-5-lobed or sometimes parted and the divisions 2-3-cleft: submersed ones dissected into either filiform or capillary divisions, which are widely spreading, usually of rather firm texture, or else flaccid so as to collapse when drawn out of water: style short. — Spec. i. 556, &c. The typical form is var. *HETEROPHYLLUS*, DC. Prodr. i. 26 (*R. aquatilis*, DC. Syst. i. 234, *R. heterophyllus*, Weber, Fries, &c.); Hook. Fl. Bor.-Am. i. 10; Gray, Man. ed. 5, 40.<sup>2</sup> — Growing in shallow waters, in this country only from Alaska and the adjacent islands (where taken by Schlechtendal for *R. hederaceus*) to Oregon and California. (Eu., Asia.)

**Var. trichophyllus**, GRAY, l. c. All the leaves dissected: the most available name for the collective forms (*R. pantothrix*, Brot. in DC. Syst. i. 235); but used in restricted sense for those with rather short and slightly rigid leaves, which do not collapse on withdrawal from the water. — *R. trichophyllus*, Chaix in Vill. Fl. Dauph. i. 335, & *R. divaricatus*, Schrank, Baiersche Fl. ii. 104, *fide* Hiern.<sup>3</sup> Var. *BRACHYPUS*, Hook. & Arn. Bot. Beech. 316, with peduncle shorter than the leaf, is the commoner form of this in California.<sup>4</sup> Var. *CÆSPITOSUS*, DC. Prodr. i. 26, is a dwarf and condensed form, becoming terrestrial; the leaves becoming somewhat fleshy or rigid. Var. *CONFEROIDES* (*R. confervoides*, Fries, Sum. Veg. Scand. i. 139) is a dwarf form with capillary flabby leaves, found only northward. Var. *FLACCIDUS* (*R. flaccidus*, Pers. in Usteri, Ann. Bot. v. pt. 14, 39), with soft capillary dissected leaves, collapsing on withdrawal from the water: New England, New York, &c., commonly a large form, in rather deep water, with longer or less numerous leaf-divisions: answering to *R. aquatilis*, var. *submersus*, Godron in Gren. & Godr. Fl. Fr. i. 23,

<sup>1</sup> Add syn. *Batrachium divaricatum*, Britton, Mem. Torr. Club, v. 160, not Wimm. (which being *R. divaricatus*, Schrank, was, acc. to Hiern, a form of the plant here called *Ranunculus aquatilis*, var. *trichophyllus*).

<sup>2</sup> Add syn. *R. Grayanus*, Freyn, Deutsche Bot. Monatsschr. viii. 179, and *R. aquatilis*, var. *hispidulus*, Drew, Bull. Torr. Club, xvi. 150. The hispid character of the lower surface of the emersed leaves is a very general one both in European and American specimens, and is in no wise restricted to plants with trifid leaves.

<sup>3</sup> Add syn. *Batrachium trichophyllum*, Bosch, Prodr. Fl. Bat. 5.

<sup>4</sup> *R. Porteri*, Britton (Bull. Torr. Club, xvii. 310), known from imperfect specimens, appears to be but a form of the same polymorphous species. Its akenes are three fourths line in diameter and its leaves are dissected, some into narrowly linear, others into filiform segments. If a form of this species it may also be placed between vars. *cæspitosus* and *trichophyllus*.

& *R. aquatilis*, var. *trichophyllus*, Gray, Man. ed. 5, 40. — In ponds, and especially in slow-flowing streams, almost everywhere. (Eu., Asia.)

— Carpel-receptacle glabrous: no submersed dissected leaves: petals about 3-nerved, narrow.

**R. HEDERÁCEUS**, L. l. c. Rooting freely on muddy banks or in shallow water: leaves all reniform, angulate-lobed: peduncles not surpassing the petiole: flowers small, with few and small akenes. — Fl. Dan. t. 321; Eng. Bot. t. 2003; Reichenb. Ic. Fl. Germ. iii. t. 2. — In fresh water marshes at Norfolk, Virginia, *Muir*.<sup>1</sup> (Nat. from Eu.)

\* \* Styles long and filiform, with small terminal stigma: petals deciduous.

**R. Lóbbii**, GRAY. Submersed leaves either none or few and of few divisions: emersed small (at most half inch broad), divergently 3-parted into oval or oblong and entire or 1-2-notched lobes: stamens 5 to 10: carpels not more numerous; styles about thrice the length of the ovary, of equal width from base to apex, only the base persisting on the oblong obliquely rugose akenes, these mostly enclosed in the marcescent-persistent petals: receptacle small, wholly glabrous. — Proc. Am. Acad. xxi. 364. *R. hydrocharis*, forma *Lobbii*, Hiern in Seem. Journ. Bot. ix. 66, t. 114 (as sub-species), at least as to Bigelow's plant, and probably as to that of Lobb from Oregon. *R. hederaceus*, var., Torr. Pacif. R. Rep. iv. 62. *R. aquatilis*, var. *Lobbii*, Wats. Bibl. Index, 17. *R. hederaceus*, var. *Lobbii*, Lawson, Rev. Canad. Ranunc. 44, partly. — In water, California, Corte Madera, Marin Co.; near Bay of San Francisco, *Bigelow*; Tomales Bay, *Greene*; Oregon, *Lobb*, in herb. Kew.

§ 2. **PSEUDAPHANOSTÉMA**, Gray. Petals and petaloid (white tardily deciduous) sepals of § *Aphanostemma*, with carpels and habit of § *Oxygraphis*: viz. the former inane, reduced to a minute fleshy-thickened lamina or nectary on a slender claw; the latter lanceolate, acuminate, compressed, membranaceous and utricular, obscurely one-nerved on the sides, the cell much longer than the seed. — Proc. Am. Acad. xxi. 365. *Kumlien*a, *Greene*, Bull. Calif. Acad. Sci. i. 337.

**R. hystrículus**, GRAY. Low and glabrous perennial with fascicled roots: leaves mainly radical, long-petioled, orbicular-reniform, 5-7-lobed and coarsely crenate-dentate: scapes a span or two high, naked or one-leaved below and one-flowered, sometimes with a small leaf above and a second flower: sepals 5 or 6, oval, quarter to half inch long: carpels numerous in a globose and squarrose head when mature, sparsely pubescent, lanceolate and gradually attenuate into the persistent style (together about 3 lines long); the oval seed supra-basal. — Proc. Am. Acad. vii. 328; Brew. & Wats. Bot. Calif. i. 6. *Kumlien*a *hystricula*, *Greene*, l. c. — Moist ground, western side of the Sierra Nevada, at 5,000 feet, Yosemite to Butte Co., *Bolander*, *Brewer*, *Mrs. Austin*, *Rattan*, &c.

§ 3. **CRYMÓDES** (i. e. *glacialis*), Gray. Petals rose-color or white (ample, nectariferous and with imperfect scale), and with the sepals marcescent-persistent: carpels utricular: seed oblong: showy flowered low perennials, with fibrose-fasciculate roots, arctic or alpine, with the notable exception of the following, glabrous at least up to the sepals. — Proc. Am. Acad. xxi. 365.

**R. Andersónii**, GRAY. A span or two high: leaves chiefly radical, 2-3-ternately or pedately divided or parted; lobes thickish, lanceolate to linear: scape one-leaved or naked, 1-2-flowered: sepals glabrous: petals rose-color or pink, orbicular or flabellate-obovate with narrow claw, half inch long: mature carpels wholly utricular and membranous-walled but compressed, obovate-orbicular and oblique, 3 lines long, the cell of the whole width except a very narrow scarious margin, abruptly apiculate with very short style. — Proc. Am. Acad. vii. 327; Wats. Bot. King Exp. 6, t. 1; Brew. & Wats. Bot. Calif. i. 6, with a slender form, var. *tenellus*, Wats.<sup>2</sup> — Eastern part of Sierra Nevada, California and Nevada, *Anderson*,

<sup>1</sup> Also collected in Dismal Swamp, Va., *Chickering*, and in Newfoundland, at New Harbor, *Wag-horne*, Bona Vista Bay, *Osborn*, and Quiddy Viddy Lake, *Robinson & Schrenk*. *Batrachium hederaceum*, S. F. Gray, Brit. Pl. ii. 72, is a synonym.

<sup>2</sup> Add syn. *Oxygraphis Andersónii*, Freyn, Flora, lxx. 140.

*Lemmon*, &c. to near Salt Lake, Utah, *Watson*, &c., and Boise City, S. W. Idaho, *Wilcox*, at 5,000 to 9,000 feet.

*R. CHAMISSÓNIS*, Schlecht. *Animad. Ranunc.* i. 12, t. 1, is known only on the Asiatic side of Bering Strait, and is much nearer the following, but with more utricular and gibbous fruit and longer more naked style (according to herb. Kew); it is very little known.

*R. GLACIÁLIS*, L., of Europe, on the other hand, coming as near the American continent as Greenland, has dark-hairy calyx and longer beaked broadly semi-ovate carpels; when young these are wholly scarious-utricular; in age the portion immediately around the seed becomes coriaceous, the rest forming the hyaline wing, which, however, is bilamellar and pervious.

§ 4. *CYRTORHYNCHA*,<sup>1</sup> Gray. Petals pale yellow, bearing a prominent simple or bifid callosity on the inner face (with the whitish or yellowish membranaceous sepals) deciduous: stamens about 20: carpels in a globular head, *Thalictrum*-like, in fruit somewhat utricular akenes, oblong, terete, or ovate and laterally flattened, prominently about 10-costate, tipped with a short subulate inflexed or slightly recurved style, subcoriaceous, loosely filled by the oblong erect seed: fibrose-rooted perennials. — (*Benth. & Hook. Gen.* i. 6.) *Proc. Acad. Philad.* 1863, 56. *Cyrtorhyncha*, Nutt. in *Torr. & Gray, Fl.* i. 26.

*R. Nuttállii*, GRAY, l. c. A span to near a foot high, glabrous: leaves 2-3-ternately divided and parted into oblong or lanceolate lobes; radical long-petioled, cauline one or two and small: stems corymbosely several-flowered: petals 5 to 9, 2 lines long, spatulate-oblong: akenes a line or so long. — *Cyrtorhyncha ranunculina*, Nutt. in *Torr. & Gray, l. c.* — Rocky Mountains of Wyoming and Colorado; fl. spring and summer; first coll. by *Nuttall*.

*R. Cooléyæ*, VASEY & ROSE. Glabrous, 3 to 10 inches high: root a cluster of stout fibres: leaves chiefly radical, orbicular in outline, deeply and palmately 3-5-cleft, 1 to 1½ inches in diameter; the lobes flabelliform, crenate-dentate and again more or less deeply parted; the cauline leaves solitary or absent, smaller and of simpler contour: stem simple or once branched: sepals greenish or yellowish white, broadly oblong, obtuse, 4 lines in length: petals bright yellow, having a bifid thickening near the junction of the very short claw and the narrowly oblong blade, 2½ to 3 lines in length: carpels very numerous, only partly ripening, at maturity ovate, laterally compressed and keeled, tipped with a slender gently recurved style with small terminal stigma. — *Contrib. U. S. Nat. Herb.* i. 289, t. 22. *Kunlienia Cooleyæ*, Greene, *Erythea*, ii. 193 & ? iii. 53. — Rocky hills near the snow level, Alaska, near Juneau, *Miss Cooley*; St Elias Alps above Disenchantment Bay, *Funston*; fl. & fr. August. A plant of doubtful affinities, possessing much the habit of the Californian *R. hystriculus*, but the shorter smooth thickish more strongly ribbed akenes as well as the petals of the preceding.

§ 5. *HALÓDES*, Gray. Petals yellow, with nectariferous spot and scale, deciduous with the sepals: mature carpels thin-walled and utricular, compressed, the sides striate with several simple or sparingly branched nerves: perennial by flagelliform stolons, affecting saline soil: scapes 1-3-flowered. — *Proc. Am. Acad.* xxi. 366. — Comprises *R. plantaginifolius*, Murr. (*R. salsuginosus*, Pall. acc. to DC., *R. Ruthenicus*, Jacq.) of Siberia, and the following.

*R. Cymbalária*, PURSH. Low, glabrous: leaves orbicular or ovate-roundish and cordate, or sometimes with truncate base, coarsely crenate, or rarely only 3-toothed, more or less succulent (varying from an inch down to 2 lines in length): scape 1 to 6 inches high: petals 5 to 9, narrowly oblong or spatulate, 1 to 4 lines long: akenes apiculate, small and very numerous, in an at length oblong head on an elongated receptacle. — *Fl.* ii. 392; *Hook. Fl. Bor.-Am.* i. 11; *Torr. & Gray, Fl.* i. 17; *Fl. Dan.* t. 2293. *R. salsuginosus*, Pall. *Reise, ed.* 3, iii. 173, in part? *R. tridentatus*, HBK. *Nov. Gen. & Spec.* v. 42. *R. halophilus*,

<sup>1</sup> Extended to include *R. Cooleyæ*.

Schlecht. *Animad. Ranunc. i.* 23, t. 4, f. 1,<sup>1</sup> the diminutive and chiefly high northern form, var. *ALPINUS*, Hook. *Fl. Bor.-Am. i.* 11. — Moist and brackish soil, arctic sea-coast and along the coast to New Jersey, and at salt springs in the interior, along the Rocky Mountain region and westward to California. (Greenland, N. & Centr. Asia, Mex., S. Amer.)

§ 6. *EURANUNCULUS*. Petals yellow or in few species white, with nectariferous spot or pit covered by a scale on the claw, deciduous: sepals 5, sometimes 3 or 4, deciduous: carpels in fruit coriaceous or crustaceous akenes, filled by the seed or nearly so, usually more or less compressed, the sides nerveless.

\* Petals white (8 or 10): sepals 3 or 4.

**R. Pallásii**, SCHLECHT. Creeping perennial, glabrous: stems and elongated petioles thick and fistulous: leaves with short blade from linear to oblong, obtuse and entire, or some cuneate and 2-3-lobed: petals quarter to half inch long, obovate: akenes thin-crustaceous, 2 lines long or more, tipped with a small short beak. — *Animad. Ranunc. i.* 15, t. 2; Hook. *Fl. Bor.-Am. i.* 10; Seem. *Bot. Herald*, 22. *R. Pallásii*, Torr. & Gray, *Fl. i.* 17. — In shallow water, arctic Alaska, and Islands, *Pallas*, *Chamisso*, *Seemann*, *Murdock*, &c. Also Labrador, *vide* Ascherson, but doubtful. (Arct. E. Asia, Lapland.)

\* \* Petals yellow, commonly 5 (3-16 in certain species).

→ Amphibious aquatics, with dissected leaves, when submersed capillary-multifid in the manner of § *Batrachium*: perennial by fibrous-rooting from the nodes: akenes smooth.

**R. multifidus**, PURSH. Polymorphous, fibrous-rooting: the well developed plant aquatic, with submersed or floating elongated fistulous stems: leaves, inch or two long, all ternately decomposed into narrow filiform or capillary divisions, flaccid, or some small uppermost emersed and 5-7-parted into cuneate lobes: flowers showy: petals 5 to 8, broadly obovate, deep golden yellow, 4 to 6 lines long: akenes obliquely ovate, rather turgid, when ripe suberose-thickened at base and ventral edge, tipped with a straight and compressed subulate beak of half their length. — *Fl. ii.* 736; DC. *Syst. i.* 270; Gray, *Man. ed. 5*, 40, not Forsk., which being quite obscure may rest as *R. Forskæhlîi*, DC. *R. fluviatilis*, Bigel. *Fl. Bost. ed. 1*, 139, not Willd. *R. lacustris*, Beck & Tracy, *N. Y. Med. & Phys. Journ. ii.* 112, & *Trans. Alb. Inst. i.* 148, t. 5.<sup>2</sup> *R. Purshii*, Hook. *Fl. Bor.-Am. i.* 15, as to vars. *α* & *β*, t. 7, B. 1; Torr. & Gray, *Fl. i.* 19, as to vars. *α* & *β*. *R. Beckii*, Don, *Syst. i.* 39. *R. Purshii*, var. *aquatilis*, Ledeb. *Fl. Ross. i.* 35. — In stagnant or slow-flowing water, Atlantic States from N. Carolina northward to N. Canada, Brit. Columbia, California, &c. (Siberia.)

**Var.\* terrêstris**, GRAY.<sup>3</sup> Under this may be collected the series of forms of shallow water or wet soil, which creep, rooting in the mud, with shorter stems, emersed coarsely dissected leaves, round-reniform and once to thrice parted or cleft into more or less cuneate lobes: flowers and fruit often somewhat smaller; also autumnal forms in exsiccated beds of ponds, with ascending stems and broadish lobes to the leaves, these usually pubescent. — *Man. ed. 5*, 41, & *Proc. Am. Acad. xxi.* 366 (where as in ms. of present work the following species was included). ? *R. Missouriensis*, Greene, *Erythea*, iii. 20. — With the typical form, and not very common. To be distinguished from the following, which it closely simulates in foliage, by its larger akenes with a tumid suberose border about the base and tipped with a longer flatter style.

**R.\* Purshii**, RICHARDS. Creeping upon muddy banks: leaves small, 4 to 9 (to 12) lines in diameter, circular in outline, 3-5- or many-cleft into linear segments (filiform dissected leaves very rarely present): flowers small, seldom over 5 lines in diameter: heads of fruit as well as the akenes themselves considerably smaller than in the preceding, the latter destitute of any distinct turgid margin and tipped with a slender style. — Richards. in *Frankl. 1st Journ. ed. 2*, App. 751 (reprint, p. 23), var. *α*; Hook. *Fl. Bor.-Am. i.* 15, as to vars. *γ* & *δ*, t. 7, B. 2 & 3; Torr. & Gray, *Fl. i.* 19, as to vars. *γ* & *δ*. *R. Gmelini*, DC. *Syst. i.* 303 (R.

<sup>1</sup> Add syn. *Cyrtorhyncha Cymbalaria*, Britton, *Mem. Torr. Club*, v. 161.

<sup>2</sup> Greene, *Pittonia*, ii. 62; C. A. Davis, *Bot. Gaz.* xvi. 115. Add also syn. *R. delphinifolius*, Torr. in *Eaton*, *Man. ed. 2*, 395, not HBK.

<sup>3</sup> This variety has been limited by the editor to exclude the following species.



no. 49, Gmel. Fl. Sibir. iv. t. 83, f. B), & *R. Langsdorfii*, DC. Prodr. i. 34. *R. pusillus*, Ledeb. Mem. Acad. Petrop. v. 546, the depauperate high northern form. *R. limosus*, Nutt. in Torr. & Gray, l. c. 20. *R. radicans*, Regel, Bull. Soc. Nat. Mosc. xxxiv. pt. 2, 44, 45, not of C. A. Meyer & Ledeb. *R. multifidus*, var. *repens*, Wats. Bot. King. Exp. 8, & Bibl. Index, 20. *R. multifidus*, var. *limosus*, Lawson, Rev. Canad. Ranunc. 47. — Western arctic America to Great Slave Lake, south to Michigan, Washington, and even New Mexico, *Palmer*; also in cold bogs of Nova Scotia, *Trueman*.

+ + Terrestrial arctic or alpine perennials (or first species amphibious and less alpine), creeping and wholly fibrous-rooting, either from procumbent stems or filiform rootstocks, glabrous; with rounded leaves palmately 3-5-lobed or parted but not divided nor filiform-dissected: flowers small: akenes smooth.

++ Stems leafy and rooting at the nodes: akenes small in a globular head: style short or hardly any.

**R. nátans**, C. A. MEYER. Creeping extensively, rooting in wet mud or floating in shallow water: leaves reniform or some with shallow sinus or truncate base, 4 to 9 lines in diameter, with 3 to 5 roundish or obovate diverging lobes: petals about 2 lines long: carpels very numerous in a globose head (of a quarter inch in diameter) with a thick fleshy receptacle: style extremely short, with a terminal stigma. — Meyer in Ledeb. Ic. t. 114, Fl. Alt. ii. 315, & Fl. Ross. i. 34. *R. hyperboreus*, var. *natans*, Regel, l. c. 43; Gray, Proc. Acad. Philad. 1863, 56. *R. radicans*, C. A. Meyer in Ledeb. Ic. t. 116, is a form of the same. *R. Purshii*, Torr. Ann. Lyc. N. Y. ii. 162, not Richards. — Rocky Mountains of Colorado, subalpine or lower, *Hall & Harbour*, *James*, *Coulter*, *Rothrock*, *Patterson*. (N. Asia.)

**R. hyperbóreus**, РОТТБ. Terrestrial in wet soil, small, depressed and creeping: leaves of cuneate or flabelliform outline, rarely with subcordate base (2 to 6 lines broad), 3-lobed or almost 3-parted: the lobes obovate or oblong, and the later ones sometimes 2-lobed: petals a line long: carpels fewer in a small head with an oval receptacle: style very short. — Act. Hafn. x. 458, t. 4, f. 16 (Fl. Dan. t. 331); DC. Syst. i. 272; Reichenb. Ic. Pl. Crit. i. t. 11, f. 21, 22; Torr. & Gray, Fl. i. 20. — Labrador, *Allen*, *Bell*, to arctic Alaska. (Arct. Asia & Eu., Greenland.)

++ ++ Scapose from filiform rootstocks: akenes rather few in a loose head with small receptacle, long-styled.

**R. Lappónicus**, L. Long filiform runners or rootstocks sending up long-petioled radical leaves and simple leafless or one-leaved scapes a span high: leaves reniform in outline (an inch in diameter), 3-parted; divisions flabellate-cuneate, 3-7-lobed or crenate-incised: petals 3 lines long: akenes a line or more long, obliquely ovate, somewhat acute-margined, a little longer than the slender introrsely stigmatose persistent style. — Spec. i. 553 (Fl. Lapp. t. 3, f. 4); Wahl. Fl. Lapp. t. 8, f. 2; Fl. Dan. t. 2292.<sup>1</sup> — Western part of arctic America, and Rocky Mountains south to Lat. 54°.<sup>2</sup> (N. Asia & Eu., Greenland, &c.)

+ + + Uliginous or subaquatic, fibrous-rooted, glabrous or nearly so, with leaves all entire or merely denticulate or crenulate, petioled.

++ Akenes beakless or nearly so, dull; the style very short and deciduous or hardly any: subannuals; ours with erect or ascending usually weak stems, sometimes rooting from the lower nodes, but hardly at all thereby perennial: lowest leaves cordate or ovate or oblong and long-petioled: upper lanceolate to linear.

= Petals 1 to 3 or occasionally 5, not over a line long, pale yellow: stamens only 5 to 10. — *Casalea*, St. Hil.

**R. trachyspérmus**, ENGELM. Stems a span to 2 feet high, seldom rooting, and plant probably purely annual: carpels somewhat orbicular, tumid-lenticular, narrowly margined, and the faces minutely tuberculose, only one third line long, crowded in a cylindraceous or oblong head with a narrow receptacle of 2 lines or so in length. — Engelm. in Gray, Pl.

<sup>1</sup> Add syn. *Anemone nudicaulis*, Gray, Bot. Gaz. xi. 17; see Britton, Ann. N. Y. Acad. Sci. vi. 233.

<sup>2</sup> Also north shore of Lake Superior, at Sand Bay, *J. C. Jones*, and near Grand Marais, Minn., *Cheney*, acc. to Coulter & Fisher, Bot. Gaz. xviii. 299.

Lindh. i. 3 (not Ell.), excl. var. *Lindheimeri*, but incl. var. *angustifolius*. — Low grounds Louisiana, *Langlois*, and Texas; first coll. by *Lindheimer*.

**R. pusillus**, Poir. Stems 6 to 20 inches high, not rarely rooting from decumbent base: carpels somewhat obovate, half to three fourths line long, dull, smooth or irregularly somewhat papillose, rather numerous in a small globular head. — Dict. vi. 99; Pursh, Fl. ii. 392; Deless. Ic. Sel. i. t. 28; Ell. Sk. ii. 57; Torr. & Gray, Fl. i. 17, partly. *R. Flammula*, Walt. Car. 159, not L. *R. humilis*, Pers. Syn. ii. 102. (*R. Bonariensis*, Poir. l. c. 102, is very near, and of no older date.) — Wet ground or in shallow water, Staten Island, New York, to Missouri and southward to Florida and Texas, along the low country.

**Var. Lindheimeri**, GRAY. A span or two high: akenes more papillose-roughish. — Proc. Am. Acad. xxi. 367. *R. trachyspermus*? var. *Lindheimeri*, Engelm. in Gray, Pl. Lindh. i. 3; Torr. Pacif. R. Rep. iv. 62; Brew. & Wats. Bot. Calif. i. 7.<sup>1</sup> — New Orleans, *Berlandier*, no. 1939; Galveston, Texas, *Lindheimer*; Napa Valley and San Rafael, California, *Bigelow*, *J. P. Moore*.

== Petals 5, bright yellow, 1 to 3 lines long, surpassing the calyx: stamens numerous.

**R. oblongifolius**, ELL. Mostly a foot or two high, paniculately branched, seldom rooting at base, seemingly annual: akenes rather few in a small globose head, globular or turgid-lenticular, smooth or scabrous-puncticulate, only one third line long; the small or slender style wholly deciduous. — Sk. ii. 58; Gray, Man. ed. 5, 41. *R. Flammula*, Michx. Fl. i. 321. *R. pusillus*, var. *oblongifolius*, Torr. & Gray, Fl. i. 17. *R. Flammula*, var. *laxicaulis*, Torr. & Gray, l. c. 16.<sup>2</sup> *R. Texensis*, Engelm. in Gray, Pl. Lindh. i. 2. — Wet ground, Illinois<sup>3</sup> and S. Carolina to Texas.

++ ++ Akenes subulate-beaked (but the beak sometimes deciduous or reduced to an apiculus), smooth, in a globular head: petals as many as 5.

== Perennial by rooting from the lower nodes of ascending stems or from most of those of creeping stems: roots all fibrous and not thickened.

a. Some lower cordate leaves.

**R. hydrocharoides**, GRAY. Amphibious, with erect or ascending flowering stems a span or two high, and elongated creeping branches from the base, these stout and fistulous or sometimes slender: leaves all entire or nearly so (inch or less long), somewhat succulent, chiefly long-petioled; lower either round-cordate or oval, or some like the uppermost obovate or spatulate: petals 2 or 3 lines long, much surpassing the calyx: akenes in a small globose head, less than a line long, tipped with narrow and short abrupt beak. — Pl. Thurb. in Mem. Am. Acad. v. 306; Rothrock in Wheeler, Rep. vi. 56. — Marshes and springs, S. W. Arizona, *Thurber*, *J. D. Smith*, *Rothrock*, *Lemmon*, the specimens of the last less succulent and rather longer-styled; Owen's Valley, S. E. California, *Kellogg*, a slender form, with small leaves and longer styles.

*R. stolónifer*, Hemsl. of Northern Mexico, much smaller-flowered, is related to this.

b. No cordate leaves, the radical ones at most oblong or ovate. — SPEARWORT.

**R. Flammula**, L. No representative known in N. America of the true species, which has rather the habit of the next, with ascending stems rooting only at or near the base, a foot or so high; with lower leaves ovate-oblong to lanceolate and often rounded at base, not rarely with serratures; akenes small, with a small or minute beak, or the deciduous style leaving only an apiculation. — Spec. i. 548; Fl. Dan. t. 575; Curt. Fl. Lond. vi. t. 36. — (Eu.)

**Var. intermedius**, Hook. Smaller: stems decumbent and creeping, often to a foot in length: leaves all lanceolate or linear-lanceolate, entire or nearly so, inch or two long, tapering into the petiole: petals 2 or 3 lines long: akenes of the type or more beaked. — Fl. Bor.-Am. i. 11; Gray, Man. ed. 5, 41, & Proc. Am. Acad. viii. 373. *R. Flammula*, var. *Unalaschensis*, Ledeb. acc. to Regel, Bull. Soc. Nat. Mosc. xxxiv. pt 2, 41. *R. reptans*, var.

<sup>1</sup> Add syn. ? *R. Biolettii*, Greene, Pittonia, ii. 225, nearly from character, and *vide* K. Brandegee, Zoe, iv. 81.

<sup>2</sup> Add syn. *R. laxicaulis*, Darby, Bot. S. St. 204.

<sup>3</sup> S. E. Missouri, *Eggert*, *Bush*, and Isle of Wight County, Virginia, acc. to Heller, Bull. Torr. Club, xxi. 22.

*intermedius*, Torr. & Gray, l. c. 16. — Shore of Lake Ontario<sup>1</sup> to California and Oregon and northward. (N. Asia, Eu.) Largest forms from western coast, nearly approaching the type; very slender and linear-leaved as well as small broader-leaved forms pass into

**Var. réptans**, E. MEYER. Small, wholly creeping: stems filiform, a span or two long: leaves with blade from 2 lines to an inch long, from linear to spatulate or lanceolate: petals about 2 lines long: akenes with more conspicuous and subulate oftener curved beak, or sometimes merely apiculate-beaked as in the type. — Pl. Labr. 96; Gray, Man. ed. 5, 41; Reichenb. Ic. Fl. Germ. iii. t. 10. *R. reptans*, L. Spec. i. 549 (Fl. Lapp. t. 3, f. 5); Fl. Dan. t. 108, &c. *R. reptans*, var. *filiformis*, DC. Syst. i. 248; Torr. & Gray, l. c. 16. *R. filiformis*, Michx. Fl. i. 320; Bart. Fl. N. A. ii. t. 70. *R. Flammula*, var. *filiformis*, Hook. Fl. Bor.-Am. i. 11. — Gravelly borders of ponds and pools, New England to Penn., and westward in the mountains of Colorado and Utah, to California, and north to arctic Alaska and Hudson Bay. (Greenland, N. Eu., N. Asia.)

**R. ámbigens**, WATSON. Robust, 2 feet high, erect from a decumbent rooting base: leaves lanceolate, acute or acuminate, often serrulate, 3 or 4 inches long by 4 to 10 lines wide, mostly much longer than the dilated half-clasping petiole: petals oblong, 2 or 3 lines long: akenes a line long, obliquely oval, compressed, tipped with erect-incurved narrow-subulate beaks of fully or more than half their length. — Proc. Am. Acad. xiv. 289, & Bibl. Index, 16. *R. Flammula*, & *R. Lingua*, Pursh, Fl. ii. 391, and of all the older Am. botanists. *R. Flammula*, Torr. & Gray, l. c. 16, excl. var. *R. alismæfolius*, Benth. Pl. Hartw. 295, as to eastern plant; Gray, Man. ed. 5, 41, not Geyer.<sup>2</sup> — In wet grassy places, New England to Illinois,<sup>3</sup> south to the mountains of Tennessee and Georgia, and north to Canada. The Amer. analogue of *R. Lingua*.

== Strictly perennial, terrestrial, more or less tufted, with thickened-fibrous and fascicled roots: stems mostly short and erect, or assurgent, not at all rooting from nodes: mature akenes turgid (a line or more long), with introrsely apical or subapical and rather short subulate beak.

**R. alismæfolius**, GEYER. Commonly robust, a span to a foot high, simple or branching: leaves lanceolate to oblong, mostly tapering into margined or base-dilated petioles, or upper subsessile, entire (sometimes obscurely repand-denticulate), thickish, 2 to 4 inches long and a quarter to full inch wide: petals broadly obovate, a third to half inch long, generally large and showy: akenes glabrous and smooth, in a globose or hemispherical head. — Geyer in Benth. Pl. Hartw. 295, as to Pacif. pl. only, the fruit not then known; Wats. Proc. Am. Acad. xiv. 289; Brew. & Wats. Bot. Calif. i. 6. *R. Flammula*, Hook. Lond. Jour. Bot. vi. 66. *R. Bolanderi*, Greene, Bull. Calif. Acad. Sci. ii. 58.<sup>4</sup> — Marshes from borders of Brit. Columbia and Colorado to central parts of California; first coll. and distinguished by Geyer.

**Var. alismellus**, GRAY. Usually much more slender, 4 to 10 inches high: leaves thinner, with blade half inch to 2 inches long, from oblong-lanceolate to ovate, or radical even cordate and on long slender petioles: flowers smaller: petals only 3 lines long. — Proc. Am. Acad. vii. 327, viii. 372; Brew. & Wats. Bot. Calif. i. 6. *R. alismæfolius*, var. *montanus*, Wats. Bot. King Exp. 7, one of the intermediate forms.<sup>5</sup> — Same range,<sup>6</sup> but subalpine, and in the Rocky Mountains, from Wyoming to Utah and Colorado. (*R. Pseudohirculus*, Schrenk, of Asia, is quite distinct and probably an entire-leaved form of *R. pulchellus*.)

<sup>1</sup> Eastward to St. John's, Newfoundland, *Robinson & Schrenk*. Add syn. *R. reptans*, var. *strigosus*, Freyn, Deutsche Bot. Monatsschr. viii. 181.

<sup>2</sup> Add as doubtful syn. *R. obtusiusculus*, Raf. in Desv. Journ. Bot. i. 225 (1808). A tracing from Rafinesque's figure of his plant shows a slender straight erect stem and single annual root, also linear-lanceolate sepals, all at variance with the stout decumbent commonly geniculate and copiously rooting stem and ovate sepals of the present species.

<sup>3</sup> Westward to Springfield, Missouri, *Blankinship*.

<sup>4</sup> Add syn. *R. calthæstorus*, & *R. Hartwegi*, Greene, Erythea, iii. 45. The *R. alismæfolius* of Geyer was properly defined by Watson, l. c., considerably before the publication of Prof. Greene's synonymy, and the Rocky Mountain and Pacific forms do not appear to have any satisfactory specific distinctions.

<sup>5</sup> Add syn. *R. alismellus*, Greene, Fl. Francis. 297, & *R. Populago*, Greene, Erythea, iii. 19, the form of S. W. Oregon and Idaho with rather broad cordate radical leaves.

<sup>6</sup> Southward in California to San Jacinto Mountains, *Hasse*, acc. to Parish, Zoe, iv. 161.

**R. Lemmóni**, GRAY. Scapiform tufted stems a span or two high, 1-2-flowered, villous-pubescent below: leaves thickish, lanceolate, entire: petals 3 lines long, obovate or oblong: akenes in an oval head, very turgid, villous-pubescent. — Proc. Am. Acad. x. 68; Brew. & Wats. Bot. Calif. i. 7. — Eastern part of the Sierra Nevada, California, in Sierra Valley Lemmon.

+ + + + Terrestrial, at least some of the leaves lobed or divided: no rooting shoots or stolons except in *R. repens* and *R. septentrionalis*.

++ Calyx clothed externally with long and soft black or brown hairs: arctic or alpine low perennials, bearing solitary large flowers: none of the leaves divided to base: akenes rather turgid, subulate-beaked.

**R. Macauléyi**, GRAY. Roots a fascicle of fleshy fibres: stems a span high: leaves short-petioled, soft-pilose when young, soon glabrous, of thick texture, from almost linear with truncate 2-3-dentate apex to obovate-spatulate and obtusely 3-10-toothed: petals flabelliform, crenulate, mostly half inch long, deep yellow. — Proc. Am. Acad. xv. 45; also in An. Rep. Chief Engineers U. S. A. 1878, p. 1833, as *R. nivalis*. — Alpine region of the Rocky Mountains in San Juan Co., S. Colorado, at about 11,700 feet, *McCauley, Pease*. Too near *R. Altaicus*, Laxm., which is *R. frigidus*, Willd. Spec. ii. 1312, & Reichenb. Ic. Pl. Crit. iii. t. 289, *R. sulphureus* of some authors, and perhaps an extreme form of the next species. Akenes not seen. Young carpels with long straight subulate style.<sup>1</sup>

**R. nivális**, L. Glabrous or glabrate except the dark-woolly calyx: roots slender-fibrous from a short caudex: stems a span or two high: radical and few lower cauline leaves slender-petioled, from cuneate-flabelliform to reniform, 3-5-lobed or deeply cleft, and the lobes diverging: petals obovate or roundish, entire or obcordate-emarginate, a quarter to a third inch long. — Spec. i. 553 (Fl. Lapp. t. 3, f. 2); Fl. Dan. t. 1699; Schlecht. Animad. Ranunc. ii. 14; Reichenb. Ic. Pl. Crit. i. t. 2, f. 6, 7; Hook. Fl. Bor.-Am. i. 17; Torr. & Gray, Fl. i. 20, with vars. *R. sulphureus*, Soland. in Phipp's Voy. 202, &c., high arctic form, approaching *R. altaicus*. — Arctic America, from Hudson Bay to Alaska, and sea-coast, south in high Rocky Mountains to lat. 55°. (Greenland, N. Eu., N. Asia.)

++ ++ Calyx not dark-hairy: akenes (glabrous or pubescent) not muricate nor hispid.

== Leaves some of them quite entire (except in *R. oxynotus*), some simply few-lobed and the lobes quite entire: alpine or subalpine low perennials, one- or few-flowered, with fascicled fibrous or tuberous roots: glabrous.

a. Radical leaves mostly round-reniform and with 5 to 9 roundish lobes or deep crenatures: akenes dorsally carinate, in an oblong head.

**R. oxynótus**, GRAY. A span or two high, fibrous-rooted from a short caudex, bearing a rosette tuft of numerous radical leaves (of half inch or more in diameter): cauline one or two, cuneate-flabelliform, 3-5-cleft or parted into oblong or lanceolate-linear lobes: petals broadly obovate, 4 or 5 lines long: head of carpels at maturity about half inch long, with a thick and fleshy receptacle: akenes semi-ovate, compressed, a line long besides the strong subulate beak, glabrous. — Proc. Am. Acad. x. 68; Brew. & Wats. Bot. Calif. i. 7. — High peaks of the central Sierra Nevada, California, *Brewer, Lemmon*.<sup>2</sup>

b. Radical leaves not reniform nor cordate, nor several-lobed: akenes turgid, with roundish back, forming a globose head: perennials.

**R. glabérrimus**, Hook. A span high, somewhat succulent: root of thickened fascicled fibres: radical leaves from spatulate or oblanceolate to roundish or dilated-cuneate, with tapering or obtuse or sometimes truncate base, and from entire to crenately 2-4-toothed or short-lobed; cauline 3-cleft or parted into narrower lobes or entire: petals broadly obovate, a third to half inch long: akenes glabrous or minutely pubescent, tipped with a small short beak; the mature head from 3 to 5 lines in diameter. — Fl. Bor.-Am. i. 12, t. 5; Torr. & Gray, Fl. i. 19; Brew. & Wats. l. c. *R. brevicaulis*, Hook. Lond. Journ. Bot. vi. 66, not Fl.

<sup>1</sup> Excellent fruiting specimens, collected in Colorado by Miss Eastwood, show the fruiting heads to be ovate, and akenes small, smooth, tipped with slender straightish but obliquely ascending styles; cf. also Watson, Bot. Gaz. xvi. 346, and Eastwood, Zoe, iv. 2, where variations are described.

<sup>2</sup> Cloud's Rest, Mariposa Co., Calif., *Congdon*, and near Mineral King Mt. acc. to Coville, Contrib. U. S. Nat. Herb. iv. 56.

Bor.-Am.<sup>1</sup> — Mountains and valleys from Montana and Brit. Columbia to the Sierra Nevada, California, and to the Rocky Mountains through Colorado; first coll. by *Douglas*.<sup>2</sup>

- R. digitátus**, Hook. Less than a span high, from a cluster of short and downwardly tuberous-thickened roots: radical leaves either entire and lanceolate or, like the few sessile cauline, 2-4-parted into oblong-lanceolate or almost linear lobes: petals (5 to 11) spatulate-oblong, 3 to 5 lines long: carpels slender-styled; akenes of the preceding or smaller, in a several times smaller head. — Jour. Bot. & Kew Misc. iii. 124, t. 4; Wats. Bot. King Exp. 8. — Mountains of S. Idaho, N. Nevada, Utah, &c.; first coll. by *Burke*.<sup>3</sup>

== Leaves all palmately or pedately lobed or divided, small: akenes turgid-flescentular, with acute or acutish back, tipped with a small subulate beak: strictly arctic or alpine perennials, fibrous-rooted from a short caudex, tufted, a span or less high, nearly glabrous except that the peduncles are pubescent: flowers mostly solitary, not large, with rounded petals little surpassing the calyx.

- R. pygmæus**, Wahl. An inch to a span high, with slender or weak one-flowered stems: radical leaves simply or pedately 3-5-cleft into roundish lobes, and cauline often 3-parted into narrow ones: petals 2 lines long or less, little or not at all exceeding the sepals: akenes hardly over half line long, in an oval or short-oblong head. — Fl. Lapp. 157, t. 8, f. 1; Reichenb. Ic. Pl. Crit. i. t. 2, f. 3-5; Hook. Fl. Bor.-Am. i. 16; Torr. & Gray, Fl. i. 20. **R. Lapponicus**, Fl. Dan. t. 144. **R. Sabinii**, R. Br. in Parry, 1st Voy. Suppl. to App. 264; Hook. l. c. 17, Torr. & Gray, l. c. 20. — Throughout arctic America to the polar seas, and on the high Rocky Mountains southward to Wyoming and Colorado. (Arct. Asia & Eu., Greenland.)

- R.\* Gráyi**, Britton.<sup>4</sup> Stouter: radical and often the one or two cauline leaves biternately or pedately divided and parted; the primary divisions sometimes petiolulate, and the lobes linear-oblong or spatulate: stems 1-2-flowered: petals 3 lines long, surpassing the rounded sparsely and finely villous sepals: akenes a line long, in a globular head. — Bull. Torr. Club, xviii. 265. **R. Hookeri**, Regel, Bull. Soc. Nat. Mosc. xxxiv. pt. 2, 47; Wats. Bibl. Index, 19, not Schlecht. **R. pedatifidus**, Hook. Fl. Bor.-Am. i. 18, t. 8, not Smith nor Schlecht. — Summit of Rocky Mountains, on eastern side, between lat 52° and 55°, *Drummond*; upper part of Gray's Peak, Colorado, at 12,300 feet, *Patterson*, in flower and fruit.<sup>5</sup>

=== Leaves all 2-4-ternately parted or divided into numerous narrow divisions (of not over a line in width): akenes turgid, subulate-beaked, dorsally marginless, smooth and glabrous or nearly so: alpine or subalpine low perennials, with strong fibrous fascicled roots and ascending stems bearing single or few large and showy flowers.

- R. triternátus**, Gray. Roots fleshy-fibrous: leaves mostly triternately divided and parted; primary divisions long-petiolulate, and lobes from filiform-linear (less than half line wide) to linear-spatulate (a line wide) and obtuse: petals broadly obovate (4 or 5 lines long): akenes very turgid, rounded on the back, slender-beaked; the head globose with a thick globular receptacle. — Proc. Am. Acad. xxi. 370. — Klikitat Co., Washington, on high hills near Goldendale, *Howell*, distributed under name of *R. Hookeri*. A very early flowering and depressed form has broader radical leaves.

- R. adóneus**, Gray. Roots of more slender fibres: stems a span or two high, some at length decumbent or spreading: leaves mostly 2-3-ternately parted, with primary divisions hardly if at all petiolulate, lobes all narrowly linear and not widened upward: petals (sometimes 6 or 8) rounded-flabelliform, often half inch long: akenes moderately compressed and dorsally acutish, long-beaked with the straight subulate style; the head globular to oblong. — Proc. Acad. Philad. 1863, 56; Coulter, Man. Rocky Mt. Reg. 8. **R. amœnus**, Gray, Am. Journ. Sci. ser. 2, xxxiii. 241, not Ledeb. **R. orthorhynchus**, var. *alpinus*, Wats. Bot.

<sup>1</sup> Add syn. *R. ellipticus*, Greene, Pittonia, ii. 110, a common form with elliptic-lanceolate radical leaves and cleft cauline, said to occur at lower altitudes, but none of the distinctions prove constant.

<sup>2</sup> A form with sparsely villous sepals has been collected in S. Utah, *Siler*, being *R. Lemmonii*, Gray, in part, *vide* S. Watson, Bot. Gaz. xvi. 346.

<sup>3</sup> Mammoth Hot Springs, Wyoming, *Dewart*, *Burglehaus*.

<sup>4</sup> In the light of recent specimens, *R. Hookeri*, Schlecht., of Mexico, appears too well recognized to permit the use of the later homonym of Regel, and the present species should be renamed as Prof. Britton suggests. Prof. Greene's *R. Drummondii* (Erythra, ii. 192) is a needless synonym.

<sup>5</sup> Mountains near Ironton, *S. H. Camp*, at 13,000 feet.

King Exp. 9. — High Rocky Mountains of Colorado, first coll. by *Parry*, and of the Wasatch, S. Utah, first coll. by *Watson*. Well developed in wet places along streamlets in the lower part of alpine region, where it becomes procumbent. On drier soil it is often coarser-leaved, much smaller flowered, and with longer carpel-heads, having a narrow receptacle of even half inch in length.

=== Leaves mostly cleft or more divided, roundish radical undivided ones, when present, at least crenate or dentate: akenes turgid or lenticular, marginless.

a. Montane or high northern species, truly perennials, with fibrous or slightly thickened roots: flowers with conspicuous and pretty large petals, except sometimes in *R. affinis*.

1. Head of carpels in fruit globular or oval: styles elongated but usually only subulate base persistent as a short beak or apiculus on the lenticular akene.

**R. Arizonicus**, LEMMON. A foot or less high, glabrate or above glabrous, below usually with some soft villous hairs: fascicled roots more or less thickened: stems slender and naked above, several-many-flowered: radical leaves round-cordate or sometimes cordate-oblong and strongly crenate-dentate, or later ones about 5-cleft and the segments 3-5-lobed; cauline once or twice 3-parted into narrow linear divisions: petals (sometimes 6 or 7, 3 to 5 lines long) oblong or at first obovate: akenes lenticular and with thin acute margin, lightly pubescent, commonly in a small globular head, having a subulate receptacle. — Lemmon in Gray, Proc. Am. Acad. xxi. 370. *R. affinis*, Torr. Bot. Mex. Bound. 29, in part; Rothrock in Wheeler, Rep. vi. 57. — Mountains of S. Arizona, *Wright* (837),<sup>1</sup> *Lemmon*, among rocks, &c. Also Willow Spring, Arizona, *Rothrock*, a form connecting with the second variety.

**Var. subaffinis**, GRAY, l. c. A dwarf and alpine form, simulating *R. affinis*, mostly 1-flowered, with thickish oval head of akenes: these densely pubescent, almost equalled by the subulate style.<sup>2</sup> — On Mount Agassiz, of the San Francisco Mountains, at 12,000 feet, *Lemmon*.

**Var. subsagittatus**, GRAY, l. c. Rather stout, villous with a deciduous pubescence, simple-stemmed and fewer-flowered: radical leaves mainly subcordate-oblong or somewhat sagittate, thick; the middle nerves approximate: petals broadly obovate, half inch or less long: head of akenes stouter, oval. — N. Arizona, in Delavergne Park of the San Francisco Mountains, *Lemmon*; in wet ground.

**R. Suksdórfii**, GRAY. A span or less high, glabrous, with slender 1-3-flowered stems: leaves small (half inch or more long) subreniform or broadly flabelliform with truncate base, deeply 3-5-cleft or parted, the radical into cuneate 3-5-cleft or incised divisions, those of the upper cauline linear: petals round-obovate, retuse, a third to half inch long, deep yellow: akenes glabrous, turgid-lenticular, acutish-edged, surmounted by a nearly filiform style of equal length (three fourths line), which is at length apparently deciduous; the head globular. — Proc. Am. Acad. xxi. 371. — Damp ground on Mount Adams, Washington, at 6,000-7,000 feet, *Suksdorf*; also, wet alpine meadows in Blue Mountains, E. Oregon, at toward 8,000 feet, *Cusick*, with young akenes in more oblong head, not yet turgid, obscurely pubescent; <sup>3</sup> fl. July, August.

2. Head of carpels in fruit oblong or cylindraceous: akenes more turgid and rounded or at least obtuse on the back.

? **R.\* eximius**, GREENE. "Radical leaves very few, often one only, on a short stout petiole 1 to 2 inches long; the blade of cuneate-obovate or almost flabelliform outline, deeply about 7-lobed at the broad summit, otherwise entire; upper cauline leaves sessile, broadly cuneiform, 1 inch long, cleft to the middle into about 5 lanceolate or broadly linear lobes: periphery of the expanded large corolla quite circular by the overlapping of the numerous broadly obovate or almost obovate yellow petals." — *Erythea*, iii. 19. — Mountains of Colorado to Idaho. Flowers large as in *R. adonens*, but foliage so close to forms of the preceding and following species as to make its specific distinctness still doubtful, especially in the absence of mature fruit. No authenticated specimens having been seen by the editor, the description is here drawn from the original characterization.

<sup>1</sup> Also at the Copper Mines, New Mexico, *Thurber*, no. 231.

<sup>2</sup> Insert syn. *R. Arizonicus*, Greene, Pittonia, ii. 60, not Lemmon. *R. subsagittatus*, var. *subaffinis*, Greene, l. c. 110.

<sup>3</sup> Mt. Rainier, O. D. Allen; Olympic Mts., *Henderson*.

**R. Eschscholtzii**, SCHLECHT. A span or two or rarely a foot high, glabrous or nearly so, 1-3-flowered, slender-fibrous-rooted from a commonly oblique caudex or short horizontal rootstock: leaves of roundish outline; radical all 3-5-parted or deeply cleft, and their obovate or cuneate divisions mostly lobed or incised; cauline similar or with oblong to spatulate or lanceolate and often entire divisions: petals a quarter to nearly half inch long: akenes glabrous, with slender-subulate and mostly straight style of more than half their length and more or less persistent as a beak. — Animad. Ranunc. ii. 16, t. 1; Hook. Fl. Bor.-Am. i. 18; Torr. & Gray, Fl. i. 21; Ledeb. Fl. Ross. i. 37. *R. nivalis*, var. *Eschscholtzii*, Wats. Bot. King Exp. 8. — N. Alaska and Aleutian Islands to the Cascade Mountains and south to those of Nevada, and the Rocky Mountains south to Colorado in the alpine regions.<sup>1</sup>

**R. affinis**, R. Br. A span to a foot high, pilose-pubescent to glabrous, few- to several-flowered: leaves various, but the cauline with linear or narrow oblanceolate divisions: petals light yellow, a quarter to a third inch long and obovate, but occasionally small and inconspicuous: akenes densely short-pubescent varying to glabrous: small and short mostly recurved style much shorter than the ovary, at most a quarter of the length of the akene, often only its thickish base persistent at maturity. — R. Br. in Parry, 1st Voy. Suppl. to App. 265; Richards. in Frankl. 1st Journ. ed. 2, App. 751 (reprint, p. 23); Lange, Medd. Grœnl. 57, & Fl. Dan. t. 3029; Gray, Proc. Am. Acad. xxi. 371. *R. arcticus*, Richards. in Frankl. 1st Journ. ed. 1, App. 741 (reprint, p. 13). *R. amœnus*, Ledeb. Fl. Alt. ii. 320, & Ic. t. 113. *R. pedatifidus*, Schlecht. l. c. 18, &c., probably not Smith.<sup>2</sup> *R. auricomus*, Hook. f. Arc. Pl. 283, 312. — Throughout arctic America, and southward to Labrador<sup>3</sup> and the Rocky Mountains to Colorado. (N. Asia, Greenland.) Very variable, quite distinct from *R. auricomus*, L., in akenes, styles, &c.; the typical form small or slender, with even the radical leaves "pedately multifid," most of them to near the base.

**Var. validus**, GRAY, l. c. Stouter and larger, with thicker more succulent leaves; the radical (an inch or two long) most of them undivided and roundish, either cordate or truncate or cuneate at base, and from coarsely crenate to 3-7-cleft or parted, occasionally some divided and even with divisions petiolulate: forms various and confluent, and passing into the more arctic-alpine slender form. — *R. affinis*, vars., Hook. Fl. Bor.-Am. i. 12, t. 6. *R. cardiophyllus*, Hook. l. c. 14, t. 5, & Bot. Mag. t. 2999, but style too long. *R. affinis*, var. *cardiophyllus*, Gray, Proc. Acad. Philad. 1863, 56, but name only occasionally appropriate for this whole group of forms. *R. auricomus* of Amer. authors. — Subarctic America and Canada to Montana, and south through the Rocky Mountains to Utah, Colorado, and N. New Mexico. **Var. leiocarpus**, Trautv. in Middendorf, Reise in Sibir. 62, has glabrate or glabrous fruit. **Var. lasiococcus**, Torr. Bot. Wilkes Exped. 213, only a villous-fruited form.<sup>4</sup>

3. Head of carpels in fruit globose: styles minute and straight: plant resembling a low form of the variety of the foregoing.

**R. rhomboideus**, GOLDIE. Dwarf, a span or two high, villous-hirsute or almost glabrous, few-flowered: radical leaves from rhombic-ovate or obovate with acute base to rotund and rarely subcordate, and from crenulate to serrate; lower cauline more cleft, the sessile upper ones 3-5-parted into linear divisions: petals obovate, 2 or 3 lines long: akenes obovate, rounded on the back, glabrous; the minute beak or style inconspicuous. — Edinb. Phil. Journ. vi. 329, t. 11, f. 1; Richards. l. c.; Hook. l. c. 12; Gray, Man. ed. 5, 42. *R. ovalis*, Hook. Fl. Bor.-Am. i. 13, t. 6, probably even of Raf. Préc. Découv. 36, & in Desv. Journ. Bot. vi. 268 (1814), from "Canada and Genessee," which is otherwise wholly obscure.<sup>5</sup> *R. brevicaulis*, Hook. l. c. 13, t. 7, a very depressed almost stemless form, with radical

<sup>1</sup> Also on summit of Grayback Mountains, S. Calif., *W. G. Wright*, acc. to Parish, *Zoe*, iv. 161.

<sup>2</sup> Dr. N. L. Britton, Bull. Torr. Club, xviii. 265, maintains the identity of Smith's species, and according to that view *R. affinis*, R. Br., should become *R. pedatifidus*, Smith, while var. *validus*, Gray, becomes *R. pedatifidus*, var. *cardiophyllus*, Britton, l. c.

<sup>3</sup> Mt. Albert, Gaspe, Lower Canada, *J. A. Allen*.

<sup>4</sup> Var. *micropetalus*, Greene, Pittonia, ii. 110 (*R. arizonicus*, var. *subaffinis*, Greene, l. c. 60, not Gray), is from character a slender small-flowered form from the San Francisco Mountains, Arizona.

<sup>5</sup> In his provisional notes upon the genus, Proc. Am. Acad. xxi. 371, Dr. Gray evidently through clerical error ascribes the name *rhomboideus* to Rafinesque, while clearly having *ovalis* in mind, as his reference and habitat show.

leaves equalling the flowers. *R. auricomus*, var. *Cassubicus*, E. Meyer, Pl. Lab. 96. — Labrador and Lower Canada to prairies of Wisconsin and N. Illinois, Saskatchewan, and the N. Rocky Mountains, lat. 52°–55°.¹

b. Pacific coast species, large-flowered, long-styled, thickish-rooted perennial.

**R. Bloomeri**, WATSON. Glabrous or sometimes sparsely villous or hirsute: stems ascending from a fascicle of thickened fibrous roots, a foot or two long, robust, sparsely flowered: leaves bright green and lucid, coarsely dentate or incised; radical long-petioled, some broadly cordate or ovate and incisely crenate-dentate or obscurely lobed (2 inches long), some 3-parted, some 3-foliolate with the leaflets petiolulate and the terminal one even 3-lobed; cauline not very dissimilar, short-petioled: petals half inch long, emarginate: akenes turgid, 2 lines long, glabrous, tipped with a slender subulate beak. — Bot. Calif. ii. 426. *R. Chilensis*, Hook. & Arn. Bot. Beech. 134? not 4. — Low grounds, about San Francisco Bay; first coll. by Bloomer.

c. Chiefly eastern or cosmopolite, small-flowered, few-stamened, very short-styled; with compressed and small beakless or very short-beaked or (in *R. Allegheniensis*) hook-styled akenes: stems erect and branching.

**R. abortivus**, L. Biennial or short-lived perennial, slender, a foot or two high, generally quite glabrous and lucid, occasionally pubescent: radical leaves or most of them round-reniform or oblate-subcordate and simply or doubly crenate; cauline once or twice 3-parted or divided into oblong or linear divisions: petals pale yellow, usually not over a line long and shorter than the calyx: akenes lenticular, glabrous, in small globular or ovoid head. — Spec. i. 551; Walt. Car. 159; DC. Syst. i. 268; Torr. & Gray, Fl. i. 19. *R. nitidus*, Walt. l. c.; Poir. Dict. vi. 126. — Moist woods and along streamlets, Newfoundland² to Florida, Arkansas, and the mountains of Colorado, northwestward to the head-waters of Fraser River, &c. in Brit. Columbia; fl. spring. Passes freely into

**Var. micranthus**, GRAY.³ Slightly or conspicuously villous: some or most of radical leaves 3-parted, some 3-foliolate and leaflets even slender-petiolulate. — Man. ed. 5, 42. *R. micranthus*, Nutt. in Torr. & Gray, Fl. i. 18; Engelm. Am. Journ. Sci. xlv. 94. — Massachusetts to Saskatchewan and Colorado.

**Var. Harveyi**, GRAY. Somewhat pubescent: leaves, &c. of the type or of the preceding variety: petals conspicuous, 3 lines long, very much surpassing the calyx! — Proc. Am. Acad. xxi. 372.⁴ — On damp rocks, common in Arkansas, *F. L. Harvey, Dr. Hasse*.⁵

**R.\* Allegheniensis**, BRITTON. Habit and foliage closely as in the typical form of the preceding species: stem glaucous, not lucid: akenes a little larger and flatter, slightly margined dorsally or at least toward the apex, and provided with a well developed and strongly recurved style; the latter a third as long as the akenes. — Bull. Torr. Club, xxii. 224. *R. abortivus*, form, Hook. Fl. Bor.-Am. i. 15. — Mountains of North Carolina and Virginia, Britton, Heller; E. Massachusetts, at Waverly, Fernald, Greenman, Schrenk; Woburn, Robinson; Cambridge, Deane. Intermediate stations in the Middle States will doubtless be found as soon as the plant is generally distinguished from the habitually similar *R. abortivus*, of which it may yet prove only an extreme variation, as regarded by Sir William Hooker.

¹ Black Hills, S. Dak., *Forwood*.

² Labrador, *Waghorne*.

³ This variety has been recently restored to specific rank by Mr. E. P. Bicknell (Bull. Torr. Club, xxi. 41), and among other distinctions attention is called to the usually glabrous receptacle, that of the typical *R. abortivus* being hispid. While in their extremes the two plants appear quite different, dubious intermediates are not lacking. The variety extends to Gaspé *vide* Macoun.

⁴ Add. syn. *R. abortivus*, var. *grandiflorus*, Engelm. acc. to Branner & Coville, Ark. Geol. Surv. iv. 162; Harvey, Bull. Torr. Club, xix. 93. *R. Harveyi*, Britton, Mem. Torr. Club, v. 159; Greene, Erythra, ii. 189. The specific distinctions, adduced by Prof. Greene from the akenes do not appear to hold, since in some specimens of the small-flowered typical form the akenes are in a globular head and when mature are quite as large and no more numerous. Nor is the difference of the roots more constant or significant. Regarding the size of the petals some of Dr. Hasse's specimens preserved in the Nat. Herbarium furnish transition to the smaller-flowered form.

⁵ Also common in S. Missouri, ranging to St. Louis, *Hasse, Bush*.



**R. scelerátus**, L. Annual or mostly so, somewhat succulent, glabrous: radical and lower cauline leaves 3-5-lobed or parted and the lobes crenately incised or cleft (or when submersed reduced to flaccid and filiform divisions); upper with narrower divisions: petals a line or two long, usually surpassing the calyx: akenes glabrous, barely apiculate, in a globular to oblong head with a thick receptacle. — Spec. i. 551; Fl. Dan. t. 571; Curt. Fl. Lond. ii. t. 42; Torr. & Gray, l. c. 19, with var. *multifidus*, Nutt., a mere form. — In shallow pools, &c., New Brunswick and Canada, north to lat. 67°, west to Brit. Columbia, and south to Arizona, in the Atlantic States appearing as if introduced. (Eu., Asia.)

== == == == Leaves variously cleft or divided: akenes compressed, often flat, surrounded by a more or less conspicuous firm or indurated margin: none truly alpine or arctic.

a. Perennials, with globular or ovoid carpal-heads (except *R. Pennsylvanicus*) and smooth or sometimes barely pubescent akenes, mostly fibrous-rooted.

1. *Hook-styled*; with long-styles recurving (at least in age) and wholly persistent in a rigid and uncinately elongated beak: petals only 5: stems erect, and radical leaves hardly ever divided into separate leaflets. — *R. Oncostyli*, Gray, Proc. Am. Acad. viii. 373, excl. spec. 1.

**R. recurvátus**, POIR. Soft-hirsute or pubescent, a foot or two high, somewhat equally leaved up to the short peduncles: leaves rather large (2 to 4 inches in diameter) and mostly round-cordate in outline, 3-5-cleft to beyond the middle or uppermost 3-5-parted, but none divided; lobes rhombic-obovate, incised and dentate: petals light yellow, oblong, 2 lines long, reflexed with and shorter or hardly longer than the calyx: style much recurved, forming a rather slender beak which is not much shorter than the glabrous akene: receptacle bristly-pilose. — Dict. vi. 125; Pursh, Fl. ii. 394; Deless. Ic. Sel. i. t. 41; Torr. & Gray, Fl. i. 22 (excl. vars.), 658; Gray, Man. ed. 5, 42. *R. lanuginosus*, Walt. Car. 159, not L. *R. saniculeformis*, Muhl. Cat. 54. *R. tomentosus*, Spreng. Neue Entd. i. 287, not Poir. — Damp woods, Nova Scotia (not "Labrador," specimen so named by DC. in herb. Banks being a *Geum*) to Florida, Ohio, and northwestward to the Lake of the Woods.

**R.\* tenellus**, NUTT.<sup>1</sup> A foot or more high, erect, very slender to stoutish, sparingly pubescent to somewhat hirsute: leaves thin, deeply 3-5-cleft; the segments oblanceolate to obovate-cuneate, sharply and irregularly few-toothed: petals small, not exceeding a line or two in length: receptacle glabrous: akenes 12 to 30, glabrous or nearly so, in a globose head, and tipped with slender circinnate-revolute beaks. — Nutt. in Torr. & Gray, Fl. i. 23; Torr. Bot. Wilkes Exp. 214. *R. recurvatus*, Bong. Veg. Sich. 123, in part, not Poir. *R. Nelsonii*, var. *tenellus*, Gray, Proc. Am. Acad. viii. 374. *R. occidentalis*, vars. *tenellus* & *Eiseni* (in part), Gray, l. c. xxi. 373. *R. Bongardi*, Greene, Erythea, iii. 54, so far as small-flowered plant of Bongard and var. *tenellus* are concerned, but excl. syn. *R. occidentalis*, var. *Lyalli*. — Alaska near the coast, southward to Idaho and S. California, *Parish*; common.

**Var.\* Lyállii**, ROBINSON, n. var. Similar in habit and foliage but commonly more pubescent or hirsute and with broader leaf-segments: akenes more or less hispid upon the faces. — ? *R. occidentalis*, var. *parviflorus*, Torr. l. c. *R. occidentalis*, var. *Lyalli*, Gray, l. c. — Common in damp woodland, Pend Oreille River, *Lyall*, and in the Cascade Mountains from N. California, *Blankinship*, to Brit. Columbia, *Macoun*, and northward to Wrangel, Alaska, acc. to Miss Cooley.

**R.\* occidentális**, NUTT. Villous-hirsute, with the hairs on the stems widely spreading, a span to a foot or more high: radical and lower cauline leaves of round-cordate outline, deeply 3-5-cleft or almost parted into cuneate-obovate mostly 2-3-cleft and again incised segments and lobes, these commonly acute, occasionally one or two 3-foliate and all the leaflets petiolulate; upper smaller and with simpler narrower commonly lanceolate segments: petals spreading, various, conspicuous and twice the length of the reflexed calyx: styles forming a stout and flattened subulate hooked beak which equals or is rather shorter than the glabrous or sparingly bristly hairy akene: carpal-receptacle quite glabrous. — Nutt.

<sup>1</sup> From the more copious material now at hand it has seemed necessary to modify considerably Dr. Gray's manuscript treatment of this and the following species. His views regarding them, however, have already been published (Proc. Am. Acad. xxi. 372-374).

in Torr. & Gray, Fl. i. 22; Gray, Proc. Am. Acad. xxi. 372. *R. recurvatus*, var. *Nelsoni*, DC. Syst. i. 290; Torr. & Gray, Fl. i. 23. *R. forma prima* & *forma secunda*, Schlecht. Animad. Ranunc. ii. 28, under *R. recurvatus*. *R. occidentalis* (excl. var. *canus*) & *R. Nelsonii*, Gray, Proc. Am. Acad. viii. 374. *R. Schlechtendalii*, Hook. Fl. Bor.-Am. i. 21, as to plant there described, but not the plant of Schlecht. (*R. fascicularis*) to which he referred it, and which was the type. *R. Eiseni*, Kellogg, Proc. Calif. Acad. Sci. vii. 115, and *R. occidentalis*, var. *Eiseni*, Gray, l. c. (in its principal part), is only a short-styled form of this species. — Open woods and low ground, northern Rocky Mountains to the Alaskan coast and islands, and southward to the borders of California, first coll. by *Nelson*, then by *Chamisso*. Nuttall's original is low, rather slender and naked-stemmed, small-leaved, but pretty large-flowered, the oblong or narrowly obovate petals 4 lines long: carpels glabrous with often a few bristly hairs toward the back.

**Var. Rattáni**, GRAY, l. c. Like the typical form; but akenes papillose-roughened as well as densely hispidulous. — On the Klamath, N. California,<sup>1</sup> *Rattan*, with short and stout strongly hooked beak; Josephine Co., S. W. Oregon, *Howell*, with more slender beak and sparser hairs on the akenes.

**Var.\* robustus**, GRAY. A span to a foot or more high, with stout stems, ample leaves (2 to 4 inches in diameter), and large flowers: petals broadly obovate, 4 to 6 lines long: akenes even 2 lines in diameter and numerous in the head. — Proc. Am. Acad. xxi. 373. Here Schlechtendal's "*forma prima*" with "*flores magni*," and the type of *R. occidentalis*, Gray, Proc. Am. Acad. viii. 374. — Alaskan Islands, especially Unalaska, Attar, Kyska, &c., *Harrington*, *Dall*, &c.

**R.\* Turneri**, GREENE. Habit and foliage much as in the taller and stouter forms of the preceding, but flowers larger, 9 to 15 lines in breadth, long-peduncled: carpels more numerous, 50 to 60 in a head and tipped with very strongly circinate-revolute styles. — Pittonia, ii. 296, & Erythea, iii. 54, excl. syn. *R. recurvatus*, var. *robustus*. — Northern Alaska, on the Porcupine River, *Turner*. This species may perhaps belong to the next subdivision, but the mature akenes necessary to decide this point are not at hand.

2. *Broad-hook-styled*; with recurved-hooked styles shorter than the ovary, broad and flat, stigmatic for much of their length, wholly persistent in a very strong and flat triangular or gladiate hooked beak, which is much shorter than the flat akenes and confluent with its sharp margin: radical leaves divided or nearly so, petals only 5.

**R. acrifórmis**, GRAY. Strict and slender, a foot high, hirsute with short mostly appressed pubescence: leaves all palmately or pedately 3-5-parted or divided into narrow 2-3-cleft segments and lobes, the latter lanceolate or linear and mostly entire: petals orbicular-obovate, a quarter inch long, hardly double the length of the spreading calyx: akenes over a line long, with curved beak of half its length. — Proc. Am. Acad. xxi. 374. *R. acris* Hook. Fl. Bor.-Am. i. 18 (partly), & Lond. Journ. Bot. vi. 66. — Eastern part of Rocky Mountains in Brit. Am., lat. 58°, *Drummond*; Wyoming, *Parry* (distrib. as *R. affinis*), Wind River, *Forwood*, and near Cheyenne,<sup>2</sup> *Greene*, the latter coll. July, 1872.

**R. cánus**, BENTH. Erect or ascending, robust, a foot or two high, soft-villous with white hairs when young, at length commonly green and sparsely villous or glabrate: leaves mostly 3-divided and the middle or all the leaflets petiolulate, all more or less cuneate and 2-3-cleft with the lobes incised: petals obovate, half inch or less in length, fully twice the length of the reflexed soft-villous calyx: akenes fully 2½ lines long, the broad and hooked beak less than a line long. — Pl. Hartw. 294; Gray, l. c. *R. Californicus*, var. *canus*, Brew. & Wats. Bot. Calif. i. 8. *R. occidentalis*, var. *canus*, Gray, l. c. viii. 374. — Low grounds, valley of the Sacramento, California, *Hartweg* (in flower), probably near Chico, where now coll. in flower and fruit by *Mrs. Bidwell*.<sup>3</sup>

<sup>1</sup> Mendocino County, Calif., *Blankinship*, and reported from Mt. Hamilton, Central Calif., by *Greene*, Erythea, i. 88.

<sup>2</sup> And on the Laramie River, *Crandall*.

<sup>3</sup> The type of this species is silky-lanate throughout and appears to be an unusual form not since rediscovered. Prof. *Greene* (Erythea, ii. 189) believes the greener sub-glabrate form a distinct species, which he has called *R. hesperoxyis*. He adduces, however, no satisfactory differences other than the more deciduous indumentum.

**Var.\* Blankinshippii**, ROBINSON, n. var. Silky-lanate indumentum persisting but less dense than in the type: akenes conspicuously hispid-papillose. — Capay, Yolo County, Calif., *J. W. Blankinship*, 15 April, 1893.

3. *Short-styled*; the introrsely stigmatic styles thickish-subulate and mostly all persisting in the short and straight or recurved beak: herbage hirsute or pubescent.

○ Lax or weak-stemmed, Californian, no stolons: petals more than 5: beak of akenes subulate and more or less hooked.

**R. Californicus**, BENTH. Usually pubescent or hirsute, 6 to 25 inches high, branching and naked above: petals 6 to 15 (sometimes only 5?), deep glossy yellow, or becoming paler, oblong or narrowly obovate, a third to half inch long: akenes flat but only slightly margined, 2 lines or less long, and beak about half line long. — Pl. Hartw. 295; Brew. & Wats. Bot. Calif. i. 7 (excl. var. *canus*); Gray, l. c. 373. *R. dissectus*, Hook. & Arn. Bot. Beech. 316, not Bieb. *R. acris*, var. (*Deppii*, Nutt.) Torr. & Gray, Fl. i. 21. *R. delphinifolius*? Torr. & Gray, l. c. 659, not HBK.<sup>1</sup> — Dry or barely moist ground, common throughout all the western part of California and adjacent Oregon; early coll. by Douglas and by Th. Coulter. The typical form with leaves some ternately divided or parted and some pinnately 5-divided into linear or narrow lanceolate and often 2-3-parted divisions, passes freely into

**Var. latilobus**, GRAY. Radical leaves palmately 3-parted or divided into broadly or narrowly cuneate incisely cleft or lacinate divisions, and cauline leaves correspondingly coarse. — Proc. Am. Acad. xxi. 375. *R. Ludovicianus*, Greene, Bull. Calif. Acad. Sci. ii. 58. — A common form, especially southward, from San Francisco Bay to San Diego and San Bernardino. Some forms too nearly approach *R. canus*.<sup>2</sup>

○ ○ Strictly erect species, introduced from Europe, no stolons: very short styles stigmatose for all or most of their length: petals 5, broad, a third to half inch long. See also *R. parvulus*.

**R. Acris**, L. Tall, not bulbous-thickened at base of stem, summer-flowering: leaves of rounded outline, pedately 5-parted or almost divided; but divisions not petiolulate, 2-3-cleft and lacinate, lobes and teeth acute: calyx merely spreading: petals smaller and less glossy than in the next: short style more prominent. — Spec. i. 554; Curt. Fl. Lond. i. t. 39; Fl. Dan. t. 2415; Torr. & Gray, Fl. i. 21, excl. var. — Moist ground, Atlantic States and Canada, especially eastward (Nat. from Eu.): Newfoundland, &c., where,<sup>3</sup> as in Greenland, perhaps indigenous.

**R. Bulbosus**, L. A foot or two high from a globose solid-bulbous base or corm, spring-flowering: radical leaves of ovate outline, divided into 3 roundish leaflets, of which the middle one is conspicuously and the lateral slightly if at all petiolulate, and all 3-cleft or parted and incised, lobes and teeth mostly obtuse: petals obovate-orbicular, deep glossy yellow: calyx reflexed: style very short. — Spec. i. 554; Fl. Dan. t. 551; Schkuhr, Handb. t. 152; Bigel. Med. Bot. iii. 61, t. 47. — Meadows and pastures, Canada to Virginia, and even Louisiana, but most common in New England.<sup>4</sup> (Nat. from Eu.)

○ ○ ○ Erect or ascending, not stoloniferous, 5-petalous: straight and stout-subulate style stigmatose for a good part of its length, and persisting in a broad-subulate beak.

**R. Pennsylvanicus**, L. f. Erect from an (at least sometimes) annual root, hirsute with widely spreading almost hispid hairs: stem stout, a foot or two high, leafy to the top: leaves all ternately compound and petiolulate leaflets 3-parted or deeply cleft into oblong or cuneate-lanceolate and lacinate segments and lobes, these acute: peduncles short: petals oblong or obovate and small, a line or two long, not surpassing the reflexed calyx: akenes a line long, pointed with a nearly straight short beak, becoming *spicate* in the oblong or

<sup>1</sup> Add syn. ? *R. rugulosus*, Greene, Pittonia, ii. 58.

<sup>2</sup> A number of further varieties of the polymorphous *R. Californicus* have been characterized by Prof. Greene, Fl. Francis. 299, & Erythea, i. 125; the material at hand, however, fails to show these forms well marked among frequent intermediates.

<sup>3</sup> There is little in its mode of occurrence in Newfoundland to suggest indigenous nature, since it appears there as elsewhere in America along roadsides, about habitations, and in pastures.

<sup>4</sup> Springily introduced also in the far west, S. Brit. Columbia, *Macoun*.

cylindraceous head. — Suppl. 272; Poir. Dict. vi. 120; Hook. Fl. Bor.-Am. i. 19; Torr. & Gray, Fl. i. 22. *R. Canadensis*, Jacq. Misc. ii. 343, & Ic. Rar. t. 105. *R. trifolius*, Mönch, Meth. Suppl. 70. *R. hispidus*, Pursh, Fl. ii. 395, not Michx. *R. fascicularis*, Wats. Bot. King Exp. 9? a dwarf form. — Wet ground, Upper Georgia to Nova Scotia, and westward to Arizona and Fort Colville on the Upper Columbia, &c.

- R.\* Macounii**, BRITTON.<sup>1</sup> Ascending or declined, usually but not always hispidly hirsute with spreading hairs, annual or biennial, but the fascicled roots sometimes thickened and more enduring: stems few-leaved, 6 to 20 inches long: leaves all ternately compound; leaflets mostly slender-petiolulate and broadly ovate in outline, 3-parted or cleft into rhomboidal or narrower and lacinate mostly acute segments and lobes: peduncles rather long: petals obovate, mostly 3 lines long, surpassing the spreading or hardly reflexed and early deciduous calyx: akenes mostly a line and a half long, with short and straight (about half line long) beak formed of the whole flat subulate style; the head (as in all but the last preceding species) globular or at most oval. — Trans. N. Y. Acad. Sci. xii. 3. *R. hispidus*, Hook. Fl. Bor.-Am. i. 19; Torr. & Gray, Fl. i. 22, not Michx. *R. repens*, var. *hispidus*, Torr. & Gray, Fl. i. 658, in part. — Moist ground, Canada and north shore of Lake Superior to Saskatchewan and northward, south to New Mexico, *Thurber*, and Utah, west to Oregon and Brit. Columbia. Reclining summer stems seldom if ever rooting. Species sometimes confounded with *R. pennsylvanicus*, sometimes with *R. septentrionalis*. *R. hispidus*, var. *Oregonus*, Gray, Proc. Am. Acad. xxi. 376 (*R. nitidus*, Hook. Fl. Bor.-Am. i. 20, in part), is a smoothish form, common in shaded and wet grounds, from Oregon, *Howell*, *Suksdorf*, &c., to Fraser River.<sup>2</sup>

○ ○ ○ ○ Ascending, also creeping by procumbent rooting branches or stolons: short subulate style stigmatose for its whole length and all or nearly all of it persisting in the beak.

- R. repens**, L. Soft-hirsute or pubescent, sometimes almost glabrous: principal leaves of ovate or roundish outline, not rarely white-variegated or spotted, some only 3-parted, more divided into 3 rhombic-ovate 2-3-lobed and incised leaflets, the middle and often the lateral ones petiolulate, sometimes these again 2-3-parted; lobes and teeth of lower leaves obtuse: petals broadly cuneate-obovate, a third to half inch long: calyx spreading: akenes over a line long. — Spec. i. 554; Fl. Dan. t. 795; Curt. Fl. Lond. iv. t. 38; Reichenb. Ic. Fl. Germ. iii. t. 20, but only partly of Amer. authors. *R. prostratus*, Poir. Dict. vi. 113; Eaton, Man. ed. 5, 358. *R. Clintonii*, Beck, Bot. 9. — Low grounds, Nova Scotia<sup>3</sup> and Canada to Virginia, generally in waste grounds near the coast, but also on river-banks well in the interior, and in New Mexico, Nevada,<sup>4</sup> &c., where it is manifestly indigenous; flowering later than *R. septentrionalis*. (Eu., Asia.)

4: *Long-styled* and mostly long-beaked: i. e. styles more or less elongated and attenuate upward, introrsely stigmatose only at and near the tip, sometimes all persistent, but mostly with the slender upper portion deciduous from the beak at maturity or fragile.

○ Petals 5: primary radical leaves or some of them (at least in dry soil) commonly undivided and only 3-parted, but succeeding ones 3-5-foliolate.

- R.\* hispidus**, MICHX.<sup>5</sup> Stems rather slender, 6 inches to 1½ feet high, flexuous, hirsute or villous especially when young, sometimes glabrate: pubescence of the lower part commonly spreading, of the leaves appressed: root a cluster of stout fibres: leaves palmately 3-parted or pedately and somewhat pinnately 3(-5)-divided; segments or leaflets oblong-oblanccolate to obovate, usually narrowed at the base, usually acutely toothed and somewhat irregularly cleft: flowers large: petals much exceeding the sepals: heal of carpels globose to ovoid: akenes suborbicular, rather numerous, strongly margined and tipped with a subulate persistent straightish or slightly curved style. — Fl. i. 321; Britton, Trans. N. Y. Acad. Sci.

<sup>1</sup> Name substituted for the one used in Dr. Gray's manuscript; see foot-note 5, below.

<sup>2</sup> Also at Sproat and Kootenai Lake, Brit. Columbia, acc. to J. M. Macoun, Bot. Gaz. xvi. 285.

<sup>3</sup> Newfoundland, *Robinson & Schrenk*.

<sup>4</sup> Humboldt Co., Calif., *Marshall*, acc. to Greene, Pittonia, ii. 38; and frequent in lawns about San Francisco, acc. to Greene, Man. Bay Reg. 3, where doubtless introduced.

<sup>5</sup> This and the following two species are here interpreted in the light of Dr. Britton's revision cited. Dr. Gray had in his manuscript notes, made in Paris in 1887, already separated the *R. hispidus* of Michx. from that of Hooker.

xii. 4; not DC., nor Hook., nor Gray. *R. Marilandicus*, Poir. Dict. vi. 126, *fide* Gray, ms. 1887. *R. repens*, var. *Marilandicus*, Torr. & Gray, Fl. i. 21; Torr. Fl. N. Y. i. 15. *R. fascicularis*, Britton, Pl. N. J. 4, *fide* Britton, Trans. N. Y. Acad. Sci. xii. 3.—Common in woods, throughout the Middle States and extending from Canada to Georgia, Arkansas, and probably Texas; fl. early spring, April, May; in the South, February.

**R.\* septentrionalis**, POIR. Similar to the preceding, but stouter, taller, more erect, often stoloniferous, from very coarsely and copiously hirsute to almost or quite glabrous: leaves nearly all pedately and pinnately 3-foliolate: leaflets 3-parted and sharply incised: flowers large, often more than an inch broad: fruiting heads ovoid; carpels strongly compressed, ovate, short-oblong, or obovate, rather gradually contracted into a long flat beak.—Dict. vi. 125. *R. tomentosus*, Poir. l. c. 127. ? *R. lucidus*, Poir. l. c. 113. *R. repens* of Amer. authors in great part. *R. fascicularis*, Schlecht. Animad. Ranunc. ii. 30, t. 2, not Muhl. *R. Schlechtendalii*, Hook. Fl. Bor.-Am. i. 21, as to type, but see also synonyms of *R. occidentalis*. *R. Belvisii*, DC. Syst. i. 291. ? *R. Philonotis*, Pursh, Fl. ii. 393.—New Brunswick, *Fowler*, to New Jersey, Kentucky, and northward to Winnipeg, *Bourgeau*; common in moist places; fl. May, June.

**R.\* palmatus**, ELL. A similar but smaller plant, weak, decumbent, sending out runners: leaves small, thin, an inch broad, the lowest subentire or usually more or less deeply 3-parted or divided; segments or leaflets ovate, obtusely few-toothed: flowers but half inch in diameter: achenes broadly and sharply margined, few in number, tipped with a strong flat straightish beak.—Sk. ii. 61; Torr. & Gray, Fl. i. 658; Chapm. Fl. 8; Wats. Bibl. Index, 21; Britton, l. c. 6. *R. septentrionalis*, Gray, Proc. Am. Acad. xxi. 376, in part, not Poir.—Swampy grounds in pine barrens, South Carolina to Tennessee and Florida; fl. April, May.

**R. fasciculáris**, MUHL. A span or two high, tufted, soon spreading, but no sarmentose stems: fascicled roots tuberous-thickened or fusiform: pubescence almost all closely appressed: earliest radical leaves ovate or oblong and almost entire or rounded and 3-lobed or parted; later and principal ones of oblong outline, and disposed to be pinnately quinate, some with divisions or leaflets again 3-7-parted; lobes from linear-spatulate to oblong, obtuse: petals obovate-oblong, from quarter to half inch long: akenes lenticular, less margined than in the foregoing and with more slender style and beak.—Cat. 54; Bigel. Fl. Bost. 137 (1814); Hook. Fl. Bor.-Am. i. 20, t. 8, f. 1; Gray, Gen. Ill. i. 30, t. 9,<sup>1</sup> not of Schlecht. and some Amer. authors.—Moist or dry hills, Canada and E. New England and Texas, northwest to L. Winnipeg; fl. early.

○ ○ Petals 7 to 16; no creeping nor procumbent basal stems: plants of Mexican type.

**R. macránthus**, SCHEELE. Hirsute: stems erect and a foot or two high, or 2 to 3 feet long and declining, commonly robust: leaves nearly as of *R. septentrionalis*, but many quinate: petals from a third to nearly full inch long, from obovate to oblong: akenes mostly numerous in a large head, ovate or orbicular, conspicuously thin-margined, at length with a rather short broadly flat-subulate beak, the slender upper portion of the long straight style falling away.—Linnaea, xxi. 585; Torr. Bot. Mex. Bound. 29; Rothrock in Wheeler, Rep. vi. 58; Gray, Proc. Am. Acad. xxi. 377. *R. repens*, var. *macranthus*, Gray, Pl. Lindh. ii. 141, & Pl. Wright. ii. 8.—Moist ground, S. & W. Texas, first coll. by *Lindheimer*, to S. W. Arizona, *Rothrock*, *Pringle*, *Lemmon*.

**R. orthorhýnchus**, HOOK. From sparsely hirsute (with spreading hairs) to nearly glabrous: stems erect, a foot or so high from a fascicled root of thick fibres: leaves mostly of oblong general outline and pinnate division into 5 to 7 leaflets or segments (lower commonly short-petiolulate, upper confluent), these again usually cleft or incised: petals a third to half inch long, obovate (sometimes purple underneath), much surpassing the reflexed soon deciduous calyx: akenes usually not numerous in the head, ovate, nearly two lines long, strongly margined, bearing a slender subulate rigid and straight beak of nearly equal length which consists of the wholly persistent style.—Gray, Proc. Am. Acad. xxi. 377. Varies extremely in foliage: the typical form, *STENOPHÝLLUS*, with all the leaves somewhat bipinnately dissected into segments of a line or less in width (as in the figure), or some radical ones simply divided into broad cuneate or obovate 2-3-lobed or toothed segments or

<sup>1</sup> Add Meehan's Monthly, ii. 1, t. 1.

leaflets. — *R. orthorhynchus*, Hook. Fl. Bor.-Am. i. 21, t. 9; Torr. & Gray, Fl. i. 24; Walp. Rep. i. 43 (misprinted *ornithorhynchus*); Gray, l. c. viii. 373. But not *R. dichotomus*, Moç. & Sesse, of Mexico, as supposed by Schlecht. Linnæa, vi. 579. — Wet ground, W. Oregon to Brit. Columbia; first coll. by Douglas. Passes into the very marked

**Var. platyphyllus**, Gray, l. c. Robust, 1 to 3 (according to Kellogg even over 5) feet high: leaves with limb 2 to 4 inches long, and leaflets or segments 1 to 3 inches long, from oblong or rhomboidal to ovate, laciniately cleft and incised: petals varying from a quarter to three fourths inch long: beak of akenes sometimes 2 lines long. — *R. macranthus*, Wats. Bot. King Exp. 9; Brew. & Wats. Bot. Calif. i. 8, not Scheele. *R. maximus*, Greene, Bull. Torr. Club, xiv. 118. — Wet soil, Wasatch Mountains, N. Utah, Watson, Jones, and N. Nevada, near Pyramid Lake, Lemmon, to Marin and Mendocino Co., Calif., Kellogg, Bolander,<sup>1</sup> in the largest forms.<sup>2</sup> Smaller and moderately broad-leaved, N. California, Greene, Mrs. Austin; Kikitat Co., Washington, Saksdorf; mountains of Idaho, Watson.<sup>3</sup>

b. Annuals or biennials, all but one introduced from the Old World.

1. Akenes smooth and even, or at length with some scattered and very small papillæ: flowers moderately large and showy.

- R. PARVULUS**, L. A span to a foot high (variable in size in the manner of annuals), hirsute, especially the lower part of the erect or ascending stems and petioles: radical leaves, some 3-parted, but most 3-foliolate, with at least middle leaflet petiolulate, all of roundish or obovate and cuneate outline, and mostly cleft and incised or dentate in the way of *R. repens*: petals much surpassing the reflexed calyx: akenes (a line long) orbicular, flat, with a thin sharp margin, tipped with a very short triangular-subulate beak, consisting of the whole introrsely stigmatose style. — Mant. 79; Smith, Fl. Brit. 593. *R. Sardous*, Crantz, Stirp. Austr. ii. 84 (ed. 2, i. 111). *R. hirsutus*, Curt. Fl. Lond. ii. t. 40; Ait. Kew. ii. 268; Eng. Bot. t. 1504; Reichenb. Ic. Fl. Germ. iii. t. 23. *R. philonotis*, Ehrh. Beitr. ii. 145; Retz. Obs. vi. 31; Fl. Dan. ix. t. 1459; probably not of Pursh. — Low ground, Savannah, Georgia, Canby; the akenes all smooth. Near Philadelphia, but only in ballast grounds, Martindale. (Sparingly nat. from Eu.)

2. Akenes hispidulous with hooked hairs and papillose-scabrous: flowers minute.

- R. hebecarpus**, Hook. & Arn. Slender, sometimes exiguous, a span to a foot high, paniculately branched, lax-hirsute: leaves of rounded outline, small, ternately or pedately parted, or some divided into petiolulate simple or laciniately cleft leaflets: peduncles short: petals a line or less long, pale yellow, not surpassing the sepals: akenes few in the loose heads, obliquely orbicular, flat, a line or less long, tipped with a short subulate curved beak. — Bot. Beech. 316; Torr. Pacif. R. Rep. 62; Brew. & Wats. Bot. Calif. i. 8, with var. *pusillus*, mere depauperate plants. *R. parviflorus*, var., Torr. & Gray, Fl. i. 25, 659. — Open ground, throughout W. California to Washington. (Lower Calif.)

3. Akenes muriculate or echinate.

- R. PARVIFLORUS**, L. Villous or hirsute, slender and low, diffuse: radical leaves orbicular in outline, 3-5-parted or divided and the cuneate segments laciniately-lobed: inflorescence and flowers nearly of the preceding: akenes rougher papillose-scabrous, not hairy, tipped with very short beak. — Spec. ed. 2, i. 780; Eng. Bot. t. 120; Reichenb. Ic. Fl. Germ. iii. t. 22; Torr. & Gray, l. c., excl. var. *R. trachyspermus*, Ell. Sk. ii. 65. — Waste grounds near towns, &c., Maryland to Florida, Texas, and Arkansas. (Nat. from Eu.)
- R. MURICATUS**, L. Glabrous or sparsely pubescent, rather stout and succulent, span to a foot or so high: leaves mostly round-cordate or reniform, 3-5-cleft and coarsely crenate-dentate: petals deep yellow, a quarter inch long, surpassing the calyx: akenes quarter inch long besides the stout subulate curved beak, which is confluent with the strong and salient margins, the flat faces conspicuously tuberculate or echinate. — Spec. i. 555; Michx. Fl. i. 321; Lam. Ill. t. 498; Torr. & Gray, Fl. i. 24. — Wet soil near towns, Virginia to S. Carolina, Louisiana, and California near San Francisco to S. Oregon. (Nat. from Eu.)

**R. ARVENSIS**, L. of Europe, with linear-lobed leaves and coarse echinate akenes, has been detected in ballast grounds.<sup>4</sup>

<sup>1</sup> Sonoma Co., Calif., Congdon.

<sup>2</sup> Similar robust forms have been recently collected in Humboldt Co., Calif., Blankinship.

<sup>3</sup> And in S. Brit. Columbia, Macoun.

<sup>4</sup> This species, according to Britton (Bull. Torr. Club, xix. 219), is spreading in New Jersey.

Recently published species of uncertain affinities.

**R.\* Aústinæ**, GREENE. "Perennial by a fascicle of coarse and long fleshy-fibrous roots: stem and leaves glabrous, weak and rather succulent, the former 6 to 10 inches high; radical leaves few, of round-obovate outline, abruptly tapering to the very long and slender petiole or nearly truncate at base, and with mostly about five rather shallow terminal lobes, some with three large and rather deeper lobes; cauline leaves cuneate-obovate, 3-lobed, sessile: flowers solitary, on very long and slender peduncles, these few and terminal or sub-terminal: petals white: stamens yellow, rather few: carpels puberulent, rounded, neither compressed nor margined, tipped with a long and slender straight or nearly straight beak, and arranged in an ovoid or more elongated head."—*Erythea*, iii. 44.—Crevices of lava rock east of Willow Creek Valley, N. Calif., *Mrs. Austin*. Description quoted from original characterization.

**R.\* álceus**, GREENE. "Less than a foot high, rather slender, freely branching, soft-hirsute and villous but not canescent: leaves only about 1 inch long, on slender petioles, of ovate general outline and in 3 divisions, the middle one stalked, all cuneiform and doubly cleft: flowers very small, the round-obovate petals 5 only, barely a line long: akenes rather numerous, obliquely obovoid, smooth, or with a faint venation, tipped with a stout recurved beak, and forming a globose head."—*Erythea*, iii. 69.—Elk Mountain, Mendocino Co., Calif., *Jepson*. Description quoted from the original characterization.

**10. CÁLTHA**, L. MARSH MARIGOLD. (Ancient Latin name of a strong-scented plant, probably the true Marigold, *Calendula*. The common derivation, originated by Linnæus, is a mere conjecture.)—Perennial herbs, of temperate and frigid regions, glabrous; with a fascicle of strong fibrous roots, simple leaves more or less rounded and cordate at base, and pedunculate showy flowers, either solitary or several and cymosely clustered.—Gen. no. 463; Benth. & Hook. Gen. i. 6.<sup>1</sup>

\* Leafy-stemmed: follicles sessile: flowering in early spring.

**C. palústris**, L. (MARSH MARIGOLD, vulgarly called *Cowslips*.) Stem erect, commonly robust, few-leaved, usually several-flowered: leaves from orbicular-cordate to reniform, from dentate or crenate to entire: sepals 5 or 6, rarely 7, oval, half inch or more long, golden yellow: anthers elongated-oblong.—Spec. i. 558; Gray, Gen. III. i. 32, t. 10. *C. palustris*, *ficarioides*, & *flabellifolia*, Pursh, Fl. ii. 389, 390, the last (t. 17) a weak form in cold mountain springs, with thinner open-reniform leaves and smaller flowers, approaching the following var.—In wet ground, Atlantic U. S. east of the Mississippi, from the mountains of Carolina and Tennessee northward to Newfoundland, thence west to Minnesota and Saskatchewan; and in some forms to Alaska and the arctic coast but mainly as var. (Eu., Asia.)

**Var. radicans**, GRAY, n. var. Stems becoming decumbent or procumbent and commonly rooting at the nodes, 1-few-flowered: flowers either similar or smaller: leaves equally various, oftener dilated-reniform, sometimes nearly truncate at base.—*C. radicans*, Forst. Trans. Linn. Soc. viii. 324, t. 17. *C. asarifolia*, DC. Syst. i. 309. *C. arctica*, R. Br. in Parry, 1st Voy. Suppl. to App. 265, said to have linear anthers, but hardly so. *C. palustris*, var. *Sibirica*, Regel, Bull. Soc. Nat. Mosc. xxxiv. pt. 2, 53, in part.—Subarctic and arctic America, Melville Island to Alaska. (Scotland to Kamtsch., Japan, &c.)

**C. nátans**, PALL. Stems prostrate or floating, rooting freely, with solitary or a few scattered flowers: leaves round-reniform, crenulate or entire: sepals oval, 2 or 3 lines long, white or tinged with rose: stamens few: anthers short-oval: follicles not over 2 lines long, blunt or mucronulate, forming a close globular head.—Reise, iii. 284 (Gmel. Fl. Sibir. iv. 192, t. 82); DC. l. c. 311; R. Br. l. c. 265; Lawson, Rev. Canad. Ranunc. 68.—Wet sphagnum bogs and flowing water, Brit. America, Athabasca Plains<sup>2</sup> and northward. (N. Asia, Kamtsch.)

<sup>1</sup> Recent literature: G. Beck, K. K. zool. bot. Gesellsch. Verhandl. (Vienna), xxxvi. 347, 353. E. Huth, Monogr. in Helios, ix. 69-74, t. 1.

<sup>2</sup> Since collected at Tower, Minnesota, *E. J. Hill*, and in Vermillion Lake, *Sandberg*.

\* \* Scapose or barely one-leaved, 1-2-flowered, erect: sepals white, sometimes bluish: follicles more or less stipitate, pointed with short style.

**C. biflora**, DC. Scape slender: leaves round-reniform, crenate or repand: sepals 6 to 9, oval, becoming oblong: follicles at maturity distinctly stipitate. — Syst. i. 310; Hook. Fl. Bor.-Am. i. 22; Torr. & Gray, Fl. i. 27; Wats. Bot. Calif. ii. 427. *C. leptosepala*, Gray, Proc. Am. Acad. viii. 373; Brew. & Wats. Bot. Calif. i. 9, mainly. — Damp ground, Alaska to mountains of California, first coll. by *Menzies*.

**C. leptosépala**, DC. l. c. Stouter: leaves from round-oval or round-obovate to ovate with small and narrow (cordiform or sagittiform) sinus, crenate or repand, the nerves at base nearly parallel: sepals 7 to 10, oblong, becoming narrower: follicles obscurely stipitate. — Hook. Fl. Bor.-Am. i. 22, t. 10; Torr. & Gray, l. c. 27; Garden, xxx. 340, t. 565.<sup>1</sup> *C. sagittata*, Torr. Ann. Lyc. N. Y. ii. 164, not Cav. — Alaska and Washington, and higher Rocky Mountains from Brit. Columbia to N. Nevada, Utah, and S. Colorado; first coll. by *Menzies*.

**11. TRÓLLIUS**, L. GLOBE-FLOWER. (Name, a Latinization by Gesner of *Troll*, from the German vernacular name *Trollblume*, of which the origin is doubtful.) — Perennial herbs, of the northern temperate zone, glabrous; with palmately cleft and incised or dissected leaves, and large usually solitary flowers terminating simple stems; fl. in spring and early summer. — Gen. ed. 5, no. 620; Gray, Gen. III. i. 33, t. 11.

*T. EUROPEÛS*, L., the true GLOBE-FLOWER, which answers to the name in the globular form of the golden yellow calyx, is cultivated in gardens.

**T. láxus**, SALISB. At length a foot or two high: leaves 5-7-parted: sepals 5 or 6, spreading, ochroleucous or dull white: petals 15 to 25, inconspicuous, being shorter than the stamens. — Trans. Linn. Soc. viii. 303; Pursh, Fl. ii. 391; Torr. Fl. N. Y. i. 18, t. 3; Gray, l. c. & Am. Jour. Sci. ser. 2, xxxiii. 241 (var. *albiflorus*); Lawson, l. c. 70. *T. Americanus*, Muhl. Trans. Am. Phil. Soc. 1791, 172, & Cat. 54; Sims, Bot. Mag. t. 1988; DC. Syst. i. 313, a much earlier published name, but without character. *Gaissenia verna*, Raf. Med. Rep. hex. 2, v. 351, & in Desv. Jour. Bot. ii. 168 (1809). — Bogs, New Hampshire to Michigan and south to Delaware, also Rocky Mountains from Brit. America to Colorado and Utah, and to the Cascades in Brit. Columbia.

**12. ISOPÝRUM**, L. (*Ἰσόπυρον*, ancient name of a *Fumaria*, transferred to the present genus.) — Low perennials (or a foreign one annual), of the northern temperate zone, glabrous, mostly white-flowered, with ternately compound leaves; the primary divisions long-petiolulate in the way of *Thalictrum*: ours (§ *Enemion*) apetalous and with white filaments clavellate; fl. spring and early summer. — Gen. ed. 2, no. 533; DC. Syst. i. 323; Benth. & Hook. Gen. i. 8; Maxim. Diag. Pl. Asiat. v. 623. *Enemion*, Raf. Jour. Phys. xci. 70, apetalous species.

\* Flowers scattered, solitary and terminal or opposite the leaves: stems slender, a span to a foot high; mostly with filiform rootstocks.

**I. biternátum**, TORR. & GRAY. Root of copious slender fibres, some here and there moniliform-thickened: leaflets cuneate-obovate or roundish, commonly 3-lobed: carpels 3 to 6, commonly 4, sessile, about 3-ovuled and 2-3-seeded, ovate, divaricate at maturity, subulate-pointed with long persistent style; seeds smooth, with prominent rhaphe. — Fl. i. 660; Gray, Gen. III. i. 36, t. 12. *I. thalictroides* (which it much resembles), Short, Cat. Pl. Kentucky, 8; Hook. Jour. Bot. i. 187. *Enemion biternatum*, Raf. l. c.; Torr. & Gray, l. c. 29. — Shady and moist grounds, Ohio<sup>2</sup> to Wisconsin and south to Texas.

**I. occidentále**, HOOK. & ARN. Root of thickened fascicled fibres: leaflets cuneate, 2-3-lobed: follicles 5 to 7, elongated-oblong, sessile, barely spreading, mucronate with short

<sup>1</sup> Vars. *rotundifolia* & *Howellii*, Huth, l. c. 68, appear to have only formal value.

<sup>2</sup> Collected at London, Ontario, *Dearness*, acc. to J. M. Macoun, Bot. Gaz. xvi. 285.



style, thinnish, transversely veiny, 8-9-seeded: seeds granulate. — Bot. Beech. 316; Torr. & Gray, Fl. i. 660; Brew. & Wats. Bot. Calif. i. 9; Maxim. l. c. 641. — Shaded ground, from near San Francisco to Plumas Co.,<sup>1</sup> first coll. by Douglas. Sepals sometimes purple, or roseate.<sup>2</sup>

- I. stipitátum**, GRAY. Root of the preceding: slender stems only a span high: peduncles not surpassing the leaves: leaflets or divisions oblong-linear or cuneate-lanceolate: stamens about 10: follicles 8 to 10, elongated-oblong, apiculate with short style, hardly veiny, abruptly short-stipitate, 3-4-seeded. — Proc. Am. Acad. xii. 54; Wats. Bot. Calif. ii. 427. *I. Clarkei*, Kellogg, Proc. Calif. Acad. Sci. vii. 131. — N. California, Siskiyou and Mendocino Co., Greene, J. H. Clarke.

\* \* Flowers umbellate-cymose: stems stouter, a foot or two high.

- I. Hálli**, GRAY. Leaflets or divisions an inch or two long, obovate-cuneate, acutely incised: stamens very numerous, fully as long as the obovate sepals, as broad as the roundish anther: follicles 3-5, turgid-ovate, subulate with short style, spreading at maturity, 2-4-seeded: seeds rugulose. — Proc. Am. Acad. viii. 374; Maxim. l. c. 640. — Valley of the Columbia, Oregon, E. Hall, Brandegee.

**13. CÓPTIS**, Salisb. GOLD-THREAD. (Κόπτω, to cut, from the cut foliage.) — Low and glabrous perennials (of the cooler parts of the northern hemisphere), acaulescent: with creeping mostly filiform and yellow bitter rootstocks, long-petioled ternately compound leaves, lasting over winter; and naked one-few-flowered scapes; the sepals white or greenish; seed-coat smooth and shining; fl. spring. — Trans. Linn. Soc. viii. 305; Gray, Gen. Ill. i. 37, t. 13.<sup>3</sup> *Chryza*, Raf. Med. Rep. hex. 2, v. 352, & in Desv. Jour. Bot. ii. 170 (1809).

§ 1. CHRÝZA, or True Coptis. Sepals oval: petals shorter than the stamens, clavate, with enlarged and thickened hollowed and nectariferous summit: leaflets 3, rarely 5, subsessile and undivided: scape 1-flowered. — Gray, l. c. 38.

- C. trifólia**, SALISB. l. c. (GOLD-THREAD.) A span high: rootstocks very long and filiform, deep yellow: leaflets 3, rounded obovate with mostly cuneate base, obscurely 3-lobed and conspicuously crenate-dentate, teeth mucronate: sepals white with yellowish base, soon deciduous: follicles ovate-oblong, longer than the style, equalled by the stipe; seeds black. — Fl. Dan. t. 1519; Lodd. Bot. Cab. t. 173; Bigel. Med. Bot. i. 60, t. 5; Raf. Med. Bot. i. t. 27; Gray, l. c. 38, t. 13; Lloyd Bros. Am. Drugs & Med. i. 188, t. 13. *Helleborus trifolius*, L. Spec. i. 558. *Chryza borealis*, Raf. Med. Rep. hex. 2, v. 352.<sup>4</sup> — Bogs and low woods, Newfoundland and Labrador to mountains of Maryland, Iowa, and Minnesota, northwest through Brit. America to Alaska, and north to the Arctic Circle. (Greenland, Eu., N. Asia to Kamtsch. & Japan.)

§ 2. CHRYSOCÓPTIS. Sepals linear or ligulate and attenuate, greenish or yellowish white: petals filiform or ligulate beyond the nectariferous portion: scape 2-3-flowered. — Gray, l. c. 38. *Chrysocoptis* § *Pterophyllum*, Nutt. Jour. Acad. Philad. vii. 9, t. 1.

- C. occidentális**, TORR. & GRAY. Leaves simply trifoliolate: leaflets long-petiolulate, of roundish outline (2 or 3 inches long at maturity), 3-lobed about to the middle; lobes obtuse, slightly 3-lobed or incised and obtusely dentate: petals shorter than sepals, and apparently subulate from a subsessile ovate and concave base (but not sufficiently known): mature carpels longer than the stipe; seeds oblong. — Fl. i. 28; Hook, Lond. Jour. Bot. vi. 67. *Chrysocoptis occidentalis*, Nutt. l. c. 8, with poor figure of flowers, these and scape undeveloped, the latter at length as long as petioles. — Mountain woods, Idaho, Wjeth, Geyer, Lyall, Watson.

<sup>1</sup> Fresno Co., Calif., A. A. Eaton; and reported from Tulare Co., by T. S. Brandegee, Zoe, iv. 198.

<sup>2</sup> The formal variety *coloratum*, Greene, Erythea, i. 125, collected in the Santa Cruz Mountains, Cushman.

<sup>3</sup> Recent literature: E. Huth in Engl. Jahrb. xvi. 299-305.

<sup>4</sup> Add syn. *Isopyrum trifolium*, Britton, Bull. Torr. Club, xviii. 265.

**C. laciniáta**, GRAY. Leaves trifoliolate; terminal leaflet very long-lateral comparatively short-petiolulate; all ovate in outline, nearly 3-parted, and divisions 3-7-cleft or incised and dentate, mostly acute: sepals linear-attenuate (barely half line wide at base, 4 or 5 lines long: petals nearly of the following species: mature carpels longer than stipe; seeds oval. — Bot. Gaz. xii. 297. *C. asplenifolia*, Gray, Proc. Am. Acad. viii. 375 (coll. Hall); Wats. Bot. Calif. ii. 427; Lloyd Bros. l. c. i. 196, f. 51-53.<sup>1</sup> — Woods of Oregon, Hall, Cusick, Henderson, and of N.W. California, G. R. Vasey, Rattan.

**C. asplenifolia**, SALISB. Leaves pinnately 5-foliolate; leaflets all rather long-petiolulate, mostly ovate-oblong in outline and pinnately 5-parted or divided; lowest pair of pinnæ commonly petiolulate and upper confluent, all 3-5-cleft and incised (about half inch long): sepals and petals filiform-attenuate, nearly equal; the latter with a thickened concave nectary much below the middle: mature carpels shorter than the stipe. — Trans. Linn. Soc. viii. 306; Pursh, Fl. ii. 391; Hook. Fl. Bor.-Am. i. 23, t. 11. *Chrysocoptis* (*Pterophyllum*) *asplenifolia*, Nutt. l. c. 9. — Woods, Brit. Columbia and Alaska; first coll. by Menzies.

**Var.\* biternáta**, E. HUTH. Leaflets ternate; lateral divisions sessile by a broad base; the terminal petiolulate. — Huth in Engl. Jahrb. xvi. 304. — Alaska, Sitka, Krause Bros. A variety not seen; description translated from the original.

**13 a. ERÁNTIS HYEMÁLIS**, Salisb. (*Helleborus hyemalis*, L.), the WINTER ACONITE of Europe, a very dwarf perennial, has been found growing spontaneously near Philadelphia, a relict of former cultivation; fl. earliest spring.

**13 b. HELLÉBORUS VÍRIDIS**, L., GREEN HELLEBORE of Europe, has in former years been found wild near Brooklyn and Jamaica, Long Island, but is probably now extinct. More recently it has been sent from W. Virginia. It is a low species, with palmately parted leaves having lanceolate very sharply serrate divisions, and green sepals.

**H. FÉTIDUS**, L., the FETID HELLEBORE of Europe, taller, and green-flowered, is in Muhl. Cat., as at Philadelphia, but only as of gardens.

**H. NÍGER**, L., the CHRISTMAS ROSE, or BLACK HELLEBORE of Europe, — low, with evergreen and shining coriaceous pedate leaves and large white flower produced on a short scape in earliest spring, the sepals enlarging and turning green in age, — has been said to grow wild in the State of New York, but it is not quite hardy, and can only temporarily occur.

**14. AQUILÉGIA**, Tourn. COLUMBINE. (*Aquilegus*, water-drawer. The derivation from *aquila*, eagle, is an invention.) — Perennial herbs (of the northern hemisphere), commonly glaucous; mostly with paniculate branches terminated by showy flowers, and 1-3-ternately compound leaves; the leaflets roundish and obtusely lobed; flowering usually in spring or early summer. — Inst. 428, t. 242; L. Gen. no. 450.<sup>2</sup> — In cultivation the most diverse species hybridize directly. Thus the plant figured as *A. formosa*, in Hook. f. Bot. Mag. t. 6552, is a hybrid of a red-flowered species, probably *A. truncata*, with *A. chrysantha*.

\* Old World type, with hooked or curved spurs; these ascending, the flower being pendulous in anthesis (position in *A. ecalcarata*, uncertain).

† More or less leafy-stemmed, 1-several-flowered.

**A. VULGÁRIS**, L. (EUROPEAN COLUMBINE.) Flowers from blue or purple to white, pretty large: lamina of the petals as long as the spur, shorter than the acute sepals; styles as long as the ovary. — Spec. i. 533. — Escaped from cultivation (where often and variously double-flowered) and established in some places, notably in Nova Scotia. (Nat. from Eu.)

<sup>1</sup> Add syn. *C. occidentalis*, var. *Howellii*, Huth, l. c. 303.

<sup>2</sup> Recent literature: M. E. Jones, Rev. Am. Spec. Aquilegia, Zoe, iv. 254-260.

**A.\* brevistyla**, Hook.<sup>1</sup> A foot or more high, pubescent and somewhat glandular-pubescent above: flower small: lamina of yellowish petals little shorter than the (half inch) obtuse sepals and longer than the blue spur: styles (2 lines long) much shorter than the forming pubescent-follicles. — Fl. Bor.-Am. i. 24; Torr. & Gray, Fl. i. 30. *A. vulgaris*, Richards. in Frankl. 1st Jour. ed. 1, App. 740 (reprint, p. 12). — Rocky Mountains of Brit. America, *Bourgeau*, *Macoun*, northward to Bear Lake, where first collected by *Dr. Richardson*, and southward according to *Rydberg* to the Black Hills of S. Dakota, *L. Anderson*.

**A.\* saximontána**, P. A. RYDBERG. Much lower, scarcely a span high: stems slender, several from a scaly rootstock, quite glabrous: leaves small, twice ternate, even the upper slender-petioled, smooth: flowers much as in the preceding, but carpels glabrous. — *Rydberg* in ms. *A. vulgaris*, var. *brevistyla*, Gray, Am. Jour. Sci. ser. 2, xxxiii. 242; Porter & Coulter, Fl. Col. 4. *A. brevistyla*, Coulter, Man. Rocky Mt. Reg. 10; Jones, Zoe, iv. 258. — Rocky Mountains of Colorado, first collected by *Parry*.

**A. flavescens**, WATSON. A foot or two high, branching freely: flower lemon-yellow, greenish yellow, or ochroleucous, the sepals sometimes scarlet-tinted outside: lamina of the petals obovate, shorter than the oblong or ovate acute sepals, equalling or shorter than the spur: styles 3 to 6 lines long, much longer than the pubescent ovary, half the length of the full-grown follicle. — Bot. King Exp. 10; Gray, Am. Jour. Sci. ser. 3, iii. 149; Baker, Gard. Chron. 1878, t. 2, 20. *A. Canadensis*, var. *hybrida*, Hook. Fl. Bor.-Am. i. 24. *A. Canadensis*, var. *aurea*, Regel, Gartenfl. xxi. t. 734. *A. cœrulea*, var. *flavescens*, Lawson, Rev. Canad. Ranunc. 76. — Moist ground and along streams, in the mountains. Pembina to Brit. Columbia, and south to Oregon and Utah.<sup>2</sup>

**A.\* micrántha**, A. EASTWOOD. Slender, perennial (?), densely glandular-pubescent and viscid above: leaflets small, cuneate, 3-cleft, with 2-3-lobed segments; petiolules of the lateral leaflets short: flowers about 10 lines in diameter, ochroleucous: sepals 5 lines long, 2 lines broad: petals truncate or nearly so, with a short straight or curved spur. — Proc. Cal. Acad. Sci. ser. 2, iv. 559, t. 19. — Abundant in cañons of the San Juan River, S. E. Utah, *A. Wetherill*. Description here condensed from the original characterization. A very similar if not identical plant was collected in imperfect specimens in Southern Utah by *Siler* in 1883.

**A.\* ecalcaráta**, A. EASTWOOD. A slender branched perennial, 1½ to 2 feet high with foliage and habit nearly as in the preceding: root long, woody: stems several, sparingly glandular-puberulent above: leaflets obovate, cuneate, cleft as in the last; the lateral as well as the terminal on slender more or less elongated petiolules: flowers white or roseate, fragrant: petals and sepals subsimilar, 6 to 8 lines long; the former merely saccate at base: styles rather long. — Zoe, ii. 226, iv. 3, & Proc. Cal. Acad. Sci. ser. 2, iv. 560, t. 18; Jones, Zoe, iv. 259. — Shaded cliffs, S. W. Colorado, *A. Wetherill*, *Miss Eastwood*. As yet too little known and appearing rather near the preceding, of which it may well prove a nearly spurless form.

+ + Scape naked, one-flowered.

**A. Jonésii**, PARRY. Densely cæspitose, soft-pubescent: tufted radical leaves an inch or two high; leaflets only 2 or 3 lines long, much congested, the partial petioles very short: scape little surpassing the leaves (2 or 3 inches long in fruit): flower blue: lamina of petals half the length of the oblong obtuse sepals and of its own spur: follicles proportionally large (almost an inch long), twice the length of their styles. — Am. Nat. viii. 211; Coulter, Man. Rocky Mt. Reg. 10. — N.W. Wyoming, alpine region, Mount Phlox, *Parry*; Maria Pass in Montana, at 8,200 feet, *Canby*.<sup>3</sup>

\* \* American type, with spur straight, or the callous knob at tip merely oblique.

<sup>1</sup> The description of this species has been modified to exclude the following, which appears wholly distinct.

<sup>2</sup> The alpine smaller-flowered form mentioned by *Dr. Watson* (Bot. King Exp. 10) is regarded as distinct by *Prof. M. E. Jones*. It appears to approach the following species too closely to be characterized as a separate species without more copious material of both.

<sup>3</sup> Since collected on subalpine limestones, E. Boulder River, Park Co., Montana, *Tweedy*; see *Rose*, Bot. Gaz. xv. 63.

— Flower pendulous in anthesis, the spurs therefore erect or ascending, and not over an inch in length. Four species distinct in nature and habitat, viz. *A. Skinneri* of Mexico and the following.

**A. Canadensis**, L. Erect, early flowering, usually a foot high: flower red with some yellow, rarely all yellow: spurs 3 or 4 times the length of their roundish yellow lamina, and this not much shorter than the barely spreading sepals. — Spec. i. 533; Curtis, Bot. Mag. t. 246; Schk. Handb. t. 146; Bart. Fl. N. A. i. 130, t. 36; Lodd. Bot. Cab. t. 888; Gray, Gen. III. i. 40, t. 14; Sprague & Goodale, Wild Flowers, i. t. 1. *A. variegata*, Moench, Meth. 311. *A. elegans*, Salisb. Prodr. 374. *A. flaviflora*, Tenney, Am. Nat. i. 388, the yellow-flowered variation.<sup>1</sup> — On rocks, &c., Canada, from lat. 56° to Manitoba, south to Florida and to New Mexico, probably not west of the Rocky Mountain district; fl. spring and early summer.

**A. formosa**, FISCHER. More spreading: flower carmine-red or scarlet: spurs little or not at all longer than the widely spreading sepals and only about twice the length of their roundish and truncate yellow lamina. — Fischer in DC. Prodr. i. 50; Torr. & Gray, Fl. i. 30; Planch. Fl. Serres, viii. 125, t. 795 (not Hook. f. Bot. Mag. t. 6552); Lawson, Rev. Canad. Ranunc. 75. *A. Canadensis*, Bong. Veg. Sitch. 124; Hook. Fl. Bor.-Am. i. 24, in part. *A. arctica*, Loud. Hort. Brit. 610, &c. *A. Canadensis*, var. *formosa*, Wats. Bot. King Exp. 10, &c. — Alaska and Brit. Columbia to N. California, mountains of Nevada and S. W. Utah, extending northeastward only to Idaho.

**A. truncata**, FISCH. & MEYER. With lax spreading branches, rather late-flowering: flower deep red or scarlet: spurs little longer than the widely spreading or reflexed sepals, truncate at the yellow-margined orifice, the lamina being obsolete or very short. — Ind. Sem. Hort. Petrop. ix. 1843, Suppl. 8; C. A. Meyer, Sert. Petrop. fol. & t. 11; Brew. & Wats. Bot. Calif. i. 10. *A. Canadensis*, Benth. Pl. Hartw. 296. *A. Californica*, Lindl. Gard. Chron. 1854, 836, & 1857, 382; Gray, Proc. Am. Acad. vii. 328. *A. eximia*, Planch. Fl. Serres, xii. 13, t. 1188; Morren, Belg. Hort. vii. t. 52.<sup>2</sup> — Common throughout California, probably in adjacent Nevada; fl. summer.

— — Flower (never red) erect or soon becoming so, the long attenuate spurs dependent or at first horizontal: lamina of the petals somewhat ample, obovate or spatulate and spreading.

**A. cœrulea**, JAMES. A foot or two high, rather early flowering: sepals ovate, an inch to inch and a half long, blue, as also the spurs of 1½ to 2 inches: lamina of the petals white. — James in Long Exped. ii. 15; Torr. Ann. Lyc. N. Y. ii. 164; Torr. & Gray, Fl. i. 30; Hook. Bot. Mag. t. 5477. — Along streamlets, lower alpine region and below, Rocky Mountains, from Montana to borders of New Mexico; first coll. by James. Apparently a smaller-flowered form in S. Utah. Varies to paler, but westward seems always to be of the

**Var. albiflora**, GRAY, n. var. Whole flower white with merely bluish or purple tinge. — *A. leptocera*, Nutt. Jour. Acad. Philad. vii. 9; *A. leptocera*, Hook. Bot. Mag. t. 4407. *A. macrantha*, Hook. & Arn. Bot. Beech. t. 72, in letter-press (317) *A. cœrulea*. *A. cœrulea*, Wats. Bot. King Exp. 10. *A. cœrulea*, var. *ochroleuca*, Hook. Bot. Mag. under t. 5477. — Wasatch and Uinta Mountains, Utah, to the eastern border of the Sierra Nevada, California, north to Idaho and perhaps to Montana.

**A. chrysantha**, GRAY. Taller, more glaucous and floribund, summer-flowering: flower yellow: sepals lanceolate-oblong, little longer and not broader than the lamina of the petals: spurs 2½ or 3 inches long, dilated at and near the orifice. — Proc. Am. Acad. viii. 621; Masters, Gard. Chron. 1873, f. 304; Meehan, Native Flowers, i. t. 7, poor. *A. leptocera*, var. *flava*, Gray, Pl. Wright. ii. 9, & Bot. Mex. Bound. 30. *A. leptocera*, var. *chrysantha*, Hook. f. Bot. Mag. t. 6073. — Wet places in ravines of moderate elevation, New Mexico, Arizona, and S. Colorado; first coll. by Wright.

<sup>1</sup> *A. Canadensis*, var. *FLAVIFLORA*, Britton, Bull. Torr. Club, xv. 97. Another form with salmon-colored flowers and pale leaves, the var. *PHIPPII*, J. Robinson, Bull. Torr. Club, xv. 166, has been found in the neighborhood of Salem, Mass.

<sup>2</sup> Add syn. *A. formosa*, var. *truncata*, M. E. Jones, l. c. 259. Prof. Jones states that intermediate forms "seem to occur" between *A. truncata* and *A. formosa*.

- A.\* pubescens**, COVILLE. A nearly related plant with very scaly caudex: flowers sulphur-yellow, rarely with pink tinge: spurs shorter, 14 to 20 lines long; the short rounded blades of the petals scarcely over a third the length of lance-oblong sepals. — Contrib. U. S. Nat. Herb. iv. 56, t. 1. — High sierras of Tulare Co., Calif., near Mineral King, 10,500 feet, in granite sand, *J. W. A. Wright*, 27 July, 1880; and on mountain side north of White Chief Mine, *P. V. Coville*, 6 August, 1891. Regarded by Dr. Gray as a dubious form of the preceding.
- A. longissima**, GRAY. Puberulent or glabrous, autumn-flowering: flowers pale yellow: sepals lanceolate, little surpassing the narrowly spatulate petals: filiform spurs 4 to 6 inches long, hardly enlarging up to the narrow orifice. — Gray in Wats. Proc. Am. Acad. xvii. 317, & Bot. Gaz. viii. 295; Wats. Gard. & For. i. 31, f. 6. — Ravines of Chisos Mountains, S. W. Texas, *Havard*. (Adj. Mex., *Palmer*.)

**15. DELPHINIUM**, Tourn. LARKSPUR. (*Delphinus*, dolphin, from the shape of the flower.) — Annual or perennial herbs (of northern temperate regions); with palmately cleft or divided leaves, and racemose or paniculate flowers, commonly showy. — Inst. 426, t. 241; L. Gen. no. 449; Gray, Gen. III. i. 41, t. 15.<sup>1</sup>

§ 1. CONSÓLIDA, DC. Carpel and follicle only one: petals (in ours only 2) united into one body: Old World annuals, or rarely more enduring, low; with leaves dissected into narrow linear or filiform divisions: flowers blue or violet, varying to purple and white. — Syst. i. 341.

**D. CONSÓLIDA**, L. Loosely paniculate in inflorescence: slender spur horizontal: follicle glabrous: seeds with interrupted transverse ridges. — Spec. i. 530; Reichenb. Ic. Fl. Germ. iv. t. 66. — Old grain-fields, &c., rare, Virginia, &c. (Nat. from Eu.)

**D. AJÁCIS**, L. Flowers more numerous and spicately racemose: follicle pubescent; seeds with rugosely broken ridges. — Spec. i. 531; Reichenb. l. c. t. 67. — Escaped from gardens in Canada and Atlantic and Middle States, in certain places. *D. orientale*, Gay, a common garden Larkspur with more showy (violet-colored) flowers in a denser raceme, is thought to be the original *D. Ajacis*, L.; according to Lawson, Rev. Canad. Ranunc. 80, it has been collected in the far interior of Canada, probably from a cultivated plant (Nat. from Eu.)

§ 2. DELPHINÁSTRUM, DC. l. c. 351. Carpels 3 to 5: flowers never scarlet or orange: petals 4, distinct; upper pair usually glabrous, extending backward into spurs; lateral ones unguiculate, more or less hairy on the face, in ours emarginate or 2-lobed at apex: follicles in ours almost always 3: perennials. In several species, such as *D. tricorné*, the caulicle does not lengthen in germination, but the connate petioles of the cotyledons do so, and the plumule comes out from the base of the false stemlet which is thus formed.

\* Seeds with a close smooth coat, dark-colored: stem few-leaved, from a fasciculate-tuberous root: Atlantic species.

**D. tricorne**, MICHX. Low, succulent: leaves deeply and somewhat pedately 5-parted and divisions cleft and lacinate into a few narrow lobes: raceme loose, few-many-flowered: flowers bright blue, or variegated with white (not rarely white): spur ascending, half or three fourths inch long: follicles 3, half inch to inch long, strongly diverging at maturity. — Fl. i. 314 (excl. habitat "highest mountains of Carolina"); Lodd. Bot. Cab. t. 306; Deless. Ic. Sel. i. t. 59; Torr. & Gray, Fl. i. 31; Gray, Gen. III. i. 41, t. 15; Lindl. Veg. Kingd. 426, f. 297. *Delphidium flexuosum*, Raf. Ann. Nat. i. 12. — Moist fertile soil, Pennsylvania to Minnesota, south to Virginia, W. Georgia, and Arkansas; fl. spring.

<sup>1</sup> Recent important literature: Gray, Bot. Gaz. xii. 49-54; Huth, Delphinium-Arten N. A., Bull. Herb. Boiss. i. 327-336, & in Engl. Jahrb. xx. 322-499.

- \* \* Seeds with a cellular more or less loose and rugulose coat: stem scapiform, with only a cluster of radical and thickish or succulent leaves, from thickish branching roots, merely puberulent or glabrate, blue-flowered.

**D. scapósum**, GREENE. Leaves of rounded or reniform outline and mostly oblong or subcuneate divisions and lobes: scape a foot or two high; raceme several-many-flowered: sepals oblong, fully half inch long and shorter than the more or less curved spur: follicles oval, erect: immature seeds with rugose and rugulose arilliform coat. — Bot. Gaz. vi. 156.<sup>1</sup> — Dry region of S. W. Utah, *Palmer*, and Arizona, *Newberry*, *Palmer*, *Greene*, *Pringle*, *Rusby*, *Lemmon*.<sup>2</sup> In Arizona is found in company with *D. azureum*.

**D. \* uliginósum**, CURRAN. Leaves so far as known all cuneate and 3-cleft, with lobes entire or 1-3-toothed: scape commonly branching; racemes few(6-18)-flowered: sepals oval, a third to half inch long, about equalling the straight spur: follicles turgid-oblong, erect, nearly half inch long; seeds with coat loose only at the angles, minutely rugulose and muriculate.<sup>3</sup> — Bull. Calif. Acad. Sci. i. 151.<sup>4</sup> — Lake Co., California, "in swampy ground, almost in the water," July, 1884, *Mrs. Curran*.

- \* \* \* Seeds with a loose cellular coat, which becomes transversely rugose-squamellate: root branching or fasciculate and elongated, thickish, but not tuberous: stem leafy, or when depauperate rarely subscapose: flowers from blue to white.

**D. azúreum**, MICHX. Stem a foot or two high, mostly strict and simple, puberulent: leaves 3-5-parted and divisions mostly again 3-5-parted or cleft usually into linear lobes: raceme spiciform, usually many-flowered: flowers azure-blue or paler and often white, sometimes greenish white: sepals often with a brownish spot: follicles oblong, erect. — Fl. i. 314; Deless. Ic. Sel. i. t. 60; Torr. & Gray, Fl. i. 32, probably not Lindl. Bot. Reg. t. 1999, from "California." ? *D. Carolinianum*, Walt. Car. 155. *D. virescens*, Nutt. Gen. ii. 14; Torr. & Gray, l. c.<sup>5</sup> — Sandy or stony soil, N. Carolina and Illinois to Texas and Arizona, north to Saskatchewan and Wyoming; fl. early summer. (Adj. Mex.)

**Var. vimíneum**, GRAY. Broader-leaved, looser-flowered: stem 2 to 4 feet high, sometimes branched: flowers violet to whitish. — Bot. Gaz. xii. 52. *D. vimíneum*, Don in Sweet, Brit. Fl. Gard. ser. 2, t. 374; Hook. Bot. Mag. t. 3593; Torr. & Gray, l. c. *D. azureum*, Lindl. Bot. Reg. t. 1999, as to f. 2, possibly of the rest. *D. virescens*, Gray, Pl. Lindh. ii. 142. — Texas, *Berlandier*, *Drummond*, *Lindheimer*, *Wright*, the last *D. simplex*, Gray, Pl. Wright. ii. 8.

- \* \* \* Seeds with a loose cellular coat, either arilliform or when dry merely scarious-winged or margined at the angles, not at all squamelliferous: flowers blue or violet-purple, often partly or wholly varying to white, at least the petals. All except the first western species.

+ Roots fasciculate (or rarely simple) at base of stem, more or less elongated and thickish but not tuberiform, or approaching it only in the last species.

++ Stem strict, tall or robust, many-leaved: racemes many-flowered, simple or paniculate: pedicels seldom longer than flower or fruit, ascending or erect: follicles hardly if at all diverging, not over half inch long and mostly short-oblong.

**D. exaltátum**, AIT. Stem 3 to 7 feet high: leaves nearly glabrous, 3-5-parted or almost so; the divergent divisions cuneate or cuneate-lanceolate, 3-cleft or lateral ones 2-cleft into lanceolate lobes: raceme elongated, virgate, at base commonly paniced: flowers blue

<sup>1</sup> Add syn. *D. decorum*, var. *scaposum*, Huth, Delph.-Art. N. A. 9.

<sup>2</sup> Also reported from S. Colorado, by Miss Eastwood, Zoe, ii. 227.

<sup>3</sup> Description modified in the light of excellent specimens collected near the type locality by *Mr. J. W. Blankinship*.

<sup>4</sup> Add syn. *D. decorum*, var. *uliginosum*, Huth, l. c.

<sup>5</sup> Add syn. *D. Penhardi*, Huth, Helios, x. 27, Delph.-Art. N. A. 10, & Bull. Herb. Boiss. i. 335, t. 16, f. 2 (a form with white flowers and ascending somewhat curved spurs); also *D. camporum*, Greene, Erythra, ii. 183 (a very similar form with spurs erect). As striking as these forms may be, they do not appear (in a considerable series of specimens) to be distinguished from *D. azureum* by any constant character. The flowers vary through all shades from blue to white, and the position of the spur both in the pale blue and white flowered forms varies from horizontal to erect through every degree of obliquity. *D. Geyerii*, Greene, l. c. 189, is apparently a form of the same species.

(varying to white), small, externally as also the inflorescence canescently puberulent. — Kew. ii. 244; DC. Syst. i. 357; Torr. & Gray, l. c. 31, excl. syn. in part; Gray, Pl. Wright. ii. 9. *D. Carolinianum*, Walt. Car. 155. *D. tridactylum*, Michx. Fl. i. 314. (*D. urceolatum*, Jacq. Ic. Rar. t. 101, & Sims, Bot. Mag. t. 1791, of unknown source, is probably not of this species?) — Border of woods, mountains of Alabama and Carolina to Kentucky, Ohio and Minnesota; fl. late summer.

**D. Californicum**, TORR. & GRAY. Stem stout, 2 to 8 feet high: leaves of rounded and somewhat reniform outline; lower ample (4 to 7 inches in diameter), deeply cleft into broad cuneate and lacinate divisions; upper with narrower divisions and lanceolate lobes: raceme dense. flowers sordid whitish with tinges of blue, externally villous: sepals and horizontal spur each about four lines long. — Fl. i. 31; Benth. Pl. Hartw. 296; Brew. & Wats. Bot. Calif. i. 11. *D. exaltatum*, Hook. & Arn. Bot. Beech. 317, not Ait.<sup>1</sup> — California, on dry hills from Monterey to Mendocino Co.; first coll. by Douglas.

**D. scopulorum**, GRAY. Glabrous below or throughout: stem 2 to 6 feet (or in subalpine forms a foot) high: leaves mostly of orbicular outline and 2 or 3 inches in diameter, 5-7-parted, the lower into cuneate and upper into narrower cleft and lacinate divisions; petioles except lowest hardly dilated at base: bracts and bractlets mainly filiform: flowers blue or purplish, rarely white, glabrous or canescent-puberulent outside: sepals and spur each about half inch long: follicles veiny. — Polymorphous species or group, analogue of the equally polymorphous or complex *D. elatum*, L., and *D. hybridum*, Willd., of the Old World (which have seed-coat transversely rugulose or lamellose); the typical or first published form a foot to a yard high, with upper or even all the leaves dissected into linear or lanceolate segments and lobes; inflorescence often paniced below, the axis, pedicels, and even the whole upper part of the stem minutely cinereous-puberulent, varying to glabrous: lower petals deeply notched, and with the whitish upper ones little shorter than the oblong sepals: ovaries and follicles commonly minutely pubescent. — Pl. Wright. ii. 9, & Am. Jour. Sci. ser. 2, xxxiii. 242. *D. exaltatum*, Hook. Fl. Bor.-Am. i. 25, at least in part. *D. azureum*, Gray, Pl. Fendl. 5, as to no. 10.<sup>2</sup> — Moist ground, mountains of New Mexico and Arizona through the Rocky Mountains and those of Utah and Nevada to the plains of the Saskatchewan. Passes freely into

**Var. stachydeum**, GRAY. A form with narrow divisions to the leaves, strict stem (3 to 7 feet high) cinereous-puberulent throughout, as also the long and dense spiciform raceme and the outside of the calyx. — Bot. Gaz. xii. 52. — Interior of Oregon (foot of the Blue Mountains, &c., *Cusick*) to New Mexico and Arizona, *Pringle*, &c.

**Var. glaucum**, GRAY, l. c. Like the broader-leaved forms, sometimes glaucous, even the pedicels glabrous or only obscurely glandular-puberulent: lower petals commonly cleft to the middle: ovaries and follicles glabrous. — *D. glaucum*, Wats. Bot. Calif. ii. 427 (*D. scopulorum*, Brew. & Wats. ibid. i. 11).<sup>3</sup> — Sierra Nevada, California, at about 6,000 feet, *Brewer*, *Lemmon*; also apparently same in San Bernardino Mountains at 10,000 feet, *W. G. Wright*; Yakima Co., Washington, *Brandegee*; and north to the Yukon River, *Kennicott*.

**Var. subalpinum**, GRAY, l. c. A foot to a yard or more high, with shorter raceme of larger and deeper-colored flowers: inflorescence and commonly whole upper part of the stem pubescent or villous with spreading slightly viscid hairs: petals well surpassed by the over half inch long acute sepals, the lower moderately notched at apex: follicles glabrous: leaves with mostly broad divisions and lobes. — *D. elatum*, Gray, Am. Jour. Sci., ser. 2, xxxiii. 242, not L., &c. *D. occidentale*, Wats. Bot. Calif. ii. 428.<sup>4</sup> — Mountains of Colorado and New Mexico, at 9,000-11,000 feet, first coll. by *Parry*. The analogue of *D. alpinum*, Walld. & Kit. By less pubescent forms, of lower elevation and compound racemes (*D. elatum*, var.? *occidentale*, Wats. Bot. King Exp. 11), of Wasatch Mountains, Utah to Oregon, *Nevius*, *Cusick*, *Henderson*, connects with the preceding forms.

<sup>1</sup> Add syn. *D. exaltatum*, var. *Californicum*, Huth, Delph.-Art. N. A. 11.

<sup>2</sup> Add syn. *D. exaltatum*, var. *scopulorum*, Huth, l. c. 12.

<sup>3</sup> Add syn. *D. exaltatum*, var. *glaucum*, Huth, l. c. 11.

<sup>4</sup> *D. Barbeyi*, Huth (Bull. Herb. Boiss. i. 335, *D. exaltatum*, var. *Barbeyi*, Huth, Delph.-Art. N. A. 11) is one of several forms which Dr. Gray included in his var. *subalpinum*.

++ ++ Stems lax (either low or tall), bearing a loosely flowered raceme of comparatively large and not very numerous bright violet blue (rarely purple) flowers: pedicels spreading or ascending, mostly decidedly longer than the fruit: follicles when well formed elongated-cylindrical and two thirds to nearly a full inch long, often partly divergent at maturity: herbage glabrous or nearly so.

**D. trolliifolium**, GRAY. Stems often reclining, 2 to 6 feet high, rather leafy: leaves thinnish, orbicular or reniform in outline (larger ones 4 to 6 inches wide), 5-7-parted or deeply cleft into cuneate divisions; these 3-cleft and lacinate-lobed; lobes acute, lanceolate to almost linear: raceme in larger plants a foot or two long and very loose: diverging pedicels commonly 2 inches long: sepals and spur usually three fourths inch long, upper ones much surpassing the white upper petals: follicles (even ovaries) glabrous, mostly recurving in age. — Proc. Am. Acad. viii. 375; Brew. & Wats. Bot. Calif. i. 11; Wats. Bibl. Index, 14, excl. syn., & Bot. Calif. ii. 428.<sup>1</sup> — Low or moist and partly wooded grounds, Columbia River below the Dalles, first coll. by *E. Hall*, then *Howell*, &c.; Humboldt Co., California, *Rattan*; there called *Cow Poison*.

**D. bicolor**, NUTT. A span (when alpine) to a foot high, from fascicled and mostly deep-descending roots, erect, rather stout: leaves thickish, seldom over an inch or two in diameter, radical orbicular in outline, all deeply parted and divisions cleft or upper simply parted; the segments mostly linear and obtuse: raceme few-several-flowered: lower pedicels inch or two long, ascending: sepals and spur half to three fourths inch long: upper petals pale yellow or white and copiously blue-veined: follicles glabrous or when young puberulent, sometimes quite erect, commonly recurving above. — Jour. Acad. Philad. vii. 10; Torr. & Gray, Fl. i. 33; Gray, Bot. Gaz. xii. 52. *D. Menziesii*, Gray, Proc. Acad. Philad. 1863, 57, not DC. *D. Menziesii*, var. *Utahense*, Wats. Bot. King Exp. 12. — Dry ground, mountains of Colorado and E. Utah, north to Brit. America, west to E. Oregon and Washington; perhaps to arctic Alaska.

++ ++ Stem strictly erect, a foot or two high, and bearing a virgate or narrow raceme: pedicels ascending, even the lowest rarely over an inch long (except when converted into leaf-bearing branch), and upper ones not longer than the spur: follicles oblong or oval, not over about half inch long, not recurving in age: Californian species or nearly so.

= Fascicled roots elongated and not at all tuberiform.

**D. Andersónii**, GRAY. Robust, very glabrous, a foot or two high: leaves thickish, of rounded outline (only an inch or two in diameter) and cuneate divisions; the lobes short, oblong or narrower, mainly obtuse: raceme commonly dense, a span or two long: sepals oblong, deep blue, half inch long, a little surpassing the petals and shorter than the spur. — Bot. Gaz. xii. 52. *D. Menziesii*, Wats. Bot. King Exp. 11, as to W. Nevada plant. *D. decorum*, var. *Nevadense*, Brew. & Wats. Bot. Calif. i. 11, mainly. — Mountains of W. Nevada and adjacent portion of the Sierra Nevada in California, *Anderson*, *Watson*, *Stretch*, *Lemmon*, &c. Most resembles the last preceding species.

**D. Párryi**, GRAY, l. c. Minutely puberulent or glabrous: stem 1 to 3 feet high from a rather slender simple or very few-fascicled root, sparsely leaved: leaves thinnish, 3-5-parted; the divisions and few lobes linear or hardly broader, mostly obtuse: raceme virgate, a span to a foot long, at length rather loose: sepals oval or broadly oblong, deep blue, over half inch long, much surpassing the petals, fully the length of the spur. — S. California, in San Bernardino Co., *Parry* (1850), *Parry & Lemmon* (1876), *Parish*. Apparently same near Santa Barbara, *Brewer*, and San Clemente Island, *Nevin & Lyon*.<sup>2</sup>

**D. Parishii**, GRAY, l. c. Minutely puberulent, several-stemmed from a simple or fasciculate deep root, a foot or two high, rather rigid, sparingly leaved: leaves all with rather few linear divisions and lobes, mostly small: sepals oblong, blue, only 3 or 4 lines long, hardly surpassing the petals, shorter than the spur. — S. E. California, at Agua Caliente in the Colorado Desert, *Parish*. (Adj. Lower Calif. to All Saints Bay, *Orcutt*.)

= = Roots (perhaps only biennial?) mostly short and numerous in a close fascicle, some of them commonly fusiform-thickened but not really tuberiform nor grumous: herbage

<sup>1</sup> Add syn. *D. exaltatum*, var. *trolliifolium*, Huth, l. c.

<sup>2</sup> Also reported by Brandegee from Santa Cruz and Santa Rosa Islands.



usually puberulent, or below hirsute-pubescent: leaves not large, only an inch or two in diameter, well dissected into linear or little broader and obtuse or mucronulate lobes or divisions.

**D. hespérium**, GRAY, l. c. Commonly 2 feet high: raceme virgate, a span to at length even a foot long, usually many-flowered: pedicels erect in fruit, lowest not over an inch and upper only 2 to 4 lines long: flowers violet-blue or paler, or often white, sometimes reddish purple: sepals 4 or 5 lines long, oval, about equalled by the petals and by the spur: follicles short-oblong, puberulent, half inch or less long. — *D. Menziesii*, var. *ochroleucum*, &c., Torr. & Gray, Fl. i. 31. *D. azureum*, Torr. & Gray, Fl. i. 660, as to Calif. and Oregon pl. *D. azureum* & *D. simplex*, Hook. & Arn. Bot. Beech. 317; Benth. Pl. Hartw. 295, 296. *D. simplex*, Brew. & Wats. Bot. Calif. i. 10. — Dry ground, plains of W. Oregon to Monterey and Mariposa Co., California; common. Var.\* HANSENI, Greene (Fl. Francis. 304), from Amador Co., Calif., is described as a more slender form with smaller pale flowers.

**D. variegátum**, TORR. & GRAY. A foot or two high, usually hirsute-pubescent below, bearing a raceme of several (rarely over 10) large flowers: sepals ample, deep violet-blue varying to purple, rose-color or white, roundish-obovate or oval or in age oval-oblong, two thirds to three fourths inch long, fully as long as the spur: upper or all the petals white: follicles half inch long, turgid-oval, puberulent. — Fl. i. 32; Brew. & Wats. l. c. *D. grandiflorum*, var. *variegatum*, Hook. & Arn. l. c. *D. decorum*, Benth. Pl. Hartw. 295, not Fisch. & Meyer.<sup>1</sup> — W. California, along streams, &c., common from Monterey northward to Butte Co.; early coll. by Douglas and by T. Coulter. The most showy species. Var.\* APICULÁTUM, Greene (Fl. Francis. 304, *D. apiculatum*, Greene, Pittonia, i. 285), of the interior of California near the San Joaquin, is from character a form having smaller more numerous flowers and somewhat broader leaf-segments.

++ Roots grumous or fasciculate-tuberos, i. e. thickening into globular or oblong or often palmate tubercles (of annual or biennial duration), bearing only fibrous rootlets: flowers mostly blue or violet.

++ Raceme spiciform and virgate, mostly many-flowered: pedicels shorter than the spur, erect or even appressed both in flower and fruit: stem strict, mostly several-leaved, simple, or the larger plants bearing one or more smaller lateral racemes.

**D. simplex**, DOUGL. Tall, about a yard high, pubescent throughout with short and soft spreading almost velvety down: leaves all dissected into linear divisions and lobes; calyx pubescent externally: root and fruit not seen (referred here from likeness to the following). — Dougl. in Hook. Fl. Bor.-Am. i. 25; Gray, l. c.; hardly of any others.<sup>2</sup> — W. Idaho; sub-alpine range west of the Rocky Mountains, near the Columbia, Douglas, Clearwater River, Spalding; also probably Union Co., E. Oregon, Cusick, with glabrate leaves.

**D. distichum**, GEYER. A foot or two and rarely a yard high, glaucescent, glabrous or inflorescence puberulent, rather rigid: leaves thickish; radical and lowest cauline of rounded outline and with cuneate or sometimes narrow divisions and lobes; upper short-petioled, erect, and with approximate or little spreading linear divisions and lobes: flowers usually approximate in the very spiciform raceme, then conspicuously distichous: sepals at first canescent-puberulent externally, a third to nearly half inch long, or in one form smaller and much less colored: follicles seldom over half inch long, erect. — Geyer in Hook. Lond. Jour. Bot. vi. 68; Gray, l. c. *D. simplex*, var. *distichiflorum*, Hook. l. c. 67. *D. simplex*, partly, of various authors. *D. azureum*, Torr. Bot. Wilkes Exped. 217. — Low prairies, &c., E. Oregon and Washington to Montana? Geyer, and various later collectors, apparently widespread.

++ Raceme loose, few-several-flowered or sometimes rather many-flowered: pedicels in flower and fruit ascending or spreading, at least the lower ones longer than the spurs: stem erect or ascending, only a foot or two high, naked and usually attenuate at base, where it at length readily separates directly from the grumose root-mass.

= Follicles at maturity half to three fourths inch long, oblong-cylindrical, and almost always widely recurving: pedicels mostly long and lax.

<sup>1</sup> *D. ornatum*, Greene (Fl. Francis. 304, *D. Blockmanæ*, Greene, Erythra, i. 247) was regarded by Dr. Gray as a form of *D. variegatum*.

<sup>2</sup> Add syn. *D. azureum*, var. *simplex*, Hüth, l. c.

**D. Menziesii**, DC. Commonly pubescent or puberulent: stem often flexuous (a foot or two or when depauperate a span or two high): leaves all 3-5-parted and divisions mainly cleft into linear or lanceolate lobes: sepals or some of them loosely pubescent outside, half to two thirds inch long; slender spur of equal length: follicles pubescent or glabrate or occasionally glabrous: lower pedicels in fruit often 2 inches long. — Syst. i. 355; Lindl. Bot. Reg. t. 1192; Hook. Fl. Bor.-Am. i. 25; Torr. & Gray, Fl. i. 661, excl. syn. *D. pauciflorum*.<sup>1</sup> — On hills, &c., Brit. Columbia (and perhaps Alaska) south to N. E. California, east to Idaho; early flowering; first coll. by *Menzies*. A low form, apparently of this species, Plumas Co., California, *Mrs. Austin*.

== Follicles at maturity half inch or less in length and oblong, erect, or merely with spreading tips.

**D. decórum**, FISCH. & MEYER. Very glabrous or pedicels barely puberulent, bright green: stem lax, 6 to 20 inches high, few-leaved: radical and lower cauline leaves of dilated-reniform or orbicular outline and deeply 3-5-lobed or parted; the divisions from round-obovate (and even an inch wide) to cuneate, sometimes entire or slightly 2-3-lobed, sometimes narrower and 2-3-cleft; upper leaves small, mostly pedately 3-5-parted into narrow lobes: raceme sparsely 5-20-flowered, often paniculate; pedicels slender, spreading, usually an inch or two long: sepals oval, half inch or more long, equalled by the thickish spur: follicles thickish, oblong. — Ind. Sem. Hort. Petrop. 1837, 33 (large-flowered form); Torr. & Gray, Fl. i. 661; Brew. & Wats. Bot. Calif. i. 11, in part; Gray, l. c. — California, from Napa and Bodega to Los Angeles and San Bernardino Mountains; early flowering. The type rather large-flowered; varying to smaller flowers and to

**Var. patens**, GRAY, l. c. 54. Sometimes obscurely and sparsely pubescent: stem erect: raceme commonly more compact; pedicels ascending in fruit, rarely over an inch long: flowers smaller, the sepals a third to half inch long. — *D. patens*, Benth. Pl. Hartw. 296.<sup>2</sup> — From Siskiyou Co., to the mountains of S. California.

**D. pauciflórum**, NUTT. Glabrous or barely puberulent: stems slender, a span to a foot high from a fasciculate-tuberos root (the tubercles from oblong to fusiform); leaves small, all pedately parted into narrowly linear divisions of an inch or less in length: raceme 3-15-flowered; pedicels about the length of the flowers: sepals quarter to third inch long, oblong, little surpassing the petals, much shorter than the slender spur: follicles so far as known oval-oblong, about 4 lines long. — Nutt in Torr. & Gray, Fl. i. 33; Gray, l. c. *D. Nuttallianum*, Pritzl in Walp. Rep. ii. 744, but the homonym of Don is not in the way of Nuttall's name.<sup>3</sup> — Rocky Mountains from Wyoming to W. Colorado, and west to Idaho and eastern borders of Washington and California.

**Var. depauperátum**, GRAY, l. c. Slender stems only 1-3-leaved and 1-7-flowered; pedicels more erect: radical and lower cauline leaves flabelliform or reniform and with obovate to lanceolate lobes, not unlike those of *D. decorum*, var. *patens*, of which it may be a form with reduced sepals and slender spur. — *D. depauperatum*, Nutt. in Torr. & Gray, Fl. i. 33; Wats. Bot. King Exp. 12.<sup>4</sup> — Mountains of E. Oregon and W. Nevada, *Nuttall*, *Beckwith*, *Watson*, scanty specimens, perhaps referable to

**Var. Nevadéense**, GRAY, n. var. Less slender, 8 to 15 inches high: leaves well dissected into linear or spatulate-linear lobes: raceme 7-20-flowered: pedicels spreading, the lower about an inch long: flowers sometimes pink-purplish: sepals a third to almost half inch long, all shorter than the spur: follicles short-oblong. — *D. decorum*, var. *Nevadense*, Wats. Bot. Calif. i. 11. — Sierra Nevada, California, above Cisco, *Bolander*, Plumas Co., *Mrs. Austin*, and adjacent Nevada, *Lemmon*.

**D. Nuttállii**, GRAY, l. c. Glabrous or nearly so: stem strict and simple, commonly 2 feet high, leafy usually up to the rather strict or virgate and 10-20-flowered raceme: leaves thinish, mostly 5-parted and divisions cleft into lanceolate lobes: pedicels ascending, half inch to inch long: flowers deep indigo-blue, usually even to the petals; sepals 4 lines and slender

<sup>1</sup> Add syn. ? *D. pauperculum*, Greene (Pittonia, i. 284), which, notwithstanding its later flowering, may from character well be of this species. Add also syn. *D. tricorné*, var. *Menziesii*, Huth, l. c. 13.

<sup>2</sup> Add syn. *D. tricorné*, var. *patens*, Huth, l. c.

<sup>3</sup> Add syn. *D. Menziesii*, var. *pauciflorum*, Huth in Engl. Jahrb. xx. 445.

<sup>4</sup> Add syn. *D. tricorné*, var. *depauperatum*, Huth, Delph.-Art. N. A. 13.

spur fully half inch long: follicles oblong, quarter to half inch in length, erect. — *D. simplex*, Nutt. in herb., not Dougl.<sup>1</sup> — Low ground, along streams and in open woods, on and near Columbia River, Oregon and Washington, Nuttall, Howell, Henderson, Suksdorf; fl. summer. There is apparently a variety with calyx and lower petals white.<sup>2</sup>

§ 3. PHENICODÉLPHIS, Gray, l. c. 49. Like § 2, but scarlet- and yellow-flowered, the calyx mostly bright scarlet and petals wholly or partly yellow: Californian perennials, glabrous or nearly so; with branching roots not tuberous, and showy flowers loosely racemose. (Germination in the first species with connate petioles elongating and plumule hypogæous, emerging from base; in the second species said to be normal.)

**D. nudicaule**, TORR. & GRAY. Stem a foot or two high, naked or very few-leaved: leaves somewhat succulent, 1 to 3 inches in diameter, deeply 3-5-cleft or barely parted into obovate or cuneate divisions, these with short obtuse lobes: racemes very loose and open; pedicels 2 to 4 inches long: spur half to two thirds inch long, usually considerably longer than the sepals: follicles elongated-oblong, above spreading at maturity, at first puberulent. — Fl. i. 33, 661; Hook. f. Bot. Mag. t. 5819; Brew. & Wats. Bot. Calif. i. 12, with var. ELÁTIUS, a taller form. *D. sarcophyllum*, Hook. & Arn. Bot. Beech. 317.<sup>3</sup> — Banks of rivulets in the mountains, from Bay of San Francisco<sup>4</sup> to near the borders of Oregon; first coll. by Douglas.

**D. cardinale**, Hook. Stem a yard high, more branching and with elongated many-flowered raceme: leaves larger, mostly deeply parted into narrow divisions, with long and linear or lanceolate lobes: pedicels an inch or two long: flowers usually larger than in the preceding, deeper red (rarely yellow): ovaries and oblong follicles glabrous. — Bot. Mag. t. 4887; Torr. Bot. Mex. Bound. 30, t. 2; Regel, Gartenfl. vi. t. 208; Fl. Serres, xi. 63, t. 1105; Brew. & Wats. l. c. *D. coccineum*, Torr. Pacif. R. Rep. iv. 62. — Mountains of S. W. California, Los Angeles Co. to the Mex. boundary; first coll. by Parry.

Recently published species of uncertain affinities.

**D.\* recurvatum**, GREENE. "Perennial, the root a fascicle of fleshy-fibrous thick roots: a foot or two high, strict and simple, or branching and the racemes more lax, glabrous and glaucous, except a sparse pubescence on the lower face of the leaves and the petioles: leaves divided, each part cleft into about 3 linear obtuse mucronulate segments, those nearest the root on elongated petioles: raceme many-flowered, the pedicels ascending, an inch long: flowers lavender-color (changing to pale blue in drying), the linear oblong sepals more than a half inch long, conspicuously recurved, the blunt spur about as long and curved upwards." — Pittonia, i. 285. — "Frequent in moist subsaline grounds along the San Joaquin River, in California, from Antioch to Tulare, flowering in March and April." Descriptions of this and of the two following species are quoted from the original characterizations.

**D.\* Emiliæ**, GREENE. "Slender, 2 feet high, from a strong cluster of thick woody-fibrous roots; stem retrorsely pubescent, some of the hairs hispid, others short and appressed: leaves on long villous-hispid petioles, the lamina cleft into about 5 segments which are broadly linear and entire below, but above the middle widened and doubly cleft, the ultimate divisions ovoid, acute: racemes about 3, slender-peduncled, rather loose: flowers small, dark blue: sepals obovoid, each with a strong apiculation which is abruptly incurved and covers a manifest round saccate depression; spur nearly straight, horizontally projecting or slightly ascending: upper petals glabrous, the lateral ones horizontally spreading over the stamens and very hirsute externally: follicles pubescent, the hairs incurved and appressed." — Erythea, ii. 120. — "Hillsides, Knights Valley, Sonoma Co., Calif.," Mrs. Emily G. Booth, 15 June, 1894. Said to be related to *D. variegatum*.

<sup>1</sup> Add syn. *D. Columbianum*, Greene, Erythea, ii. 193.

<sup>2</sup> This blue and white flowered form is, with scarcely a doubt, the *D. leucophæum*, just published by Greene, l. c. 118. It had been named and distributed as a new species by Suksdorf some time before.

<sup>3</sup> Add syn. *D. decorum*, var. *nudicaule*, Huth, l. c. 9.

<sup>4</sup> Southward to the Santa Lucia Mountains, Eastwood, Vortriede, acc. to Brandegee, Zoe, iv. 148.

**D.\* Búrkei, GREENE.** "Stems one or several, a foot high or more, erect, not slender, from a manifestly woody-fibrous root, leafy at or near the base only: foliage and lower part of stem seeming glabrous, though somewhat puberulent under a lens; upper part of stem and the inflorescence clothed with a short villous-hirsute pubescence: leaves 2 inches broad, deeply parted into many linear and oblong-linear obtusish segments, the texture rather fleshy: raceme rather long and narrow, the pedicels being equal and quite erect: sepals deep blue, pubescent exteriorly, spur rather long, usually blunt, nearly straight and horizontal; petals conspicuously white, or perhaps ochroleucous: ovaries densely appressed-villous: follicles unknown."—Greene, l. c. 183.—"Snake Country probably in Idaho," *Burke*. Said by Prof. Greene to have been referred by Dr. Gray to *D. Andersónii*, but this is not shown by specimens in herb. Gray. From the characterization quoted above, the species would appear near if not identical with some forms of *D. distichum*.

**16. ACONÍTUM, Tourn. MONKSHOOD, WOLFSBANE.** (Ancient Greek and Latin name, of uncertain origin.)—Perennial herbs (of the cooler parts of the northern hemisphere); with palmately lobed or dissected leaves, and showy flowers in terminal racemes or panicles. Seeds in ours densely squamellose.—Inst. 424, t. 239, 240; L. Gen. no. 448; Gray, Gen. Ill. i. 43, t. 16.—For convenient brevity the upper sepal is here called the *hood*.

**A. NAPÉLLUS, L.**, of Europe, the official *Aconite*, *Monkshood*, or *Wolfsbane*, not rare in gardens, is said to have escaped sparingly from them in some places, at least in Lower Canada and Newfoundland.

\* Stem erect (or in *A. uncinatum* with flowering summit declining), from tuberous thickened conical or napiform roots: hood helmet-shaped or cap-shaped: flowers blue, rarely varying to white or pale yellow.

**A. delphinifólium, DC.** Stem a foot to a yard high, strict, above more or less cinereous with a close retrorse pubescence: leaves deeply parted, divisions laciniately cleft into lanceolate or linear lobes: flowers large: hood low, not over semicircular, almost symmetrical and slightly crescentic in outline, only short-attenuate at base and apex: lower sepals as long and half as broad as the lateral: follicles oblong.—Syst. i. 380; Reichenb. Monogr. 79, t. 9. *A. Kamtschaticum*, Willd. acc. to Reichenb. Uebers. Acon. 39, & *A. maximum*, Pall. in herb. acc. to DC. Syst. i. 380; Reichenb. Ill. Acon. t. 15–17; Ledeb. Fl. Ross. i. 69; larger forms, the former very leafy to top. *A. Chamissonianum, semigaleatum* (Pall.), *paradoxum*, &c., Reichenb. Monogr. & Ill. Acon. *A. Napellus*, var. *delphinifólium*, Seringe, Mus. Helv. i. 159; Hook. Fl. Bor.-Am. i. 26; Torr. & Gray, Fl. i. 34, &c.<sup>1</sup> Varies to depauperate few-leaved and 1–5-flowered forms.—Brit. Columbia, through Alaska to Bering Strait, and Islands; Jasper House, N. Rocky Mountains, *Burke*. (Adj. N. E. Asia.)

**A. Noveboracénse, GRAY.** Stem erect, 2 feet high, leafy, only the summit and strict but rather loosely several-flowered raceme pubescent: leaves membranaceous, rather deeply parted; the broadly cuneate divisions 3-cleft, and the lobes incised into lanceolate or broader lobelets: hood (over half inch long) gibbous-obovate, with rounded casque-shaped summit or back about the length of the basal portion and of the porrect descending beak: lower sepals small and narrow: follicles oblong.—Bull. Torr. Club, xiii. 190. *A. uncinatum*, Torr. Fl. N. Y. i. 21?—Chenango Co., New York, on the Chenango River, at Greene, *A. Willard* (1857), and below Oxford, *F. V. Coville* (1885).<sup>2</sup> Habit of some forms of the following; in the hood between it and the preceding. The specimen of herb. Le Conte, referred to by Torrey under *A. uncinatum*, is not extant, and may be of either this or that species.

**A. Columbiánum, Nutt.** Stem commonly 2 to 4 feet high, lax, the upper part or at least the loose and sometimes flexuous racemes or panicles pubescent and mostly viscid: leaves deeply cleft or barely parted, usually into rhombic-ovate or obovate-cuneate divisions, these

<sup>1</sup> Add syn. *A. Napellus*, Hook. f. & Jackson, Ind. Kew. i. pt. 1, 31, in part.

<sup>2</sup> Reported from Cuyahoga Falls, Summit Co., Ohio, *Krebs*; see Werner, Ohio Agric. Exp. Sta. Tech. Ser. i. 235.

incisely cleft and toothed: hood half to three fourths inch long, with helmet-shaped portion higher than the broad, at length much shorter than the downwardly narrowed basal portion, very strongly beaked; the beak variable, sometimes broadly subulate and porrect, sometimes subulate and elongated (4 or even 6 lines long) and either porrect or decurved: lower sepals small and oblong: follicles oblong. — Nutt. in Torr. & Gray, Fl. i. 34; Wats. Bot. Calif. ii. 428; Coulter, Man. Rocky Mt. Reg. 11. *A. nasutum*, Hook. Fl. Bor.-Am. i. 26; Torr. & Gray, l. c.; Wats. Bot. King Exp. 12, not Fisch. & Reichenb. *A. Fischeri*, Regel, Bull. Soc. Nat. Mosc. xxxiv. pt. 2, 98; Brew. & Wats. Bot. Calif. i. 12, not Reichenb.<sup>1</sup> — Moist grounds, Brit. Columbia to California throughout the Sierra Nevada, east to the Rocky Mountains, and south to those of New Mexico and Arizona. Leaves thin, commonly rather large; lower often 4 to 6 inches in diameter, sometimes rather small. Sometimes bears bulblets in the axils of the leaves.

**A. uncinatum**, L. Very smooth and glabrous up to the short pedicels: stem 2 or 3 feet high, with summit of stem or flowering branches often declining, and paniculate rather than racemose inflorescence sometimes flexuous: leaves of rather firm texture, deeply cleft or the lower parted into oblong-obovate incisely dentate or sometimes laciniate divisions: hood over half inch high, strongly saccate, and with the porrect at length decurved beak attaining or exceeding the length of the basal portion: lower sepals small and narrow: ovaries pubescent or glabrous: follicles turgid, over half inch long. — Spec. ed. 2, i. 750; Michx. Fl. i. 315; Sims, Bot. Mag. t. 1119; Reichenb. Ill. Acon. t. 35; Gray, Gen. Ill. i. 43, t. 16.<sup>2</sup> *A. volubile*, Muhl. Cat. 52, but stem not twining. — Moist ground, along the mountains, from Georgia to Pennsylvania (according to Torrey in Fl. N. Y. i. 21, to adjacent part of New York in Chenango Co.) and Wisconsin; fl. late summer and autumn.

\* \* Stems reclining from elongated fascicled roots: hood oblong-conical, the length about twice the width, soon horizontal.

**A. reclinatum**, GRAY. Nearly glabrous, soft in texture: stems 2 or 3 feet long, bearing loose and rather few-flowered somewhat leafy racemes: leaves deeply 3-7-cleft into oblong-cuneate laciniate-lobed divisions, lower long-petioled, 5 to 9 inches in diameter: flowers dull white or ochroleucous, varying to purple. — Am. Jour. Sci. xlii. 34, Lond. Jour. Bot. ii. 118, & Man. ed. 5, 46. — Wet woods on mountain sides, in the Alleghanies, N. Carolina to Virginia, first coll. by Gray & Carey; fl. summer.

**17. CIMICÍFUGA**, L. BUGBANE. (*Cimex*, a bug, *fugere*, to drive away.) — Tall perennial herbs (of northern temperate zone), nearly glabrous or a little pubescent above; with short clustered rootstocks and matted roots, ample ternately and quinate compound leaves, having incised and serrate membranaceous leaflets, and white flowers in elongated simple or paniculately clustered racemes, sometimes polygamous or subdiœcious; fl. summer. — Amœn. Acad. ii. 354, & Mant. i. 20; Lam. Ill. t. 487; Gray, Gen. Ill. i. 51, t. 20.<sup>3</sup>

§ 1. **ACTINÓSPORA**, Benth. & Hook., or true *Cimicifuga*. Carpels and follicles seldom solitary, compressed, membranaceous, distinctly styliiferous: stigma small, more or less introrse: seeds not very numerous, laterally compressed or terete (not depressed), the coat squamose or squamellose. — *Actinospora* & *Cimicifuga*, Fisch. & Meyer, Ind. Sem. Hort. Petrop. 1835, 21; Turcz. Fl. Baic.-Dahur. i. 85, 86.

\* Follicles 3 to 5 or rarely more, stipitate: seeds mostly laterally flattish; the coat conspicuously and copiously scarious-squamose: petals or staminodes present, 1 to 5: leaves

<sup>1</sup> Although Dr. Gray regarded the American plant distinct from Reichenbach's species, it is impossible to find satisfactory or constant technical differences, and Sir Joseph Hooker, Bot. Mag. under t. 7130, includes in *A. Fischeri*, Reichenb., not only *A. Columbianum*, Nutt., but also *A. Novæboracense*, Gray.

<sup>2</sup> Meehan's Monthly, iv. 81, t. 6.

<sup>3</sup> Recent literature: Huth in Ed. Jahrb. xvi. 310-319.

2-3-ternate and then pinnately 3-5-foliolate; leaflets ovate and oblong, incised and dentate, or terminal one also 3-cleft, mostly acuminate.

**C. FÉTIDA**, L., the original species, of N. Asia, &c., is given by Pursh as of the N. W. Coast, no doubt mistakenly, but the original, the var. *simplex* (*C. simplex*, Wormsk.), was from the opposite shore of Kamtschatka. It has short-pedicelled flowers and at first pubescent short-stipitate carpels.

**C. Americána**, MICHX. A yard or less high, with rather weak stem and lax elongated raceme, a few shorter ones below: leaves pale beneath: pedicels widely spreading, hardly shorter than the flower and the follicles: petals 2-horned and with a concave nectariferous spot below: carpels 4 or 5, shorter than their slender stipe; follicles mostly 5 lines long; seeds all over about uniformly squamiferous. — Fl. i. 316; Torr. & Gray, Fl. i. 36; Gray, Gen. III. t. 20, f. 14-19. *C. podocarpa*, Ell. Sk. ii. 16. *Actæa podocarpa*, DC. Syst. i. 382; Deless. Ic. Sel. i. t. 66. — Moist woods of the higher Alleghanies, S. Pennsylvania to Georgia; first coll. by Michaux; fl. August, September; mainly hermaphrodite.

**C. laciniáta**, WATSON. Leaves brighter green, more deeply and copiously incised and cleft: racemes paniced, loosely flowered: flowers smaller and stamens much fewer: carpels in flower pubescent and longer than their stipes; follicles half inch long, twice the length of the stipe; seeds apparently shorter-squamiferous on the disk. — Proc. Am. Acad. xx. 352. — Oregon, on the flanks of Mount Hood, Mrs. Barrett, Henderson. Near *C. Dahurica*. Flowers apparently all hermaphrodite.

\* \* Follicles 1 to 3, not stipitate: seeds nearly terete: petals wanting, sometimes one or two deformed stamens: style shorter, disposed to be recurved or uncinat: racemes spiciform.

**C. Arizónica**, WATSON, l. c. Less tall: leaflets ovate or oblong-ovate (1 to 3 inches long), moderately incised and serrate: raceme (as far as seen) solitary, with pedicel much shorter than the very numerous stamens: ovaries and (half inch long) follicles 2 or 3, glabrous or nearly so; seeds conspicuously squamiferous. — On Bill Williams Mountain, N. Arizona, Lemmon.

**C. eláta**, NUTT. Slender, 3 to 6 or 8 feet high: leaflets roundish and cordate, mostly 3-lobed, 2 to 6 inches in diameter: racemes several, slender, small-flowered: ovaries and follicles 1 to 3, the latter 4 or 5 lines long: stigma almost terminal on the short style: seeds minutely rugose-squamellose. — Nutt. in Torr. & Gray, Fl. i. 36. — Wet mountain woods of Oregon and Washington, Nuttall, Hall, Howell, Suksdorf, &c. Approaches *C. Japonica*, Miq., and the related species of § *Pityrospërma*, which, with short-squamellose seeds, have the short style surmounted by a broad and depressed terminal stigma, thus making a transition to the following section.

§ 2. **MACRÓTRYs**. Carpels and follicles solitary, or rarely 2 or 3, terete and ovoid, not stipitate: style extremely short, thick, the truncate summit occupied by a strictly terminal depressed stigma (as in *Actæa*): seeds horizontal in a double row, depressed; the coat close, smooth and firm. — *Macrotrys* (abbreviation of *Macrobotrys*), Raf. Med. Rep. hex. 2, v. 352, & in Desv. Jour. Bot. ii. 170 (1809). *Actæa* § *Macrotyis* (mistake for *Macrotrys*), DC. Syst. i. 383. *Botrophis*, Raf. Med. Fl. i. 85; Fisch. & Meyer, l. c. 20. *Cimicifuga* § *Macrotyis*, Torr. & Gray, l. c.

**C. racemósa**, NUTT. (BLACK SNAKE-ROOT, BLACK COHOSH.) Stem 3 to 8 feet high: leaves 2-3-ternately and then often quaternately compound; leaflets mostly ovate, of rather firm texture: racemes few, virgate, rigidly erect, becoming a foot or two long: petals or staminodes 1-2-horned: follicle rather shorter than the pedicel, not over quarter inch long, the tip or short style abruptly recurved. — Gen. ii. 15; Ell. Sk. ii. 16; Torr. & Gray, Fl. i. 36; Gray, Gen. III. i. 51, t. 20; Lloyd Bros. Am. Drugs & Med. i. t. 21, f. 82-88. *C. serpentina*, Pursh, Fl. ii. 372. *Actæa racemosa*, L. Spec. i. 504 (Dill. Elth. i. 79, t. 67); Michx. Fl. i. 308; DC. l. c. 383; Regel, Gartenfl. xiii. 200, t. 443. *A. monogyna*, Walt. Car. 151. *Macrotrys actæoides*, Raf. Med. Rep. hex. 2, v. 352, & in Desv. Jour. Bot. ii. (1809) 170.

*Botrophis serpentaria*, Raf. Med. Fl. i. 85, t. 16. *B. acteoides*, Fisch. & Meyer, l. c. 21. — Open woods, &c., in rich soil, S. New England and Upper Canada to Wisconsin, and south to Missouri, Tennessee, and Georgia; fl. early summer. Foliage runs to the following extreme varieties or monstrosities: —

**Var. cordifolia**, GRAY. Leaflets only about 9, ample (4 to 6 or even 10 inches long), at least the terminal ones cordate at base and 3-lobed. — Gray in Patterson, Checklist, ed. 1892, 1. *C. cordifolia*, Pursh, Fl. ii. 373 (excl. syn.); Sims, Bot. Mag. t. 2069; Torr. & Gray, l. c. (where char. of seeds, &c. must belong to *C. Americana*); Gray, Am. Jour. Sci. xlii. 47. *Actæa cordifolia*, DC. Syst. i. 383. — Damp woods, mountains of N. Carolina.<sup>1</sup>

**Var. dissécta**, GRAY. Leaves irregularly pinnately decomposed; leaflets comparatively small, oblong or lanceolate, laciniate or incised. — Man. ed. 6, 47. — Centreville, Delaware, *A. Commons*.

18. **ACTÆA**, L. BANEERRY, also called COHOSH. (Ἀκτῆα, Greek, *Actæa*, Latin name of the Elder, transferred by Linnaeus.) — Perennial herbs (of temperate parts of northern hemisphere), several forms almost of one species; glabrous or soon glabrate; with simple 1-2-leaved stems from short and branching rootstock, terminated by a short and simple or sometimes forked raceme (and sometimes a second one) of small white flowers, produced in spring: leaves ample, ternately or quinate decomposed: leaflets commonly ovate or oblong, incised or some 2-3-cleft, and irregularly dentate: berries ripening late in summer, mostly black in the Old World, red or white in the New. — Gen. no. 427; Gray, Gen. III. i. 49, t. 19.

**A. spicáta**, L. Raceme at first ovate or corymbiform: petals usually rhombic-spatulate: berries slender-pedicelled, oval, at maturity black. (Eu., Asia.)

**Var. rubra**, AIR. Berries cherry-red, or sometimes white, in a barely oblong raceme. — Kew. ii. 221; Michx. Fl. i. 308. *A. Americana*, var. *rubra*, Pursh, Fl. ii. 366. *A. brachypetala*, var. *rubra*, DC. Syst. i. 385. *A. rubra*, Willd. Enum. 561; Bigel. Fl. Bost. ed. 2, 211; Hook. Fl. Bor.-Am. i. 27; Torr. & Gray, Fl. i. 35; Gray, Gen. III. i. 50, t. 19. *A. longipes*, Spach, Hist. Veg. vii. 388. — Woods, Newfoundland to the Saskatchewan district, and Rocky Mountains, and south to Pennsylvania, Missouri, &c.

**Var. argúta**, TORR. Berries either red or white: raceme elongating in age: leaflets more deeply incised, sometimes more sharply dentate: stem disposed to be taller. — Pacif. R. Rep. iv. 63; Wats. Bot. King Exp. 12; Brew. & Wats. Bot. Calif. i. 12. *A. arguta*, Nutt. in Torr. & Gray, Fl. i. 35. *A. rubra*, var. *arguta*, Lawson, Rev. Canad. Ranunc. 84. — Rocky Mountains, Montana to coast of Brit. Columbia, California, and New Mexico, eastwardly passing into the preceding form. (N. Asia.)

**A.\* viridiflóra**, GREENE. Stems several from the same root: flowers even during anthesis in a narrow oblong spike: pedicels during anthesis a line or two, at fruiting three lines long, reddish, much more slender than in the next: bractlets a third to half the length of the pedicels: petals oblong-lanceolate: stamens greenish. — Pittonia, ii. 109. — San Francisco Mountains, Arizona, *Rushy, Greene*.

**A. álba**, MILL. Raceme from the first oblong, hardly elongating: leaflets more incised and sharply dentate: petals more like staminodes, narrow and usually truncate: pedicels short and stout, in fruit as thick as the axis of the raceme, becoming red: berries globose-oval, bright white (but rarely by hybridization, purplish red). — Diet. ed. 8, no. 2; Eaton, Man. ed. 2, 1818, 123; Bigel. Fl. Bost. ed. 2, 211; Hook. Fl. Bor.-Am. i. 27; Torr. & Gray, l. c.; Gray, Man. ed. 5, 47; Lawson, l. c. 83; Lloyd Bros. Am. Drugs & Med. i. t. 18, f. 73-75, 78. *A. spicata*, var. *alba*, L. Spec. i. 504; Michx. l. c. *A. Americana*, var. *alba*, Pursh, l. c. *A. brachypetala*, DC. Syst. i. 385, excl. var. *rubra* & var. *cærulea* (the latter is *Caulophyllum*).

<sup>1</sup> Also reported from near Knoxville, Tenn., by Kearney, Bull. Torr. Club, xx. 253, who states that it flowers considerably later in the season than the typical form.

*A. pachypoda*, Ell. Sk. ii. 15. — Woods in rich soil, New Brunswick and Canada to Minnesota, and south to the mountains of Tennessee and Georgia.<sup>1</sup>

19. **HYDRÁSTIS**, Ellis. **YELLOW-ROOT**, &c. (Unmeaning name, suggested from some likeness of the leaf to that of *Hydrophyllum Canadense*, with which the sterile plant was at first confounded.) — Ellis in L. Syst. Nat. ed. 10, ii. 1088, & Gen. ed. 6, no. 704; Gray, Gen. Ill. i. 47, t. 18.<sup>2</sup> *Warneria*, Mill. Ic. ii. 190, t. 285 (1768). — Single species.

**H. Canadensis**, L. (**GOLDEN-SEAL**, **YELLOW PUCCOON**, &c.) Rootstock fleshy, marked on the upper side by circular scars of the annually produced stem, deep yellow within: herbage pubescent; sterile growth a long-petioled and large peltate 5-7-lobed leaf; fertile a low and simple stem, bearing toward the summit two alternate 5-7-lobed and serrate leaves, the lower petioled, upper sessile and a short-peduncled white flower, in early spring: the red fruit, resembling that of a *Rubus*, maturing in summer. — Syst. Nat. ed. 10, ii. 1088, & Spec. ed. 2, i. 784; Michx. Fl. i. 317; Raf. Med. Fl. i. 251, t. 51; Hook. Fl. Bor.-Am. i. 9, & Bot. Mag. t. 3019 & 3232; Torr. & Gray, Fl. i. 40; Lloyd Bros. l. c. 76, t. 8, f. 27-29. *Hydrophyllum verum*, &c., L. Spec. i. 146. — Woods in rich soil, Canada near the Lakes and New York, to Wisconsin, Iowa, and south to Missouri, Tennessee, and Georgia along the mountains.

20. **XANTHORRHÍZA**, Marshall. **SHRUB YELLOW-ROOT**. (*Ξανθός*, yellow, *ρίζα*, root.) — Arbust. 167 (1785); Endl. Gen. 850; Benth. & Hook. Gen. i. 9. *Zanthorhiza* (erroneous form), L'Her. Stirp. 79, t. 38 (1784); Juss. Gen. 234; DC. Syst. i. 386; Torr. & Gray, Fl. i. 40; Gray, Gen. Ill. i. 45, t. 17. — Single species, with floral characters of *Ranunculaceæ*, but yellow wood and other sensible properties of *Berberis*.

**X. apiifolia**, L'HER. l. c. Stems a foot to a yard high, seldom branching, with gray bark and bright yellow wood of Barberry, from similar rootstocks, sending off yellow fibrous roots, from terminal scaly bud producing in spring long drooping racemes or sometimes panicles, or a racemose cluster of them, and pinnately 3-5-foliate leaves, the later growth bearing 5-7-foliate leaves; petioles much dilated at base and half-clasping; leaflets ovate and oblong, irregularly incised and serrate, often 3-cleft: flowers small, brown-purple, sometimes polygamous. — Ait. Kew. i. 399; Lam. Ill. t. 854; Barton, Elem. Bot. App. 26, t. 12; Nouv. Duham. iii. 151, t. 37; Sims, Bot. Mag. t. 1736; Barton, Veg. Mat. Med. ii. 203, t. 46; Lloyd Bros. l. c. 291, t. 25, f. 99-105.<sup>3</sup> *X. simplicissima*, Marsh. l. c. 168. *Actæa dioica*, Walt. Car. 152. — Along streamlets of the Alleghany Mountain district, from S. W. New York to Florida, west to Kentucky.

21. **PÆÓNIA**, Tourn. **PÆONY**. (Ancient Greek and Latin name, said to be in honor of a physician, *Pæon*.) — Robust and large-flowered herbs (or a Chinese species shrubby), with divided leaves and ample flowers; some Old World species familiar in gardens, one indigenous on the Pacific coast. — Inst. 273, t. 146; L. Gen. no. 445.

**P. Brównii**, DOUGL. Low, with glaucous or pale and rather fleshy 1-2-ternately divided and parted leaves; lobes obovate or spatulate to nearly linear: fructiferous stems reclined or recurved: flowers dull colored: petals 5 or 6, thickish, dull brownish red, hardly surpassing the roundish concave sepals: disk many-lobed: follicles mostly 5, glabrous; seeds oblong. — Dougl. in Hook. Fl. Bor.-Am. i. 27; Lindl. Bot. Reg. xxv. t. 30; Brew. & Wats. Bot. Calif. i. 13. *P. Brównii* & *P. Californica*, Torr. & Gray, Fl. i. 41. — Mostly in dry

<sup>1</sup> Louisiana, *Dr. Carpenter*.

<sup>2</sup> Recent literature: Huth in Engl. Jahrb. xvi. 291; H. Bowers, Bot. Gaz. xvi. 73, t. 8.

<sup>3</sup> *X. apiifolia*, var. *ternata*, Huth, l. c. 320, is the not infrequent form or state with leaves merely 3-foliate.



ground, nearly throughout California and adjacent Nevada, rare in W. Utah and W. Idaho, north to Vancouver; fl. early spring or summer according to situation, which ranges from the sea level to the confines of summer snow; first coll. by *Douglas*.

**22. CROSSOSÓMA**, Nutt. (*Κροσσοί*, fringe, *σῶμα*, body, from the fringe-like body at the hilum of the seeds.) — Much branched low shrubs, very glabrous; with grayish and bitter bark and whitish wood: leaves oblong or narrower, entire, mucronulate, obscurely pinnately veined, alternate, subsessile, those of short branchlets or spurs fascicled: flowers solitary and short-peduncled, terminating the branchlets: petals white. — Jour. Acad. Philad. ser. 2, i. 150; Torr. Pacif. R. Rep. iv. 63, t. 1; Benth. & Hook. Gen. i. 15; Brew. & Wats. Bot. Calif. i. 13.

**C. Califórnicum**, Nutt. l. c. Shrub 3 to 15 feet high; stem becoming several inches in thickness: leaves 1 to 3 inches long, seldom much fascicled: flowers large: petals orbicular, over half inch long, white: anthers elongated-oblong: follicles half to three fourths inch long, 20–25-seeded; seeds with smooth and shining coat, falling out after dehiscence in a connected row, being held together by the entangling threads of the arillus. — Torr. l. c. as to f. 1–4; Wats. Proc. Am. Acad. xi. 112; Brew. & Wats. l. c. — Island of Santa Catalina off S. Calif.; first coll. by *Gambel*. (Guadalupe Island, *Palmer*.)

**C. Bigelóvii**, Watson. Shrub 3 to 5 feet high, slenderly and often intricately branched: leaves largely fascicled on spur-like branchlets, a fourth to half inch long: flower fully half smaller: petals oval, becoming spatulate-oblong, white or purplish: stamens fewer: anthers short-oblong: follicles seldom over quarter inch long or more than 2 or 3, hardly stipitate, 10–12-seeded; seeds with dull coat (none seen with embryo formed). — Proc. Am. Acad. xi. 122, & Bot. Calif. ii. 428.<sup>1</sup> *C. Californicum*, Torr. l. c. mainly, i. e. as to pl. Bigelow. — Rocky ravines, S. E. California and Arizona to Bill Williams Mountain (where first coll. by *Bigelow*), *Palmer*, *Parry* & *Lehman*, *W. G. Wright*, *G. R. Vasey*.

## ORDER II. MAGNOLIACEÆ.

By A. Gray.

Trees or shrubs, with aromatic and bitter bark, simple mainly entire alternate and pinnately-veined leaves, which are commonly minutely pellucid-dotted; all the parts of the flower distinct and free (hypogynous) except the carpels when numerous and spirally imbricated on a prolonged receptacle may cohere into a mass; polyandrous, with one exception; deciduous sepals and petals imbricated and disposed to be in whorls of three, with at least two series of the latter. Anthers adnate. Stigma usually introrse and occupying most or whole length of the ventral edge of the style. Ovules in all ours solitary or a pair, anatropous. Seeds with a minute embryo in fleshy albumen, not arillate. Stipules commonly present but deciduous. — Three very distinct tribes, which may be taken as sub-orders and have been regarded as orders. The first is the most anomalous of the order.

<sup>1</sup> Add syn. ? *C. parviflora*, Robinson & Fernald (Proc. Am. Acad. xxx. 114), an imperfectly known species with more elongated branches, scattered leaves, and smaller flowers, first collected in the Grand Cañon of the Colorado by *Dr. Gray*, and later in Sonora by *C. V. Hartman*. In the absence of better material it is doubtfully distinct from *C. Bigelovii*, which in its turn is believed by some to intergrade with *C. Californicum*; see Vaslit, *Zoe*, i. 27.

TRIBE I. SCHIZANDREÆ. Flowers monœcious or dioecious, often 5-merous. Carpels baccate, spicate or capitate. More or less climbing shrubs, hardly aromatic: no stipules.

1. **SCHIZANDRA**. Flowers monœcious, small. Sepals and petals together 9 to 12 with gradual passage, more commonly 5 of each with quincuncial æstivation. Male flowers with 5 to 15 monadelphous stamens: anther-cells bordering the connective. Female flowers with a head of 2-ovulate carpels, which in fruit become berries and sparsely spicate on the then elongated and filiform receptacle. Seed reniform, with crustaceous coat.

TRIBE II. WINTEREÆ. Flowers hermaphrodite. Carpels in a simple whorl, or only one. Erect trees or shrubs, highly spicy-aromatic, with evergreen leaves and no stipules.

2. **ILLICIUM**. Sepals 3 to 6, membranaceous, caducous. Petals 9 to 30. Stamens 6 (or even 5) to 40: anthers with oblong and contiguous introrse cells, nearly as long as the thick filaments. Carpels 6 to 18 in a whorl around a short column, one-ovuled, with subulate introrsely stigmatose style; in fruit drupaceous but at length dry and woody crustaceous follicles, stellately spreading, in age 2-valved. Seed-coat crustaceous.

TRIBE III. MAGNOLIEÆ. Flowers hermaphrodite, polyandrous and polygamous; the envelopes 3-merous in at least three series. Carpels imbricated in a spike or head on a prolongation of the receptacle. Trees or shrubs, with conspicuous membranaceous stipules, serving as bud-scales and early deciduous, the leaves conduplicate in the bud: flowers terminal, large, solitary.

3. **MAGNOLIA**. Sepals 3. Petals 6 to 12. Anthers much longer than the filaments, introrse. Gynophore little or not at all stipitate. Carpels ovate, more or less coherent in a mass, fleshy, in fruit coriaceous-baccate, but at length dry and somewhat woody, dorsally dehiscent. Styles short, recurving, intorsely stigmatose. Ovules and seeds a pair, the latter drupaceous (the outer part of the thick seed-coat becoming baccate and the inner bony): funiculus very short, filled with spiral ducts, by the extended threads of which the seeds when detached are for a time suspended. Stipules mostly connate and adnate to petiole, caducous.

4. **LIRIODENDRON**. Sepals 3, deflexed. Petals 6, broad, erect, forming a bell-shaped corolla. Anthers hardly longer than the filiform filaments, extrorse. Gynophore sessile. Carpels numerous and closely imbricated over the prolonged and very slender receptacle, the dilated free apex tipped with a linear introrse stigma; in fruit dry, indehiscent, falling at maturity from the bodkin-shaped receptacle, samara-like, the small fertile portion at base carinate, produced above into an elongated oblong wing. Ovules and sometimes seeds a pair: seed-coat thin and dry. Stipules distinct and free from petiole.

1. **SCHIZANDRA**, Michx. (*Σχίζω*, to cut, *ἀνθήρ*, used for anther, alluding to the cleft andrœcium.) — Twining shrubs (of Atlantic U. S. and Asia), with mucilaginous and bitterish juice, deciduous ovate leaves, and solitary small flowers on slender peduncles from the earliest axils of the annual shoot: fl. spring. — Fl. ii. 218, t. 47; Benth. & Hook. Gen. i. 19. *Schizandra* & *Sphaerostemma* (Blume) of authors. — Single American species.

**S. coccinea**, Michx. l. c. 219, t. 47. Leaves slender-petioled, ovate, sometimes obscurely and sparingly denticulate: flowers half inch or less in diameter, crimson-purplish: stamens 5, monadelphous in a simple peltate 5-lobed disk, the ten anther-cells widely separated on the margins of the very broad lobes or connectives: gynœcium ovate in flower, the carpels then imbricated on the short receptacle, ventrally stigmatic from the subulate tip down to the insertion of the ovules; in fruit the scarlet berries sparse on a lengthened pendulous receptacle of 2 or 3 inches in length. — Poir. in Lam. Ill. t. 995; Sims, Bot. Mag. t. 1413; Barton, Fl. N. Am. i. 45, t. 13; Gray, Gen. Ill. i. 58, t. 22. — Low woods, S. Carolina to E. Texas; fl. early summer.

2. **ILLÍCIUM**, L. STAR ANISE. (*Illicium* means an allurement.) — Shrubs or small trees (Chino-Japanese and Himalayan, except the following),

very glabrous: leaves entire, short-petioled, coriaceous and persistent: flowers single in the axils of the leaves or bud-scales, pedunculate, nodding: fruits yielding an anisate volatile oil. Both in Japan and in America (under the name of POISON BAY) said to be poisonous to the touch. — Syst. Nat. ed. 10, ii. 1050, & Gen. ed. 6, no. 611; Gray, Gen. III. i. 55, t. 21.<sup>1</sup>

**I. Floridanum**, ELLIS. Shrub 6 to 10 feet high: leaves oblong-lanceolate, 4 to 7 inches long: petals 20 to 30, mostly linear, dark crimson, half to three fourths inch long, widely spreading: stamens numerous. — Phil. Trans. lx. 524, t. 12; L. Mant. ii. 395; Lam. III. t. 493, f. 1; Curtis, Bot. Mag. t. 439; Michx. Fl. i. 326; Nouv. Duham. iii. 190, t. 47; Gray, l. c.<sup>2</sup> — Sandy low ground, near the coast, Florida to Louisiana; fl. May.

**I. parviflorum**, VENT. Leaves elliptical or oblong-lanceolate, obtuse or acute, 3 or 4 inches long: petals 6 to 11, oval, concave, ascending, yellowish, only quarter inch long: stamens commonly only as many as petals. — Descr. Pl. Nouv. Jard. Cels, t. 22; Michx. Fl. i. 326; Baill. Hist. Pl. i. 151, f. 191-194. *Cymbostemon parviflorus*, Spach, Hist. Veg. vii. 446. — E. Florida, and S. E. Georgia? (Cuba, Wright.)

**3. MAGNÓLIA**, (Plum.) L. (*Pierre Magnol* of Montpellier, died 1745. The original *Magnolia* of Plumier is *Talauma* of W. Indies.) — Trees, or some shrubs, of Atlantic U. S., Mexico, E. Asia, and Himalayan Mountains, with mostly large showy flowers, in spring and early summer; the cone-like fruits rose-colored at maturity, and seed-coat scarlet. Leaves upright in the bud. A spathaceous stipular bract at first enclosing the flower-bud. — Syst. Nat. ed. 1, & Gen. no. 456; Juss. Gen. 281; Gray, Gen. III. i. 59, t. 23, 24.<sup>3</sup>

*M. obovata*, Thunb. (*M. purpurea*, Curtis), and *M. conspiciua*, Salisb., Chino-Japanese species, hardy or nearly so in the Atlantic States, are planted for ornament. The peculiar small-flowered *M. fuscata*, of China, is cultivated at the South.

§ 1. Leaves coriaceous and at the South persistent, not very large, never cordate: flower-buds silky: flowers very sweet-scented, white, turning fuscous in age: petals roundish to obovate. Species at the South called BAY and LAUREL.

**M. grandiflora**, L. Large tree when well developed: leaves thick and firm, bright green and lucid above, ferrugineous-pubescent beneath or in age glabrate but dull, oblong to obovate, 5 to 10 inches long: stipules adnate only to the base of short petiole: petals 3 or 4 inches long, thick, barely spreading in anthesis: carpels pubescent, numerous: the cone of fruit 4 inches long. — Syst. Nat. ed. 10, ii. 1082, & Spec. ed. 2, i. 755 (Catesb. Car. ii. t. 61; Trew, Ehret. t. 33); Andr. Bot. Rep. t. 518; Sims, Bot. Mag. t. 1952; Michx. f. Hist. Arb. Am. iii. 71, t. 1; Torr. & Gray, Fl. i. 42; Sargent, U. S. 10th Census, ix. 19.<sup>4</sup> *M. Virginiana*, var. *fetida*, L. Spec. i. 536, in part.<sup>5</sup> — Woods in fertile soil, coast of N. Carolina to Texas, never far in the interior; fl. April to June.

**M. glauca**, L. (SWEET BAY, WHITE BAY, WHITE LAUREL, &c. of the South, BEAVER-TREE.) Small tree, northwardly a tall shrub with leaves deciduous: petioles slender: leaves from oval to broadly lanceolate, 3 to 6 inches long, glaucous and at first silky-pubescent beneath: corolla almost globular in anthesis, open only when past prime; the petals inch or two long: carpels glabrous, rather few: fruit-cone inch or so long. — Syst. Nat. ed. 10,

<sup>1</sup> A synopsis of the species of this genus is given by Maximowicz in his Diag. Plant. Nov. Asiat. vii. 716, Melang. Biol. Acad. Imp. St. Pétersb. xii. 716.

<sup>2</sup> Garden, xxxvi. 150, t. 714.

<sup>3</sup> Add Sargent, Silv. i. 1, t. 1-12.

<sup>4</sup> Add Gray, Pl. For. Trees N. A. t. 1.

<sup>5</sup> Add syn. *M. fetida*, Sargent, Gard. & For. ii. 615, & Silv. i. 3, t. 1, 2. Prof. Sargent extends the range to S. Arkansas.

ii. 1082, & Spec. ed. 2, i. 755 (Dill. Elth. t. 168; Catesb. Car. i. t. 39; Trew, Ehret. t. 9); Schk. Handb. t. 148; Nouv. Duham. ii. t. 66; Michx. f. l. c. 77, t. 2; Barton, Veg. Mat. Med. t. 7; Bigel. Med. Bot. ii. 67, t. 27; Gray, Gen. III. i. 61, t. 23; Sargent, l. c. 19.<sup>1</sup> *M. glauca*, var. *major*, Sims, Bot. Mag. t. 2164.<sup>2</sup> *M. Virginiana*, var. *glauca*, L. Spec. i. 535. *M. fragrans*, Salisb. Prodr. 379. *M. longifolia*, Sweet, Hort. Brit. 1; Don, Syst. i. 83, narrow-leaved form. — Swamps, Cape Ann (at Magnolia), Mass.<sup>3</sup> and New Jersey to Texas, through the low and middle country and up the Mississippi to lat. 35°; fl. early summer, sometimes till autumn.<sup>4</sup>

§ 2. Leaves membranaceous and deciduous, very large, subcordate at base; those of flowering branches somewhat umbrella-clustered: stipules and young flower-buds tomentose: flowers very large, white, fragrant.

**M. macrophýlla**, MICHX. Small tree or large shrub, with stout branches: leaves oblong-ovate, with auriculate-subcordate base, a foot to a yard long, canescent and tomentulose beneath as also young shoots: corolla open-campanulate: petals oblong with narrowed base, 5 to 7 inches long: carpels and ovate fruit-cone canescently pubescent. — Fl. i. 327; Michx. f. Hist. Arb. Am. iii. 99, t. 7; Bonpl. Malm. 84, t. 33; Sims, Bot. Mag. t. 2189; Torr. & Gray, Fl. i. 43; Sargent, U. S. 10th Census, ix. 21.<sup>5</sup> — Open woods in fertile soil, middle country of N. Carolina, S. E. Kentucky, and Arkansas to Louisiana and upper part of Florida; fl. May and June.

§ 3. Leaves membranaceous and deciduous, ample, green both sides; those of flowering or other determinate branches approximate and umbrella-like in disposition: flowers large and white: petals obovate-oblong or spatulate, erect, spreading after anthesis: carpels, ample stipules and buds glabrous. — **UMBRELLA-TREES.**

**M. Fraseri**, WALT. Small or slender tree: leaves glabrous even in the bud, slender-petioled, spatulate-obovate with 2-auriculate base, 8 to 20 inches long: flowers rather sweet-scented: petals much narrowed at base, 4 or 5 inches long: fruit-cone oblong, rose-colored. — Car. 159, with plate; Torr. & Gray, Fl. i. 43.<sup>6</sup> *M. auriculata*, Lam. Dict. iii. 673; Michx. Fl. i. 328; Andr. Bot. Rep. t. 573; Sims, Bot. Mag. t. 1206; Michx. f. l. c. 94, t. 6; Ell. Sk. ii. 39.<sup>7</sup> *M. sp.* Bartr. Trav. 340. *M. pyramidata*, Edw. Bot. Reg. t. 407; Lodd. Bot. Cab. t. 1092. *M. auricularis*, Salisb. Parad. Lond. t. 43, too narrow petals. — Woods in rich soil, mountains of Virginia to upper parts of Mississippi, Alabama, and Florida, not common in the middle or low country; fl. May. In the mountains called *Wahoo*, *Indian Physic*, and *Cucumber-tree*.

**M. Umbrellá**, DESR. (**UMBRELLA-TREE.**) A small and branching tree: leaves short-petioled, soft-pubescent underneath when young, soon glabrate, obovate-lanceolate with both ends acute, a foot or two long: flowers slightly and not pleasantly scented: petals 4 or 5 inches long, less tapering at base: fruit oval-oblong, 4 or 5 inches in length, light rose-colored when ripe. — Desr. in Lam. Dict. iii. 673; DC. Syst. i. 452; Torr. & Gray, Fl. i. 43; Gray, Gen. III. i. 62, t. 24 (fruit), & Journ. Linn. Soc. ii. 106, f. 1-18 (ovules, &c.).<sup>8</sup> *M. Virginiana*, var. *tripetala*, L. Spec. i. 536. *M. tripetala*, L. Syst. Nat. ed. 10, ii. 1082,

<sup>1</sup> Add Lloyd Bros. Am. Drugs & Med. ii. 25, t. 28; Sargent, Silv. i. 5, t. 3; Gray, Pl. For. Trees N. A. t. 2.

<sup>2</sup> Prof. Sargent (Gard. & For. i. 268, t. 43) considers the tree illustrated in the Bot. Mag. a hybrid between *M. glauca* and *M. Umbrella*.

<sup>3</sup> Rhode Island (without exact locality), *G. H. Smith*, in Thurber Herbarium; Suffolk Co., L. I., acc. to Rudkin, Bull. Torr. Club, x. 95; S. Pennsylvania, *A. A. Heller & Miss Halbach*.

<sup>4</sup> Nuttall's var. *PÚMILUM* of this species (Am. Journ. Sci. v. 295) appears to be merely a dwarfed shrubby state with smaller leaves and flowers, doubtless due to unfavorable environment; Florida, and near Merchantville, N. J., *Martindale*.

<sup>5</sup> Add Lloyd Bros. Am. Drugs & Med. ii. t. 30 (stated to be natural size, but certainly under the usual dimensions); Sargent, Silv. i. 11, t. 7, 8.

<sup>6</sup> Add Sargent, Silv. i. 15, t. 11, 12; Burbridge, Garden, xlv. 433, with plate.

<sup>7</sup> Add Gray, Pl. For. Trees N. A. t. 4.

<sup>8</sup> Add Gray, Pl. For. Trees N. A. t. 3.

& Spec. ed. 2, i. 756; Walt. Car. 159; Michx. Fl. i. 327; Michx. f. l. c. 90, t. 5.<sup>1</sup> *M. frondosa*, Salisb. Prodr. 379. — In woods, S. Pennsylvania to N. Carolina, Alabama, and through Kentucky and Tennessee to S. W. Arkansas; fl. May and June. Also called *Elk-wood* in some places.

§ 4. Leaves membranaceous and deciduous, mediocre, rather dull green, not approximate in umbrella fashion on the branches: flowers rather small, greenish to light yellow: petals oblong, commonly not over 6, erect in anthesis, much longer than the small sepals: carpels glabrous, in fruit pointless, the styles or stigmas filiform and deciduous: fruit-cone comparatively small and narrow, often torose, the shape and appearance when green like a gherkin, whence the name of CUCUMBER-TREES.

**M. acumináta**, L. (CUCUMBER-TREE.) Tall tree with straight much prolonged trunk: leaves light green, oval or oblong, more or less acuminate, and with either rounded or acutish base, 6 to 9 inches long, soft-pubescent, especially beneath, glabrate above: petals 2 inches long, dull green and glaucous, or tinged with yellow. — Syst. Nat. ed. 10, ii. 1082, & Spec. ed. 2, i. 756; Michx. Fl. i. 328; Michx. f. l. c. 82, t. 3; Sims, Bot. Mag. t. 2427; Sargent, U. S. 10th Census, ix. 20.<sup>2</sup> *M. Virginia*, var. *acuminata*, L. Spec. i. 536. *Tulipastrum Americanum*, Spach, Hist. Veg. vii. 483. — Woods in deep soil, W. New York, or barely in Canada at Niagara, to Illinois, and south to Arkansas, Alabama, and Georgia, especially in the mountains; fl. May and June.

**M. cordáta**, Michx. A small and branching tree: leaves more pubescent, at least beneath, ovate or oval, little or not at all acuminate, obtuse or rounded at base, only on vigorous shoots subcordate: petals cream-yellow. — Fl. i. 328; Michx. f. l. c. 87, t. 4; Edw. Bot. Reg. t. 325; Lodd. Bot. Cab. t. 474; Torr. & Gray, l. c.; Sargent, U. S. 10th Census, ix. 20.<sup>3</sup> *Tulipastrum Americanum*, var. *subcordatum*, Spach, l. c. 485. — Georgia near Augusta and Alabama, rare; fl. April or May.

**4. LIRIODÉNDRON, L. TULIP-TREE.** (Λείριος, lily, δένδρον, tree.) — Spec. i. 535. Earlier in the form *Liriodendrum*, Hort. Cliff. 223, & Gen. no. 960. *Tulipifera*, Pluk. Alm. 379, & Phytogr. t. 68, 117, 348; Catesb. Car. i. t. 48. — Conduplicate leaves in the bud, each placed upside down by curvature of the petiole, and enclosed along with the younger parts by its flat stipules applied face to face. Single or perhaps two species,<sup>4</sup> deciduous-leaved.

**L. Tulipifera**, L. (TULIP-TREE, WHITE-WOOD, also wrongly called POPLAR.) Tree 50 to 200 feet high, with large straight trunk: herbage glabrous; leaves long-petioled, broad, subcordate, obscurely angulate, 4-lobed and emarginate-truncate: flower-bud spathaceous-bracteate by the last pair of stipules, these caducous: petals very broad, greenish yellow marked with orange, inch or two long: cone of fruit about 3 inches long. — Spec. i. 535; Curtis, Bot. Mag. t. 275; Schk. Handb. t. 147; Nouv. Duham. iii. 62, t. 18; Barton, Veg. Mat. Med. t. 8; Bigel. Med. Bot. ii. t. 31; Gray, Gen. III. i. 64, t. 25.<sup>5</sup> — Woods of deep soil, W. New England,<sup>6</sup> through New York and adjacent borders of Canada to Wisconsin, south to Arkansas and Florida; fl. early summer. (China.)

<sup>1</sup> Add Sargent, Silv. i. 13, t. 9, 10.

<sup>2</sup> Add Lloyd Bros. Am. Drugs & Med. ii. 29, t. 29; Sargent, Silv. i. 7, t. 4, 5.

<sup>3</sup> Prof. Sargent believes this to be merely a variety of the preceding, and has published it as *M. acuminata*, var. *cordata*, Am. Jour. Sci. ser. 3, xxxii. 473, Gard. & For. ii. 338, & Silv. i. 8, t. 6, where it is stated that the exact form of the cultivated plant has not been rediscovered, although specimens approaching it are not infrequent upon the Blue Ridge in Carolina and in Northern Alabama.

<sup>4</sup> But one species; see Hemsl. Gard. Chron. ser. 3, vi. 718.

<sup>5</sup> Add Garden, xxxiv. 31, f. on p. 42; Lloyd Bros. Am. Drugs & Med. ii. 3, t. 26 & f. 106-111, with map of distribution; Sargent, Silv. i. 19, t. 13, 14; Holm, Proc. U. S. Nat. Mus. xiii. 13-35, t. 4-9, showing the extraordinary variability in shape of the leaves; Gray, Pl. For. Trees N. A. t. 8.

<sup>6</sup> Eastward to Rhode Island, *Thurber*, and adjacent Massachusetts according to Russell, Gard. & For. ii. 82.

## ORDER III. ANONACEÆ.

By A. GRAY.

Trees or shrubs; with herbage as of the preceding order, but no stipules; the flowers all hermaphrodite and equally 3-merous (by occasional variation 4-5-merous) and hypogynous; a calyx of 3 sepals valvate in the bud, corolla of 6 petals in two unlike series; indefinitely numerous stamens imbricated on an enlarged receptacle, their anthers extrorsely adnate and longer than the filaments; carpels either distinct or when imbricated on a prolongation of the receptacle cohering to form an aggregate fruit; ovules anatropous, and large seeds with a crustaceous coat, ruminated albumen (in the manner of a nutmeg), and a minute embryo. Sepals and petals deciduous. A tropical order, except in the Atlantic United States.

1. **ANONA.** Petals valvate in the bud, thick and fleshy, those of the inner series smaller but little different from the outer. Anther-tips convex. Carpels numerous, one-ovuled, imbricated over the elongated receptacle and more or less confluent in a mass, forming a fleshy aggregate fruit.
2. **ASIMINA.** Petals of each series imbricated in the bud (at least the outer or the inner distant), accrescent, membranaceous or thinnish, veiny, commonly rugulose, more or less dissimilar; the outer plane and spreading; inner smaller and erect, mostly thicker, concave at base. Stamens densely covering the globose torus: anther-tips depressed and pulvinate. Carpels few or several, distinct, sessile or very short-stipitate, few-many-seeded, only one to three or four (or rarely six) maturing into oblong baccate fruits. Seeds horizontal, encased in a thin membranaceous arillus.

1. **ANÓNA, L.** CUSTARD APPLE. (Corruption of a Malayan name, *menona* or *manoa*, not from the Latin *annona*, provision or annual produce.) — Tropical American trees, early carried round the world: the following natural to S. Florida. — Syst. Nat. ed. 1, & Gen. no. 446; Benth. & Hook. Gen. i. 27.

**A. laurifolia, DUNAL.** Tree 10 to 30 feet high, glabrous: leaves oval to oblong: outer petals inch or two long, ovate or subcordate; inner obovate, somewhat cucullate-concave: fruit (hardly edible in the manner of the cultivated custard apples) 3 or 4 inches long, the carpels all completely fused at maturity into a smooth-rinded apple-like or pear-shaped mass. — Monog. Anon. 65 (Catesb. Car. ii. 67, t. 67); DC. Prodr. i. 84; Chapm. Fl. ed. 2, 603; Sargent, U. S. 10th Census, ix. 23.<sup>1</sup> *Porcelia parviflora*, Audubon, Birds Amer. ii. t. 162 (and in 8vo ed. v. 14, t. 281). — Low islands and everglades, S. E. Florida. (W. Ind., S. Am.)

2. **ASÍMINA, Adans.** PAPAW of N. Americans. (Abbreviation of *Assiminier* of the French colonists, who took the name from the Indians.) — Consists of a small tree and three or four low shrubs of Atlantic U. S., not aromatic, but bruised herbage and bark unpleasantly heavy-scented: flowers ill-scented; solitary or few in a fascicle, produced from the axils of preceding or

<sup>1</sup> Add syn. ? *A. glabra*, L. Spec. i. 537 (Catesb. Car. ii. 64, t. 64). The identity of this species with Dunal's, of later description, has been maintained by Sargent, Gard. & For. ii. 616, & Silv. i. 29, t. 17, 18; but the Linnæan species, founded solely upon Catesby's flowerless figure with obviously erroneous habitat, is certainly too indefinite to be satisfactorily revived. Especially is this the case, as Catesby, upon whose two figures the species were founded, evidently regarded them as different plants.

present leaves, strongly protogynous: fruit edible. Arillus very distinct in *A. grandiflora* and *A. pygmaea*.—Fam. ii. 365; Dunal. l. c. 81; DC. l. c. 87; Gray, Gen. III. i. 67, t. 26, 27; Benth. & Hook. Gen. i. 24 (but belongs to their tribe *Uvarieæ*); Gray, Bot. Gaz. xi. 161.<sup>1</sup> *Orchidocarpum*, Michx. Fl. i. 329.

\* Flowers (in early spring) from the axils of the deciduous leaves of the preceding year, therefore from woody stems: nascent shoots and foliage also calyx pubescent; leaves comparatively broad, short-petioled.

+ Leaves membranaceous, ample, acute or acuminate, copiously pinnately-veined, the reticulation of veinlets inconspicuous: pubescence of calyx and nascent leaves sericeous and ferrugineous: petals moderately accrescent, from lurid green becoming brown purple, in both series ovate, not very unlike, the inner moderately concave and not rimose-thickened nor corrugated at base within.

**A. triloba**, DUNAL. (PAPAW.) Tree 20 to 40 feet high, also flowering as a low shrub: leaves at maturity half a foot to a foot long, obovate-oblong with tapering base: flowers on brown-pubescent pedicels of about their own length: outer petals half inch, accrescent to an inch in length: carpels few: style distinct and with short introrse stigma: ovules numerous in two series: fruits sometimes 3 maturing (whence the specific name), commonly only one or two, the larger about 4 inches long, filled with sweet somewhat aromatic but mawkish pulp: seeds several, oblong, compressed, an inch long.—Monog. Anon. 83; DC. l. c.; Guimp. Otto & Hayne, Abbild. Holzpflanzen, 66, t. 53; Gray, Gen. III. i. 68, t. 26, 27; Hook. f. Bot. Mag. t. 5854.<sup>2</sup> *A. campaniflora* & *A. conoidea*, Spach, Hist. Veg. vii. 528, 530. *Annona triloba*, L. Spec. i. 537 (Catesb. Car. ii. t. 85); Marsh. Arbust. 10; Michx. f. Hist. Arb. Am. iii. 161, t. 9; Schk. Handb. t. 149. *Anona triloba*, Nouv. Duham. ii. 83, t. 25. *Orchidocarpum arietinum*, Michx. Fl. i. 329. *Porcelia triloba*, Pers. Syn. ii. 95; Pursh, Fl. ii. 383. *Uvaria triloba*, Torr. & Gray, Fl. i. 45; Baill. Hist. Pl. i. 193, f. 220-228.<sup>3</sup>—Alluvial soil along streams, W. New York and adjacent Canada to Michigan and Iowa, south to Middle Florida and E. Texas.<sup>4</sup>

**A. parviflora**, DUNAL. Shrub 2 to 5 feet high, branching above: leaves smaller and rather thicker, from obovate to spatulate: flowers fully half smaller, very short-pedicelled: petals less accrescent and less unequal: stigma sessile: ovules about 10, nearly in a single series: fruit oblong or pyriform, an inch or so long: seeds few, turgid, half inch long.—Monog. Anon. 82, t. 9; DC. l. c.; Ell. Sk. ii. 41; Chapm. Fl. 15. *Orchidocarpum parviflorum*, Michx. Fl. i. 329. *Porcelia parviflora*, Pers. l. c.; Pursh, l. c. *Uvaria parviflora*, Torr. & Gray, Fl. i. 45.—Dry sandy soil, N. Carolina to Florida and Alabama.

+ + Leaves furfuraceous-tomentulose when young, in age chartaceous and with conspicuous reticulation of veinlets, mostly retuse or obtuse, comparatively small: flowers often in pairs or with a leafy shoot from the same axil: petals white; outer much accrescent, orbicular and at length obovate; inner much smaller, with saccate-concave base, purple within and rimose-corrugate: ovaries densely pubescent, tipped with a sessile depressed stigma; fruits an inch or two long, several-seeded; seeds ovate-oval, flattened.

**A. grandiflora**, DUNAL. Stems 2 to 5 feet high: leaves tomentulose both sides, only glabrate in age, spatulate-oblong to obovate or oval; the larger 3 or 4 inches long and 1 or 2 wide: outer petals when full grown 2 inches or more in length, and 3 or 4 times the length of the inner, these for the upper half with revolute margins.—Monog. Anon. 84, t. 11; DC. Prodr. i. 86; Ell. Sk. ii. 42; Chapm. Fl. 15. *Anona grandiflora*, Bartr. Trav. (Am. ed.) t. 2. *Annona obovata*, Willd. Spec. ii. 1269. *Orchidocarpum grandiflorum*, Michx. Fl. i. 330. *Porcelia grandiflora*, Pers. l. c.; Pursh, l. c. *Uvaria obovata*, Torr. & Gray, Fl. i. 45.—Sandy woods, S. Georgia and Florida; first coll. by Bartram. He describes the flowers as sweet-scented, "the fruit of the size and form of a small cucumber, containing a yellow pulp of the consistence of a hard custard, and very delicious wholesome food." Fl. March, April.

<sup>1</sup> Add Sargent, Silv. i. 21, with conspectus of species.

<sup>2</sup> Add Lloyd Bros. Am. Drugs & Med. ii. 49, t. 33, f. 120-125; Sargent, Silv. i. 23, t. 15, 16.

<sup>3</sup> Add Bull. Soc. Linn. de Paris, 651.

<sup>4</sup> Prof. Sargent, l. c., extends the range to E. Pennsylvania and on the west to E. Kansas.

**A. cuneata**, SHUTTLEWORTH. Less pubescent, a foot or two high: leaves smaller, an inch or two long, even the nascent ones often quite glabrous above, becoming coriaceous in age: pedicels solitary: outer petals 1 to 1½ inches long, only twice the length of the inner. — Distr. coll. Rugel, 8; Gray, Bot. Gaz. xi. 163. *A. reticulata*, Chapm. Fl. ed. 2, 603, not Shuttleworth. — Pine barrens of S. Florida; near L. Monroe, Rugel, in fruit. Coll. in flower by Palmer, Feay, Harvard, the last in February; later also by Curtiss.

\* \* Flowers solitary in the axils of extant subcoriaceous and reticulate-veiny subsessile leaves, produced in spring and early summer: outer and inner petals strongly dissimilar: styles distinct: ovules 8 to 10: flowering stems mostly simple and suffruticose from a thickened woody base or stock: herbage quite glabrous from the first or very nearly so: fruit an inch long or more, few-seeded: seeds globose-ovate, little compressed.

**A. angustifolia**, GRAY. Stems 2 or 3 feet high, erect: leaves elongated, from narrowly linear (5 or 6 inches long by 2 to 4 lines wide) to narrowly spatulate (3 to 5 inches long and half or three fourths inch wide): flower white, large, commonly erect: outer petals much accrescent, 1½ to 2 inches long, oblong; inner much smaller, lanceolate above the strongly concave internally purple and longitudinally corrugate-thickened base: ovaries almost glabrous.<sup>1</sup> — Bot. Gaz. xi. 163. *Orchidocarpum pygmæum*, Michx. Fl. i. 330, & *Porcelia pygmæa*, Pers. Syn. ii. 95, in part. *Asimina pygmæa*, Dunal, l. c. t. 10; Ell. Sk. ii. 43, mainly; Chapm. Fl. 15, in part. *A. pygmæa*, var., Curtiss, distr. 87\*. *Uvaria pygmæa*, Torr. & Gray, Fl. i. 45, mainly. — Sandy pine woods, Florida and adjacent Georgia. Parts of the flower occasionally in fours.

**A. pygmæa**, DUNAL, l. c. excl. syn. Stems a foot or two high, commonly declined or arcuate: leaves from cuneate-linear to oblong, 1 to 4 inches long, half inch to full inch wide, much reticulated: flowers strongly nodding, mostly brown purple; outer petals ovate, becoming ovate-lanceolate or spatulate, seldom over half inch long, not broader nor becoming much longer than the thicker and broadly ovate inner ones. — Ell. l. c. in part; Curtiss, distr. 87; Gray, l. c. 164. *Anona pygmæa*, Bartr. Trav. (Am. ed.) t. 1. *Uvaria pygmæa*, Torr. & Gray, l. c. in part. *Asimina secundiflora*, & *A. reticulata*, Shuttleworth in distr. coll. Rugel, 10 & 9, the former just the plant described and figured by Bartram; the latter a smaller-flowered form with oblong or linear-oblong leaves an inch or so in length and not tapering to the base. — Dry pine barrens, E. Florida<sup>2</sup> and adjacent Georgia, first coll. by Bartram.

## ORDER IV. MENISPERMACEÆ.

By A. GRAY.

Woody (at least at base) and sarmentose or twining plants; with colorless bitter juice, mostly palmate or peltate alternate leaves and no stipules, and small diœcious flowers; their parts 3-merous or sometimes 4-merous, with hypogynous sepals, petals, and stamens in two series of each (or the latter more numerous in one genus and petals wanting in another), the parts imbricated in the bud; the 3 to 6 carpels distinct, uniovulate, in fruit berry-like drupes, commonly incurved as they grow, making the seed and embryo crescentic or annular, the latter nearly the length of the scanty albumen. Peduncles axillary or super-axillary. Anthers with normal dehiscence, usually short. Ovule amphitropous. Order nearly all tropical, except these few representatives in Atlantic N. America.

\* Floral envelopes plainly of two sorts, viz. sepals and petals: anthers innate, 4-lobed and mostly 4-locellate: carpels becoming incurved after anthesis, bringing the apex of the drupe down next the base; the rugose and grooved and laterally flattened putamen therefore circular or strongly reniform, bony, and the seed reniform or horse-shoe shaped: embryo slender, with long and narrow cotyledons.

<sup>1</sup> Seeds ovate-subglobose with distinct arillus; see Bot. Gaz. xi. 220.

<sup>2</sup> Since coll. at Gainesville, Central Florida, Miss Peirce.



1. **COCULUS.** Sepals, petals, and stamens each 6, and anteposed, being in successive regularly alternate threes. Inner sepals larger than the outer, also larger than the petals, which in male flowers are partly involute at base around one of the short filaments. Stamens of female flowers 6 flattened sterile filaments. Carpels 3 to 6, sessile on the common receptacle: styles short and subulate, recurved, ventrally stigmatose.
2. **MENISPERMUM.** Sepals 4 to 8. Petals 6 to 8 or 10, shorter. Male flowers with 12 to 24 stamens: filaments filiform. Female flowers with a short abortive stamen before each petal, and 2 to 4 carpels on the summit of a short gynophore: stigmas broad, sessile or nearly so.  
 \* \* Divisions of floral envelopes fewer, all alike: anthers adnate, introrse, simply 2-celled: stigma remaining apical: drupe when dry and seed meniscoidal: cotyledons broad and thin, laterally divergent.
3. **CALYCOCARPUM.** Sepals 6 in two series, similar, petaloid, oblong-obovate. Petals wanting. Stamens in male flowers 12, with filaments flattened and somewhat dilated upward; in the female flowers a short abortive stamen before each sepal. Carpels 3, sessile: ovary fusiform: stigma sessile, peltate, laciniately multifid. Drupe globular, with thin pulp on a thin crustaceous putamen, which is broadly and deeply excavated or intruded ventrally, forming an acetabuliform or bowl-shaped cavity, the transverse and also longitudinal section meniscoidal. Embryo also meniscoidal, in the thin albumen; the broad and thin cotyledons separate.

1. **CÓCCULUS**, DC. (Diminutive of *κόκκος*, a berry, applied by Bauhin to the *Cocculus Indicus* of commerce.) — Mainly Asiatic and African species; ours slender-stemmed and low-twining, variable-leaved. — Syst. i. 515, in part; Gray, Gen. III. i. 71, t. 28; Benth. & Hook. Gen. i. 36.

**C. Carolinus**, DC. Tomentulose: leaves long-petioled, ovate or cordate and entire, or some hastately 3-lobed or even sinuately 5-lobed, thinnish, glabrate or glabrous above: flowers greenish, in either short or lengthened racemiform panicles: fruit red, 3 lines in diameter. — Syst. i. 524; Torr. & Gray, Fl. i. 47; Gray, l. c. 72, t. 28; Baill. Hist. Pl. iii. 2, f. 2-4; Miers, Contrib. Bot. iii. 253. *Cissampelos smilacina*, L. Spec. ii. 1032, on Catesb. Car. i. t. 51. *Menispermum Carolinum*, L. Spec. i. 340. *M. Carolinianum*, Hill, Veg. Syst. xvi. t. 27, f. 1; Walt. Car. 248. *Baumgartia scandens*, Moench, Meth. 650. *Androphylax scandens*, Wendl. Bot. Beobacht. 38. *Wendlandia populifolia*, Willd. Spec. ii. 275; Pursh, Fl. i. 252. *W. Caroliniana*, Nutt. Gen. i. 241. *Cocculidium populifolium*, Spach, Hist. Veg. viii. 17.<sup>1</sup> Var. *hede-raceæfolius*, Miers, l. c. (*Menispermum Virginicum*, L. l. c., founded on Dill. Elth. 223, t. 178), is no more than a form with a few of the leaves sinuately 5-lobed. *C. sagittæfolius*, Miers, l. c. 255, from San Felipe, Texas, *Drummond*, must be another form, with more hastate foliage. — River-banks, Virginia and S. Illinois to Florida and Texas; fl. summer.

**C. diversifolius**, DC. Puberulent and glabrate: flowering stems filiform: leaves short-petioled, small, chartaceous, lucid, varying from linear and lanceolate (with ribs parallel) to ovate or cordate and sometimes 3-lobed: flowers greenish yellow: fruit apparently purple. — Hemsl. Biol. Cent.-Am. Bot. i. 21; Wats. Proc. Am. Acad. xvii. 318. *C. diversifolius* & *C. oblongifolius*, DC. Syst. i. 523, 529, & Calques des Dess. t. 10, 11. — Southern borders of Texas, on the Rio Grande, *Palmer*, *Havard*, and S. Arizona, *Pringle*; fl. May. (Mex.)

2. **MENISPÉRMUM**, Tourn. MOONSEED. (*Μήνη*, moon, *σπέρμα*, seed.) — Partly herbaceous twiners, but woody and persistent below; with membranaceous slender-petioled leaves angulately 5-7-lobed and peltate near the base; the flowers in small and loose slender-pedunculate panicles, mostly shorter than the petioles, greenish or whitish, the stamens bright white; fl. in summer. — Mem. Acad. Par. 1705, 237; L. Syst. Nat. ed. 1, & Gen. ed. 2, 362, in part; Lam. Ill. t. 824; Gray, Gen. III. i. 73, t. 29; Maxim. Diag. Pl. Nov. Asiat. v. 647, t. 2. Consists of the following species and one of E. Asia.

<sup>1</sup> Add syn. *Cebatha Carolina*, Britton, Mem. Torr. Club, v. 162.

**M. Canadense**, L. Somewhat pubescent when young, glabrate: leaves peltate close to the broadly dilated subcordate base: petals only half the length of the inner sepals, flattish, much shorter than the 10 to 20 stamens of the male flowers: abortive stamens of the female flowers one before each petal and of its length: stigmas obovate or reniform, sessile: fruit ripening late in autumn, resembling small grapes, blue-black with a copious bloom. — Spec. i. 340; Michx. Fl. ii. 241; Sims, Bot. Mag. t. 1910; Schk. Handb. t. 337; Torr. & Gray, Fl. i. 48; Miers, Contrib. Bot. iii. 115, t. 110. *M. angulatum*, Mœnch, Meth. 277. *M. smilacinum*, DC. Syst. 541. *Cissampelos smilacina*, Jacq. Ic. Rar. iii. t. 629, not L. — Alluvial ground, along streams; Canada to Minnesota and Winnipeg, south to Georgia and Alabama in the upper districts.

**3. CALYCOCARPUM**, Nutt. (Κάλυξ, a cup or shell, καρπός, fruit, the dry shell of the drupe with a cup-like hollow on one side.) — Nutt. in Torr. & Gray, Fl. i. 48 (§ of *Menispermum*); Gray, Gen. III. i. 75, t. 30, & Man. ed. 5, 52; Benth. & Hook. Gen. i. 35; Miers, l. c. 24, t. 89. — Single species.

**C.\* Lyóni**, GRAY.<sup>1</sup> Climbing extensively, sparsely hirsute when young: leaves ample and long-petioled, membranaceous, open-cordate at base, not peltate, deeply 3-5-lobed, lobes ovate and acuminate: panicles of small white flowers, loose and slender, male much elongated: drupe nearly inch long, black when ripe, globose when fresh, with ventral face at length flattened, and when the dried epicarp breaks away disclosing the deep cavity of the putamen, its border then more or less denticulate-crested. — Gen. III. i. 76, t. 30; Chapm. Fl. 16; Baill. Hist. Pl. iii. 13, 39. *Menispermum Lyoni*, Pursh, Fl. ii. 371; DC. Syst. i. 541; Torr. & Gray, l. c. — Moist woods, in alluvial soil, Kentucky and S. Illinois to Missouri, and south to Florida and Texas; fl. late spring and summer.

## ORDER V. BERBERIDACEÆ.

By A. GRAY; the genus *Vancouveria* revised by B. L. ROBINSON.

Shrubs or herbs with colorless juice but yellow wood and bark in *Berberis*; leaves commonly with stipular dilated and marginal bases to the petioles or obviously stipulate; symmetrical and hermaphrodite hypogynous flowers, with imbricate æstivation, and parts all distinct and 3-merous (rarely 2- or 4-merous); sepals, petals, stamens, and sometimes bractlets in two series of each (or occasionally more), that is, taken as wholes regularly anteposed throughout; anthers opening by uplifted valves; carpel normally only one; seeds anatropous, with a straight or straightish embryo in fleshy or horny albumen. Parts of flower deciduous. *Podophyllum* and *Achlys* are anomalous exceptions, as seen below. The *Lardizabaleæ* are an order between this and the *Menispermaceæ*.

\* Shrubs, with compound but often unifoliate (and seemingly simple) alternate leaves.

**1. BERBERIS.** Sepals 6 (besides 2 or 3 bracts), somewhat petaloid. Petals 6, concave and ascending or erect, 2-glandular next the base within. Stamens 6, short. Stigma peltate and umbilicate. Ovules few, ascending from base of the cell. Fruit a berry, sometimes dry. Seeds with crustaceous coat.

\* Perennial herbs, with deciduous ovary and mostly a single pair of ovules from base of the cell; these becoming naked drupaceous seeds: leaves ternately decompound.

**2. CAULOPHYLLUM.** Sepals 6, usually with 3 or 4 bractlets underneath. Petals 6, much shorter, nectariferous, flabelliform and fleshy, short-unguiculate. Stamens 6, short.

<sup>1</sup> Dr. Gray in his manuscript (as in the 5th edition of Manual) ascribes this species to Nuttall. The combination *C. Lyoni*, however, was first made in Gray's Gen. III. i. 76, where there is no reference to Nuttall. The species must accordingly stand as Dr. Gray's.

Ovary ovoid: subulate short style with introrse stigma. Seeds stipitate on their thickened clavate funiculi, globose, with a fleshy and at length pulpy coat; the very hard albumen deeply umbilicate at the hilum. Embryo minute at the centre.

\* \* \* Anomalous herbs, with no floral envelopes, and dry indehiscent fruit one-seeded from the base.

3. **ACHLYS.** Stamens 6 to 12; filaments elongated, filiform, or the outer dilated upward: anthers globose-didymous. Ovary ovoid, surmounted by a broad sessile stigma. Ovule solitary. Fruit at first somewhat fleshy, at length dry and coriaceous, lunate-incurved, dorsally convex and carinate, ventrally excavated each side of the fleshy salient suture or ventral appendage. Embryo minute. Flowers spicate.

\* \* \* \* Perennial herbs: ovary with few or many ovules on the lateral placenta.

+ Forming a dry and dehiscent fruit: seeds laterally arillate: embryo minute: leaves compound.

4. **VANCOUVERIA.** Sepals 6 in two series, obovate, petaloid, reflexed, and below them 6 or 9 calicine bracts in 2 or 3 series. Petals 6, nectariform and unguiculate, i. e. a ligulate claw bearing a much shorter cucullate nectariferous lamina. Stamens 6: anthers elongated-oblong, the connective produced into a pointed tip. Ovary 2-9-ovulate; style slender; stigma terminal, truncate and scarious-cupulate. Follicle oblong, membranaceous, unequally 2-valved, in the manner of *Epimedium* (which has dimerous flowers and sessile petals or nectaries). Seeds arcuate, with an ample lateral arillus. Leaves triternate.

5. **JEFFERSONIA.** Sepals 4, rarely 3 or 5, linear-oblong, petaloid, caducous. Petals 8 in two series, oblong, plane, larger than the sepals. Stamens 8; anthers oblong-linear, longer than the filaments. Ovary ovoid, slightly stipitate, apex contracted into a short style with terminal 2-lobed stigma. Ovules and seeds numerous and horizontal in several rows on the broad placenta. Arillus small and laciniate. Fruit obovate, transversely (or obliquely) dehiscent by a slit. Leaves 2-foliolate or 2-lobed.

+ + Fruit a berry: embryo comparatively large: anthers oblong, longer than the filaments: rootstocks producing sterile plants of a single large and long-stalked leaf and flowering plants of two leaves: leaves undivided but cleft and peltate.

6. **DIPHYLLEIA.** Sepals 6 in two series (or the three outer and smaller more herbaceous ones bracts), caducous. Petals 6, obovate, plane and larger, spreading. Stamens 6. Ovary 5-6-ovulate toward the base of the placenta: style very short: stigma terminal, depressed, emarginate. Berry globular, somewhat gibbous, few-seeded. Seeds oblong, naked (not arillate).

7. **PODOPHYLLUM.** Bracts 3, small and green, very early caducous. Sepals 6 in two series, broad and thin, partly herbaceous, caducous. Petals 6 to 9, rounded-obovate, spreading. Stamens as many or twice as many as the petals, or more; anthers not with uplifted valves! Ovary ovoid, crowned with a large and sessile fungoid-lobulate stigma. Ovules and seeds very numerous in several rows covering the very broad ventral placenta; the seeds at length immersed each in a pulpy arillus or arilliform outgrowth of the placenta. Berry large. In monstrosity 2 or 3 carpels!

1. **BÉRBERIS**, Tourn. **BARBERRY** or **BERBERRY**. (Arabic name.) — Widely distributed genus of shrubs; the inner bark and wood yellow and charged with a bitter principle (berberine). Leaves or leaflets spinulose- or ciliate-dentate, or some converted into persistent spines. Flowers small, yellow, mostly in racemes, produced in spring or early summer, heavy scented. Filaments sensitive, springing forward upon a touch at base inside. — Inst. 614, t. 385; L. Gen. no. 267.

§ 1. **TRUE BÉRBERIS.** Leaves of primary axes transformed into persistent and simple or triple spines; those of the foliage in fascicles from the axils, in

ours deciduous, seemingly simple, but really unifoliolate and nearly sessile, the petiole being extremely short and articulated with tapering base or petiole of the leaflet: racemes drooping: filaments toothless: berries red and acid, edible.

**B. vulgáris**, L. (EUROPEAN BARBERRY.) Shrub 3 to 9 feet high, with recurving branches: leaves obovate-oblong, closely and strongly ciliate throughout with setiform-spinulose teeth: racemes elongated, many-flowered: berries oval or oblong. — Spec. i. 330. *B. Canadensis*, Raf. Med. Fl. i. 82, t. 15, Loud. Arboret. i. 303, f. 48, and in some earlier books. *B. vulgaris*, var. *Canadensis*, Torr. Fl. N. & Midd. States, 336. *B. macracantha*, *laziflora*, & *mitis*, Schlecht. Linnæa, xii. 366–371. — Thickets and waste land, abundantly naturalized near the coast of New England, New Brunswick, &c.; sparingly escaped from gardens elsewhere. (Nat. from Eu.)

**B. Canadensis**, PURSH. Low: leaves pale or glaucescent, spatulate-oblong, sparsely repand-denticulate and short-spinulose or some nearly entire: racemes short and few-flowered, and almost corymbiform: flowers smaller than in the foregoing: petals retuse or emarginate: berries short-oval to globular. — Fl. i. 219; Torr. & Gray, Fl. i. 50; Gray, Gen. Ill. i. 80, t. 31, & Man. ed. 5, 53.<sup>1</sup> ? *B. vulgaris*, Walt. Car. 120; Michx. Fl. i. 205. *B. vulgaris*, var. *Canadensis*, Ait. Kew. i. 479. *B. emarginata*, Willd. Enum. 395, which seems not to be Siberian? *B. crenulata* (excl. syn. Bigel.) & *B. emarginata*? Schlecht. l. c. 362, 372. — Common in the Alleghanies, along streams, Virginia to border of Georgia.<sup>2</sup> (Not Canadian!)

**B. Fendleri**, GRAY. Low: vernicose purplish branchlets and leaves lucid: otherwise like preceding, but flowers larger and petals entire. — Pl. Fendl. 5; Rothrock in Wheeler, Rep. vi. 60. — New Mexico, near Santa Fé and eastward, *Fendler*, *Bigelow*, *Rothrock*; also on the Rio Grande in S. Colorado, *Brandege*.

§ 2. **MAHÓNIA**, Torr. & Gray. Leaves evergreen, all evolute (none reduced to spines) and 3–several-foliolate, the petiole or rhachis articulated at the insertion of the leaflets. — *Mahonia*, Nutt. Gen. i. 211. *Odostemon*, Raf. “Florula Missurica,” Am. Month. Mag. 1818, 265, & Med. Fl. ii. 247.

\* Leaves palmately 3-foliolate and no articulation of petiole below: bud-scales short and small, somewhat persistent on the axillary spurs, which bear fascicles rather than racemes: filaments toothless: berries red, acidulous, edible. — § *Trilicina*, Gray, Gen. Ill. i. 80.

**B. trifoliolata**, MÖRICAND. (ALGERITAS OR CURRANTS of TEXANS.) Shrub 2 to 8 feet high, rigid: leaflets rigid and coriaceous, sessile on the apex of the petiole, oblong or lanceolate, 3–7-lobed or toothed, the teeth and tip spinescent: flowers saffron-scented: berries globose, the size of peas. — Pl. Nouv. Am. 113, t. 69; Gray, Pl. Lindh. ii. 142; Lindl. & Paxt. Fl. Gard. ii. 68, f. 168. Perhaps *B. trifoliata*, Hartw. ex Lindl. Bot. Reg. xxvii. Misc. 149, & xxxi. t. 10; Fl. Serres, i. t. 56. *B. ilicifolia* & *B. Rameriana*, Scheele, Linnæa, xxi. 591, & xxii. 352. — Common in Texas, from the coast to the upper country, first coll. by *Berlandier*; fl. February, March. (Adj. Mex.) There is a palmately trifoliolate species much like this, but with generally broader leaflets, and with bidentate filaments and blue berries. It is no. 14 of coll. Palmer, south of Saltillo, referred by Watson to *B. Shiedeana*, Schlecht. (*Mahonia trifolia*, Cham. & Schlecht.): to this *B. trifoliata*, Hartw., raised from seeds gathered between Zacatecas and San Luis Potosi, and figured as above, may belong; but char. of filaments and fruit not determined.

\* \* Leaves pinnately 3–17-foliolate, when reduced to 3 leaflets, always having an articulation where a missing pair of leaflets would be: bud-scales ovate or roundish, deciduous: flowers in erect and commonly fascicled racemes: filaments with a pair of divergent or recurved teeth near the apex: berries blue or rather black with a glaucous bloom

+ Fruit becoming dry at maturity and inflated, globose: inflorescence loose.

<sup>1</sup> Not of Mill. Dict. ed. 8, no. 2, *fide* Hook. f. & Jackson, Ind. Kew. i. 292.

<sup>2</sup> Also Shannon Co., Missouri, *Bush*; not common.

**B.\* Fremóntii**, TORR. Shrub 5 to 12 feet high: leaflets 3 to 7, rigidly coriaceous, ovate to oblong, not over inch long, repandly or sinuately 1-4-toothed on each margin, strongly spinescent; lowest pair or an articulation close to base of petiole: racemes loosely 3-7-flowered: pedicels slender; bractlets small or minute, lanceolate, acuminate, brown and more or less scarious: berries at first blue, becoming dry and inflated to half inch in diameter, 6-8-seeded. — Bot. Mex. Bound. 30 (char. filaments inappendiculate incorrect); Gray, Bot. Ives Rep. 5; Wat. Bot. King Exp. 416.<sup>1</sup> — Arid region, W. Texas to S. Utah and Arizona, first coll. by *Frémont*. (Adj. Mex. in Sonora, and Lower Calif.)

— — — Fruit white or nearly so, large, juicy.

**B.\* Swazéyi**, BUCKL. Shrub with evergreen leaves much as in preceding but with leaflets more elliptical, less stoutly spiny and with veins more closely reticulated and prominent upon both surfaces: bractlets small but foliaceous, ovate or suborbicular: fruit white, translucent with a pale reddish tinge, nearly half inch in diameter, of pleasant acid taste. — Southern Horticulturist, ii. 14 (as *B. Swazeyii*); Rural Alabamian, i. 479; Young, Fl. Tex. 152; Coulter, Contrib. U. S. Nat. Herb. ii. 10; Plank, Gard. & For. vi. 332. — Limestone hills, near the Perdales River, Hays Co., W. Texas, *Buckley*, and again in Hays Co., *Plank*.

— — — Fruit unknown: leaflets small and few: inflorescence loose.

**B. Nevínii**, GRAY, n. sp. Leaflets 3 to 7, oblong-lanceolate, rather evenly and numerous spinulose-serrulate, half to full inch long, obscurely reticulated; lowest pair toward base of petiole: raceme loosely 5-7-flowered, equalling or surpassing the leaves: pedicels slender. — S. California, near Los Angeles, *Nevin*. Shrub 7 or 8 feet high, on a sandy plain.

— — — — Berries juicy, ovoid, black or blue with a copious white bloom, called by Californian Mexicans *Leña Amarilla*, and northward *Oregon Grape*: leaflets ovate to oblong, usually 2 or 3 inches long: racemes commonly fasciated at summit of stem or in axils, subsessile, dense and numerous flowered; pedicels rather short.

**B. pinnáta**, LAG. Shrub 3 to 6 feet high, very leafy: leaflets 5 to 9 or sometimes 11 to 17, lucid above, scarcely paler beneath, repand-dentate and the teeth aristately spinescent; lowest pair close to base of petiole. — "Elench. Hort. Madr. (1803) 6," Nov. Gen. & Spec. (1816) 14; Torr. & Gray, Fl. i. 51; Benth. Pl. Hartw. 296; Brew. & Wats. Bot. Calif. i. 15; perhaps also Don, Bot. Reg. t. 702, not HBK. of Mexico. *Mahonia fascicularis*, DC. Syst. ii. 19, as to plant from Monterey, & Deless. Ic. Sel. ii. t. 3. — Common through W. California from San Francisco Bay to Monterey (where first coll. by *Nee*), and southward.

**B.\* dictyóta**, JEPSON. Leaflets 5 to 7, thicker, paler, and less crowded than in the last, dull or scarcely lucid above, much paler and glaucous beneath, rather prominently reticulated; spinose teeth stout, mostly less numerous: flowers in dense panicle. — Bull. Torr. Club, xviii. 319. — Marysville Buttes, Calif., *Jepson*, *Blankinship*; San Diego, *Palmer*, *Cleveland*. The fruit of the California plants is still unknown. *B. Wilcoxii*, Britton & Kearney (Trans. N. Y. Acad. Sci. xiv. 29), from the Huachuca Mts., Arizona, so closely resembles this species in foliage and flowers that it can scarcely be maintained without further distinctions, which may appear as both plants are better known. The Arizona plant has blue-black berries with a copious bloom. It differs from the California specimens from Marysville Buttes only in having slightly thinner and more finely reticulated leaves and more acute bracts. The specimens from San Diego are in some respects intermediate.

**B. Aquifólium**, PURSH. Shrub 1 to 5 feet high: leaflets 5 to 11, commonly thin-coriaceous and elongated-oblong (2 to 4 inches long), numerous spinulose-dentate, bright green and lucid; lowest pair at some distance from base of petiole. — Fl. i. 219, in part, & t. 4, mainly; Hook. Fl. Bor.-Am. i. 29, partly; Lindl. Bot. Reg. t. 1425; Torr. & Gray, l. c. 50, partly. *B. pinnata*, Lag. l. c. as to Nutka pl.; Don, Bot. Reg. t. 702? Hook. l. c. 28. *Mahonia Aquifolium*, DC. Syst. ii. 20, mainly. — Coast of Oregon to Brit. Columbia, and eastward to near the sources of the Columbia, in hilly woods.

**B. répens**, LINDL.<sup>2</sup> Dwarf, depressed or prostrate, rarely rising over a foot high: leaflets 3 to 7, oval to oblong, mostly with obtuse or rounded apex, pale or glaucous, not lucid,

<sup>1</sup> And in Gard. & For. i. 496, f. 77. Dr. Gray's description of this species has been slightly amplified to exclude more clearly the following evidently distinct species.

<sup>2</sup> The form of the Pacific Slope attributed to this species has somewhat thicker duller leaves. It has been characterized by Prof. Greene (Pittonia, ii. 161) as *B. PUMILA*, and is said not to be

numerously but rather weakly spinulose-dentate; lowest pair distant from base of petiole. — Bot. Reg. t. 1176, & Journ. Hort. Soc. v. 17; Lodd. Bot. Cab. t. 1847; Brew. & Wats. Bot. Calif. i. 14. *B. nervosa*, Pursh, Fl. t. 5, as to flowers only. *B. pinnata*, Muhl. Cat. 36. *B. Aquifolium*, Pursh, l. c. 219, mainly as to descr.; also Hook. l. c. 29; Torr. & Gray, l. c. as to glaucous form; Gray, Pl. Fendl. 5, &c. *B. Aquifolium*, var. *repens*, Torr. & Gray, Pacif. R. Rep. iv. 63, &c.<sup>1</sup> *Mahonia Aquifolium*, Nutt. Gen. i. 212, & Jour. Acad. Philad. vii. 11. — Rocky Mountains and Brit. Columbia from lat. 55° to northern part of Sierra Nevada of California and to New Mexico, eastward to Wyoming.<sup>2</sup>

\* \* \* Leaves pinnately 13–17-foliolate: bud-scales large, coriaceous-glumaceous and persistent: racemes few from the bud or solitary, erect, elongated: filaments toothless: berries black or dark purple with a copious bloom.

**B. nervosa**, PURSH. Simple stems rising only a few inches above ground: leaves elongated, often a foot or more long, with conspicuously nodose articulations: leaflets glaucescent, thick-coriaceous, ovate to ovate-lanceolate, somewhat nervose-veiny, spinulose-dentate; lowest pair above base of petiole: scales of the strong terminal bud about inch long, lanceolate from a broad base and cuspidate-attenuate, striolate: pedicels shorter than the globose juicy berries. — Fl. i. 219, t. 5, excl. flowering portion; Hook. l. c.; Sweet, Brit. Fl. Gard. ser. 2, t. 171; Torr. & Gray, l. c. 51; Hook. Bot. Mag. t. 3949. *B. glumacea*, Spreng. Syst. ii. 120; Lindl. l. c. t. 1426; Lodd. l. c. t. 1701. *Mahonia nervosa* (Nutt. Gen. i. 212), & *M. glumacea*, DC. Syst. ii. 20, 21. — In woods, Oregon, Washington, and Brit. Columbia; fl. early spring, fr. May, June.

**2. CAULOPHYLLUM**, Michx. BLUE COHOSH. (Καυλός, stem, φύλλον, leaf, the stem seeming like a stalk to the large compound leaf.) — Fl. i. 204, t. 21; Benth. & Hook. Gen. i. 43. — Single species.

**C. thalictroides**, Michx. l. c. 205. Glaucescent herb, with simple stems a foot or two high from a thickened knotty rootstock, naked below, bearing toward the top a sessile 3-ternate leaf, the primary petiolules of which are as thick as the continuation of the stem and enlarged at the common insertion; above commonly a second and smaller 2-ternate, and even a third small and less compound leaf; leaflets cuneate-obovate or oblong, very veiny, terminal 3-lobed at summit and the lateral 2-lobed, and sometimes incised: flowers in small and loose terminal and axillary cymose clusters or panicles, yellowish green and lurid purplish, small: ovary bursting and falling away as the seeds form; the latter as large as peas, berry-like, blue with a bloom. — Pursh, Fl. i. 218; Raf. Med. Fl. i. 97, f. 19; Gray, Man. ed. 5, 53. *Leontice thalictroides*, L. Spec. i. 312; R. Br. Trans. Linn. Soc. xii. 145, t. 7; Lodd. Bot. Cab. t. 1473; Torr. & Gray, Fl. i. 52; Gray, Gen. Ill. i. 82, t. 32.<sup>3</sup> *Actea brachypetala*, var. *caerulea*, DC. Syst. i. 385. — Woods in rich soil, New Brunswick and Canada as far as the Great Lakes,<sup>4</sup> south to Missouri, Kentucky, and mountains of Carolina; fl. spring, fr. autumn. (Japan & Amur.)

**3. ACHLYS**, DC. (Αχλὺς, the goddess of obscurity, says DC.) — Syst. ii. 35; Hook. Fl. Bor.-Am. i. 30, t. 12; Gray, Proc. Am. Acad. viii. 376; Baill. Hist. Pl. iii. 60, 75. — Consists of the following species and one in Japan very like it.

**A. triphylla**, DC. l. c. Herb with filiform creeping rootstocks, terminated by a strong and scaly winter bud, whence proceed in spring one or two long petioles bearing on the apex 3 ample flabelliform and sinuate-dentate leaflets; also a leafless scape terminated by a slender at all sarmentose. The material of this form in eastern collections is unfortunately limited and fragmentary.

<sup>1</sup> Add syn. *B. Nutkana*, Kearney, Trans. N. Y. Acad. Sci. xiv. 29. One of Lewis's original specimens from the Columbia River and now in the herbarium of the Philadelphia Acad. Nat. Sci. has certainly the lucid acute leaflets of *B. Aquifolium* as ordinarily interpreted.

<sup>2</sup> A round-leaved form from Bellemont, Nebraska, has been collected by Webber.

<sup>3</sup> Foerste, Bull. Torr. Club, xiv. 139, where some formal variations are indicated; Lloyd Bros. Am. Drugs & Med. ii. 141–162.

<sup>4</sup> Westward to Cass Co., Nebraska, acc. to Swezey, Bull. Torr. Club, xix. 94.

densely flowered naked spike; the white filaments and small ovary making up the whole flower; nut-like fruit barely 3 lines long. — Torr. & Gray, Fl. i. 53; Brew. & Wats. Bot. Calif. i. 16. *Leontice triphylla*, Smith in Rees, Cycl. xx. no. 1. — Woods, Brit. Columbia to northern part of California, near the coast; fl. spring.

4. **VANCOUVÉRIA**, Morr. & Decsne. (*Capt. George Vancouver*, commander of the Discovery in the voyage to our northwest coast in 1791–95, of which Menzies was surgeon and botanist.) — Ann. Sci. Nat. ser. 2, ii. 351; Torr. & Gray, Fl. i. 52; Benth. & Hook. Gen. i. 44; Gray, l. c. 375; Brew. & Wats. l. c. 15. — Three species of the Pacific Slope. [Revised by B. L. ROBINSON.]

\* Leaves thin, membranaceous, soon perishing after the maturing of the fruit, their edges flat or nearly so, not indurated.

V.\* **hexándra**, MORR. & DECSENE, l. c. About a foot high, from slender and lignescent creeping rootstocks, glabrous or sparsely pilose: leaves all or mostly radical, 3-ternate and with slender common and partial petioles: leaflets rounded and cordate or subcordate, mostly angulately 3-lobed or repand and margin obscurely undulate-crenulate or entire: scape naked, or sometimes one-leaved at base of the simple or branched loose panicle; pedicels filiform, recurving: flowers white or cream-colored. — Garden, xxx. 263, fig. ? *V. planipetala*, S. Calloni, Malpighia, i. 266. *Epimedium hexandrum*, Hook. Fl. Bor.-Am. i. 30, t. 13, dissections not very good. — In coniferous woods near the coast, Brit. Columbia (Vancouver Island) to Northern and Central California, first coll. by *Menzies*; fl. spring.

\* \* Leaves much thicker, somewhat coriaceous, narrowly cartilaginously-margined, often crenulate or crisped at the edges, persisting.

V.\* **chrysántha**, GREENE. Stems rusty villous-pubescent, firmer than in the preceding: thickish leaflets sub-3-lobed, glabrous and reticulated above, whitened and pubescent beneath, margins only slightly crisped, revolute in places: inflorescence sub-racemose, 5–18-flowered, covered with dense dark glandular pubescence: flowers a little larger than in the last, golden yellow: sepals 3 or 4 lines long: ovules 7 or 8. — Bull. Calif. Acad. Sci. i. 66. *V. hexandra*, var. *chrysantha*, Greene, Pittonia, ii. 100. *V. aurea*, Greene (*ubi?*) acc. to Rattan, Anal. Key, 17. *V. hexandra*, var. *aurea*, Rattan, l. c.; Wats., *fide* Howell, Cat. Pl. Oreg. 1. — Oregon, at Waldo, Rattan, and Coast Mts., Curry Co., *T. Howell*. A well marked species readily distinguished from the preceding by its thicker foliage and larger more deeply colored corolla, from the following by its very different flowers as well as pubescence.

V.\* **parviflóra**, GREENE. Rootstock much-branched: stems numerous in groups: foliage much as in the preceding; leaflets more or less 3-lobed or suborbicular, more distinctly crenulate-crisped: inflorescence more paniculately branched with flowers commonly much more numerous (25 to 35 or more), scarcely half as large: ovules but 2 or 3. — Pittonia, ii. 100. *V. hexandra*, Brew. & Wats. l. c., in part. — Abundant upon hillsides, Central California, *Bigelow*, *Anderson*, *Bolander*, *Greene*, &c.

5. **JEFFERSÓNIA**, Barton. TWIN-LEAF. (*Thomas Jefferson*, author of Notes on Virginia, originator of the first expedition across the Rocky Mountains to the Pacific.) — Trans. Am. Phil. Soc. iii. 342, and plate; Michx. Fl. i. 236; Gray, Gen. Ill. i. 85, t. 34. — Single Atlantic-American species, but *J. dubia*, *Plagiorhegma dubium*, Maxim. Prim. Fl. Amur. 34, t. 2, of N. E. Asia, is almost certainly another.

J.\* **bináta**, BARTON, l. c.<sup>1</sup> Glaucous and glabrous, tufted from short matted rootstocks, producing below innumerable fibrous roots, sending up simple one-flowered naked scapes (4 or in fruit 8 to 10 inches high), these at length overtopped by the long radical petioles, which bear a pair of sessile semi-cordate (either sinuate-lobulate, repand or entire) veiny

<sup>1</sup> Name altered from *J. diphylla*, acc. to Dr. Gray's statement in ms. that Barton's name should have been retained, and in accordance with the recently published *Index Kewensis*.

leaflets: flower white: fruit obovate or rather urn-shaped, thick-walled and at maturity coriaceous, transversely dehiscent about two thirds way round above the middle, the persistent top forming a lid. — *J. diphylla*, Pers. Syn. i. 418; Sims, Bot. Mag. t. 1513; Lodd. Bot. Cab. t. 1036; Gray, l. c. 86, t. 34. *J. Bartonis*, Michx. Fl. i. 237; Raf. Med. Fl. ii. 11, f. 55, with *J. odorata* & *J. lobata*, the latter (also Nutt. Jour. Acad. Philad. vii. 99) with outer margin of leaflets sinuate-lobed. *Podophyllum diphyllum*, L. Spec. i. 505. — Rich and moist soil in woods, N. New York to Illinois<sup>1</sup> and adjacent Canada, south to Virginia and Tennessee, mainly along the mountains; fl. early spring. Also called RHEUMATISM-ROOT.

**6. DIPHYLLÉIA**, Michx. (Δίς, double, and φύλλον, leaf.) — Fl. i. 203, t. 19, 20; Gray, Gen. Ill. i. 83, t. 33. — Single species; for the *D. Grayi*, F. Schmidt, of Sachalin and Japan, seems to be no more than a variety, with some pubescence on the leaves.

**D. cymósa**, Michx. l. c. Rootstock horizontal and with large contiguous scars on upper side left by annual growths: stout flowering stem a foot or two high, above bearing two alternate approximate petiolate leaves and terminated by a small corymbiform cyme of white flowers: leaves thin, very veiny, accrescent, at first 5 or 6 inches, at length a foot or two wide, with acutely denticulate margins; cauline with shallow basal and deep central sinus, very excentrically peltate; large radical centrally peltate and more equally 9-13-lobed: berries as big as peas, blue or black-purple with a bloom. — Sims, Bot. Mag. t. 1666; Pursh, Fl. i. 218; DC. Syst. ii. 30; Gray, l. c. 84, t. 33, & Am. Jour. Sci. xlii. 23.<sup>2</sup> — Springy ground in woods, higher mountains of Virginia, Carolina, and E. Tennessee; fl. spring. (N. E. Asia.)

**7. PODOPHYLLUM**, L. MAY-APPLE, MANDRAKE. (Πούς, foot, and φύλλον, leaf, probably in reference to the very large footstock of the radical leaves.) — Robust perennial herbs (Atlantic N. Amer. and Asiatic, in 3 or 4 species), with strong running rootstocks, sending up in spring single centrally peltate leaves from an undeveloped stem, also mostly 2-leaved one-flowered stems with their leaves very eccentrically peltate: flower large, mostly white: woody bundles in stem scattered. — Syst. Nat. ed. 1, & Gen. no. 426; Gray, Gen. Ill. i. 87, t. 35, 36. *Anapodophyllum*, Tourn. Inst. 239, t. 122.

**P. peltátum**, L. Radical leaf of sterile shoots with petiole a foot or more high, about equally 7-9-parted into oblong-cuneate and emarginate divisions; leaves of flowering stem a pair at summit, with a short-peduncled flower between them: stamens 12 to 18: pulpy fruit ovoid, nearly 2 inches long: sometimes flowering stem leafless, a naked scape; sometimes 3 alternate leaves or 2 unequal ones, the smaller 2-3-lobed, sometimes 2 or 3 additional carpels! — Spec. i. 505; Michx. Fl. i. 309; Lam. Ill. t. 449; Bigel. Med. Bot. ii. 34, t. 23; Sims, Bot. Mag. t. 1819; Gray, l. c. 88, t. 35, 36; Porter, Bot. Gaz. ii. 117, with figures of variations.<sup>3</sup> *P. montanum* & *P. callicarpum*, Raf. Med. Fl. ii. 59, 60. *Anapodophyllum peltatum*, Moench, Meth. 277. — Low and alluvial ground, borders of Canada to Minnesota, Missouri, E. Texas, and Florida. (Japan?)

## ORDER VI. NYMPHÆACEÆ.

By A. GRAY; the genus *Nuphar* by B. L. ROBINSON.

Aquatic perennial herbs; with naked and one-flowered scapes or peduncles, commonly peltate leaves which are involute in the bud; hermaphrodite flowers, with the floral envelopes commonly in threes or fours, or indefinitely numerous,

<sup>1</sup> Wisconsin, *Lapham*.

<sup>2</sup> Add Lloyd Bros. Am. Drugs & Med. ii. 120, 121.

<sup>3</sup> Also Foerste, Bull. Torr. Club, xi. 62.



and imbricated; carpels either apocarpous or syncarpous; ovules anatropous and when more than one not borne on the ventral suture; embryo small and enclosed in a close sac at the base of the fleshy albumen, or the latter wanting in the anomalous *Nelumbium*. Rootstocks apparently endogenous rather than exogenous in structure. The WATER-LILIES are of three suborders, of which the first is most simple.

**SUBORDER I. CABOMBEÆ.** Sepals and petals each 3 (occasionally 4) and persistent: stamens 3 to 18, and carpels 2 to 18, all free and distinct; no evident disk. Carpels in fruit indehiscent, somewhat nut-like, 2-ovuled and 2-seeded on the sides or on the dorsal suture, or when 3-seeded one usually on or near the ventral suture. Flowers small.

1. **CABOMBA.** Petals bi-auriculate at base above a very short claw. Stamens as many as petals and sepals, and opposite them: anthers short, adnate, extrorse. Carpels 2 or 3. Stigma small and terminal on a short style, depressed or globular. Submersed leaves capillary-multifid and opposite or verticillate.

2. **BRASENIA.** Petals narrow and plane. Stamens 3 or 4 times as many: anthers linear-oblong, innate. Carpels 4 to 18, generally capitate-crowded. Stigma sessile and large, oblong, unilateral. Leaves alternate and entire.

**SUBORDER II. NELUMBONEÆ.** Sepals and petals indefinitely numerous and passing the one into the other, regularly imbricated, hypogynous, inner successively larger and more colored, promptly deciduous. Stamens indefinitely numerous, hypogynous: anthers linear, slightly extrorse, the connective prolonged into an incurved appendage. Carpels several (15 to 30) immersed separately in an obconical enlargement of the receptacle; ovary globular, with very short style and depressed umbilicate terminal stigma; ovule solitary (rarely a pair) suspended. Fruit an acorn-like nut. Seed exalbuminous, filled by the highly developed embryo; cotyledons thick and farinaceous-fleshy, united by the obsolete caulicle, enclosing a plumule of two or three developing leaves, from the first node of which in germination proceed the earliest roots.

3. **NELUMBO.** The only genus.

**SUBORDER III. NYMPHÆACEÆ PROPER.** Sepals 4 to 6. Petals numerous, sometimes reduced to or resembling staminodes or innermost passing gradually into stamens, mostly marcescent or decaying away. Stamens very numerous: anthers adnate, introrse. Carpels several, more or less united into several-celled compound ovary, which bears indefinitely numerous ovules upon the ovarian walls. Stigmas sessile and radiate. Fruit coriaceous-baccate, many-seeded. Seed and embryo as in character of the order. Acaulescent from stout rootstocks, commonly slightly lactescent. Stipules intrafoliaceous and united, sometimes adnate to base of petiole.

4. **NYMPHÆA.** Sepals and petals 4-merous in numerous ranks, and stamens indefinitely numerous passing into each other successively. Sepals 4, plane, hypogynous, herbaceous on the outer and somewhat petaloid on the inner face. Petals plane, those of the outermost row often greenish outside, all oblong or lanceolate, imbricated over and their bases adnate to the surface of the 7-35-celled ovary; innermost staminodes or imperfect stamens with petaloid filaments. True stamens with narrow filaments and linear-oblong anthers, inserted around the broad summit of the ovary. This concave and umbonate, lineate with as many radiate stigmatic lines as there are carpels, the tips of the latter produced into as many incurved short processes. Surface of the spongy-baccate fruit bearing the bases of decaying sepals or their scars. Seeds enclosed in cellular membranaceous arillus.

5. **NUPHAR.** Sepals 5 to 12, concave, roundish, mostly yellow and petaloid except greenish base or outside, coriaceous, persistent. Petals 10 to 20, hypogynous, small and thick, the

innermost or sometimes all of them like staminodes. Stamens hypogynous, numerous and densely imbricated over the receptacle and around the ovary, at length recurving, rigid and persistent: filaments very short; anthers linear; apex covered by the glandular truncate tip of the connective. Stigmas radiate upon the truncate summit of the 10-25-celled ovary. Fruit corticate-baccate, naked. Seeds not arillate.

1. **CABÓMBA**, Aublet. (An aboriginal or unmeaning name.) — Slender, mainly submersed, with capillary-dissected mostly opposite leaves, a few simple peltate floating leaves and emersed flowers from their axils. — Hist. Guian. i. 321, t. 124; Rich. Analyse du Fruit, 46, 60, & Ann. Mus. xvii. 230, t. 5; Torr. & Gray, Fl. i. 54; Gray, Gen. III. i. 93, t. 38; Casp. Fl. Bras. iv. pt. 2, 138, t. 37. *Nectris*, Schreb. Gen. no. 610. — The following with three similar S. American species.

**C. Caroliniána**, GRAY. Floating leaves oblong-linear, obovate-linear, or elongated-oblong, often with a basal notch: flowers white, a pair of yellow spots on base of each petal: stamens 6; anthers oval: seeds costate and the ribs muriculate. — Ann. Lyc. N. Y. iv. 47; Torr. & Gray, l. c.; Gardner in Hook. Ic. vii. 642; Gray, l. c. 94, t. 38. *C. Aubletii*, Michx. Fl. i. 206, as to N. Am. Pl. *C. aquatica*, DC. Syst. ii. 36, in part. *Nectris peltata*, Pursh, Fl. i. 239. *N. aquatica*, Nutt. Gen. i. 230; Ell. Sk. i. 416. — Stagnant waters, N. Carolina in the low country and S. Illinois<sup>1</sup> to Florida and Texas. (Cuba?)

2. **BRASÉNIA**, Schreb. **WATER-SHIELD**. (Unexplained, perhaps named for some obscure botanist.) — Gen. no. 938; Nutt. Gen. ii. 23; Gray, Gen. III. i. 95, t. 39. *Hydropeltis*, Michx. Fl. i. 323, t. 29; Rich. Ann. Mus. xvii. 230; DC. Syst. ii. 37. — Single species, of wonderful distribution.

**B.\* Schrëberi**, GMEL. Leaves alternate, submersed (if any) unknown; floating ones oval, centrally peltate, entire (1 to 4 inches long): flowers dull and dark purple: stems, peduncles, &c. coated with a transparent jelly. — Syst. Veg. i. 853; Hook. f. & Jackson, Ind. Kew. i. 333. *B. peltata*, Pursh, Fl. ii. 389; Torr. & Gray, Fl. i. 55; Gray, l. c. 96, t. 39, and in ms. of present work. The change to Gmelin's earlier name, evidently overlooked by Dr. Gray, is in entire accord with his own practice. *B. Hydropeltis*, Muhl. Cat. 55; Raf. Med. Fl. i. 90, f. 17. *B. nymphoides*, Baill. Hist. Pl. iii. 82.<sup>2</sup> *Menyanthes peltata*, Thunb. Nov. Act. Ups. vii. 142, t. 4. *M. nymphoides*, Thunb. Fl. Jap. 82. *Hydropeltis purpurea*, Michx. l. c. 324; Sims, Bot. Mag. t. 1147; DC. l. c. 38. *H. pulla*, Salisb. Ann. Bot. ii. 74. *Villarsia peltata*, Rœm. & Schult. Syst. iv. 178. *Limnanthemum peltatum*, Griseb. Gent. 348, & in DC. Prodr. ix. 141. *Cabomba peltata*, F. Muell. Pl. Vict. 15. — In still water, Nova Scotia and Canada, along the Great Lakes to Minnesota and south to Texas; also Brit. Columbia to California; fl. summer. (Mex. & Cuba, Japan to Khasia, E. Australia, W. Trop. Africa.)

3. **NELÚMBO**, Tourn., Adans. (Ceylonese name of the E. Indian species, the SACRED BEAN.) — Perennial by slender creeping rootstocks, some internodes of which enlarge into a farinaceous propagating tuber with only a terminal bud, sending up very large orbicular and centrally peltate entire leaves on long and stout petioles, the upper face concave, and a scape bearing a very large flower: seed and tubers edible. — Tourn. Inst. i. 261; Adans. Fam. ii. 76; Gærtn. Fruct. i. 73, t. 19; Casp. in Miq. Ann. Mus. Bot. Lugd.-Bat. ii. 242, & Fl. Bras. iv. pt. 2, 134. *Nelumbium*, Juss. Gen. 68; Turp. Ann. Mus. Par. vii. 210, t. 11; Rich. *ibid.* xvii. 249, t. 5; DC., Endl., Benth. & Hook. (all freely adopting *Negundo*). *Cyamus*, Salisb. Ann. Bot. ii. 75. — Two species, the Asiatic *N. nuceifera*, Gærtn., with white or rose-colored flowers and

<sup>1</sup> Dunklin Co., Missouri, *Bush*.

<sup>2</sup> Add syn. *B. purpurea*, Casp. in Engl. & Prantl. Nat. Pflanzenf. iii. Ab. 2, 6.

**N. lútea**, PERS. (WATER CHINQUAPIN, WANKAPIN.) Petals pale or dingy yellow, obtuse: anther-tip linear-clavate: peduncles minutely or obscurely muriculate and petioles little more so: leaves usually raised high out of water, a foot or two in diameter, on petiole 2 to 6 feet long. — Syn. ii. 92; Casp. l. c. 134; Baill. Hist. Pl. iii. 79, f. 79-81.<sup>1</sup> *Nelumbium luteum*, Willd. Spec. ii. 1259; Michx. Fl. i. 317; DC. Syst. ii. 46; Torr. & Gray, Fl. i. 56; Hook. Bot. Mag. t. 3753; Gray, Gen. III. i. 98, t. 40, 41. *N. Jamaicense*, DC. Syst. ii. 47. *N. speciosum*, Ait. f. Kew. ed. 2, iii. 332, in part. *N. pentapetalum*, Willd. l. c.; DC. l. c. 47. *N. codophyllum*, Raf. Fl. Lud. 22; DC. l. c. *Nymphaea Nelumbo*, var., L. Spec. i. 511. *N. Nelumbo* & *N. pentapetala*, Walt. Car. 155, and even also *N. reniformis*, as to the fruit, therefore *Nelumbium reniforme*, Willd. and *Cyamus reniformis*, Pursh. *Cyamus flavicomus*, Salisb. l. c.; Pursh, Fl. ii. 398, with *C. pentapetalus*. *Cyamus luteus*, Barton, Fl. Philad. ii. 26, & Fl. N. Am. ii. 77, t. 63. — In shallow or rather deep water, S. Connecticut<sup>2</sup> (probably of Indian introduction), New Jersey, Big Sodus Bay, L. Ontario, and Michigan to Minnesota, south to Florida and Texas; fl. summer. (W. Ind., E. S. Am.)<sup>3</sup>

**4. NYMPHÆA**, Tourn. WATER-LILY. (The classical name, dedicated to the water nymphs.) — Thick prostrate and creeping or tuberous rootstocks, sending up long petioles and scapes; the rounded leaves with deep sinus at base. Flowers showy, mostly fragrant, and opening at or before dawn day after day, closing toward evening, commonly produced all summer; the fruit maturing under water. — Inst. 260, t. 137, 138; L. Gen. no. 421; Smith, Prodr. Fl. Græc. i. 360, &c. *Castalia*, Salisb. Parad. Lond. 14, & Ann. Bot. ii. 71.<sup>4</sup>

§ 1. Carpels uncombined, except dorsally with the common parietes of the compound pistil, and ventrally with the axis. — § *Lytoptleura*, Casp.

**N. ampla**, DC. Rootstocks short and tuberiferous: leaves of orbicular or round oval outline, acutely dentate, thickish, very prominently costate and reticulate-veiny underneath: petals white, lanceolate-oblong, 2 or 3 inches long: connective of anthers prolonged into a linear tip: fruit much depressed; seeds very small, subglobose (half line long). — Syst. ii. 54 (mainly); Hook. Bot. Mag. t. 4469; Gray, Pl. Wright. i. 7; Casp. l. c. 156, t. 28-30.<sup>5</sup> — Southern borders of Texas, Wright. (Adj. Mex. and W. Ind. to Brasil.)

§ 2. Carpels combined throughout into a many-celled compound ovary. — § *Symphytoptleura*, Casp.

\* Flowers tinged with blue or violet: connective of the outer anthers produced into an oblong appendage.

**N. elegans**, Hook. Petioles and scapes slender, from a short rootstock: leaves entire or barely repand (3 to 6 inches long) of broadly oval or roundish outline with very narrow sagittiform sinus and basal terminations slightly or not at all pointed: petals ovate-lanceolate, hardly inch and a half long: stamens apparently in phalanges (Hook.): stigmatic rays about 15, the radiate appendages very short. — Bot. Mag. t. 4604, not Hemsl. Biol. Cent. Am. Bot. for the plant of Bourgeau must be *N. Mexicana*, Zucc. *N. Mexicana*? Gray, Pl. Wright. i. 7, not Zucc.<sup>6</sup> — W. Texas, in a pond near the head of the Leona, Wright.<sup>7</sup> (Monterey, Mex., Berlandier?)

<sup>1</sup> Also Gray, Bull. Torr. Club, xiv. 228.

<sup>2</sup> Since reported from Osterville, Mass., W. G. Farlow, Bull. Torr. Club, xii. 40.

<sup>3</sup> The oriental *N. NUCIFERA*, Gaertn., with white or pink flowers, has not infrequently been planted for ornament, and is established in certain localities in New Jersey. See Sturtevant, Gard. & For. ii. 172, 173.

<sup>4</sup> For full generic synonymy according to strict priority see Greene, Bull. Torr. Club, xiv. 257, xv. 84, and Britten, Jour. Bot. xxvi. 6. The names here retained, however, are those established by long usage, confirmed by recent publications by the Kew botanists and by Prof. Caspary in Engl. & Prantl. Nat. Pflanzenf. iii. Ab. 2, 1-10.

<sup>5</sup> Add syn. *Castalia ampla*, Salisb. Ann. Bot. ii. 73.

<sup>6</sup> Add syn. *Castalia elegans*, Greene, l. c. 85.

<sup>7</sup> Rediscovered near Waco, Texas, by Misses Trimble & Wright, 1888; see Sterns, Bull. Torr. Club, xv. 13; also collected in same year near Brownsville by C. G. Pringle.

- \* \* Flowers white varying sometimes to rose-color; the centre commonly pale yellow: anthers inappendiculate; pollen minutely echinulate: prostrate rootstocks elongated and cylindrical: no stolons: leaves entire, obscurely if at all peltate, generally orbicular with narrow or more open sinus.

**N.\* tetrágona**, GEORGI. Rootstock short, vertical or nearly so, woolly with dark hairs: leaves oval, with deep but rather open sinus, acutish lobes, and entire margin, usually small,  $1\frac{1}{2}$  to 3 (rarely 6 to 8) inches long, two thirds as broad: flowers  $1\frac{1}{2}$  to  $2\frac{1}{2}$  inches in diameter: sepals green outside, oblong lanceolate, often acutish, 1 inch long: petals 8 or 10, white, or faintly marked with purple, a little shorter than the sepals: stamens 3-4-seriate: carpels about 7; the free tips of the stigmas short and blunt. — Reise Russ. Reiche, i. 220. *N. pygmæa*, Ait. f. Kew. ed. 2, iii. 293; Sims, Bot. Mag. t. 1525. *Castalia tetrágona*, Lawson, Trans. Roy. Soc. Canad. vi. Sec. 4, 112; Morong, Mem. Torr. Club, v. 154? *C. Leibergi* (*N. Leibergi*), Morong, Bot. Gaz. xiii. 124, t. 7, as to flower only, the leaves being evidently those of a *Nuphar*. — Ponds, Kootenai Co., N. Idaho, *Leiberg*; also (acc. to Britton, Trans. N. Y. Acad. ix. 6) in Severn Riv., Keewatin, Canada, *J. M. Macoun*, and Misinaibi Riv., Ontario, *R. Bell*. (Siberia to India.)

**N. odoráta**, AIT.<sup>1</sup> Rootstock with sparing and persistent branches: leaves floating, commonly reddish beneath, rarely over 6 or 8 inches in diameter: flowers deliciously fragrant: sepals dull green tinged with purple: petals pure white with sulphur-yellow centre, or not rarely tinged with rose, rarely bright rose-color, oval to oblong-lanceolate,  $1\frac{1}{2}$  to  $2\frac{1}{2}$  inches long: seeds oblong, 1 to  $1\frac{1}{2}$  lines long, stipitate in the arillus. — Kew. ii. 227; <sup>2</sup> Willd. Hort. Berol. t. 39; Andr. Bot. Rep. v. t. 297; Sims, Bot. Mag. t. 819; Gray, Gen. III. i. 102, t. 42, 43; Sprague & Goodale, Wild Flowers, 161, t. 38. *N. alba*, Walt. Car. 155; Michx. Fl. i. 311. *Castalia pudica*, Salisb. Parad. Lond. 14, & Ann. Bot. ii. 72. — In still water, Newfoundland to Winnipeg, and south to Florida and Texas. (Cuba.)

**Var. mínor**, SIMS. Leaves only 2 or 3 inches in diameter and often crimson beneath; petioles and peduncles either glabrous or villous: sepals and petals an inch or two long, varying from pure white to light rose or even bright pink. — Bot. Mag. t. 1652; Torr. & Gray, Fl. i. 57. *N. odorata*, var. *rosea*, Pursh, Fl. ii. 369; Hook. f. Bot. Mag. t. 6708. *N. rosea*, Raf. Meil. Fl. ii. 45. — Shallow water, same range as the larger-flowered, passing freely into it, also from pure white to pale yellow or deep pink-rose.

**N. renifórmis**, DC. Propagating by easily detached oblong tuber-like branches of the rootstock: leaves in shallow water emersed and ascending or erect, rarely purplish beneath, more prominently and copiously ribbed and veiny, the larger a foot or more in diameter: flowers odorless or slightly scented: sepals green outside, rather dull white within, never rose-tinged: petals elongated-oblong, 2 or 3 inches long: fruit more depressed: seeds globular-ovoid,  $1\frac{1}{2}$  lines in diameter, not stipitate in the arillus. — Syst. ii. 55; Deless. Ic. Sel. ii. t. 5, not Walt. *N. tuberosa*, Paine, Cat. Pl. Oneida, 132; Gray, Man. ed. 5, 56; Garden, xxi. 130, t. 325. *N. alba*, Nutt. Gen. ii. 13; Graham, Edin. New Phil. Journ. i. 386, var. *Canadensis*?<sup>3</sup> — Still and slow-flowing waters, New York and Canada<sup>4</sup> along the Great Lakes, to Minnesota, Illinois, and probably in the S. Atlantic States.

- \* \* \* Flowers yellow: anthers inappendiculate or nearly so; pollen smooth: rootstocks short, roughened with salient pulvini of fallen leaves, sending off from apex along with leaves and blossoms elongated naked stolons.

**N. fláva**, LEITNER. Leaves of broadly oval outline and with narrow or closed sinus, 3 to 8 inches long, commonly crimson-purple beneath; margin somewhat undulate or repand and

<sup>1</sup> A noteworthy form of this plant, or perhaps distinct species, has recently been discovered at Eustis, Florida, by G. V. Nash. The leaves are a foot or two in diameter with strongly upturned margins; flowers white, said to be odorless. This form has been confidently identified with *N. reniformis*, Walt., by the collector, Bull. Torr. Club, xxii. 147, a disposition in no sense warranted by the brief and wholly dubious characterization of Walter's species.

<sup>2</sup> Excl. Siberian plant of Gmelin, which is *N. tetrágona*, Georgi. Add syn. *Castalia odorata*, Woodv. & Wood in Rees, Cycl. vi. no. 1.

<sup>3</sup> Add syn. *Castalia tuberosa*, Greene, l. c. 84.

<sup>4</sup> Also at Ferrisburgh, Vermont, *Brainerd*; and reported from near Trenton, N. J., *Abbott*, and Meadville, Penn. (see Gard. & For. i. 368, f. 58, 59, & vi. 415, f. 62); also near Little Rock, Arkansas, *Coville*.

basal lobes not pointed: petals bright light yellow, lanceolate,  $1\frac{1}{2}$  to 2 inches long. — Leitner in Audubon, Birds Am. t. 411, with some wrong foliage; Chapm. Fl. ed. 2, 604; Hook. f. Bot. Mag. t. 6917.<sup>1</sup> — Creeks and rivers of E. Florida, first coll. by *Leitner*, rediscovered by *Palmer*, *Mrs. Treat*, *Dr. Garber*. Perhaps also Cedar Bayou, Harris Co., Texas, in brackish water. *Dr. Joor*, with "pale straw-color" blossom, but specimen insufficient.<sup>2</sup> (Perhaps also *N. tussilagifolia*, Lehm. Ind. Sem. Hort. Hamb. 1853, 10, & Ann. Sci. Nat. ser. 4, i. 326, coll. in Mexico by *Andrieux*, &c.)

**5. NÚPHAR**, Smith. SPATTER-DOCK, YELLOW POND-LILY. (Said to be of Arabic origin and mentioned by Dioscorides under *Nymphæa*.) — Perennials of northern hemisphere and extra-tropical, with cylindrical creeping rootstocks of the White Water-Lilies, subterrestrial and aquatic: calyx more showy than corolla, at least the upper face of the sepals being bright yellow; fl. summer. — Prodr. Fl. Græc. i. 361; DC. Syst. ii. 59. *Nymphæa*, Boerh. Hist. Pl. Lugd.-Bat. 363; Salisb. Ann. Bot. ii. 71. *Nymphosanthus*, Rich. Analyse du Fruit, 68, & Ann. Mus. Par. xvii. 230, t. 5. *Ropalon*, Raf. New Fl. Am. ii. 17. [By B. L. ROBINSON.]

\* Leaves oval; sinus fully one fourth to nearly half the length of the blade.

+ Anther-cells usually nearly or quite as long as the filaments or exceeding them: stigmatic disk 4 or 5 lines to nearly an inch in diameter, undulate margined, 12-22-rayed.

**N. polysépalum**, ENGELM. Very robust: petioles stout; thin submersed leaves none or at least not seen; floating leaves large, 8 to 12 inches long, 6 to 9 inches broad, with narrow or closed sinus and very broad rounded basal lobes: the subglobose cup-shaped calyx 3 inches in diameter, when fully expanded even 4 or 5 inches broad; sepals 9 to 12, yellow or with a reddish tinge in age: petals 12 to 18, obovate, cuneate, truncate, half inch long, two thirds as broad: stamens very numerous, red, recurved in age; pollen yellow: fruit subglobose,  $1\frac{1}{2}$  inches in diameter, with short stout definitely constricted neck and convex umbonate 15-24-rayed stigmatic disk. — Trans. Acad. St. Louis, ii. 282, & Bot. Works, 472; Torr. Bot. Wilkes Exp. 220; Porter & Coulter, Fl. Col. 5. *N. advena*, Benth. Pl. Hartw. 296; Newberry, Pacif. R. Rep. vi. 67, not Ait. f. *Nymphæa polysepala*, Greene, Bull. Torr. Club, xv. 84. ? *N. advena*, Greene, Fl. Francis. 288. — Colorado to Central California and northwestward to Alaska, especially in alpine ponds of mountain valleys. The farinaceous seeds are an important source of food to certain Indian tribes. Here appears to belong the *N. W. American N. luteum* of authors (Bong. Veg. Sitch. 124; Ledeb. Fl. Ress. i. 84; Rothr. Fl. Alask. 442; &c.), not Smith. Var. *pictum*, Engelm. l. c., is a form with more highly colored flowers, having sepals margined with reddish brown and petals deep red with yellow tips and bases. — Colorado, *Parry*, and probably elsewhere with the duller more yellow-flowered form. A form with smaller flowers (2 to 3 inches in diameter), in habit approaching the following, but with the characteristic dark red anthers of the western species, has been collected in Lake County, Calif., *Blankinship*.

**N. ádvena**, AIT. f. Stout but smaller in all parts than the preceding: rhizome horizontal, thick: petioles usually  $\frac{1}{3}$  to  $\frac{1}{2}$  inch in diameter: thin submersed leaves present in seedlings, but in the mature plant rare or none; floating leaves broadly oval, often pubescent below; sinus usually open; basal lobes very obtuse, sometimes rounded but usually more or less triangular in outline: subglobose flowers  $1\frac{1}{2}$  inches in diameter, when fully expanded 2 to 3 inches broad: outer sepals greenish; the inner commonly dull yellow: petals oblanceolate-oblong, truncate, gradually narrowed toward the base: stamens in 5 or 6 series, recurved with age, yellow: disk pale red, yellow, or green, subentire or undulate-margined; stig-

<sup>1</sup> Add syn. *Castalia flava*, Greene, l. c. 85.

<sup>2</sup> Specimens subsequently collected by *Nealley* at Rio Grande City, Texas, and by *Pringle* near Brownsville, no. 1956, as well as specimens of *Bourgeau* and of *Pringle* from Mexico, agreeing well with the Florida plant, may be referred to this species, as by Coulter, Contrib. U. S. Nat. Herb. i. 30. Also *Castalia Mexicana*, Coulter, l. c. ii. 12, apparently not *Nymphæa Mexicana* of Zuccarini, which should have white flowers.

matic rays 12 to 22, usually not attaining the edge of the disk; fruit ovate, with thick more or less costate scarcely constricted neck. — Kew. ed. 2, iii. 295; Pursh, Fl. ii. 369; Gray, Gen. III. i. 104, t. 44; Meehan's Monthly, i. 17, 18, t. 2. *N. lutea*, Pursh, l. c.; DC. Syst. ii. 60, as to Amer. plant; ? Hook. Fl. Bor.-Am. i. 32; Torr. & Gray, Fl. i. 57, excl. var. and (?) Alaskan plant. *N. Americanum*, Provancher, Fl. Canad. i. 28. *Nymphæa lutea*, Walt. Car. 154. *N. advena*, Ait. Kew. ii. 226; Willd. Hort. Berol. t. 38; Sims, Bot. Mag. t. 684. *N. arifolia*, Salisb. Ann. Bot. ii. 71. — Labrador to Florida, Texas, Wyoming, and doubtfully to California; common throughout the Eastern and Middle States, much rarer if present upon the Pacific Slope. (Cuba.) Var. *VARIEGATUM*, Engelm. (in Gray, Man. ed. 5, 57) is a frequent form with sepals a brighter yellow toward the edges, and some at least red-purple or maroon toward the base within; the sinus of the leaf commonly narrow or closed. — Growing with the duller flowered type, but in some places the commoner or only form.

**Var. mínus**, MORONG. Similar in general aspect: leaves and flowers smaller; petioles and peduncles more flaccid; a few thin submersed leaves commonly present: stigmatic disk smaller, bright red (occasionally green or yellow), 9–12-rayed, rather deeply crenate, only 3 to 4 lines in diameter; ovary and fruit somewhat smaller and with a strongly constricted neck. — The var. (?) *minor*, Morong (Bot. Gaz. xi. 167), as taken by Wats. & Coulter in Gray, Man. ed. 6, 56, to include *N. rubrodiscum*, Morong, l. c., which cannot be satisfactorily distinguished from Dr. Morong's type of his var. *minor*. *N. luteum*, Gray, Man. 24, excl. var., and not of Smith. *N. advena* × *Kalmiana*, Casp. in Macoun, Cat. Canad. Pl. 32. *N. Fletcheri*, Lawson, l. c. 119. *Nymphæa rubrodisca*, Greene, Bull. Torr. Club, xv. 84. — An exact intermediate between *N. advena* and the following species, and, with little doubt, of hybrid origin, frequently associated with the parent plants in Lower Canada, Ontario, and the Northern States, westward at least to Minnesota, growing in shallower water than *N. advena*, and often showing imperfect pollen as though only partially fertile; in other localities, however, as in Lake Champlain, appearing (acc. to Dr. Morong) thoroughly independent and fertile; so that it may be best regarded as a perpetuated or established hybrid. Intergradation (probably rehybridization) with the parent stocks, especially toward *N. advena*, makes specific distinction undesirable. Frequent and very similar hybrids between *N. minimum* and *N. luteum* have been repeatedly noticed in Europe by Caspary and others. + — Anther-cells (at maturity) only a third as long as the filaments: stigmatic disk small, 2 to 3 lines in diameter, about 8-rayed.

**N. mínimum**, SMITH. Rootstock horizontal, slender, enveloped at the end by the sheathing membranous expanded bases of the slender flaccid petioles: floating leaves  $1\frac{1}{2}$ –3 (–4) inches long, usually pubescent beneath; the sinus reaching almost to the middle of the leaf; submersed leaves freely produced, suborbicular, very delicate, membranaceous and translucent; sinus more open: sepals about 5, suborbicular, 6 to 8 lines in diameter, yellow: petals obovate-cuneate, 2 lines long, half as broad: stigmatic disk distinctly lobed, deep red or (at least in the European form) green; stigmatic rays yellow; fruit ovoid, 6 to 8 lines in diameter, with short slender neck. — Eng. Bot. xxxii., description of t. 2292; Hook. f. & Jacks. Ind. Kew. ii. 320. *N. pumilum*, DC. Syst. ii. 61; Smith, l. c. on plate; Casp. in Miq. Ann. Mus. Lugd.-Bat. ii. 256; Wats. Bibl. Index, 37. *N. Kalmiana*, Ait. f. Kew. ed. 2, iii. 295; Pursh, Fl. ii. 369. *N. lutea*, var. *Kalmiana*, Torr. & Gray, Fl. i. 58. *N. luteum*, var. *pumilum*, Gray, Man. ed. 5, 57. *Nymphæa microphylla*, Pers. Syn. ii. 63. *N. Kalmiana*, Sims, Bot. Mag. t. 1243. — Ponds from Newfoundland to the Saskatchewan, southward to Pennsylvania. (Eu.)

\* \* Leaves elongated-oblong, sagittate; the blade 6 to 10 times as long as the sinus: flowers small, an inch to inch and a third in diameter when open: southern Atlantic species.

**N. sagittæfólium**, PURSH. Rhizome apparently horizontal, or oblique, sending off stout roots: petioles long and rather slender: leaves thin and relatively much narrower than in any of the other American species; the floating ones narrowly elliptic-oblong, 7 to 12 inches in length,  $1\frac{1}{2}$  to  $2\frac{1}{2}$  inches broad; the submersed considerably larger, delicately membranaceous: sepals about 6 or 7; the outer green; the inner petaloid at least near the edges: petals spatulate, truncate, thickish (said sometimes to be completely transformed into stamens): stamens in 4 to 6 rows; anthers fully as long as the flat filaments: disk 4 to 6 lines in

diameter; margin repand; stigmatic rays 11 to 14: fruit depressed-ovate, 7 or 8 lines in diameter, costate and moderately constricted beneath the disk; seeds pale yellowish brown,  $1\frac{1}{4}$  lines in diameter. — Fl. ii. 370; DC. Syst. ii. 62; Ell. Sk. ii. 8. *N. sagittifolium*, Morong, Bot. Gaz. xi. 169. *N. longifolia*, Smith in Rees, Cycl. no. 5. *Nymphaea sagittifolia*, Walt. Car. 155. *N. sagittata*, Pers. Syn. ii. 63. *N. longifolia*, Michx. Fl. i. 312. — In stagnant pools of the low lands, North Carolina to Georgia and (acc. to Morong) Florida; also in S. Indiana and Illinois, *Schneck* (fide Watson & Coulter).

## ORDER VII. SARRACENIACEÆ.

By A. GRAY.

Acaulescent perennial bog-plants, with colorless inert juice, and leaves transformed into more or less colored secretive pitchers or tubes (in which insects are collected); the flowers hermaphrodite, hypogynous, polyandrous; sepals and petals each 5 and imbricated in the bud; anthers fixed by the middle and introrse; pistil compound, 3–5-celled, with many-ovuled placentæ in the axis; fruit a loculicidal capsule; seed anatropous, with a small embryo at the base of fleshy albumen. Flowers comparatively large, nodding. True affinity of the order undetermined. Consists of a monotypic apetalous and tricarpeal genus found on a single mountain in Eastern S. America, and of the following.

1. **SARRACENIA.** Bractlets 3 under the calyx. Sepals coriaceous, persistent. Petals panduriform, at first connivent-incurved and imbricated over the stamens and pistil, in age becoming deciduous. Ovary globular and 5-lobed, the lobes alternate with the petals: style bearing 5-angled 5-rayed umbrella, the tips of the slender rays projecting from the notched angles, recurved and introrsely stigmatose. Capsule densely verrucose, loculicidal, but the five valves cohering by the partitions with the axis. Seeds with a close and firm reticulate coat and broad raphe.
2. **DARLINGTONIA.** Sepals membranaceous and somewhat herbaceous, lax, marcescent. Petals shorter, somewhat convergent, oblong-ovate, with a contraction above the middle and the apical portion concave, marcescent. Stamens 12 to 20, short. Ovary somewhat turbinate with depressed or umbilicate broad summit, the cells opposite the petals: style short, 5-cleft; its short and thick branches radiate-spreading: stigma broad and terminal. Capsule oblong, smooth, 5-valved, the valves septiferous: base of the columella naked. Seeds clavate or turbinate, densely beset with short stiff bristles. Scape bracteate.

1. **SARRACÉNIA, Tourn.** PITCHER-PLANT, SIDE-SADDLE FLOWER, TRUMPETS. (*Dr. Sarrazin* of Quebec, who about the year 1730 sent our northern species and an account of it to Tournefort.) — Scape naked and one-flowered with the cluster of radical leaves from a short horizontal rootstock; the pitchers trumpet-shaped with a ventral wing or salient margin and an arching hood (the lamina) at apex, some earlier leaves phyllodia-like, destitute of pitcher, all yellowish green or purplish, or purple-veined. Petals purple or yellow. Fl. early summer or southward in spring. Species all strictly Atlantic N. American. — Inst. 657, t. 476, & L. Gen. ed. 1–5, as *Sarracena*; L. Spec. i. 510, & Gen. ed. 6, no. 652; Mill. Ic. t. 241; Croom, Ann. Lyc. N. Y. iv. 98; A. DC. Prodr. xvii. 3. *Coilophyllum*, Morison, Pl. Oxon. iii. 533. For account of the relation of the pitchers to insects and references to the literature, see Goodale, Physiol. Bot. 347–353. Sweet alluring secretion at some time more or less manifest at

the orifice of the pitcher in all the species. — Hybrids and varieties of cultivation unnoticed.

\* Petals brown-red or maroon (rarely varying to greenish yellow), little accrescent after anthesis.

+ Leaves short, with ventral wing broad, commonly semi-ovate, in some later-grown leaves even wider than the pitcher: sepals coriaceous and mostly dark colored.

**S. purpurea**, L. (SIDE-SADDLE FLOWER, HUNTSMAN'S CUP, &c.) Leaves ascending; pitcher gibbous-ovate, with open orifice; hood erect, round-cordate, concave, the inner face strongly retrorse-hispid and reticulated with broad purple veins: petals 2 inches long. — Spec. i. 510 (Catesb. Car. ii. t. 70); Lam. Ill. t. 452; Michx. Fl. i. 310; Sims, Bot. Mag. t. 849; Lodd. Bot. Cab. t. 308; Croom, Ann. Lyc. N. Y. iv. 98; Torr. & Gray, Fl. i. 59.<sup>1</sup> *S. heterophylla*, Eaton, Man. ed. 4, 445 (*S. purpurea*, var. *heterophylla*, Torr. Compend. 217, & Fl. N. Y. i. 41, t. 6), an occasional form with greener foliage and yellowish green flower. Var. *alata*, Wood, Bot. & Fl. 30, refers to the phyllodial wing, which in certain leaves of most plants is wider than the diminished pitcher. — Sphagnous bogs, Newfoundland and S. Labrador to Bear Lake and south to Florida and Alabama, but southward mainly east of the Alleghanies. A remarkable range in latitude and climate. A monstrosity coll. by I. Sprague has the umbrella of the style deeply 5-parted into linear divisions!

**S. psittacina**, MICHX. Leaves reclined in a rosulate tuft; pitcher narrow, of clavate outline, 2 to 5 inches long, densely and retrorsely long-hirsute within; hood strongly incurved over the contracted orifice, globose-inflated, dorsally white-variegated and commonly purplish-tinged: petals inch and a half long. — Fl. i. 311; Pursh, Fl. ii. 368; Croom, l. c. 101; Torr. & Gray, l. c.; Masters, Gard. Chron. 1866, 1218, fig., & 1881, pt. 1, 817, fig.; A. DC. l. c. 4.<sup>2</sup> *S. calceolata*, Nutt. Trans. Am. Phil. Soc. ser. 2, iv. 49, t. 1. *S. pulchella*, Croom, Am. Jour. Sci. xxv. 75, & xxviii. 167. — Pine-barren swamps, from near Augusta, Georgia, to Apalachicola, Florida, and S. Alabama.

+ + Leaves erect with long and narrow or trumpet-shaped open-mouthed tube and soon ascending or erect hood; the wing a narrow margin or in the phyllodial leaves (with reduced abortive tube) linear-lanceolate.

**S. rubra**, WALT. Leaves slender, the larger a foot or more long, wholly green with reddish veins above; hood ovate, varying from obtuse to acuminate, usually inflexed when young, at length erect and merely concave, reddish or red-veined and variegated; retrorse pubescent of inner face minute: petals inch or so long. — Car. 152; Ell. Sk. ii. 10; Croom, Ann. Lyc. N. Y. iv. 99; Hook. Exot. Fl. i. t. 13 (excl. syn.), & Bot. Mag. t. 3515; Lodd. Bot. Cab. t. 1163; Torr. & Gray, l. c.; Planchon, Fl. Serres, x. t. 1074.<sup>3</sup> *S. minor*, Sweet, Brit. Fl. Gard. ser. 2, t. 138, with only earlier small leaves. *S. rubra* & *S. Sweetii*, A. DC. l. c. 5. *S. Gronovii*, var. *rubra*, Wood, Class-Book, ed. of 1861, 222. — Swamps, N. Carolina to Georgia and Alabama, in the middle country and toward the mountains.<sup>4</sup>

**S. Drummondii**, CROOM. Leaves ampler (from less than a foot to a yard high), with orifice an inch or two in diameter; hood roundish with contracted base, soon erect and flattish or with recurved margins, retrorsely hispid on the inner face, and with the whole summit of the pitcher highly variegated with red-purple reticulation on a white semitransparent ground; the wing extremely narrow: plane phyllodial leaves sometimes 2 feet long: petals 2 inches long. — Ann. Lyc. N. Y. iv. 100, t. 1; Torr. & Gray, l. c.; Planchon, Fl. Serres, x. 239, t. 1071, 1072.<sup>5</sup> *S. Drummondii* & *S. undulata*, Desne, Rev. Hort. ser. 4, i. (1852) 126, & Fl. Serres, vii. 267, 268; A. DC. l. c., the latter a mere form or stage with erect and undulate hood, well marked in leaves of original specimens. (*S. leucophylla*, Raf. Fl. Lud. is essentially fictitious.) *S. Gronovii*, var. *Drummondii*, Wood, l. c. — Pine-barren

<sup>1</sup> Meehan's Monthly, i. 86, t. 6.

<sup>2</sup> Meehan, Native Flowers, ser. 2, i. 21, t. 5.

<sup>3</sup> Meehan, l. c. 37, t. 9.

<sup>4</sup> Natural hybrids apparently of *S. rubra* and *S. purpurea* have been noted, very similar to those of cultivation.

<sup>5</sup> Meehan, l. c. 5, t. 1.



swamps, S. W. Georgia and adjacent Florida, at Apalachicola, &c., first made known from foliage coll. by *Drummond* and flowers by *Chapman*.

\* \* Petals and whole flower yellow: leaves with elongated pitchers or tubes, in *S. States* called TRUMPETS or TRUMPET-LEAF, and the flowers WATCHES!

**S. varioláris**, MICHX. Leaves 3 to 14 (rarely 20) inches high; the tube narrowly or rather broadly winged, dorsally reticulate-variegated at and below the summit with green and purplish veining on a yellowish white translucent ground; the ovate fornicate hood inflexed over the wide open orifice, puberulent and purple-veiny within; mouth of the tube and edge of the wing for a time bedewed with a sweet alluring secretion: phyllodial leaves seemingly hardly any: petals an inch or more long, little accrescent after anthesis. — Fl. i. 310; Sims, Bot. Mag. t. 1710; Ell. Sk. ii. 11; Lodd. Bot. Cab. t. 803; Croom, l. c. 102; Torr. & Gray, l. c.; Mellichamp, Nature, x. 253; A. DC. l. c. 6.<sup>1</sup> ? *S. minor*, Walt. Car. 153. *S. adunca*, Smith, Exot. Bot. i. 103, t. 53; Macbride, Trans. Linn. Soc. xii. 48. — Low pine-barrens, N. Carolina to Florida in the low country.<sup>2</sup>

**S. fláva**, L. Narrowly trumpet-shaped leaves about 2 feet long; pitcher bordered with very narrow wing, yellowish green, unspotted; hood ovate and soon erect, with (often reddish) base contracted or recurved at sides, hispidulous-puberulent within, commonly with purple reticulated veinlets; autumnal phyllodial leaves oblong or lanceolate and falcate, a span or two long; petals at first inch and a half long, becoming pendulous, elongating to 2½ or 3 inches. — Spec. i. 510; Walt. Car. 153; Michx. l. c.; Andr. Bot. Rep. t. 381; Sims, Bot. Mag. t. 780; Lodd. Bot. Cab. t. 1957; Ell. Sk. ii. 10; Croom, l. c. 103; Torr. & Gray, l. c.; Planchon, l. c. t. 1068; A. DC. l. c.<sup>3</sup> *S. Catesbaei*, Ell. Sk. ii. 11, greener form. *S. Gronovii*, Wood, l. c. — Wet meadows and swamps, North Carolina to Florida; fl. spring and early summer.

**2. DARLINGTONIA**, Torr. (*Dr. Wm. Darlington* of Pennsylvania, author of *Flora Cestrica*, &c.) — Smiths. Contrib. vi. 4, t. 12, Bot. Wilkes Exped. 221, & Bull. Torr. Club, ii. 14; Gray, Am. Jour. Sci. ser. 2, xvi. 425, xxxv. 136; Benth. & Hook. Gen. i. 48; Planchon, Fl. Serres, xiv. 125, t. 1440; Hook. f. Bot. Mag. t. 5920; A. DC. Prodr. xvii. 2; Brew. & Wats. Bot. Calif. i. 17. — Single species.

**D. Californica**, Torr. ll. cc. Rootstock elongated and creeping, rough-scaly: leaves (a span to 2 feet long) greenish yellow, of nervose tubes gradually enlarging upward and with dilated and inflated-saccate externally white-variegated incurved summit, so that the contracted orifice looks downward, its proper apex bearing a conspicuous divergently bifid pendulous appendage resembling a fish-tail and generally reddish or yellowish; the whole leaf twisted half round, the orifice becoming averse from the scape. ventral wing a narrow border: scape bearing several greenish and membranaceous alternate bracts, nodding at apex, greenish, at length 2 inches long: petals greenish yellow and reddish brown or purple. — Mountain bogs of the Sierra Nevada, California, at 1,000 to 6,000 feet, from Truckee Pass to Shasta Co. (where first coll. without flowers, by *Pickering* and *Brackenridge*); also within the borders of Oregon, Waldo Co., *Howell*; fl. spring. Areolation of the inflated hooded summit of the leaf translucent: appendage within beset with retrorse bristly hairs, and along its margins producing a sweet alluring secretion, which sometimes extends downward on the edge of the wing, as discovered by *Mrs. R. M. Austin*. For details of mode of capturing insects, see Canby, Proc. Am. Ass. Sci. 1874, pt. 2, 64, and abstract in Brew. & Wats. l. c. 18.

<sup>1</sup> Meehan's Monthly, iv. 1, t. 1.

<sup>2</sup> Some striking variations are noted by Miss Mary F. Peirce, Bull. Torr. Club, xiv. 229.

<sup>3</sup> Meehan's Monthly, ii. 113, t. 8.

## ORDER VIII. PAPAVERACEÆ.

By A. GRAY; the genus *Arctomecon* by B. L. ROBINSON.

Mostly colored-juiced herbs, with mostly alternate leaves, no stipules, and narcotic or acid qualities; flowers hermaphrodite, hypogynous, polyandrous, dimerous or sometimes trimerous i. e. sepals 2, rarely 3, and caducous, petals double to quadruple (or even sextuple) that number and commonly very deciduous; the ranks imbricated in the bud; pistil of 2 to many carpels combined to form a one-celled ovary with parietal placentæ. Filaments filiform, or rarely dilated, distinct: anthers innate. Ovules anatropous, numerous. Fruit capsular. Seeds with small or minute embryo at base of fleshy and oily albumen.—Several genera have more or less colorless juice. *Dendromecon* is shrubby. *Platystemon* has carpels in flower partly and in fruit becoming wholly distinct. *Glaucium* has a falsely 2-celled ovary, and the placentæ in Poppy, &c., may meet in the axis. *Eschscholtzia*, besides its calyprate calyx, has a cupulate-dilated seemingly perigynous disk. *Platystemon* and yet more *Canbya* and *Arctomecon* retain their petals until fruiting. *Platystigma* and *Canbya* may have very few stamens. *Bucconia* is apetalous. And the leaves are usually opposite or verticillate and entire in the first tribe. So, although one of the most distinct of orders, it teems with exceptions.

TRIBE I. PLATYSTEMONEÆ. Leaves mainly opposite or whorled and entire.

Flowers usually 3-merous, i. e. sepals 3 and obovate petals 6 in two series. Ovary mostly lobed or angled: stigmas distinct, one terminating each carpel, alternate with the placentæ, which never separate from the valves. No dilated torus under the flower. Flower-buds usually drooping on the peduncle: anthesis for more than one day. Juice watery or yellowish.

1. **PLATYSTEMON.** Stamens numerous: filaments petaloid, obovate or spatulate. Stigmas subulate-filiform. Carpels 9 to 18, each several-ovuled, at first all united in a circle into a deeply plurisulcate compound ovary by as many parietal placentæ, in fruit separating and closing into as many torose narrow follicles, which when mature are disposed to break up transversely into a few one-seeded joints! Petals tardily deciduous!
2. **PLATYSTIGMA.** Flowers occasionally 2-merous, i. e. with 2 sepals and 4 petals. Stamens 6 to 12, rarely 4: filaments from lanceolate-subulate to filiform. Carpels 3, rarely 4, wholly combined into a somewhat 3-lobed or angled or nearly terete ovary, having as many pluri-ovulate strictly parietal placentæ; in fruit a thin-walled completely 3-valved capsule, dehiscent through the placentæ. Stigmas ovate to subulate. Petals deciduous.

TRIBE II. PAPAVEREÆ. Leaves alternate or mainly so. Flowers rarely 3-merous.

Ovary of 2 to 20 completely combined carpels; even the stigmas more or less confluent or else radiate from a common centre, never more numerous than the placentæ: these when the capsule dehisces persisting as a frame alternate with and freed from the valves, while held in place by attachment to receptacle below and combined stigmas above.

\* Petals 4 or 6, usually scarious-marcescent and persistent till the fruit is grown! apparently not crumpled in the bud: this drooping before anthesis: capsule ovoid, strictly one-celled, 3-6-valved from above; valves alternating with as many nerviform placentæ.

3. **CANBYA.** Sepals 3. Petals 6, obovate, after anthesis closing over the capsule. Stamens 6 or 9: filaments shorter than the oblong-linear anthers. Ovary and membranaceous cap-

sule ovoid-globose: style none: stigmas 3, oblong-linear, opposite the three nerviform placenta and recurved-appressed to them. Seeds obovate-oblong, smooth, neither crested nor carunculate. Exiguous annuals.

4. **ARCTOMECON.** Sepals 2. Petals 4, rotund-obovate, in age thin-scarious and persisting around the base of the capsule. Stamens indefinitely numerous, short: filaments longer than the oblong-linear anthers. Ovary and subcoriaceous capsule ovoid or obovoid, 3-6 (commonly 4)-valved: style shorter than the globular and lobulate mass of 3 to 6 erect and somewhat united stigmas; each stigma cordate-bilobed and over a valve, i. e. *alternate* with the nerviform placenta. Seeds rather few, oblong, with sinuous-lineolate coat and a narrow crested rhaphe, which is carunculate-dilated at hilum. Herbs.

\* \* Petals 8 to 12, not at all crumpled in the bud (which is never drooping), of rather firm texture, deciduous after anthesis of a few days: stigmas (2) *alternate* with the nerviform placenta, i. e. over the valves: acaulescent herb.

5. **SANGUINARIA.** Sepals 2. Petals obovate to oblong-spatulate. Stamens about 24. Ovary oblong, with short and stout style: stigmas 2, thickish, erect and partly united, being confluent at their bases. Capsule fusiform, nearly membranaceous. Seeds with crustaceous coat and a loose-cellular crest to the rhaphe.

\* \* \* Petals 4 to 6, usually crumpled in the bud, thin and broad, deciduous after anthesis of one or more days.

+ Truly shrubby, 2-carpellary: stigmas over the valves, i. e. *alternate* with the nerviform placenta: flowers lasting two or three days.

6. **DENDROMECON.** Sepals 2. Petals 4. Stamens very many. Ovary narrow, tipped with short style and broadish stigmas. Capsule linear, strictly one-celled, elastically 2-valved from the base upward: valves firm-coriaceous, striate-costate, tardily and often incompletely detached from the exiguous placenta. Seeds oval, fleshy-carunculate at the hilum.

+ + Shrubby-based, pluricarpellary: stigmas over the septiform placenta: flowers not drooping in the bud, lasting for a few days.

7. **ROMNEYA.** Sepals 3 (rarely with a dorsal wing), externally strigose. Petals 6. Stamens very many. Style none: stigmas 7 to 12, oblong, firm-fleshy and thick, partly cohering in a ring around and incurved over a globular epigynous disk. Ovary and coriaceous capsule ovate or oblong, strigose-hispid, with 7 to 12 lamelliform at length coriaceous placenta, some or most of which meet in the axis and so form partitions: valves 7 to 12, opening from the summit downward and so denudating the solid placental framework. Seeds slightly incurved, with scrobiculate or rugulose and dull coat, naked at rhaphe and hilum.

+ + + Herbaceous (except one *Argemone*): stigmas over the placenta: sepals 2, or by variation 3 and then petals 6.

+ + Capsule 4-20 carpellary, dehiscent only at top or to near the middle.

8. **ARGEMONE.** Flowers erect in the bud and short-peduncled or sessile. Herbage prickly. Sepals often 3 and petals 6. Stamens many. Ovary strictly 1-celled, with 4 to 6 nerviform placenta: stigmas oval, somewhat radiate and united on the summit of very short or obsolete style. Capsule 4-6-valved at summit. Seeds scrobiculate, naked, but with salient rhaphe. Juice orange.

9. **PAPAV.** Flower-bud generally drooping on the peduncle until anthesis. Stamens very many. Ovary and capsule globose to oblong, capped by the closely sessile circular flat or somewhat conical disk of the combined radiate stigmas, and dehiscent only under the edge of it by as many dentiform short lids: placenta 4 to 20, septiform, mostly projecting far into the cell. Seeds scrobiculate, naked. Juice mostly white.

10. **MECONOPSIS.** Flower-bud drooping before anthesis. Stamens many. Ovary and capsule tipped with a style, and with globular mass of stigmas, one-celled, and with 4 to 8 more or less intruded placenta, dehiscent only by as many short teeth or valves at the summit. Juice orange.

+ + + Capsule 2-4 carpellary, dehiscent for the whole length, the valves completely separating from the 2 to 4 nerviform placenta: juice orange or yellow.

11. **STYLOPHORUM.** Stamens 20 or more. Ovary in the genuine species with 3 or 4 nerviform placentæ from which the valves of the capsule separate from apex to base. Style comparatively long: stigmas 3, short and depressed, confluent. Seeds scrobiculate-reticulated: rhaphe prominent and crested.
12. **CHELIDONIUM.** Stamens rather few. Ovary and capsule linear, strictly one-celled with 2 nerviform placentæ, and a short style bearing two small simple stigmas: valves membranaceous at maturity, dehiscent mostly from base upward. Seeds smooth: rhaphe crested.
13. **GLAUCIUM.** Like *Chelidonium*, but mitre-shaped stigmas with divergent or deflexed base on each side, and coriaceous capsule 2-celled by a spongy false partition between the placentæ, in which the scrobiculate seeds are partly embedded.
- TRIBE III. **HUNNEMANNIÆ.** Leaves alternate, ternately decomposed. Flowers dimerous, i. e. sepals and placentæ 2, and (deciduous) petals 4. Torus more or less dilated and excavated under or around base of the pistil: flower thus as if perigynous. Stamens numerous. Stigmas twice or thrice as many as placentæ: ovary strictly one-celled. Capsule elongated and siliquiform, terete, striate-costate, many-seeded, elastically 2-valved usually from the base to apex; valves coriaceous, the nerviform placentæ remaining attached to their margins, or imperfectly separating. Seeds globular, inappendiculate. Juice of herbage mainly watery and not acrid, of the root yellow. Flowers erect in the bud, in anthesis usually more than one day, normally yellow. Consists of the adjacent Mexican genus *Hunnebmanna*, with calyx of distinct sepals and 4 roundish depressed stigmas, the nerviform placentæ partly separating from the valves, and
14. **ESCHSCHOLTZIA.** Torus under the flower dilated and hollowed, cyathiform. Calyx calyptrate, the two sepals completely combined into an extinguisher-shaped body, which is detached at base and pushed off at the expansion of the 4 petals. Style short and stout or hardly any: stigmas 4 to 6, subulate or setaceous, unequal. Cotyledons said to be 2-parted. Chiefly annuals.

1. **PLATYSTÉMON**, Benth. CREAM-CUPS. (Πλατύς, wide, στήμων, stamen.) — Trans. Hort. Soc. ser. 2, i. 405; Benth. & Hook. Gen. i. 51. — Single species, remarkable in the order on many accounts, among them for anthesis continued for several days, and marcescent petals at length loosely closing over the forming fruit.

**P. Califórnicus**, Benth. l. c. Low and slender annual, hispid with long spreading hairs, or glabrate: leaves mainly opposite, closely sessile, ligulate-linear, obtuse, nervose: peduncles a span or more long, sometimes scapose: petals half inch or less long, from light yellow to cream color or white (rarely roseate): mature and separated carpels linear, moniliform, sometimes sparsely hispid, commonly glabrous. — Lindl. Bot. Reg. t. 1679; Sweet, Brit. Fl. Gard. ser. 2, t. 394; Hook. Bot. Mag. t. 3579; Torr. & Gray, Fl. i. 65, with vars.; Brew. & Wats. Bot. Calif. i. 19, with var. *leiocarpus*. *P. leiocarpus*, Fisch. & Meyer, Ind. Sem. Hort. Petrop. ii. 47 (1835); Hook. Bot. Mag. t. 3750, a mere state.<sup>1</sup> — Open ground, throughout California (except in the mountains), also S. Utah and Arizona; type coll. by Douglas.

2. **PLATYSTÍGMA**, Benth. (Πλατύς, broad, στίγμα, stigma.) — Pacific N. American low annuals, with linear mostly opposite leaves and light yellow or almost white flowers; in spring. — Trans. Hort. Soc. ser. 2, i. 406; Benth. & Hook. l. c. *Platystigma* & *Meconella* (Nutt.), Torr. & Gray, Fl. i. 64, 65.

§ 1. Subscapose: capsule obovoid or clavate-ovoid, of rather firm texture, crowned with the three broad and obtuse spreading introrsely stigmatose tips or stigmas.

<sup>1</sup> Add syn. ? *P. crinitus*, Greene, Pittonia, ii. 13 (*P. Californicus*, var. *crinitus*, Greene, Fl. Francis. 282), apparently only a weak and more pubescent form of the inland.

**P. lineáre**, BENTH. l. c. 407. A span or two high, branching only at base, sparsely barbately-hispid in the manner of *Platystemon*, which it resembles: leaves all sessile, linear, mostly 2 inches long: petals half inch long: stamens numerous; anthers oblong-linear. — Hook. Ic. t. 38, & Bot. Mag. t. 3575; Lindl. Bot. Reg. t. 1954; Torr. & Gray, Fl. i. 65; Brew. & Wats. l. c. 20.<sup>1</sup> — W. California, from Los Angeles,<sup>2</sup> to Oregon; type coll. by Douglas.

§ 2. Stems leafy and paniculately branching, filiform: capsule linear, with thin or membranaceous valves, commonly twisting in age: stigmas subulate. — *Meconella*, Nutt. in Torr. & Gray, l. c. 64.

**P.\* Oregánum**, BENTH. & HOOK.<sup>3</sup> Glabrous, an inch (in depauperate plants) to a span or two high, with spreading branches or peduncles: leaves a quarter to at most an inch long; lowest spatulate or obovate and contracted into petiole; upper linear-oblong or linear, sessile: petals 4 to 6, from 1 to 2 lines in length: stamens (4 or) 6, equal or nearly so and in single row; anthers oval, very much shorter than the filaments. — Benth. & Hook. acc. to Brew. & Wats. l. c.; Wats. Bibl. Index, 43. *Meconella Oregana*, Nutt. l. c.; Hook. Ic. t. 360.<sup>4</sup> — Moist or dry ground in spring, Brit. Columbia to Oregon; first made known by Nuttall.

**P.\* Califórnicum**, BENTH. & HOOK. Flowers usually larger: petals 2 to 5 lines long: stamens 6 to 12, unequal and biseriate: other characters closely as in the preceding (of which Dr. Gray regarded it a form). — Gen. i. 51; Brew. & Wats. l. c. *Meconella Californica*, Torr. & Frém. in Frém. Rep. 312; Torr. Bot. Mex. Bound. 31. *Platystemon Torreji*, Greene, Fl. Francis. 283. *P. Oreganus*, M. K. Curran, l. c., in part. — Low hills, &c., Central and Southern California.

**P. denticulátum**, GREENE. Very similar, more diffuse: weak stems a span to a foot long: leaves from linear to spatulate, sometimes callous-denticulate: petals a line or two long, apparently white: anthers (6) linear, equalling or double the length of the filaments. — Bull. Torr. Club, xiii. 218. *Meconella denticulata*, Greene, Bull. Calif. Acad. Sci. ii. 59.<sup>5</sup> — S. California, between San Bernardino and San Diego, and on the adjacent islands, *Cleveland*, Parish, Greene.

**3. CÁNBYA**, Parry. (*William Marriott Canby*, of Delaware, excellent botanist and friend.) — Singular genus of two minute acaulescent annuals, vernal productions of the interior desert, glabrous; with a tiny root, a close tuft of exceedingly short and densely leafy stems or branches, sending up filiform one-flowered scapes of less than an inch in length; the leaves crowded but mainly alternate, fleshy, oblong to linear, entire, the lowermost a line and upper quarter inch long: petals not over 2 lines long. — Parry in Gray, Proc. Am. Acad. xii. 51, t. 1.

**C. cándida**, PARRY, l. c. Petals bright white: foliage green. — Wats. Bot. Calif. ii. 429. — S. E. California, on the upper part of the Mohave River, *Palmer*, 1876; Cajou Pass, *Parish*, 1882.

**C. aúrea**, WATSON. Petals bright yellow, deciduous in age: scapes capillary: foliage glaucescent. — Proc. Am. Acad. xxi. 445. — On the sage plains of S. E. Oregon, June, in flower, *Howell*.

**4. ARCTOMÉCON**, Torr. & Frém. (\**ἄρκτος*, a bear, *μήκων*, poppy, from the hirsuteness.) — Frém. Rep. (1845), 312, t. 2; Benth. & Hook. Gen. i. 52; Parry, Am. Nat. ix. 139, 268; Gray, Proc. Am. Acad. xii. 52, t. 2; Coville,

<sup>1</sup> Add syn. *Platystemon linearis*, M. K. Curran, Proc. Calif. Acad. Sci. ser. 2, i. 242.

<sup>2</sup> A dubious specimen from Ft. Mohave, *Cooper*.

<sup>3</sup> Description modified to exclude the apparently distinct *P. Californicum*.

<sup>4</sup> Add syn. *Platystemon Oreganus*, M. K. Curran, l. c., so far as the northern plant is concerned.

<sup>5</sup> Add syn. *Platystemon denticulatus*, Greene, Fl. Francis. 283.

Proc. Biol. Soc. Wash. vii. 66, 67, & Contrib. U. S. Nat. Herb. iv. 58, 59.<sup>1</sup> [By B. L. ROBINSON.]

\* Capsule obovoid.

**A. hūmīlis**, COVILLE. Low, 4 to 7 inches in height, erect leaves oblanceolate, usually 2-3-dentate toward the apex, hirsute-ciliate and sparsely villous: scapes naked and one-flowered or more frequently stems bearing a pair of subopposite leaves and 2-3-flowered: petals 4, suborbicular, white, three fourths inch in diameter: filaments flattened and slightly dilated: capsule 4 lines or more in length, two thirds as broad, splitting about to the middle: style short but present. — Proc. Biol. Soc. Wash. vii. 67, & Contrib. U. S. Nat. Herb. iv. 58. *A. Californicum*, Gray, Proc. Am. Acad. xii. 53 (so far as Dr. Parry's plant is concerned), t. 2, not Torr. & Frém. — Desert of S. W. Utah, on the Rio Virgen, Parry, no 6.

**A. Califórnicā**, TORR. & FRÉM. l. c. Taller and much more densely clothed with long gray barbellate hair: leaves crowded at the base of the plant, oblanceolate in outline or flabelliform-cuneate and several toothed at the apex: stem about a foot high bearing about two alternate distant reduced leaves and an umbelliform cluster of several to many slender-peduncled successively opening flowers: filaments slender: stigma sessile. — Coville, Contrib. U. S. Nat. Herb. iv. 58. — S. Nevada, first collected by Frémont, rediscovered in the same locality near Vegas Ranch, Lincoln Co., by Dr. Merriam & V. Bailey.

\* \* Capsule linear-oblong.

**A. Merriāmi**, COVILLE. Foliage and pubescence much as in the last, but flowers usually solitary: sepals 3, villous, caducous: petals 6, white, orbiculate, more than an inch in diameter: filaments slender but slightly dilated upward: capsule narrow, an inch and a half or more in length. — Proc. Biol. Soc. Wash. vii. 66, & Contrib. U. S. Nat. Herb. iv. 59. — Near the same locality as the preceding, Dr. Merriam & V. Bailey, May, 1891, no. 1890.

**5. SANGUINÁRIA**, Dill. BLOODROOT. (Named from the blood-red juice.) — Hort. Elth. ii. 334, t. 252; L. Gen. no. 425. — Single species, vernal.

**S. Canadénsis**, L. Rootstock horizontal, fleshy and tuberous, crimson-red, surcharged as also the glabrous partly glaucous herbage with orange-red acrid juice, sending up in early spring, from terminal 2-3-valved buds a long-petioled leaf and a 1-flowered scape: leaves reniform, palmately and obtusely 5-9-lobed, reticulated: lobes repand-dentate or 3-lobed: scape a span high, naked (has been found with a pair of opposite bracts and 3 flowers<sup>2</sup>): petals inch or less long, white, sometimes tinged with rose: capsule 2 inches long. — Spec. i. 505; Lam. Ill. t. 449; Curtis, Bot. Mag. t. 162; Bigel. Med. Bot. i. 75, t. 7; Lodd. Bot. Cab. t. 1840; Torr. & Gray, Fl. i. 62; Gray, Gen. Ill. i. 116, t. 49; Sprague & Goodale, Wild Flowers, 141, t. 33. *S. acaulis*, Moench, Meth. 227. *S. vernalis*, Salisb. Prodr. 376. *S. grandiflora*, Sweet, Brit. Fl. Gard. ser. 2, t. 147. — Woods in rich soil, Nova Scotia to Manitoba, and south to Arkansas and Florida.

**6. DENDROMÉCON**, Benth. (Δένδρον, tree, μήκων, poppy.) — Trans. Hort. Soc. ser. 2, i. 407; Benth. & Hook. Gen. i. 54; Hook. Ic. t. 37, & Bot. Mag. t. 5134; Torr. Bot. Mex. Bound. 32, t. 3. — Single species, polymorphous in foliage, yellow-flowered, in spring.

**D.\* rígida**, BENTH. l. c.<sup>3</sup> Glabrous and rigid shrub; leaves pale or glaucescent, coriaceous, lanceolate and cuspidate-acuminate, varying to oblong and obtuse with rigid mucro, entire or ciliolate-denticulate on callous margins (those of seedlings slightly lobed), very reticulate-veiny and venulose and with strong midrib, short-petioled, in age falling by an articulation: flowers naked-pedunculate at apex of branchlets: sepals orbicular: petals very broad, about inch long, golden yellow: capsule commonly arcuate at maturity. — Torr. & Gray, Fl. i. 64;

<sup>1</sup> In the light of Mr. Coville's recent discoveries, and more copious material secured on the Death Valley Exploring Expedition, it has been necessary to rewrite the treatment of this genus.

<sup>2</sup> A second interesting anomalous form is described by A. Foerste (Bull. Torr. Club, xiv. 74, t. 67), in which but two flowers are present and these alternate.

<sup>3</sup> Description slightly modified to exclude the following species.

Fl. Serres, xiv. t. 1411; Brew. & Wats. Bot. Calif. i. 22. — Dry hills, California, from San Diego, San Bernardino, &c., to Butte Co.

- D.\* Harfordii**, KELLOGG. Low or arborescent shrub; leaves oval, or broadly oblong, usually very obtuse, and mucronate at apex (rarely ovate-lanceolate and acute), thick but somewhat less harsh than in the preceding; margins entire or inconspicuously crenulate, never so scabrous-ciliolate as often in the last: axillary buds at certain stage in their development rigid and almost thorn-like. — Proc. Calif. Acad. Sci. v. 102. *D. flexilis*, Greene, Bull. Torr. Club, xiii. 216. *D. rigida*, var. *Harfordii*, K. Brandegee, Zoe, iv. 83. — Islands off coast of S. California. Dr. Kellogg's species as originally collected on Santa Rosa Isl. is said to be a low shrub, but the foliage shows no constant or satisfactory differences from the arborescent *D. flexilis*, Greene, of Santa Cruz Isl. Essentially the same plant has been collected upon Santa Catalina Isl., Brandegee. All these insular forms are unsatisfactorily separable from each other and none too definitely distinguished from broad-leaved forms of the mainland, such as Hartweg's 1641. (See T. S. Brandegee, Zoe, i. 46.)

**7. ROMNÉYA**, Harv. (The astronomer, *T. Romney Robinson*, friend of Dr. Coulter, the discoverer of the plant.) — Lond. Jour. Bot. iv. 74, t. 3 (stigmas not well given); Torr. Bot. Mex. Bound. 31. — Single species, large- and white-flowered, with colorless bitter juice.

- R. Coulteri**, HARV. l. c. 75. Herbaceous stems 3 to 8 feet high from a soft woody base, branching, leafy to the top, glabrous, glaucescent: leaves of firm texture, pinnately parted or divided, petioled; divisions or leaflets 3 to 9, cuneate-oblong to lanceolate, sparingly dentate, terminal 3-cleft, margins and rachis often sparsely ciliate-spinulose: flowers short-peduncled, terminating the branches, delicately fragrant, a few days in anthesis: petals bright white, 2 inches long: capsule inch and a half long. — Brew. & Wats. Bot. Calif. i. 20; W. Robinson, Garden, xxvi. 400, t. 465.<sup>1</sup> — Plains and ravines, S. California, Ventura Co.<sup>2</sup> to San Bernardino, San Diego Co. (and Lower Calif.); first coll. by *Th. Coulter*; fl. all summer.

**8. ARGEMÓNE**, Tourn. PRICKLY POPPY. (Ancient Greek and Latin name of some herb, transferred to this American genus by the herbalists.) — Setose and spinulose-dentate herbs, chiefly annuals, but in hot countries becoming indurated and lignescent below, leafy-stemmed and branching, with orange-yellow and acrid juice, the leaves sinuate or pinnatifid, commonly variegated with white. Sepals with cornute tip or appendage below the apex. — Inst. 239, t. 151; L. Gen. no. 422.<sup>3</sup> — Consists of the following species or forms, which cannot be very definitely characterized.

**A. FRUTICÓSA**, Thurber, *vide* Gray, Pl. Thurb. 306; Wats. Proc. Am. Acad. xvii. 318, of Coahuila, Mexico, *Thurber*, *Palmer*, is very glaucous, with small and fleshy rigid leaves and sessile sulphur-yellow flowers, and has the branches so completely ligneous-indurated, that it can hardly be joined with *A. Mexicana*.

**A. GRANDIFLÓRA**, Sweet, Brit. Fl. Gard. t. 226; Lindl. Bot. Reg. t. 1264; Hook. Bot. Mag. t. 3073, of Mexico, said to be perennial, has white petals of  $1\frac{1}{2}$  to 2 inches in length, glabrous and unarmed stems, sepals, and capsule, yet the latter occasionally bears a few spiniform setæ.

**A. MEXICÁNA**, L. Stems, as well as foliage, also sepals and capsule more or less setose-prickly: petals dull or pale yellow or ochroleucous, an inch or less long, nearly sessile or subtended by small leaves. — Spec. i. 508; Gray, Gen. Ill. i. 112, t. 47. — Waste places, common southward and near coast, less so northward. (Nat. from Mex.)

<sup>1</sup> W. Am. Scientist, viii. 5, with plate; Gartenflora, xl. t. 1359.

<sup>2</sup> Since collected on the Santa Maria River, *Mrs. Blochman*.

<sup>3</sup> Recent important literature: Prain, An account of the Genus *Argemone*, Jour. Bot. xxxiii. 129-135, 176-178.

**A.\* álba**, LESTIB. Flowers white, somewhat pedunculate: capsule armed, but valves thin-nish. — Bot. Belg. ed. 2, iii. pt. 2, 133, as interpreted by Prain, l. c. *A. albiflora*, Hornem. Hort. Hafn. 439; Sims, Bot. Mag. t. 2342. *A. Georgiana*, Croom, Am. Jour. Sci. xxv. 75. — Nebraska to Texas and S. Atlantic States.

**A. platýceras**, LINK & OTTO. Setose-hispid all over (but stem sometimes sparsely so): petals pure white,  $1\frac{1}{2}$  to 2 inches long: capsule strongly armed, its spines sometimes simple, sometimes herbaceous below and again prickly down their sides. — Ic. Pl. Rar. Hort. Berol. i. 85, t. 43; Wats. l. c. *A. hispida*, Gray,<sup>1</sup> Pl. Fendl. 5. *A. munita*, Durand & Hilg. Jour. Acad. Philad. ser. 2, iii. 37, & Pacif. R. Rep. v. 5, t. 1.<sup>2</sup> *A. Mexicana*, var. *hispida*, Torr. Bot. Mex. Bound. 31; Wats. Bot. King Exp. 13. — Open plains and banks of streams, Rocky Mountains of Colorado to California, Texas, &c. (Mex., and nat. in S. Am., &c.) Var.\* *rósea*, Coulter. Flowers rose-color or purplish. — Contrib. U. S. Nat. Herb. i. 30, ii. 12. — S. Texas near coast, Corpus Christi, *Nealley*. (Coahuila, *Palmer*.)

**A. corymbósa**, GREENE. Habit of the foregoing, equally prickly, very leafy up to the crowded corymbose cyme of flowers, glabrous: leaves obovate and nearly orbicular, sparingly repand, the faces as prickly as the edges: petals white, apparently only half inch long: capsule 4-5-valved, rather narrow and pointed, only an inch long, long-prickly. — Bull. Calif. Acad. Sci. ii. 59. — Mohave Desert, S. E. California, *Mrs. Curran*.

**9. PAPÁVER**, Tourn. POPPY. (Latin name of Poppy, of obscure derivation.) — Annual or perennial herbs; with narcotic juice milky, rarely turning yellow, mostly pinnately lobed or dissected leaves, showy flowers solitary on long peduncle, drooping in bud except in the large-flowered perennial species. — Inst. 237, t. 119, 120; L. Gen. no. 423.

\* Annuals of the Old World, sparingly and locally adventive, not enough so to count as constituents of our flora.

**P. SOMNÍFERUM**, L. (GARDEN OR OPIUM POPPY.) Glaucous, glabrous, or peduncles hispid: leaves clasping, oblong, undulate, dentate or incised: corolla large, purple to white: capsule globular, with numerous septiform placentæ. — Escaped from gardens in some places at the East.

**P. RHŒAS**, L. (CORN POPPY of Eu.) Sparsely hispid: leaves deeply pinnatifid and lobes incisely dentate or again pinnatifid: corolla 2 to 4 inches in diameter, scarlet, often with dark centre: capsule globular, glabrous: stigmatic rays and placentæ 8 to 12. — Rare in ballast grounds: found occasionally in grain-fields.

**P. DÚBIUM**, L. Smaller and leaves more cut into narrower lobes than in the last: bristles on peduncles appressed: corolla paler red: capsule oblong, narrowed at base, glabrous: stigmatic rays 6 to 12. — Cult. fields, S. Penn. to N. Carolina, local.

**P. ARGEMÓNE**, L. Leaves twice pinnately parted into narrow lobes: flowers smaller, red-purple: filaments dilated upward: capsule clavate, usually hispid: stigmatic rays 4 to 6. — Commons at Philadelphia, *Diffenbaugh*.

\* \* Annual, indigenous.

**P.\* Califórnicum**, GRAY.<sup>3</sup> Very much like *P. dubium*, but hairs scanty, much finer: petals saffron or more red, with lemon-colored or greenish eye toward the base: capsule (about half inch long) clavate-turbinate, 6-11-merous; dehiscing by dentiform subquadrate valves a line long and wide, disclosing the placentæ. — Proc. Am. Acad. xxii. 313; Brandegee, Zoe, ii. 121; Greene, Fl. Francis. 280. ? *P. Lemmoni*, Greene, Pittonia, i. 168, a very

<sup>1</sup> In the light of Miss Eastwood's notes (Zoe, iv. 4), *A. hispida*, Gray, differs strikingly in the field from the typical *A. platýceras*, the former being much more densely setose, with generally much finer spines or bristles, more sessile heads, paler foliage, and less deeply pitted seeds. It is doubted, however, whether these differences are more than varietal, as apparent intermediates occur.

<sup>2</sup> Add Greene, Fl. Francis. 281.

<sup>3</sup> The description of this species, not having been prepared for the Flora by Dr. Gray, has been translated from his original publication with slight alterations, and the literature and synonymy added.



nearly related if not confluent species. — Santa Inez Mts., S. Calif., *Spence, Brandegee*, northward to San Luis Obispo Co. (*P. Lemmoni*), acc. to Greene, l. e., and south at least to Los Angeles Co., acc. to McClatchie. Especially abundant on burns.

\* \* \* Arctic-alpine, acaulescent, perennial.

**P. nudicaule**, L. Dwarf, hirsute-hispid: leaves all in a radical tuft, oblong-spatulate or obovate in outline, pinnatifid or below pinnately divided; divisions spatulate to lanceolate, entire or 2-3-cleft: petals half inch to inch long, rarely orange or whitish: capsule from short-obovate to turbinate-oblong, mostly hispid: stigmatic rays and placenta 4 to 7, usually 6 or 7. — Spec. i. 507, & ed. 2, i. 725 (Dill. Elth. t. 224); Fl. Dan. t. 41; DC. Syst. ii. 70; Elkan, Monog. Pap. 16. — Whether or not the species should include *P. alpinum*, L. of European Alps, ours is all

**Var. arcticum**, ELKAN, l. c. with dark hairy scapes rarely over a span high, and divisions of leaves entire or sparingly cleft: capsule short and thick, or even obovate-globose (as in *P. microcarpum*, DC. Syst. ii. 71, & *P. nudicaule*, Reichenb. Ic. Pl. Crit. t. 742). — *P. alpinum*, Hook. f. Arc. Pl. 284, 313; Gray, Am. Jour. Sci. ser. 2, xxxiii. 407. — Through Arctic Coast and Islands to Hudson Bay, Unalaska, and alpine Rocky Mountains to S. Colorado. (Greenland E. to Kamtschatka.)

**10. MECONÓPSIS**, Viguier. (Μήκων, poppy, ὄψις, resemblance.) — Poppy-like herbs, with yellow juice, W. European and Himalayan perennials, with the following outlying species. — Hist. des Pav. 11, 48; DC. Fl. Fr. Suppl. 586, & Syst. ii. 86; Benth. & Hook. Gen. i. 52.

**M. heterophylla**, BENTH. Glabrous annual, a foot or two high, simple or branching: leaves somewhat succulent, pinnately parted or divided, mostly petioled; divisions variable, from oval to linear, entire or incised, or some pinnatifid: peduncles slender: petals half inch to inch long, pale scarlet or orange-red: capsule turbinate to obovate, with style shorter than the width of the truncate summit, dehiscent by about 8 operculate lids rather than valves at summit. — Trans. Hort. Soc. ser. 2, i. 408; Hook. Ic. t. 732; Torr. Pacif. R. Rep. iv. 64; Brew. & Wats. Bot. Calif. i. 22. *M. heterophylla* & *M. crassifolia*, Benth. l. c.; Torr. & Gray, Fl. i. 61.<sup>1</sup> — Dry ground, throughout W. California; type coll. by Douglas; fl. summer. (Lower Calif.)

**11. STYLÓPHORUM**, Nutt. (Formed of σῦλος, style, and φέρω, to bear, the style conspicuous.) — Perennial herbs with orange-yellow juice, of an anomalous Japanese, another Himalayan, and the following original species. — Gen. ii. 7; Gray, Gen. Ill. i. 113, t. 48.

**S. diphylum**, NUTT. l. c. (CELANDINE POPPY.) Minutely pubescent or glabrate: stems a foot or two high, two-leaved at summit and sometimes one-leaved below: leaves petioled, pinnately parted, the radical into 7, cauline mostly into 5 to 7 oblong or oval sinuate-dentate divisions, upper ones more broadly confluent: peduncles 3 to 5 in an umbelliform cluster between the subopposite leaves, slightly drooping in bud: petals golden yellow, orbicular, inch or less long, early deciduous: style abrupt, rather shorter than the ovary: capsule drooping, oval, about an inch long, beset with soft spreading bristles: placenta 3 or 4; seeds reticulated, the rhaphe strongly crested. — Gray, Man. 27, & Gen. Ill. i. 114, t. 48; Hook. Bot. Mag. t. 4867. *S. diphylum* & *S. petiolatum*, Nutt. l. c. 7, 8. *S. Ohienae*, Spreng. Syst. ii. 570. *Chelidonium diphylum*, Michx. Fl. i. 309. *Meconopsis diphylla* & *M. petiolata*, DC. Syst. ii. 87, 88. *M. diphylla*, Torr. & Gray, Fl. i. 61. — Moist woods, W. Penn. to Wisconsin, and Tennessee; fl. spring and early summer.

**12. CHELIDÓNIUM**, Tourn. CELANDINE, SWALLOW-WORT. (Ancient Greek name, from χελιδών, the swallow.) — Inst. 231, t. 116; L. Gen. no. 424. — Now of single species.

**C. majus**, L. Perennial or biennial, with brittle branching stems (2 to 4 feet high) and copious orange and acrid juice, glaucous, more or less pubescent: leaves petioled, pinnately

<sup>1</sup> Add syn. *Papaver heterophyllum*, Greene, Fl. Francis. 281; *P. crassifolium*, Greene, Man. Bay-Reg. 9.

divided or parted; divisions oval, obtusely sinuate-pinnatifid, incised or dentate, upper ones confluent; peduncles terminal and axillary, umbellately several-flowered; flowers nodding in the bud: petals yellow, half inch or less long: linear capsules inch or two long. — Spec. i. 505. — Waste and moist ground near dwellings; fl. summer. (Nat. from Eu.)

**13. GLAUCIUM, Tourn. HORNED POPPY.** (Γλαύκιον, the ancient Greek name, from the glaucous foliage.) — Annuals, biennials or subperennials, of the Old World, one sparingly naturalized. — Inst. 254, t. 130; Hall. Enum. Helv. i. 304.

**G. LUTEUM, Scop.** A foot or two high, with stout and rigid stems, glaucous, also pubescent: leaves thickish; radical bipinnatifid, hairy; upper cauline sinuate-pinnatifid, auriculate-clasping: flowers mostly solitary, terminating the branches: petals golden yellow, inch or so long: capsule a span to a foot long, filiform, rigid, curved: stigmas with divaricate or deflexed base. — Fl. Carn. ed. 2, i. 369; Gray, Man. ed. 2, 26. *G. flavum*, DC. Syst. ii. 94. *Chelidonium Glaucium*, L. Spec. i. 506; Fl. Dan. t. 585.<sup>1</sup> — Sandy sea-shore, Montauk, New York,<sup>2</sup> to Virginia, in a few places; fl. summer. (Nat. from Eu.)

**14. ESCHSCHOLTZIA, Cham.** (Dedicated by Chamisso to *Dr. J. F. Eschscholtz*, his companion in the scientific expedition under Kotzebue, during which the original of this familiar genus was by them collected. Menzies had collected it long before.) — Pacific N. American low annuals, or the original species perennial, pale and glaucescent, mainly glabrous; with petioled leaves dissected into narrow linear-spatulate to filiform lobes, and (normally) yellow pedunculate flowers, in spring and summer. Watery juice of herbage with odor like that of hydrochloric acid, that of root yellowish. Cotyledons of the common species notched and in germination 2-cleft. — Cham. in Nees, *Horæ Phys. Berol.* 73, t. 15; Cham. & Schlecht. *Linnaea*, i. 554; DC. *Prodr.* iii. 344.<sup>3</sup> *Chryseis*, Lindl. *Bot. Reg.* t. 1948; Torr. & Gray, *Fl.* i. 63.

\* Dilated torus funnellform, bearing an expanded rim outside of the insertion of the calyptrate calyx: mature seeds with a coarse and salient superficial reticulation of the epispem: flowers lasting for 3 or 4 days.

**E. Californica, CHAM. l. c.** Flowering as an annual, but short-lived perennial with thickish branching roots, at length a foot or two high and leafy-stemmed: petals flabelliform, inch and a half long at the largest, saffron or orange, varying to pure yellow: expanded rim of the torus when fully developed a line or two wide, but varying down to less than half that width. — Lindl. *Bot. Reg.* t. 1168; Sweet, *Brit. Fl. Gard.* t. 265; Hook. *Bot. Mag.* t. 2887; Lodd. *Bot. Cab.* t. 1635 (mostly narrow-rimmed form); Spach, *Hist. Veg.* vii. 48, t. 140. *E. crocea*, Benth. *Trans. Hort. Soc.* ser. 2, i. 407; Lindl. *Bot. Reg.* t. 1677; Sweet, *Brit. Fl. Gard.* ser. 2, t. 299; Hook. *Bot. Mag.* t. 3495. *E. tenuifolia*, var., Benth. *Pl. Hartw.* 296, not of *Trans. Hort. Soc.*, nor of Hook. *Chryseis compacta*, Lindl. *Bot. Reg.* t. 1948.<sup>4</sup> *C.* (or

<sup>1</sup> Add syn. *Glaucium Glaucium*, Karst. *Deutsch. Fl.* 649.

<sup>2</sup> Eastward to Rhode Island, *Peckham*.

<sup>3</sup> Recent literature: Gray, *Proc. Am. Acad.* xxii. 271-273; Greene, *Bull. Calif. Acad. Sci.* i. 66-72, 182, 183; K. Brandegee, *Proc. Calif. Acad. Sci.* ser. 2, i. 245-251, & Zoe, i. 278-282. While Mrs. Brandegee's observations on the intergradation of these plants are substantiated by specimens, the general reduction of forms so different to one species is undesirable.

<sup>4</sup> Add syn. *E. compacta*, Walp. *Rep.* i. 116, a species recently restored by Prof. E. L. Greene, who regards it as strictly annual. *E. tenuisecta*, Greene, *Pittonia*, i. 169, is a form of the same. *E. Californicum*, as widely drawn by Dr. Gray, should probably include also the following species, based largely upon vegetative and doubtfully trustworthy characteristics. *E. leptandra*, Greene, *Pittonia*, i. 169, a very glaucous form with short and rather broad leaf-segments. (Neither the number of stamens nor the length of the anthers furnishes a satisfactory distinction.) *E. cucullata*, Greene, *Erythea*, ii. 120, a maritime form with leaves "compact and small, all the divisions broad, when young strongly cucullate-incurved and even in age noticeably so." *E. glauca*, Greene, *Pittonia*, i. 45, a glaucous form with delicate foliage.

*E.*) *Douglasii*, & *Californica*, Torr. & Gray, Fl. i. 664; Hook. & Arn. Bot. Beech. 319. — Oregon and through the whole length of California, most common along the coast, where also most perennial and semperflorant. The var. *Douglasii* is a form with narrower torus-rim, and pure yellow corolla. First coll. by *Menzies*, later by *Chamisso* & *Eschscholtz*.

? *E.\* ambigua*, GREENE. Annual, decumbent, glaucous and scabrous-puberulent throughout: otherwise scarcely distinguishable from forms of the preceding. — Fl. Francis. 286; Man. Bay-Reg. 11. — Central California near the coast, San Luis Obispo, *Mr. & Mrs. Lemmon*, Mt. Diablo, acc. to *Greene*, and (?) at *Castroville*, *Brandegee*.

*E.\* maritima*, GREENE. Perennial, densely cinereous-puberulent: stems "prostrate," very leafy: cauline leaves rather small, with short crowded segments: calyptra of the bud short-oblong, half inch in length, abruptly narrowed to a blunt apex: petals three fourths inch long, "lemon-yellow with a rhomboidal spot of orange at base:" pod an inch and a half in length; seeds nearly smooth. — *Pittonia*, i. 60. — Abundant on clayey slopes near the sea, San Miguel Island, California, *Greene*.

*E. peninsularis*, GREENE. Winter annual (or sometimes perennial?), tufted and many-stemmed from the tap-root, at first scapose, a span or two high: petals flabelliform or broadly cuneate, golden yellow, 5 to 8 lines long; expanded rim of the torus conspicuous: seeds less favose-reticulated. — Bull. Calif. Acad. Sci. i. 68, 183. — Common in S. California, from San Bernardino Co. to San Diego, &c., *Coulter*, *Parish*, *Orcutt*, &c.; also as far north as upper part of Salinas Valley, *Brewer*. (Lower Calif.)

\* \* Dilated torus cyathiform or tubular-campanulate, destitute of expanded rim or border, although the edge sometimes becomes sphacelate and a little recurved in age, a hyaline internal edge (within the insertion of the calyx) commonly a little projecting: annuals, mostly low or slender.

+ Petals from one third to two thirds or rarely an inch long, broadly cuneate, lasting more than one day.

+ Seeds superficially reticulated or almost smooth.

*E. ramósa*, GREENE. Glaucous and glabrous, with rigid erect stems branching above, very leafy to the top: leaves much dissected into narrow linear and divaricate divisions and lobes; upper usually surpassing the short-peduncles: petals quarter to half inch long, light yellow (or orange in drying): torus turbinate. — Bull. Torr. Club, xiii. 217. *E. elegans*, var. *ramosa*, *Greene*, Bull. Calif. Acad. Sci. i. 182. *E. Californica*, var. *hypocoides*, *Wats*. Proc. Am. Acad. xi. 112 (form with smaller flowers). — Santa Cruz Island off Santa Barbara, California, *Greene*, San Clemente, *Nevin & Lyon*. (Lower Californian islands, *Streets*, *Palmer*, *Greene*.)

*E. cæspitosa*, BENTH. Glaucous, sparsely hispidulous below when young, or else quite glabrous, commonly leafy only at base, and the leaves with narrow- or cuneate-linear ascending divisions and lobes: peduncles elongated: earlier ones scapiform, a span or two long; later ones from more or less leafy stems: petals pure yellow, half inch to inch long: torus turbinate to oblong-turbinate. — *Gray*, Proc. Am. Acad. xxii. 272; *E. cæspitosa* & *E. tenuifolia*, *Benth*. Trans. Hort. Soc. ser. 2, i. 408, therefore *Chryseis cæspitosa* & *C. tenuifolia*, Torr. & Gray, Fl. i. 63, 64. *E. Californica*, var. *hypocoides*, *Brew. & Wats*, Bot. Calif. i. 23. *E. Douglasii*, Torr. Pacif. R. Rep. iv. 64. *E. Austinae*, *Greene*, Bull. Calif. Acad. Sci. i. 69. — Common throughout California, especially northward and westward.

Var. *hypocoides*, *Gray*, l. c. Leafy stemmed, slender (a span to a foot high), with coarser lobes to the leaves, and petals half inch long or less. — *E. hypocoides*, *Benth*. l. c. *Chryseis hypocoides*, Torr. & Gray, l. c. 64. — W. California,<sup>1</sup> *Coulter*, *Douglas*, &c. No seeds seen: torus usually narrow.

*E. Mexicana*, GREENE. Wholly glabrous, glaucous, low and scapose or with later leafy branches: leaves of thick and firm texture and rather coarsely and compactly dissected: peduncles 2 to 10 inches long: petals orange-yellow, very broad, half inch to almost inch long: torus turbinate or campanulate. — Bull. Calif. Acad. Sci. i. 69; *Gray*, l. c. *E. Douglasii*, var. *parvula*, *Gray*, Pl. Wright. ii. 10. — Plains of Arizona, S. Utah, and New Mexico,<sup>2</sup> *Bigelow*, *Thurber*, *Newberry*, *Javier*, *Mrs. Thompson*, *Rusby*, &c. (Adj. Mex. below El Paso, *Wright*, *Guadalupe Island*, Lower Calif., *E. elegans*, *Greene*?)

<sup>1</sup> Northward to Oregon, *Howell*.

<sup>2</sup> San Bernardino Co., Calif., *Parish*.

++ ++ Seeds with thick gray coat and large deep pits.

**E. glyptosperma**, GREENE. Dwarf, wholly scapose: leaves much dissected into crowded filiform-linear divisions: scapes a span high: petals very broad, hardly half inch long: seeds globose, coarsely tuberculate-favose, the coriaceous meshes nearly as broad as the pits. — Bull. Calif. Acad. Sci. i. 70. — S. E. California, on the Mohave Desert, *Mrs. Curran*. Probably also on eastern slope of San Jacinto Mountain, *Parish* (*E. Parishii*, Greene, l. c. 183), and S. Utah, *Mrs. Thompson*, and Bill Williams Fork, *Bigelow* (Pacif. R. Rep. iv. 64, under *E. Douglasii*, var. *tenuifolia*), but seeds not seen.

++ ++ ++ Seed-coat strongly muricate-squamose: leaves with narrow and comparatively few divisions.

**E. tenuifolia**, Hook. Minutely hispidulous-pubescent below, or glabrous, scapose and tufted from the slender root: divisions of the leaves seldom over 9 or 11, mostly narrow-linear: scapes a span or more high: petals light yellow, at most half inch long: torus turbinate: seeds oval, densely muricate with oblong obtuse flattened processes in about 12 longitudinal rows. — Bot. Mag. t. 4812, excl. syn.; Greene, l. c. 70, excl. syn.; not Benth. *E. Douglasii*, var. *tenuifolia*, Torr. Pacif. R. Rep. iv. 64. *E. Californica*, var. *caespitosa*, Brew. & Wats. Bot. Calif. i. 23, excl. syn.<sup>1</sup> — California, valley of the Sacramento and adjacent foothills of the Sierra Nevada; first coll. by *Frémont*.

+ + Petals quarter inch long or less, obovate, soon deciduous: seeds with reticulate surface.

**E. minutiflora**, WATSON. Glabrous, leafy-stemmed and branching, a span to a foot high: leaves thickish, small: peduncles mostly shorter than the slender (inch or two long) capsule: petals a line or two long, broadly obovate. — Proc. Am. Acad. xi. 122; Brew. & Wats. l. c.; Greene, l. c. *E. Californica*, var. *hypercoides*, Wats. Bot. King Exp. 14, excl. syn. *E. modesta*, Greene, Pittonia, i. 169. — N. Nevada, S. Utah to W. Arizona and southern borders of California; first coll. by *Newberry* in Arizona, by *Watson* in Nevada.

**E. rhombipétala**, GREENE. Sparsely scabro-hispidulous below or glabrate, depressed-spreading, very leafy at base, a span or two high: peduncles stout, subscapose, hardly exceeding the tufted leaves, mostly longer than the large 2 or 3 inch long capsules: petals rhombic-obovate, a quarter inch long, fugacious. — Bull. Calif. Acad. Sci. i. 71. — Valley of the San Joaquin and Sacramento, *Mrs. Curran*.

Recently published species of doubtful affinity.

**E.\* Lemmóni**, GREENE. "Annual, 6 to 12 inches high, with numerous ascending branches leafy below, hoary pubescent throughout, even to the capsules, with short spreading white hairs; leaves with elongated petioles; peduncles stoutish, quadrangular, the earliest scapiform; torus urceolate, 3-4 lines long, nearly glabrous, constricted just below the narrow, erect hyaline border; calyptra ovate, long acuminate, very conspicuously hairy; petals orange-color, nearly or quite an inch long." — West Am. Sci. iii. 157; Fl. Francis. 287. — "Fields near Cholame, San Luis Obispo Co., Mr. & Mrs. Lemmon." The character quoted from the original description.

## ORDER IX. FUMARIACEÆ.

By A. GRAY.

Nearest *Papaveraceæ*, now more commonly combined with that order; but always with bland watery juice, and irregular dimerous flowers with definite (6) diadelphous stamens in a more or less closed corolla. Leaves compound, usually much dissected, tender, alternate. Sepals 2, small and scale-like. Petals 4 in two pairs; outer (lateral ones) with spreading tips, one or both spurred or saccate at base: inner pair narrower, with callous-crested tips cohering over the enclosed

<sup>1</sup> Add syn. *E. caespitosa*, Greene, Fl. Francis. 287, not Benth.

stigma, which is flattened contrary to and has lobes alternate with the placentæ. Stamens two sets of three each, the phalanxes opposite the outer and larger petals: middle anther of each 2-celled, lateral ones 1-celled. Ovary 1-celled with two parietal several-ovuled placentæ; in fruit usually a siliquiform capsule, with the two valves falling away from the nerviform placentæ, as in most of the *Papaveraceæ*. Stigma often 2-horned or 2-lobed on each side alternate with the placentæ. Ovules amphitropous or anatropous. Seeds with minute embryo in fleshy albumen. *Fumaria* has a one-ovuled ovary, becoming an indehiscent nuculaceous fruit.

\* Corolla bigibbous or two-spurred; the two outer and larger (lateral) petals similar: capsule siliquiform, several-seeded.

1. **ADLUMIA**. Petals permanently united into a subcordate spongy-cellular or marcescent-persistent corolla, enclosing the slender ripe capsule. Stamens high-monadelphous, at summit diadelphous. Seeds crestless.

2. **DICENTRA**. Petals less or slightly united into a 2-spurred or merely 2-gibbous nectariferous corolla. Stamens diadelphous; the filaments of each phalanx partly or lightly cohering, at least about the middle, or distinct. Seeds mostly crested. Pedicels 2-bracteolate.

\* \* Corolla with only one of the outer petals spurred or gibbous and nectariferous, by torsion becoming posterior, all erect and convenient up to the shut tips of the outer. A nectariferous spur-like process from the base of the filaments on that side projects into the petal-spur.

3. **CORYDALIS**. Capsule few-many-seeded. Seeds with a concave arilliform crest. Style mostly persistent. Corolla deciduous.

**FUMARIA**. Flower of *Corydalis* on a small scale. Style deciduous. Ovary uni-ovulate. Fruit a one-seeded nutlet. Old World genus.

**F. OFFICINÁLIS**, L. A widely branched low annual, with finely dissected foliage, and dense racemes of small flesh-colored flowers with dark crimson tips, — a weed in and about gardens and on dunghills, — can hardly be said to be naturalized in this country.

1. **ADLÚMIA**, Raf. (*Major John Adlum*, a cultivator at Washington in the early part of the century.) — Med. Rep. hex. 2, v. 352, & in Desv. Jour. Bot. ii. 169 (1809); DC. Syst. ii. 111. — Single species.

**A. cirrhósa**, Raf. l. c. Glaucous biennial or annual, glabrous branching, leafy, climbing over shrubs by means of the tendril-like petiolules: leaves 3-pinnate, usually quinate divided; leaflets small, obovate or cuneate, mostly 3-5-lobed: flowers numerous in loose and axillary cymose panicles: corolla white with tinge of flesh-color, in age becoming dull colored and scarious: stigma 4-lobed; seeds 8 to 12, black and shining. — Darl. Fl. Cestr. 399; Sweet, Brit. Fl. Gard. t. 189; Torr. & Gray, Fl. i. 68; Gray, Gen. III. i. 122, t. 51; Sprague & Goodale, Wild Flowers, 67, t. 13.<sup>1</sup> *Fumaria fungosa*, Ait. Kew. iii. 1. *F. recta*, Michx. Fl. ii. 51. *Bicuculla fumarioides*, Borkh. in Rœm. Archiv. i. pt. 2, 46. *Capnoides scandens*, Moench, Meth. Suppl. 215. *Corydalis fungosa*, Vent. Choix Cels, t. 19. — Low and shaded grounds, New Brunswick to Lake Superior and mountains of N. Carolina; fl. summer.

2. **DICÉNTRA**, Borkh., Bernh. (*Δίς, κέντρον*, two-spurred: but name is printed *Diclytra*, from *δίς* and *κλυτρον*, said to mean “with two spurs,” while there is no such word.) — Perennial and glabrous herbs; with variously compound leaves, none climbing except the peculiar Himalayan section? *Dactylocapnos*; the genuine species all E. Asian and the following. — Bernh. Linnæa, viii. 457, 468; Endl. Gen. 859; Gray, Gen. III. i. 119, t. 50. *Diclytra* & *Cap-*

<sup>1</sup> Add syn. *A. fungosa*, Greene, in Torr. Club, Prelim. Cat. N. Y. 3.

*norchis*, Borkh. l. c. *Diclytra*, DC. Syst. ii. 107. *Diclytra*, Hook. Fl. Bor.-Am. i. 35. *Capnorchis* (Boerh.), Planch. Fl. Serres, viii. 828. *Bicucullata*, Juss. *fide* L. Gen. ed. 6, no. 849.<sup>1</sup> (Much would have been saved if Bernhardt had taken the name *Capnorchis*.)

§ 1. *CUCULLÁRIA*. Acaulescent and scapose: corolla white or tipped with cream-color or flesh-color, flattened: a gland or gibbosity at base of middle filaments, the more conspicuous as the nectariferous petals are more saccate: seeds crested. — *Capnorchis*, Boerh. Ind. Alt. Pl. Hart. Lugd.-Bat. 309, not Borkh. *Bicucullata* or *Cucullaria*, Juss.

\* Inflorescence simple and racemiform, several-one-flowered, the uppermost flower earliest: petioles and scapes a span high: leaves ternately decompound, the lobes linear or nearly so. — *Dicentra*, Bernh. Linnaea, viii. 468.

D. *TENUIFÓLIA*, DC. (that is, *Diclytra tenuifolia* & *D. lachenaliaeflora*, DC. Syst. ii. 110, *Corydalis tenuifolia*, Pursh), described from Pallas's specimens, belongs to the Asiatic coast and is not known on the American side: It is distinguished by its fibrous roots from a small rootstock, very much and finely dissected leaves, the divisions very narrow, acute, and crowded, 1-5-flowered scape, corolla nearly an inch long, the narrow upper half of the outer petals recurving.

D. *pauciflóra*, WATSON. A span or more high from thickish-filiform and fleshy creeping and branching rootstocks which bear small granular bulblets: leaves small, 2-3-ternate and the divisions laciniately subpinnatifid into lanceolate- or spatulate-linear lobes: scape bearing 2 or 3 or sometimes solitary nodding flowers: corolla almost inch long, white or slightly flesh-colored, withering-persistent; outer petals with saccate spur and linear-oblong recurving tip considerably shorter than the body; inner with ligulate claw abruptly contracted at apex into a short stalk, which abruptly dilates into the elongated ligulate-spatulate lamina: style elongated. — Bot. Calif. ii. 429. — N. California; near snow on Scott Mountains, in summer, *Greene*; also, at less elevation, near Castle Lake, *Lemmon*.<sup>2</sup>

D. *uniflóra*, KELLOGG. Smaller, 2 to 4 inches high, from a fascicle of narrow-fusiform and perpendicular fleshy tubers: leaves less compound and lobes more spatulate: scape 1-2-flowered: flower seemingly erect, half inch long; outer petals merely gibbous-saccate at base, their spatulate-linear recurving tips very much longer than the body; inner with lamina dilated and hastate at base directly from the oblong-linear claw: style short. — Proc. Calif. Acad. Sci. iv. 141, with fig.; Brew. & Wats. Bot. Calif. i. 24; Coulter, Man. Rocky Mt. Reg. 14. — Sierra Nevada, California, near Cisco and Sierra Valley, *Kellogg*, *Lemmon*; high mountains of Wyoming and Utah, *Coulter*, *Chadbourne*, &c.; Mt. Adams, Washington, *Suksdorf*.

D. *Canadensis*, DC. (SQUIRREL-CORN.) A span or two high, from filiform creeping rootstocks bearing clusters of golden yellow fleshy grains about the size of those of Indian corn (each the thickened base of a petiole or in place of it): leaves usually once or twice ternately and then quaternately compound, then pinnately parted into linear divisions: scape bearing few or several nodding fragrant flowers: corolla pearl-white or tinged with rose, tardily deciduous, at most inch long, cordate in outline (the saccate bases short and roundish), outer petals connivent up to the short ovate-saccate spreading tips; inner conspicuously wing-crested on the back at summit. — Prodr. i. 126 (*Diclytra*); Hook. Bot. Mag. t. 3031 (*Diclytra*); Torr. & Gray, Fl. i. 67 (*Diclytra*); Gray, Gen. III. i. 120, t. 50. *D. eximia*, Beck, Bot. 23 (*Diclytra*). *D. eximia*, var., Hook. Fl. Bor.-Am. i. 35 (*Diclytra*); Darlingt. Fl. Cest. 399 (*Diclytra*). *Corydalis formosa*, Pursh, Fl. ii. 462, partly. *C. Canadensis*, Goldie, Edinb. Phil. Jour. vi. 330; Thomas, Am. Jour. Sci. xxvi. 114, with plate.<sup>3</sup> — Woods in vegetable mould, Nova Scotia to Michigan, Pennsylvania, and Kentucky, but chiefly northward; fl. spring.

<sup>1</sup> Add syn. *Capnorchis* & *Capnodes*, *Greene*, Fl. Francis. 278, 280.

<sup>2</sup> Reported by Coville (Contrib. U. S. Nat. Herb. iv. 60) from near Mineral King, Tulare Co., Calif., which greatly extends the range of the species.

<sup>3</sup> Add syn. *Bicuculla Canadensis*, *Millsp.* Fl. W. Va. 327.

**D. Cucullária, DC.** (DUTCHMAN'S BREECHES.) Rather larger, with similar foliage: tuberous-thickened subterranean leaf-bases angular, white or reddish, collected to form a kind of scaly fleshy bulb: scape bearing several nodding flowers (in Oregon sometimes paniculate): corolla deciduous in fruiting, white with yellowish tips, divergently 2-spurred at base, the spurs as long as the body and longer than the pedicel; crest of inner petals small, semioval, bladdery. — Syst. ii. 108 (*Dielytra*); Hook. Fl. Bor.-Am. i. 35 (*Dielytra*); Torr. & Gray, l. c. 66 (*Dielytra*); Lemaire, Ill. Hort. vi. t. 215 (*Dielytra*). *Dielytra Canadensis*, Borkh. l. c. 46. *Bicucullata (Canadensis)*, Juss. Act. Par. 1733, cited as *Cucullaria*, Juss. by L.; whence *Fumaria Cucullaria*, L. Spec. ii. 699; Sims, Bot. Mag. t. 1127. *F. pallida*, Salisb. Prodr. 377. *Corydalis Cucullaria*, Pers. Syn. ii. 269. *Cucullaria bulbosa*, Raf. Med. Rep. hex. 2, v. 352, & in Desv. Jour. Bot. ii. 169 (1809).<sup>1</sup> (*Dielytra bracteosa*, DC. Syst. ii. 109, would seem to be a monstrosity of this species, probably from Canada.) — Woods in vegetable mould, Nova Scotia to L. Huron, south to N. Carolina in the mountains and Missouri, and northwest to Idaho and Oregon<sup>2</sup> (where occurs an obscure form with much shorter and rounded spurs); fl. spring.

\* \* Inflorescence thyrsoid, subulate-bracteate; flowering for a long time, and the usually rose-purple or flesh-colored cordate corolla withering-persistent around the fruit: tips of the inner petals rather conspicuously crested on the back: glands of the filaments obsolete (stigma with a double pair of lobes in both species): plants about a foot high from rather stout and fleshy branching and spreading rootstalks: leaves once or twice ternately compound and then quinately or pinnately dissected into rather coarse oblong and incised divisions, usually green above, glaucescent beneath. — *Eucapnos*, Bernh. Linnæa, viii. 468.

**D. formósa, DC.** Corolla cordate, and with very short neck under the short and ovate-cymbiform spreading tips of the outer petals; crests of inner petals little surpassing their tips; all the petals united up to above the middle. — Syst. ii. 109 (*Dielytra*), excl. syn. Pursh and eastern habitat; Torr. & Gray, Fl. i. 665 (*Dielytra*); Brew. & Wats. Bot. Calif. i. 24, ii. 429. *Dielytra saccata*, Nutt. in Torr. & Gray, l. c. 67. *D. eximia*, Hook. Fl. Bor.-Am. i. 35, excl. var. *Fumaria formosa*, Andr. Bot. Rep. vi. t. 393 (flowers poorly represented); Sims, Bot. Mag. t. 1335. *Corydalis formosa*, Spreng. Syst. iii. 162. *Eucapnos formosa*, Bernh. l. c. — In woods, Brit. Columbia to the middle of California; first coll. by *Menzies*. Occasionally with yellowish flowers as in coll. *Rattan*.

**D. exímia, DC.** l. c. (*Dielytra*). Corolla tapering from the cordate base into a longer and narrower neck, early separating to much below the middle; lax tips of the outer petals longer and acuminate; of the inner surpassed by the prolonged apex of the crest. — Torr. & Gray, Fl. i. 665 (*Dielytra*); Gray, Man. 29. *Fumaria eximia*, Ker, Bot. Reg. t. 50. *F. formosa*, Poir. Suppl. v. 684. *Corydalis formosa*, Pursh, Fl. ii. 462, excl. syn. & var.; Thomas, Am. Jour. Sci. xxvi. 114, with plate. *Eucapnos eximius*, Bernh. l. c.<sup>3</sup> — Wooded banks, W. New York (station not now known), to the mountains of Virginia, N. Carolina, and Tennessee; perhaps first coll. by *Lyon*.

§ 2. **CHRYSOCÁPNOS, Torr.** Caulescent and branching stout-rooted perennials: inflorescence compound, thyrsoid-paniculate: corolla yellow, subterete, deciduous; outer petals barely gibbous at base, hardly larger than the inner: stamens high-diadelphous: slender persistent style at dehiscence of the capsule usually fissile up to the stigma into four portions, two answering to the valves and two to the placente: seeds crestless, the coat dull and rough.

**D. chrysántha, Hook. & Arn.** Pale and glaucous: stem stout, erect, 2 to 5 feet high: leaves twice or thrice pinnate, and the more or less confluent divisions pinnately 3-5-cleft or incised: thyrsus elongated, many-flowered: flowers erect, half to three fourths inch long, golden yellow; outer petals soon spreading or recurving to below the middle, mucronate beyond the small saccate tip; inner dorsally crested with a long and wide undulate or crisped wing. — Bot. Beech. 320, t. 73 (*Dielytra*); Torr. & Gray, Fl. i. 665 (*Dielytra*); Torr.

<sup>1</sup> Add syn. *Bicuculla Cucullaria*, Millsp. l. c.

<sup>2</sup> Washington, *Suksdorf*.

<sup>3</sup> Add syn. *Bicuculla eximia*, Millsp. l. c.

Bot. Mex. Bound. 32; Brew. & Wats. Bot. Calif. i. 24. *Capnorchis chrysantha*, Planchon, Fl. Serres, viii. 193, t. 820. — Dry hills, California, from Lake Co. to San Diego and farther, first coll. by Douglas; fl. summer.

**D. ochroleuca**, ENGELM. Flowers an inch long, ochroleucous; only the tips of the outer petals spreading; the inner with purple tips and still larger winged crests: otherwise like the preceding, of which it may be a form. — Bot. Gaz. vi. 223. — Valleys of the Santa Monica Mountains near Los Angeles, California, Engelmann; sandy washes, Temescal, San Bernardino Co., Lyon.<sup>1</sup>

**3. CORYDALIS**, Vent. (*Κορυδαλλίς*, Latin *Corydalis*, ancient name of the crested lark.) — Herbs of wide range and various habit; none of ours at all cirrhose and climbing. — Vent. Choix Cels, 19; DC. Fl. Fr. ed. 3, iv. 636, & Syst. ii. 113; Benth. & Hook. Gen. i. 55, excl. *Cysticapnos* (which is original *Corydalis*, Dill.), &c.

§ 1. Perennial and simple-stemmed from a tuber. — *Bulbocapnos*, Bernh.

**C. pauciflora**, PERS. A span high, from a simple or double oblong tuber, 1-3-leaved below: leaves 1-2-ternately divided or parted; divisions obovate or spatulate, mostly entire; raceme capituliform, 2-7-flowered, leafy bracteate: corolla three fourths inch long, long-spurred, purple. — Syn. ii. 269; Deless. Ic. Sel. ii. t. 9; Hook. Fl. Bor.-Am. i. 37; Torr. & Gray, Fl. i. 70; Ledeb. Ic. t. 450. *Fumaria pauciflora*, Steph. in Willd. Spec. iii. 861. — N. Alaska and Islands. (E. Siberia to Caucasus.)

*C. AMBIGUA*, Cham. & Schlecht., comes as near as Arakamtchem Island, on the Asiatic side of Bering Strait, Wright.

§ 2. Perennial, from thickened roots, branching, with ample 2-3-pinnate leaves and many-flowered racemes: stigma with 6 lobes or processes, one pair terminal, one medial, and one basal: capsules oval or oblong, rather few-seeded. Western.

\* Flowers rose-colored: root tuberous-thickened: stem squamose at base, leafless for considerable height, then few- and large-leaved. (Here the Siberian *C. pæoniifolia*, Pers., & *C. gigantea*, Trautv. & Meyer.)

**C. Scouleri**, Hook. Stem a foot to a yard high, 1-3-leaved above: larger leaves thrice pinnate, then pinnately parted into oblong obtuse divisions of an inch or two in length, glaucous beneath: corolla fully inch long, cylindrical spur thrice the length of the body. — Fl. Bor.-Am. i. 36, t. 14. *C. Scouleri* & *C. macrophylla* (Nutt.), Torr. & Gray, Fl. i. 69. — Woods of Columbia River near the coast, Scouler, Cooper, &c.

\* \* Flowers cream-color or white, mostly with bluish tips: stems erect from strong perennial roots, 2 to 5 feet high, leafy throughout, glaucescent: leaflets oval or oblong, half inch to inch long, mucronate: racemes terminal, dense: corolla inch or less long; the nearly straight spur fully twice the length of the rest of the flower: species or forms, probably all to be reunited.

**C. Caseana**, GRAY. Stem rather lax and succulent: hood of the outer petals concave, with spreading margins, pointless or short-pointed, and bearing a rather broad and apically projecting dorsal crest: mature fruit unknown, the forming capsules barely half inch long, elliptical, obtuse. — Proc. Am. Acad. x. 69; Wats. Bot. Calif. ii. 429. *C. Bidwellie*, Wats. l. c. — In water or on very wet banks, Sierra Nevada, California, from Truckee River to the Big Spring district in Plumas Co., Bolander, E. L. Case, Lemmon, Mrs. Austin, Mrs. Bidwell, Parry.

**C. Cusickii**, WATSON, l. c. 430. Raceme more bracteate: flowers white or purplish, with tips of inner petals violet; hood of outer petals emarginate by the development of broad thin margins which are recurved over the narrow and undulate dorsal crest: capsule oblong, turgid, half inch long, "elastically dehiscent from the apex downward, forcibly projecting the seeds" (*Cusick*); seeds nearly smooth with a conspicuous orbicular carunculate crest. —

<sup>1</sup> Near Cholame, San Luis Obispo Co., Lemmon; San Rafael Mts., Ford.



Coulter, Man. Rocky Mt. Reg. 14. — Blue Mountains and Eagle Creek Range, along alpine watercourses, *Cusick*, 1877; W. Idaho, on the ridge above Clearwater, *Watson*, 1880. Largest leaves 3 feet long.

- C. Brandegéi**, *Watson*, l. c. Stems 2 to 5 feet high: dorsal crest of the hoods obsolete and rounded summit not emarginate, but margins recurved: capsules short-oval to oblong, obtuse, reflexed on the ascending pedicels: seeds with a small arilliform crest. — Coulter, l. c. — Mountains of S. W. Colorado, *Brandegée*, 1874, *Lieut. McCauley*, 1877; Utah, in the Wasatch Mountains, at about 10,000 feet, on rather dry banks, *M. E. Jones*, 1879, *Hooker & Gray*, 1887.

§ 3. Annuals or (chiefly) biennials, mostly branched from the base, with finely dissected leaves and siliquiform capsule.

\* Stem strict: flowers purple or rose-colored with yellow tips.

- C. glauca**, *Pursh*. A foot or two high, except in depauperate specimens, very glaucous: lobes of the leaves mostly spatulate: racemes short, paniced at the naked summit of the branches: flowers barely half inch long: spur short and rounded: capsule slender and linear: seeds minutely rugulose transversely. — Fl. ii. 463; Hook. Fl. Bor.-Am. i. 37; Torr. & Gray, Fl. i. 69. *Fumaria sempervirens*, L. Spec. ii. 700, but in no way evergreen. *F. glauca*, Curtis, Bot. Mag. t. 179. *Capnoides sempervirens*, Borkh. in Rœm. l. c. 44. *Corydalis sempervirens*, Pers. Syn. ii. 269. — Rocky or sterile ground, Nova Scotia to the northern Rocky Mountains (and even to Brit. Columbia and Arctic Coast), south to Texas; fl. summer.

\* \* Low, ascending or diffuse: flowers yellow: apparently all biennials or winter-annuals; but a common western one seemingly more enduring.<sup>1</sup>

+ Hood or sac of the outer petals at most carinate but not wing-crested upon the back.

- C. aurea**, *Willd.* Commonly low and spreading: flowers golden yellow, about half inch long, on rather slender pedicels in a short raceme; spur barely half the length of the body, somewhat decurved: capsules spreading or pendulous, about inch long, terete, torulose when dry, 10–12-seeded: seeds turgid, obtuse at margin, the shining surface obscurely reticulated. — Enum. 740; DC. Syst. ii. 125, partly; Hook. Fl. Bor.-Am. i. 37; Torr. & Gray, Fl. i. 68, mainly; Gray, Gen. III. i. 124, t. 52, & Man. 29. *C. aurea*, var. *micrantha*, Wats. Bot. King Exp. 14. *C. aurea*, var. *macrantha*, Wood, Bot. & Fl. 34. *Fumaria aurea*, Ker, Bot. Reg. t. 66.<sup>2</sup> — Rocky banks, Lower Canada and N. New England, northwestward to lat. 64°, west to Brit. Columbia and Oregon, south to Texas, Arizona. (Adj. Mex., but not Japan.) Western forms with spur almost as long as the body of the corolla and passing into

**Var. occidentális**, *Engelm.* More erect and cespitose, from a stouter and sometimes more enduring root: flowers rather larger and spur (almost as long as the body) commonly ascending: capsules thicker, less torulose, sometimes minutely pruinose, mostly incurved-ascending on short spreading pedicels: seeds less turgid and acutish at the margins. — Engelm. in Gray (Pl. Fendl. 6), Man. ed. 5, 62. *C. montana*, Engelm. l. c.; Wood, Bot. & Fl. 34.<sup>3</sup> — Colorado, New Mexico, W. Texas, Arizona. (Adj. Mex.) The typical form of this (well represented by Pringle's 198 from Chihuahua, and the plant about El Paso) by itself seems quite specifically distinct, and nearly approaches the next species.

- C. curvisiliqua**, *Engelm.* Commonly robust, ascending or erect, a foot or less high: flowers golden yellow, over half inch long, in a spiciform raceme; spur equalling the body in length, commonly ascending: capsules rather stout, quadrangular, inch and a half long, 2 lines thick, incurved-ascending or straightish on very short and thickish diverging pedicels: seeds turgid-lenticular with acute margins, the surface thickly and minutely muriculate. — Engelm. in Gray, Man. ed. 5, 62. *C. aurea*, var. *curvisiliqua*, Gray, Proc. Acad. Philad. 1863, 57 (but the plant of Hall & Harbour is rather *C. aurea*, var. *occidentális*). *C. aurea*, var., Gray, Pl. Wright. ii. 10.<sup>4</sup> — Woods and thickets, New Braunfels, &c., Texas, *Lindheimer*.

+ + A conspicuous wing-like crest on the back of the hood or sac of the outer petals (not developed in cleistogamous flowers).

<sup>1</sup> For Dr. Gray's preliminary treatment of this difficult group, see Bot. Gaz. xi. 188, 189.

<sup>2</sup> Add syn. *Capnoides aureum*, Kuntze, acc. to Britton, Mem. Torr. Club, v. 165.

<sup>3</sup> Add syn. *Capnoides montanum*, Britton, l. c. 166.

<sup>4</sup> Add syn. *Capnoides curvisiliquum*, Kuntze, acc. to Britton, l. c.

- C. cristallina**, ENGELM. Ascending or nearly erect, a foot or less high: flowers bright yellow, about two thirds inch long, in a rather close or strict spike; spur mostly horizontal, nearly as long as the body; dorsal crest shorter than the hood but very broad and salient, usually 3-4-dentate: capsules linear-oblong, terete, half or three fourths inch long, erect on extremely short pedicels, densely pruinose with (when fresh) transparent crystalline vesicles (as in the Ice-plant): seeds with acute margins, the coat minutely tubercular-reticulated. — Engelm. in Gray, Man. ed. 5, 62. *C. aurea*, var. *cristallina*, Torr. & Gray, Fl. i. 665.<sup>1</sup> — Prairies and fields, Arkansas and S. W. Missouri; first coll. by Nuttall.
- C. flavula**, DC. Slender, soon diffuse, branching: flowers usually pale yellow (rarely "bright" or even "deep" yellow) a fourth or third inch long, slender-pedicelled and conspicuously bracted; spur short and decurved; outer petals surpassing the inner, acute or acuminate; dorsal crest very salient and 3-4-dentate: capsules linear and slender, torulose, pendulous or spreading on filiform pedicels: seeds comparatively large, acutely wing-margined, toward the margins rugose-reticulated. — Prodr. i. 129; Gray, Man. ed. 5, 61. *C. aurea*, var. *flavula*, Wood, Bot. & Fl. 34. *C. flavidula*, Chapm. Fl. ed. 2, 604. *Fumaria flavula*, Raf. in Desv. Jour. Bot. i. 224 (1808).<sup>2</sup> — Rocky or gravelly places, Canada, on shore of L. Erie, to Virginia, Tennessee, Missouri, and Louisiana.
- C. micrantha**, GRAY. Slender and diffuse, a span or two high, with habit of *C. flavula*, but with smaller bracts and short pedicels: flowers pale yellow; when well developed fully a third inch long, narrow, with spur a line or two long, and a lunate mostly entire crest on the back of the mucronate-tipped hoods; often producing only cleistogamous and smaller flowers, destitute of spur and with or without the crest: capsules linear, torulose, ascending on short pedicels: seeds turgid and obtuse at margins, as in true *C. aurea*. — Bot. Gaz. xi. 189. *C. aurea*, var. *micrantha*, Engelm. in Gray, Man. ed. 5, 62. *C. aurea*, var. *australis*, Chapm. Fl. ed. 2, 604.<sup>3</sup> — Waste or open ground, coast of N. Carolina, *Havard*, to Florida, Texas, and Missouri.<sup>4</sup> Dr. Havard only has yet collected specimens showing both the ordinary flowers and some cleistogamous and spurless ones.

## ORDER X. CRUCIFERÆ.

The genera *Draba*, *Lesquerella*, *Nasturtium*, *Dryopetalon*, *Platyspermum*, *Selenia*, *Parrya*, *Leavenworthia*, *Dentaria*, *Cardamine*, *Arabis*, and *Streptanthus* by S. WATSON; the remaining genera, together with the ordinal character and generic key, by B. L. ROBINSON.

Herbaceous or rarely suffruticose plants with a watery juice. Flowers perfect, regular,<sup>5</sup> racemose, spicate, or somewhat corymbose, and (with rare exceptions) ebracteate. Sepals 4, usually oblong, often colored, erect and appressed to the corolla or spreading during anthesis; the outer pair median; the inner pair lateral, similar or more saccate at the base. Petals 4 (rarely wanting), hypogynous, in a single whorl, equal, alternating with the sepals, more or less distinctly unguiculate, entire, infrequently bifid or very rarely toothed or lobed, yellow, white, roseate, or purple. Stamens normally 6 (rarely 4 or 2), hypogynous, of unequal length (didynamous); the two outer ones lateral, shorter than the others, opposite the inner sepals; the remaining four (arising by collateral chorisis of an original median inner pair) longer, nearly opposite the

<sup>1</sup> Add syn. *Capnoides cristallinum*, Kuntze, l. c.

<sup>2</sup> Add syn. *Capnoides flavulum*, Kuntze, l. c.

<sup>3</sup> Add syn. *Capnoides micranthum*, Britton, l. c.

<sup>4</sup> Said by Patterson (Pl. Ill. 3) and Hill (Bull. Torr. Cl. xvii. 172) to grow throughout Illinois; also reported from Minnesota by MacMillan, Metasp. Minn. Val. 255. Specimens from these States have not been seen by the editor.

<sup>5</sup> Except sometimes in *Streptanthus*.

petals; filaments sometimes dilated or toothed below; anthers 2(-1)-celled, longitudinally dehiscent, commonly innate, entire or sagittate at the base, rarely contorted or spirally coiled. Honey glands always present upon the receptacle, distinct or more or less confluent in lateral pairs flanking the shorter stamens, or less frequently also between the bases of the longer pairs of stamens. Carpels 2, lateral, united; ovary superior, 2-celled (rarely unicellular, or by the intrusion of false transverse partitions several-celled in *Raphanus*); cells collateral or in one tribe (*Cakilineæ*) superposed, 1-many-seeded; placentæ parietal or rarely basal; style simple, elongated, short, or undeveloped, often persistent; stigma terminal, regular and circular in outline or more or less distinctly 2-lobed; the lobes being either lateral or median: ovules horizontal or pendulous or rarely (when solitary in indehiscent cells) erect, campylotropous or amphitropous. Fruit capsular, 2-valved, or rarely indehiscent, either elongated (silique) or relatively short and broad (silicle), terete, prismatic, or more or less strongly compressed, either laterally and parallel to or obcompressed contrary to the partition, sometimes inflated or wing-margined; seeds exalbuminous; the outer coat often becoming mucilaginous when moistened; embryo with rare exceptions curved; cotyledons flat, entire or rarely lobed, lying either with the surface against the mostly ascending radicle (incumbent, in cross-section thus, ☉), or with one edge toward the radicle (accumbent, in cross-section thus, ☉), or less frequently longitudinally plicate and partially enveloping the radicle (conduplicate, in cross-section thus, ☉), or finally (in certain foreign genera) spirally coiled. — A large order, represented in almost every part of the earth, but preferring temperate and subarctic regions. Plants of considerable constancy of floral character but with much variability in fruit, economically important as furnishing a number of vegetables (cabbage, turnip, cauliflower, Brussels-sprouts, radish, &c.), salad plants (water-cress, garden-cress), and condiments (mustard, horse-radish).

**TRIBE I. ALYSSINEÆ.** Fruit short, orbicular, elliptical, or short-oblong, rarely more elongated, lanceolate or linear (some species of *Draba*), always more or less compressed parallel to the partition, 2-celled, dehiscent, 2-many-seeded, or rarely (in *Athysanus* and certain species of *Draba*) indehiscent or nearly so, or through the obliteration of the partition 1-celled, 1-seeded (*Athysanus*). Valves flat or moderately convex. Cotyledons accumbent, very rarely (in *Draba*) incumbent. Pubescence altogether or in great part branched, only in the genus *Thysanocarpus* quite simple.

\* Fruit oblong, elliptic or lanceolate, rarely linear, 2-celled, dehiscent (sometimes very tardily so), 2-several-seeded: stamens unappendaged.

1. **DRABA.** Sepals short and broad, obtuse, equal at the base. Petals commonly obovate, entire or rather deeply bifid. Style short or slender and somewhat elongated; stigma simple or very slightly lobed. Septum thin, membranaceous. Seeds biseriate, neither margined nor winged. Cotyledons accumbent or rarely incumbent. Pubescence branched.

\* \* Fruit orbicular, indehiscent, 1-celled, 1-seeded.

2. **ATHYSANUS.** Flowers minute. Sepals ovate, rounded, equal at the base, spreading. Petals minute, linear, or wanting. Stamens 6, subequal; filaments slender; anthers short. Stigma small, sessile. Ovules 3 or 4, only one maturing. Fruit wingless. Pubescence branched; the hairs on the fruit usually uncinatæ.

3. **THYSANOCARPUS.** Flowers small. Sepals ovate, rounded, spreading. Petals spatulate. Stamens as in the last. Style slender, short or rarely absent; stigma simple. Ovule solitary. Fruit winged. Pubescence simple or none.

\* \* \* Fruit orbicular or nearly so, 2-celled, dehiscent, 2-several-seeded: filaments often dilated and toothed or appendaged near the base.

4. **BERTEROA.** Sepals oblong, rounded at the apex. Petals obovate, bifid, cuneate below. Stamens 6; filaments somewhat appendaged upon the inner surface near the base. Style slender, rather long. Stigma essentially simple. Pods flat, often tomentose. Seeds several in each cell, winged or margined. Pubescence stellate, not appressed.

5. **LOBULARIA.** Sepals short, ovate, spreading in anthesis. Petals obovate, cuneate, entire. Stamens 6; filaments slender, rarely dilated below, not toothed. Silicle small; valves flat or slightly convex. Style slender; stigma subsimple. Cells few-seeded. Hairs 2-parted and appressed.

6. **ALYSSUM.** Sepals short, ovate or oblong, more or less spreading. Petals obovate, cuneate to spatulate or linear, entire or slightly retuse at the summit. Stamens 6; filaments commonly more or less dilated at the base and toothed. Capsule with valves convex. Pubescence densely stellate.

TRIBE II. **PHYSARIEÆ.** Fruit a silicle, 2-celled, completely dehiscent, either very turgid with broad partition and almost hemispherical valves, or didymous, or strongly obcompressed with narrow partition and conduplicate. Cotyledons accumbent. Pubescence stellate.

\* Silicle subglobose; partition broad, suborbicular.

7. **LESQUERELLA.** Sepals oblong or elliptical, rather short, equal at base, erect or spreading, usually pubescent. Petals longer, spatulate to oblong-obovate, entire. Stamens 6; anthers linear, sagittate; filaments rarely dilated or winged at the base. Style slender; stigma entire or nearly so. Pods mostly very turgid; cells 2-16-seeded; septum nerved from the top to the middle. Seeds rarely margined.

\* \* Silicle didymous or obcompressed; partition narrow, elliptical, oblong or linear.

+ Seeds several to many.

8. **PHYSARIA.** Floral envelopes and androecium of the preceding. Style slender. Fruit more or less strongly didymous and inflated or sometimes rather strongly obcompressed, but the cells at least somewhat turgid at maturity.

9. **SYNTHLIPSIS.** Sepals oblong, spreading in anthesis. Petals longer; blade flat, obovate; claw rather short. Stamens 6, unappendaged. Style slender; stigma simple. Capsule elliptic-oblong, very strongly obcompressed; valves sharply carinate, not auriculate or wing-appendaged. Seeds about 10 in each cell, neither margined nor winged.

10. **LYROCARPA.** Sepals linear or linear-oblong, acute or acutish, erect, equal at base. Petals long, linear to obovate, sometimes twisted. Stamens six, free, unappendaged. Style short or none; stigma rather large, entire or somewhat lobed; the lobes lying over the valves. Capsule very strongly obcompressed, oblong and biauriculate at the apex, or short, broad and obcordate. Septum narrow, linear.

+ + Seeds solitary in each cell.

11. **DITHYREA.** Sepals ovate or oblong, erect or spreading, pubescent. Petals conspicuous, broadly spatulate, with spreading blades and slender claws. Stamens 6, free and unappendaged; anthers linear, sagittate. Pods very strongly obcompressed and didymous; cells suborbicular; septum very narrow and shorter than the cells. Style almost none; stigma rather large, somewhat ovate, simple.

TRIBE III. **LEPIDINEÆ.** Fruit a 2-celled silicle, strongly obcompressed (except in the aquatic genus *Subularia*). Cotyledons incumbent or accumbent. Pubescence wholly simple or none.

\* Fruit strongly obcompressed, dehiscent; cells 2-several-seeded; cotyledons accumbent: terrestrial and glabrous.

- 12. THLASPI.** Sepals short, oval, obtuse, thin-margined, erect or slightly spreading. Petals obovate or oblanceolate, entire. Stamens free, unappendaged; anthers short, oval. Style slender or sometimes none; stigma small, entire or slightly emarginate. Capsule orbicular, elliptic-oblong, or oblanceolate; the valves very strongly and usually sharply keeled, often winged especially toward the apex.
- \* \* Fruit strongly obcompressed or didymous; cells usually 1-seeded; cotyledons incumbent (except in *Lepidium Virginicum*): terrestrial.
- 13. LEPIDIUM.** Sepals short, ovate or elliptic-oblong, obtuse, equal at base, more or less spreading. Petals obovate or oblanceolate-spatulate, entire, rounded at the apex, sometimes abortive or none. Stamens free, unappendaged, all six present or by abortion the smaller ones absent, or through further simplification only two stamens present, each representing one of the longer pairs. Style slender and more or less elongated or stigma sessile. Capsule orbicular, ovate, or elliptic-oblong, often notched at the apex, regularly dehiscent; valves very strongly compressed and sharply keeled, often wing-appendaged especially toward the apex, not thickened nor sculptured. Ovules pendulous from near the apex of the cells.
- 14. SENEBIERA.** Sepals oval, equal at base, spreading, often fugacious. Petals obovate, or more or less abortive, short, linear, or subulate. Stamens free and unappendaged, all 6 present or only 4 or 2 as in the preceding; anthers short, somewhat didymous. Stigma sessile, nearly or quite simple. Fruit more or less distinctly didymous; the valves thickish, often sculptured or tuberculated, falling off as 1-seeded closed or nearly closed nutlets. Embryo folded morphologically above the base of the cotyledons.
- \* \* \* Fruit turgid, subglobose, pyriform or short fusiform, dehiscent, several-seeded; cotyledons incumbent: aquatic with subulate leaves.
- 15. SUBULARIA.** Sepals ovate, equal, obtuse, spreading. Petals oblong or spatulate, entire, without sharp distinction of blade and claw. Stamens 6, scarcely unequal, free and unappendaged; anthers oval. Stigma sessile, slightly 2-lobed. Seeds few, 2-rowed in the cells. Embryo folded morphologically above the radicle, the curvature being in the cotyledons, not between them and the radicle nor in the latter.
- TRIBE IV. CAMELINEÆ.** Fruit short, scarcely longer than broad, turgid or obcompressed, orbicular-obovate or elliptic-oblong in outline. Cotyledons incumbent. Hairs some or all branched (absent in *Capsella procumbens*).
- 16. CAPSELLA.** Sepals ovate or oblong, obtuse, thin-margined, spreading slightly or considerably or even reflexed in anthesis, not saccate at base. Petals small, spatulate, equalling or little exceeding the calyx. Stamens free and unappendaged. Style almost none. Fruit capsular, 2-valved, many-seeded, more or less strongly obcompressed; septum linear to elliptic-oblong, thin and nerveless or nearly so; valves carinate.
- 17. CAMELINA.** Sepals short-oblong, obtuse, thin-margined, subequal at base, more or less colored, often villous. Petals spatulate or obovate, unguiculate. Stamens 6, free and unappendaged. Style slender; stigma simple. Capsule obovoid, 2-celled, many-seeded, with a broad thin obovate persistent septum and somewhat firm strongly convex valves. Seeds biseriate in the cells, wingless.
- 18. NESLIA.** Sepals, petals, and stamens of the preceding. Style slender; stigma simple or emarginate. Fruit globose or subglobose, indehiscent, 2-celled or more commonly, through the obliteration of the fugacious septum, 1-celled. Seeds 2, or more frequently by abortion 1, neither winged nor margined.
- TRIBE V. CAKILINEÆ.** Fruit transversely 2-jointed; cells unequal, both 1-seeded (in North American species) and indehiscent. The ovule in the upper cell erect, in the lower pendulous.
- 19. CAKILE.** Sepals short, erect or slightly spreading, oblong, obscurely saccate at base, somewhat fleshy. Petals exserted. Stamens 6; filaments free and unappendaged. Style none; stigma simple. Seeds oblong, turgid; cotyledons accumbent.
- TRIBE VI. BRASSICEÆ.** Fruit elongated, terete or somewhat prismatic, often torose, usually partially or wholly dehiscent by two valves, 2-celled with a longi-

tudinal membranous or spongy dissepiment, less frequently unicellular or divided transversely by spongy false partitions, thus becoming multicellular and indehiscent (*Raphanus*). Seeds uniseriate or biseriate; cotyledons conduplicate. Petals well developed. Pubescence, when present, usually hirsute. Hairs simple.

\* Fruit stout, indehiscent, commonly more or less moniliform, unicellular or transversely divided by several false partitions.

20. **RAPHANUS**. Sepals erect; the lateral somewhat saccate. Petals large, unguiculate, white or pale yellow, less commonly purplish. Stamens 6, unappendaged. Fruit attenuate to a slender or rather stout beak. Seeds globular, pendulous.

\* \* Fruit more slender, longitudinally 2-celled, and more or less completely dehiscent.

21. **BRASSICA**. Sepals erect or spreading, glabrous, equal at the base or one pair somewhat saccate. Petals large, unguiculate, light yellow or white, often with purple markings. Stamens 6, free and unappendaged. Pod terete or nearly so, tipped with a slender conical or somewhat flattened empty or 1-seeded often indehiscent beak. Seeds globose, uniseriate or rarely and indistinctly biseriate in the cells.

22. **DILOTAXIS**. Sepals erect or spreading, often pilose. Petals and stamens of the preceding. Capsules slender, subterete or angled, borne upon slender spreading pedicels; valves rather flat, 1-nerved; beak conical, sometimes very short. Seeds ovoid or oblong, distinctly biseriate in the cells.

TRIBE VII. **SISYMBRIÆ**. Stigma when lobed elongated over the placenta (except in *Greggia*). Fruit longitudinally 2-celled (very rarely 1-celled), from elliptic or lance-oblong to linear, always considerably longer than broad. Seeds numerous; cotyledons incumbent (very oblique or accumbent in some species of *Erysimum*). A tribe of difficult limitation.

\* Hairs of stem simple, stellately branched or none, not regularly bifid.

+ Stigma entire, or with short lobes spreading over the placenta.

++ Capsule 2-valved, terete, prismatic, or compressed parallel to the perfect or broad and fenestrate septum.

= Leaves elliptical, sessile and clasping by a cordate base: pods long, of firm texture, angled: stout glabrous annual with habit of a *Brassica*: introduced.

23. **CONRINGIA**. Sepals and petals rather long and narrow. Valves of the capsule 1-3-nerved. Style short; stigma quite simple or more or less distinctly 2-lobed. Seeds 1-rowed in the cells, oblong, thick, not margined. Leaves entire.

= = Leaves suborbicular or reniform, broadly cordate, petiolate, toothed: pubescence simple or none: pods elongated, angled: introduced biennial with foliage of a *Cardamine* and fruit suggesting that of *Barbarea*.

24. **ALLIARIA**. Sepals oval, obtuse, caducous. Petals obovate. Stamens 6, free and unappendaged. Pod many-seeded, often torulose; valves keeled, more or less distinctly 3-nerved. Style short or none; stigma simple.

= = = Leaves various, not cordate, except in one or two species of *Sisymbrium*.

a. Septum of the capsule usually narrowly or broadly nerved, when nerveless having its cells elongated longitudinally and usually rather thin-walled.

25. **EUTREMA**. Sepals short, ovate, rounded at apex, equal at base. Petals exserted, entire, obovate, short-clawed. Stamens 6, free and unappendaged; anthers short, ovate. Style short or almost none; stigma small, simple. Fruit oblong-lanceolate to linear, somewhat flattened parallel to the septum, narrowed at each end; valves 1-nerved and somewhat keeled. Septum entire or very incomplete or almost wanting. Pubescence simple or none. Leaves entire or nearly so.

26. **SMELOWSKIA**. Sepals oblong, subequal, somewhat spreading. Petals entire, obovate or spatulate, exserted. Stamens 6, unappendaged; anthers oblong, slightly sagittate at base. Pods lanceolate to lance-oblong, more or less obcompressed; valves sharply keeled. Stigma sessile. Leaves deeply pinnatifid. Hairs in part or all branched.

**27. SISYMBRIUM.** Flowers usually small, and mostly yellow or yellowish. Sepals oblong to linear, usually spreading in anthesis, equalling or exceeding the claws of the obovate or spatulate petals. Stamens 6, free, unappendaged. Style short or none; stigma simple or slightly bifid. Pods linear, short or long, nearly terete. Leaves from entire to bipinnatifid or multifid. Pubescence hirsute with simple hairs, or stellate, or glandular, or none.

b. Septum nerveless or nearly so; its cells smaller, thicker-walled, elongated transversely: boreal and arctic plants with hairs branched, and leaves (in American species) entire or merely dentate.

**28. BRAYA.** Calyx, corolla, and andrœcium of *Eutrema*. Style present but short; stigma more or less distinctly 2-lobed. Fruit oblong to linear-oblong; valves flattish or convex, faintly 1-nerved, not keeled.

++ ++ Capsule strongly obcompressed, at least the upper part, or anomalous and 4-valved!

**29. TROPIDOCARPUM.** Sepals ovate-oblong, spreading. Petals obovate, cuneate. Stamens 6, free and unappendaged. Style slender, sometimes short; stigma circular and entire or slightly emarginate. Silique partially or completely 2-celled, with a very narrow partition, or 1-celled. Seeds 2-4-seriate. Pubescence chiefly simple, a few branched hairs being mixed with the others.

+ + Stigma (anomalous in tribe) bifid with short lobes over the valves.

**30. GREGGIA.** Sepals oblong, spreading. Petals obovate, entire, cuneate. Stamens 6, free, unappendaged; anthers oblong, cordate at base. Stigma somewhat ovate or conical; the stigmatic surface elongated above the valves of the capsule not over the placentæ. Style slender. Seeds nearly uniseriate. Pubescence densely stellate.

+ + + Stigma subconical, with short lobes erect and approximate or connate.

**31. HESPERIS.** Flowers showy, mostly purplish. Sepals erect, oblong; the lateral saccate at base. Petals with long and slender exerted claws and broad obovate or nearly orbicular blades. Stamens 6, free and unappendaged. Pods very long, spreading, torulose, beaked; valves 3-nerved. Leaves mostly undivided. Pubescence in part branched.

\* \* Cauline hairs bifid and closely appressed.

**32. ERYSIMUM.** Sepals oblong to linear-oblong, erect, equal at the base or the lateral somewhat saccate. Petals commonly large, with broad obovate blades and slender elongated claws. Stamens 6, free and unappendaged. Pods strongly compressed, broadly linear with flat 1-nerved valves, or narrow and quadrangular with convex and more or less distinctly keeled valves. Seeds numerous, oblong and turgid or suborbicular and flattened or winged. Cotyledons incumbent or accumbent or the radicle not infrequently very oblique.

**TRIBE VIII. ARABIDEÆ.** Stigma when lobed prolonged over the placentæ. Fruit 2-celled, sometimes incompletely so, regularly dehiscent, short or long, flattened parallel to a broad partition, terete or prismatic. Cotyledons accumbent (in some species of *Leavenworthia* the embryo straight or nearly so). Pubescence simple, branched, or absent.

\* Pods globose, terete, or prismatic, at least not compressed parallel to the partition.

+ Flowers (in North American species) white: pods subglobose to short-oblong, often somewhat obcompressed: leaves entire, angulate, or shallowly toothed, not pinnatifid.

**33. COCHLEARIA.** Sepals short and broad, rounded at apex. Petals obovate, cuneate, or very shortly unguiculate. Stamens straight, free. Style slender, sometimes very short; stigma simple or nearly so. Capsule (in North American species) very turgid; valves distinctly 1-nerved. Seeds 2-several, biseriate in the cells.

+ + Flowers yellow, rarely white: pods short-oblong to linear: some or all of the leaves usually pinnatifid.

**34. NASTURTIIUM.** Flowers small. Sepals ovate to elliptic-oblong, spreading in anthesis, often colored. Petals obovate or spatulate, cuneiform at base; scarcely clawed, sometimes minute or wanting. Pods terete or nearly so; valves thin, nearly or quite nerve-

less. Seeds very small, turgid and wingless, usually numerous, in two rows in each cell (scarcely so in *N. sylvestre*), minutely tuberculate or in a few species reticulate-pitted.

35. **BARBAREA.** Flowers somewhat larger than in the preceding. Sepals oblong, often colored; lateral pair often saccate at base and slightly cornute on the back near apex. Petals spatulate or with obovate blades and slender claws. Stamens 6, free and unappendaged, distinctly tetradynamous. Style short; stigma bifid. Capsule linear, elongated, somewhat tetragonal. Seeds uniseriate in the cells.

+ + + Flowers purple: pods linear, elongated.

36. **IODANTHUS.** Sepals oblong, shorter than the claws of the petals, somewhat spreading in anthesis; the lateral pair narrower and more or less distinctly horned or appendaged upon the back near apex. Petals broadly spatulate. Stamens 6, strongly tetradynamous.

\* \* Pods more or less strongly compressed parallel to the partition.

+ Petals toothed or lobed: fruit narrowly linear, elongated.

37. **DRYOPETALON.** Sepals elliptic, purplish; the lateral gibbous at base. Petals exerted; the blade toothed or lobed. Stamens 6, free and unappendaged; anthers ovate-oblong. Stigma nearly sessile, 2-lobed. Seeds many, small, somewhat 2-rowed; cotyledons nearly accumbent. Valves of capsule 1-nerved and veined.

+ + Petals entire or retuse, not lobed.

+ + Pods suborbicular: seeds broadly winged: pubescence simple.

38. **PLATYSPERMUM.** Flowers minute, solitary, borne on naked scapes. Sepals broad, erect, equalling the white linear-spatulate petals. Seeds in two rows, reticulated; cotyledons longer than the radicle. Leaves lyrate, few-lobed or subentire.

+ + Pods broad, lanceolate to elliptic or oblong: seeds mostly biseriate.

39. **SELENIA.** Flowers conspicuous, yellow, in a leafy bracteate raceme. Sepals erect, ovate-lanceolate, acutish, somewhat saccate at base. Petals spatulate. Stamens 6, free and unappendaged; anthers oblong. Pods oblong to broadly elliptic, upon short broad stipes, and beaked by slender styles. Stigma capitate. Glands 10. Seeds in two rows, minutely pitted and margined with a thin cartilaginous wing. Cotyledons longer than the radicle.

40. **PARRYA.** Flowers showy, purple or rose-colored. Sepals oblong, erect; the lateral gibbous at base, nearly equalling the claws of the broad-bladed petals. Anthers included, oblong, subsagittate at base. Pod with flat 1-nerved reticulated valves. Stigma 2-lobed; lobes approximate. Seeds orbicular, winged or wingless.

+ + + Pods narrower, linear-oblong to linear.

= Pubescence simple or none.

41. **LEAVENWORTHIA.** Flowers conspicuous, yellow, whitish, or purplish. Sepals linear-oblong, equal at base, usually spreading in anthesis, considerably exceeded by the obovate or oblanceolate cuneate petals. Stamens 6, strongly tetradynamous, free and unappendaged; anthers oblong. Pod oblong or linear, beaked by a rather slender style, sometimes torulose. Stigma somewhat 2-lobed. Seeds in one row, minutely pitted, margined with a firm thick wing. Cotyledons orbicular; radicle short and straight or more or less oblique.

42. **DENTARIA.** Sepals equal at base, erect or nearly so. Petals much longer, with slender claws and ovate spreading blades. Pods linear, straight with stout replum, firm nerveless flat valves, and nerveless partition; stigma short, capitate or rarely 2-lobed. Seeds in one row, wingless. Cotyledons often thick, more or less unequal and somewhat oblique, petiolate. Funiculus often thickened in fruit.

43. **CARDAMINE.** Sepals equal at base, erect or more or less spreading. Petals obovate to narrowly spatulate. Pods of the preceding. Seeds in one row, wingless; cotyledons flattened, strictly accumbent or one slightly overlapping the radicle, more or less petiolate. Funiculus very slender.

= = Pubescence in part or wholly branched.

44. **ARABIS.** Sepals erect or nearly so, green or less frequently colored; the lateral pair usually gibbous at base. Petals obovate or spatulate, usually unguiculate, commonly con-



siderably exceeding the calyx and with a flat patulous entire or emarginate blade. Stamens 6, free and unappendaged. Pods with nearly flat more or less 1-nerved valves; replum not thickened. Seeds flattened, orbicular or elliptic, more or less winged. The section *Sisymbirina* with oblong wingless seeds and more or less oblique cotyledons.

**TRIBE IX. STANLEYÆ.** Stigma circular in outline or elongated or produced into two lobes lying (except in two or three species of *Thelypodium*) transverse to the partition of the ovary, i. e. over the valves of the capsule. Fruit longitudinally 2-celled, dehiscent, elongated, terete or prismatic or (in *Streptanthus*) compressed parallel to partition or more rarely obcompressed (*Stanfordia*). Cotyledons incumbent or accumbent. Pubescence simple or none (branched in two species of *Thelypodium*).

\* Cotyledons accumbent; ovary sessile upon the receptacle; capsule compressed.

**45. STREPTANTHUS.** Sepals ovate or oblong, colored, usually purplish, quite equal at base, or one pair saccate, rarely both. Calyx commonly closed, ovoid, less frequently subcylindric, or by the spreading of the tips becoming somewhat flask-shaped. Petals usually narrow, linear or with a well developed blade and channelled claw. Stamens 6; the longer pairs often connate below; anthers more or less elongated, sagittate at the base. Capsule oblong to narrowly linear. Seeds flat, margined or winged. Receptacle enlarged.

\* \* Cotyledons incumbent, 3-parted; ovary sessile or nearly so; capsule obcompressed.

**46. STANFORDIA.** Calyx ovoid; sepals large, ovate, colored. Petals exserted, with broad oblong or lance-oblong claw and narrower crisped blade. Stamens 6, free and unappendaged; anthers linear-oblong, sagittate, straight or moderately curved. Style short; stigma at first elliptic, entire, later conspicuously 2-lobed. Capsule linear-oblong, subchartaceous; valves keeled. Seeds many, biseriate in the cells, wingless.

\* \* \* Cotyledons incumbent: ovary sessile or raised upon a short thick gynophore: capsule terete, tetragonal, or slightly flattened parallel to the partition.

**47. CAULANTHUS.** Calyx of *Streptanthus*. Petals undulate-crisped with a broad claw and small or obsolete blade. Stamens 6; anthers linear, sagittate. Stigma well developed and commonly distinctly 2-lobed, persistent. Capsule somewhat flattened and narrowly linear or subterete; valves 1-nerved, and often reticulate-veined.

**48. THELYPODIUM.** Sepals oblong to linear, rather short; calyx at first cylindric, but often more or less spreading in anthesis. Petals flat, long and narrow or with a well developed blade, white or purplish, rarely yellow. Stamens 6, exserted; filaments long and slender; anthers narrowly linear, sagittate at base, curved or coiled. Stigma usually small, often circular in outline, or very slightly 2-lobed. Pods slender, terete, or quadrangular, often torulose, usually spreading.

\* \* \* \* Cotyledons incumbent: ovary raised upon a slender elongated gynophore.

**49. STANLEYA.** Calyx long, cylindric or clavate in bud, spreading in anthesis; sepals linear or spatulate. Petals long and narrow, spatulate, slender-clawed. Stamens 6; anthers linear, curved or spirally coiled; filaments elongated, spreading. Stigma sessile, small, simple. Pods terete or subterete; valves 1-nerved. Seeds oblong, uniseriate. Flowers in more or less elongated racemes.

**50. WAREA.** Calyx short-clavate in bud, spreading in anthesis; sepals short-linear or spatulate. Petals relatively large with broad spreading laminae and slender claws. Stamens 6, exserted, spreading; filaments slender; anthers very small, curved. Stigma simple. Pods terete, slender, widely spreading. Flowers in very short subcorymbose racemes.

**1. DRÁBA, Dill.** ( $\Delta\rho\acute{\alpha}\beta\eta$ , a name of uncertain meaning, applied by Dioscorides to some cruciferous plant.) — Petals entire or emarginate except in § *Erophila*. Seeds smooth or faintly tuberculate, rarely hispidulous. Pubescence usually stellate. A large and widely distributed genus, the larger number of the species arctic or alpine. Many are very variable and the number of species has consequently been greatly multiplied, especially as in the reduced forms of

higher regions the characters become obscured and limits of species ill defined. Some South American species are suffruticose and have showy violet-colored flowers. — Cat. Pl. Giss. App. 122; L. Gen. no. 535; Gray, Gen. III. i. 159, t. 68, 69; Benth. & Hook. Gen. i. 74; Wats. Proc. Am. Acad. xxiii. 255. [By S. WATSON.]

§ 1. *ERÓPHILA*, Koch. Petals bifid: flowers white: pods many-seeded, round-oval to oblong: stellate-pubescent scapose winter-annuals with coarsely toothed or entire leaves. — Syn. 65.<sup>1</sup>

**D. VÉRNA**, L. (WHITLOW-GRASS.) Leaves rosulate, oblong-obovate to oblanceolate: scapes very slender, glabrous or nearly so, 2 to 6 inches high: pods glabrous, round-oval to oblong, 2 to 4 lines long, shorter than the spreading pedicels; stigma nearly sessile. — Spec. ii. 642; Barton, Fl. N. A. iii. 49, t. 88, f. 2; Gray, l. c. t. 69. *D. verna*, var. *Americana*, Pers. Syn. ii. 190. *Erophila Americana*, DC. Syst. ii. 356. *E. vulgaris*, DC. l. c.; Hook. Fl. Bor.-Am. i. 56. — Quebec to Georgia, *Chapman*, and west to Minnesota and Missouri; Washington and Vancouver Isl.; fl. early.<sup>2</sup> (Nat. from Eu.)

§ 2. *HETERODRÁBA*, Watson. Pedicels reflexed, secund: seeds 6 to 10, hispidulous: branching short-caulescent winter-annual, stellate-pubescent; the leaves coarsely toothed or entire: flowers white. — Proc. Am. Acad. xxiii. 256. *Heterodrava*, Greene, Bull. Calif. Acad. Sci. i. 71.

**D. unilaterális**, M. E. JONES. Branching from the base; branches spreading, elongated, lax, leafy below: leaves cuneate-obovate to oblanceolate, an inch long or less: racemes usually nearly sessile: flowers very small: siliques round-oval, somewhat twisted, pubescent, distant, 2 or 3 lines long, on pedicels a line long or less, 12-seeded; stigma sessile. — Bull. Torr. Club, ix. 124. *Heterodrava unilateralis*, Greene, l. c. 72. — Valleys of California from Colusa County to All Saints Bay, Lower Calif.

§ 3. *DRABELLA*, DC. Short-caulescent and more or less leafy winter-annuals (rarely biennial in *D. crassifolia*; scapose in *D. asprella* and *D. crassifolia*): pubescence stellate or more or less villous: pedicels not reflexed: petals entire or emarginate: seeds smooth. — Syst. ii. 332, 351.

\* Early spring species of valleys and hillsides; southern.

+ Leaves entire: flowers white: pedicels clustered or approximate.

**D. Caroliniána**, WALT. Very slender, usually branched; branches often decumbent: leaves obovate to oblanceolate, obtuse or acute, loosely stellate-pubescent, 6 lines long or less: scape-like peduncles glabrous or pubescent, 1 to 4 inches high: flowers small: pods clustered or approximate, glabrous, linear, 3 to 9 lines long, much exceeding the spreading pedicels; stigma sessile. — Car. 174; Torr. & Gray, Fl. i. 109. (*Paronychia Myosotis Virginiana*, Pluk. Alm. t. 51, f. 5.) *D. hispidula*, Michx. Fl. ii. 28. *Arabis reptans*, Lam. Dict. i. 222. *A. rotundifolia*, Raf. Am. Monthly Mag. ii. 43. — E. Massachusetts, *J. Robinson*, to the northern shores of Lakes Erie and Ontario, *Macoun*, Minnesota, Arkansas, and Georgia; Umatilla, Oregon, *Howell Bros.*

**Var. micrantha**, GRAY. Pods hispid with short sub-appressed hairs. — Man. ed. 5, 72. *D. micrantha*, Nutt. in Torr. & Gray, Fl. i. 109. — Illinois to Nebraska, Texas, and New Mexico; Utah,<sup>3</sup> *Watson*; Mt. Helena, Montana, *Canby*; Idaho, *Spalding*; Klikitat Co., Washington, *Suksdorf*.

<sup>1</sup> Add syn. *Gansblum*, Adans. Fam. ii. 420. *Erophila*, DC. Syst. ii. 356.

<sup>2</sup> This species is a noteworthy aggregate of similar forms, distinguished from each other by minute but apparently constant characters, and is sometimes regarded as a group of many very closely related species. (See Rosen, Bot. Zeit. xlvii. 565; Prantl in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 2, 190.) The constancy of trivial characters is doubtless due to close fertilization prevalent in these plants.

<sup>3</sup> Reported from the Panamint Mountains, Calif., by Coville, Contrib. U. S. Nat. Herb. iv. 63.

+- Leaves coarsely few-toothed or entire : pedicels more remotely racemose.

++ Flowers small, white : stigma sessile or nearly so.

**D. cuneifolia**, Nutt. Loosely stellate-pubescent, usually branching from the base ; branches leafy below and obovate to oblanceolate, acute or acutish,  $\frac{1}{2}$  to 2 inches long : raceme pedunculate, at length elongated : flowers small : pods linear-oblong, usually acutish, 3 to 6 lines long, 16-50-seeded, hispid with short sub-appressed simple hairs (very rarely glabrous), on spreading or divaricate pedicels 1 to 3 lines long ; stigma sessile or nearly so. — Nutt. in Torr. & Gray, Fl. i. 108 ; Brew. & Wats. Bot. Calif. i. 28. *D. filicaulis*, Scheele, Linnæa, xxi. 583. — Illinois (?) ; Kentucky, *Short*, to Alabama ; Arkansas and Texas, and west to S. California ; S. Utah, *Parry*, and Jordan Valley, *Watson*.

**Var. platycarpa**, Watson, l. c. Pods oblong-oval, mostly obtuse,  $2\frac{1}{2}$  to 4 lines long, equalling or exceeding the pedicels. — *D. platycarpa*, Torr. & Gray, Fl. i. 108. *D. Rameriana*, Scheele, l. c. — Texas to Arizona.

**Var. integrifolia**, Watson, l. c. Small (1 or 2 inches high) : leaves small, mostly entire : pods glabrous, on pedicels about a line long. — Coast ranges of S. California ; Temescal Mountains, *Brewer* ; Pasadena, Los Angeles Co., *O. D. Allen* ; Santa Maria, *Jared*.

**D. Sonoræ**, Greene. Racemes usually nearly sessile and flowers very small : pods finely stellate-pubescent, 3 lines long, on pedicels 1 or 2 lines in length. — Bull. Calif. Acad. Sci. ii. 59 ; Wats. l. c. — Santa Catalina Mountains, Arizona, *Lemmon* ; Chollas Valley, San Diego Co.,<sup>1</sup> Calif., *Orcutt*. (Mountains of Northwestern Sonora, *Pringle*.) The pubescence of the pods is the most constant character distinguishing this species from the last.

**D. brachycarpa**, Nutt. l. c. Simple or branched, 1 to 6 inches high, somewhat appressed stellate-pubescent : leaves ovate to ovate-oblong, half inch long ; the cauline oblong-lanceolate or linear, obtuse or acute : peduncles short : flowers very small : pods narrowly oblong, acutish, glabrous, 1 or 2 lines long, 10-12-seeded, about equalling the divaricate pedicels ; stigma nearly sessile. — Virginia to Georgia and west to Missouri and Louisiana ; Roseberg, Oregon, *Howell*.

++ ++ Flowers yellow, large : style slender.

**D. Mogollónica**, Greene. Stems simple or loosely branching from base, about a foot high, villous or loosely stellate-pubescent below : leaves mostly at the base, oblanceolate, stellate-pubescent, 1 to 3 inches long : flowers large, in broad racemes which are elongated in fruit : sepals glabrous : pods linear or oblong, glabrous, 4 to 8 lines long, with a slender style a line long, on usually divaricate pedicels 3 to 9 lines in length. — Bot. Gaz. vi. 157. — In the Mogollon and Santa Magdalena Mountains, New Mexico, *Kusby*, *Greene*.

**D. (?) asprella**, Greene. Pubescent with spreading simple or forked hairs : scape-like peduncles one to several : filaments dilated downward : pods oblong-elliptical, somewhat turgid, hispid, on divaricate pedicels ; style slender. — Bull. Torr. Club, x. 125 ; Wats. l. c. 257. — Arizona. A doubtful species by reason of the turgid pods and dilated filaments. Mature fruit has not been seen.

\* \* High mountain or northern species : leaves entire or few-toothed : flowers small, yellow, becoming whitish : stigma sessile.

**D. nemorosa**, L. Slender, loosely stellate-pubescent, branching and leafy below, a foot high or less : leaves rarely rosulate, ovate to oblong-lanceolate, an inch long or less, acutish : racemes nearly sessile : calyx somewhat villous : petals small : pods narrowly oblong, minutely pubescent or rarely glabrous, 3 or 4 lines long, on spreading or divaricate pedicels 6 to 12 lines long ; stigma nearly sessile. — Spec. ii. 643. *D. nemoralis*, Ehrh. Beitr. vii. 154. *D. lutea*, Gilib. acc. to DC. Syst. ii. 351, & *D. gracilis*, Graham, Edinb. New Phil. Jour. 1828, 172, the form with glabrous pods (var. *leiocarpa*, Lindbl.). — From the Great Lakes (Ft. Gratiot, Michigan, *Pitcher* ; Michipicotin, Lake Superior, acc. to Macoun) across the plains to the Rocky Mountains, N. Colorado, Central Idaho, the lower Columbia Valley, and northward into Brit. America. (Eu., Siberia.)

**D. stenoloba**, Ledeb. Slender : stem erect or lax, a foot high or less, simple or branching below, villous toward the base : leaves thin, mostly subrosulate, oblong-obovate or oblanceolate, the one or two cauline ovate to oblong-lanceolate, acutish, mostly entire, often glabrous

<sup>1</sup> Panamint Mountains, Calif., and Vegas Wash, S. W. Nevada, acc. to Coville, l. c.

beneath, stellate-pubescent above, or usually more or less villous and ciliate with simple hairs, 6 to 9 lines long: racemes pedunculate or nearly sessile: sepals glabrous or sparingly pilose: pods linear, acute, glabrous, 4 to 7 lines long, equalling or exceeding the spreading pedicels. — Fl. Ross. i. 154; Brew. & Wats. Bot. Calif. i. 28. — Subalpine in Rocky Mountains from Colorado and Utah to Brit. America; Blue Mountains, Oregon, *Cusick*; Sierra Nevada, Calif., *Brewer, Jones*; Unalaska, *Eschscholtz, Chamisso*.

**D. montána**, WATSON. Stellate-pubescent throughout and villous below, rather stout, simple or branched, leafy: leaves more or less densely pubescent and villous, oblanceolate or oblong; the cauline oblong-lanceolate: racemes nearly sessile: pods linear-oblong, finely pubescent, obtuse or acutish, 3 to 5 lines long, erect or ascending on shorter spreading pedicels. — Bibl. Index, 69 (name only), & Proc. Am. Acad. xiv. 289. — Mountains of N. Colorado, *Hall & Harbour, Vasey, Greene, Wolf*.

**D. crassifolia**, GRAHAM. Annual or biennial, usually scapose, slender, glabrous throughout or leaves ciliate (rarely slightly villous): caudex simple or shortly branched: leaves narrowly oblanceolate, 6 to 9 lines long or less: scape-like peduncles 1 to 6 inches high: flowers small, often nearly white: pods lanceolate or oblong-lanceolate, acute, 2 to 4 lines long, on spreading pedicels 2 to 5 lines in length. — Edinb. New Phil. Jour. 1829, 182; Fl. Dan. t. 2419; Brew. & Wats. Bot. Calif. i. 28. — Rocky Mountains of Brit. America, *Drummond, Macoun*, and Colorado in Sawatch Mountains, *Brandegee*; at Perego's in the Sierra Nevada, *Gray*. (Greenland.)

§ 4. DRABÆA, Lindbl. Perennial, with a branching leafy-tufted caudex; in a few species (in \* \* + +) sometimes biennial and simple-stemmed: leaves flat, soft, more or less broad, not carinate. — Linnæa, xiii. 318, & Stockholm Acad. Handl. 1839, 28.

\* Scapose.

+ Leaves entire (less than 6 lines long): flowers yellow.

**D. alpina**, L. Densely cespitose and caudex much branched: leaves oblong-lanceolate, obtuse or acute, with a thick midvein at base, glabrous and villous-ciliate or somewhat villous-pubescent with simple and stellate hairs, 6 lines long or less: scape pubescent,  $\frac{1}{4}$  to 6 inches high: sepals more or less villous: pods usually glabrous, ovate to oblong-ovate, acute, 2 to 4 lines long, on pedicels 1 to 5 lines long, 8-20-ovuled; style short ( $\frac{1}{4}$  line long); stigma broadly capitate. — Spec. ii. 642; DC. Syst. ii. 338; Lange, Medd. Græn. iii. 247. *D. pauciflora*, R. Br. in Parry, 1st Voy. Suppl. to App. 266. *D. micropetala*, Hook. in Parry, 2d Voy. App. 385. — Arctic coast and islands from Grinnell Land, *Greely*, to Point Barrow; Cape Chudleigh and Mansfield Island, Hudson Bay, *R. Bell*, the latter specimens with rounded pods; Rocky Mountains, Brit. America, *Drummond* (*D. rupestris*,  $\beta$ , Hook. Fl. Bor.-Am. i. 53), *Macoun*. (Greenland, N. Eu., Siberia.)

**D. Howéllii**, WATSON. Finely stellate-pubescent throughout, cespitose with branching caudex: leaves broadly spatulate, mostly very obtuse, half inch long or less: scapes 3 or 4 inches high: flowers large (3 or 4 lines long), in a loose raceme, deep yellow: pods pubescent, oblong, acute at each end, somewhat oblique, 2 to 4 lines long not including the slender style (a line long), on spreading pedicels 3 or 4 lines in length. — Proc. Am. Acad. xx. 354. — In the Siskiyou Mountains, Calif., *T. Howell*.

**D. Lemmóni**, WATSON. High alpine, densely cespitose and caudex much branched: leaves rather thick, spatulate or oblong-obovate, mostly very obtuse, ciliate and pilose with simple or forked hairs or nearly glabrous, 3 to 5 lines long: scapes 1 or 2 inches high, pilose with spreading hairs: flowers 2 lines long: sepals somewhat villous: pods pubescent or glabrous, ovate to broadly lanceolate, more or less twisted, 3 lines long, on slender spreading pedicels 2 to 4 lines long; style stout, short. — Bot. Calif. ii. 430. *D. alpina*, var. *algida*, Brew. & Wats. Bot. Calif. i. 29, mainly. — Peaks of the Sierra Nevada, *Brewer, Lemmon*; Wallowa Mountains, E. Oregon, *Cusick*.

**D. ventósa**, GRAY. Cespitose; the slender branches of the caudex more or less densely leafy: leaves oblong-oblanceolate, obtuse or acutish, densely stellate-pubescent, 2 to 5 lines

<sup>1</sup> Southward to Mineral King, Calif., acc. to Coville, l. c.

long: scapes  $\frac{1}{2}$  to 4 inches high, pubescent or glabrate; raceme usually loose: flowers bright yellow, 2 lines long or more: calyx usually pubescent: pods ovate to oblong-lanceolate, usually acute, densely pubescent to glabrous, 2 to 4 lines long, with a short slender style (a third line long), on pedicels 1 to 4 lines long. — Am. Nat. viii. 212. *D. alpina*, Wats. Bot. King Exp. 20. — Peak above Snake Pass, N. W. Wyoming, *Parry*; E. Humboldt Mountains, Nevada, and Uinta Mountains, Utah, *Watson*, no. 84, and no. 92 in part; Stein's Mountain, S. E. Oregon, *T. Howell*. The original specimens were very densely leafy and densely pubescent throughout.

**D. eurycarpa**, GRAY. Densely cespitose and stellate-pubescent; the short branches of the caudex very leafy: leaves oblanceolate, 6 lines long: scapes scarcely exceeding the leaves, pubescent, few-flowered: flowers unknown: pods large, oblong-obovate, acute, glabrous, 5 to 8 lines long, 2 to 4 broad; the slender style nearly a line long. — Proc. Am. Acad. vi. 520. — Near summit of peak south of Sonora Pass, Calif., at 11,500 feet alt., *Brewer*, no. 1909.

+ + Leaves (mostly very small) entire or rarely few-toothed: flowers white: scapes rarely with a single leaf.

**D. nivális**, LILJEBLAD. Caudex with numerous slender matted branches: leaves in small dense tufts, oblanceolate, acutish, with a rather stout midnerve, entire, canescent with a short dense stellate pubescence, not at all ciliate or slightly so near the base, 2 or 3 lines long or less: scapes slender, pubescent, 1 to 3 inches high: calyx pubescent: pods few, usually glabrous, oblong, acute at each end, 2 or 3 lines long, with short stout style and 2-lobed stigma, on pedicels 1 or 2 lines long or less; ovules about 10 or 12. — Vet. Akad. Handl. 1793, 208; Lindbl. Linnaea, xiii. 325; Fl. Dan. t. 2417; Lange, Medd. Grøn. iii. 39. *D. muricella*, Wahl. Fl. Lap. 174; Torr. & Gray, Fl. i. 104. *D. stellata*, var. *nivális*, Regel, Bull. Soc. Nat. Mosc. xxxiv. pt. 2, 192. — From the Arctic Coast to Labrador on the east, and to the Aleutian Islands on the west; Macleod's Lake, Brit. Columbia and North Kootenai Pass, *Macoun*; mountains of Colorado; Uinta Mountains, Utah, and E. Humboldt Mountains, Nevada, *Watson*. The flowers appear to be sometimes tinged with yellow. The Rocky Mountain and other western specimens are usually somewhat ciliate at the base of the leaves. (Greenland, Iceland, Spitzbergen, N. Eu.)

**Var. elongáta**, WATSON. Leaves obtuse or acutish: scapes very slender: pods long and narrow (4 to 8 lines in length), on pedicels 1 to 5 lines long. — Proc. Am. Acad. xxiii. 258. ? *D. levipes*, Hook. Fl. Bor.-Am. i. 53. — Rocky Mountains of Brit. America, *Bourgeau*, *Macoun*; McDonald's Peak and Upper Maria's Pass, Montana, *Canby*; N. W. Wyoming, *Parry*; Uinta Mountains, *Watson*; Mt. Paddo, Washington, *Suksdorf*.

**D. subséssilis**, WATSON. Densely cespitose; the caudex very much branched: leaves crowded, very small, oblong, obtuse, finely stellate-pubescent or partially glabrate, not ciliate: peduncles very short, rather stout; the fruiting racemes an inch high, with the pods sparsely pubescent; pedicels short: flowers small: petals white, scarcely exceeding the yellowish ovate sepals: pods broadly ovate-elliptical, acutish or obtuse, 2 lines long, ascending: style very short and thick; ovules and seeds 6 or more. — Proc. Am. Acad. xxiii. 255, 258. — White Mountains, Mono Co.,<sup>1</sup> California, at 13,000 feet alt., *Shockley*.

**D. Fladnizénsis**, WULF. Caudex much branched: leaves more loosely rosulate, narrowly oblanceolate and usually acute, entire, pilose-ciliate and usually sparsely villous or somewhat stellate-pubescent, rarely wholly glabrous, 3 to 5 lines long: scapes 1 to 3 inches high, usually glabrous or slightly villous: petals often yellowish: pods glabrous, ovate-oblong or ovate, 2 to 3½ lines long, several-seeded, on pedicels 1 or 2 lines in length; stigma nearly sessile. — Wulf. in Jacq. Misc. i. 147, t. 17, f. 1. *D. androsacea*, Willd. Spec. iii. 428. *D. lactea*, Adams, Mém. Soc. Nat. Mosc. v. 104. *D. Lapponica*, Willd. in DC. Syst. ii. 344. *D. Wahlbergii*, Hartm. Scand. Fl. 249; Fl. Dan. t. 2420. — Hudson Strait, *R. Bell*; Gaspé County, Lower Canada, *J. A. Allen*; Rocky Mountains of Brit. America, *Bourgeau*, *Burke*; Mountains of Colorado, *Brandegee*, *Hooker & Gray*, *Patterson*; S. Utah, *Siler*, a form with the leaves regularly ciliate with unusually long hairs. (Greenland, N. and Central Eu., Asia.)

**Var. corymbósa**, WATSON, l. c. Leaves rather more frequently toothed, ciliate and somewhat pubescent: scapes and sepals usually pubescent: pods stellate-pubescent; style very short. — *D. corymbosa*, R. Br. in Ross, Voy. App. 143; Fl. Dan. t. 2418; Lange, l. c.

<sup>1</sup> Also near Mt. Whitney, acc. to Coville, l. c.

41.—Greenland and perhaps also (the original specimens) from the western coast of Baffin's Bay. Many of the specimens from Greenland and Spitzbergen that have been referred to it appear to belong, some to *D. alpina* and others to *D. hirta*.

\* \* Caulесcent; stems few- or many-leaved: leaves entire or few-toothed.

+ Flowers yellow.

++ Lower leaves often an inch long or more.

**D. hyperborea**, DESV. More or less pubescent with very short branching hairs; caudex stout, simple; stems simple or branched, decumbent, a span high or less: leaves oblanceolate, coarsely toothed, 1 to 4 inches long including the broadly winged petiole; the cauline sometimes oblong-obovate: flowers in a broad corymb: pods broadly elliptical to narrowly oblong and obtuse (var. *spatulata*, Gray), 3 to 9 lines long, usually glabrous, on spreading pedicels 3 to 6 lines long; style half line long. — Jour. Bot. iii. 172 (1814). *Alyssum hyperboreum*, L. Spec. ii. 651. *D. grandis*, Langsd. in DC. Syst. ii. 355; Deless. Ic. Sel. ii. 14, t. 47. *Cochlearia spatulata* & *C. siliquosa*, Schlecht. in DC. Syst. ii. 369. *C. septentrionalis*, DC. Prodr. i. 174, not Schlecht. — Alaska, from Sitka to the Aleutian Islands and St. Paul's Island.

**D. chrysántha**, WATSON. Cespitose; the caudex much-branched; stems 1 to 5 inches high, glabrous or loosely pubescent: leaves deep green, very narrowly oblanceolate; the few cauline linear to lanceolate, rarely few-toothed, glabrous or sparingly ciliate or somewhat pubescent,  $\frac{1}{2}$  to 2 inches long: flowers bright yellow becoming whitish: calyx somewhat villous: pods glabrous, oblong to oblong-lanceolate, 3 to 6 lines long: pedicels usually short, 1 to 5 lines long: style slender, about half line long. — Proc. Am. Acad. xvii. 364. — High peaks of Colorado, frequent; peak south of Apache Pass, Arizona, *Lemmon*.

**D. streptocarpa**, GRAY. Thinly villous with long spreading simple or branched hairs: caudex simple or sparingly branched; stems erect, simple or strictly branched, an inch to a span high: leaves oblanceolate, or the cauline oblong or lanceolate, acute, rarely slightly toothed, ciliate and more or less villous, 3 to 18 lines long: calyx glabrous or somewhat villous: pods lanceolate, acute or acuminate, usually twisted, glabrous or often pubescent on the margin, 3 to 6 lines long, on pedicels half as long; style slender, a line long. — Am. Jour. Sci. ser. 2, xxxiii. 242. — Mountains of Colorado and New Mexico; Huachuca and Santa Rita Mountains, Arizona, *Lemmon*, *Pringle*, a stellate-pubescent and but slightly villous form, nearly approaching the following.

**D. aúrea**, VAHL. Pubescent throughout with short stellate hairs and occasionally somewhat pilose: caudex simple or sparingly branched; stems usually rather stout, erect, usually branched from the base upward, leafy, 2 to 15 inches high: leaves oblanceolate or the cauline lanceolate, usually narrow, frequently ciliate at base,  $\frac{1}{2}$  to 2 inches long: calyx more or less pubescent: petals bright yellow to nearly white: pods lanceolate to linear, acute, pubescent (rarely glabrous), often twisted, 3 to 6 lines long, on pedicels half as long; style half line long or less. — Vahl in Hornem. Fors. Öec. Plantel. ed. 2, 599; Fl. Dan. t. 1460; Hook. Bot. Mag. t. 2934. — In the Rocky Mountains from Mt. Selwyn, Brit. America, to New Mexico and Utah; Arizona, Santa Rita Mountains, *Pringle*, Mt. Graham and Mt. Agassiz, *Lemmon*, the last with glabrous pods; Mignon Island, Gulf of St. Lawrence, *Linden*. A form with ovate pods has been collected in the Uinta Mountains, Utah, *Watson*, and in the Sawatch, *Brandegee*. (Greenland.)

**Var. stylósa**, GRAY, l. c. 243. Styles very slender, a line long. — Near Santa Fé, New Mexico, *Fendler*. Doubtful specimens collected by *Bigelow* near Albuquerque, New Mexico, and by *Rothrock* in Sanoita Valley, Arizona, have some of the cauline leaves broad and ovate.

++ ++ Leaves small, half inch long or less.

**D. auréola**, WATSON. Rather densely stellate-pubescent throughout; caudex simple or branched; stems short, simple, 4 inches high or less: leaves oblanceolate; the cauline oblong, obtuse, entire, half inch long: raceme dense in flower and fruit: calyx glabrous: pods broadly oblong, obtuse, pubescent, not twisted, 4 to 5 lines long, on spreading pedicels 2 or 3 lines long; style short (half line long), stout. — Bot. Calif. ii. 430. — Lassen's Peak, Calif., *Lemmon*, *Mrs. Austin*.

**D. corrugáta**, WATSON, l. c. Pubescent throughout with loose branching hairs; caudex

simple or branched; stems branching from the base upward, very leafy, 2 to 6 inches high: leaves oblong-oblancoolate, obtusish, entire, about half inch long or less: flowers pale yellow: sepals pubescent: pods lanceolate to broadly oblong, acute or obtuse, pubescent, much corrugated and twisted, 2 to 5 lines long not including the very slender style (a line or more long) which is attenuate to a minute stigma: pedicels 1 to 3 lines long. — Mt. Greyback in the San Bernardino Mountains, *Lemmon, W. G. Wright.*

+ + Flowers white.

+ + Stems simple or sparingly branched.

= Cauline leaves several (or few in *D. Breweri*).

**D. incána, L.** Stellate-pubescent throughout; pubescence usually loose: caudex often simple; stem 2 to 15 inches high: leaves mostly oblanceolate or the cauline sometimes ovate, few-toothed or entire: pods oblong to lanceolate, usually acute and straight, glabrous or finely stellate-pubescent, 3 to 5 lines long, usually suberect on ascending pedicels 1 to 3 lines long; style very short. — Spec. ii. 643. *D. contorta*, Ehrh. Beitr. vii. 155. *D. confusa*, Ehrh. l. c., the form with pubescent pods. — Labrador to New Brunswick and N. Vermont; in the Rocky Mountains in lat. 51°, and in Colorado at Georgetown, *Greene*, and South Park, *Rothrock & Wolf*; at Ft. Fraser and McLeod's Lake, Brit. Columbia, *Macoun*. Some of the western specimens are more finely and densely pubescent than is usual. (Greenland, *Eu., Asia*.)

**Var. arábisans, WATSON.** Caudex much branched: pod glabrous, acuminate or acute, often twisted, 4 to 6 lines long; beaked with a longer distinct style. — Proc. Am. Acad. xxiii. 260, & in Gray, Man. ed. 6, 67. *D. arabisans*, Michx. Fl. ii. 28; Gray, Gen. III. i. 160, t. 68. *D. Arabis*, Pers. Syn. ii. 190. *D. glabella*, Pursh, Fl. ii. 434. *D. incana*, var. *glabriuscula*, Gray, Ann. N. Y. Lyc. iii. 222. *D. Henneana*, Schlecht. Linnæa, x. 100. *D. Canadensis*, Brunet, Pl. Canad. 21, a form with ovate pods. — Labrador to N. Vermont and New York, and the shores of Lakes Huron and Superior. Grading indefinitely into the typical form of the species.

**D. Bréweri, WATSON, l. c.** Dwarf and alpine, hoary throughout with a dense stellate pubescence; the few stems from a shortly branched caudex, 1 to 3 inches high: leaves crowded, oblong to linear-oblong, obtuse, entire or rarely sparingly toothed, sometimes slightly ciliate at base, 2 to 4 lines long; the cauline few, oblong-ovate; flowers small: sepals oblong, herbaceous, shorter than the petals: pods linear-oblong, obtusish, pubescent, 2 or 3 lines long, on short ascending pedicels: stigma sessile or nearly so. — Mt. Dana, California, at 12,000 feet alt., *Brewer*; White Mountains, Mono County, at 13,000 feet alt., *Shockley*.

**D. boreális, DC.** Loosely stellate-pubescent throughout, more or less cespitose; stems 2 to 12 inches high: leaves ovate to oblong-ovate, flat, glabrous or pubescent, 3 to 5 lines long, exceeding the pedicels; style short and stout. — Syst. ii. 342. *D. Unalaschkiana*, DC. l. c. 350. *D. incana*, var. *borealis*, Torr. & Gray, Fl. i. 107. — Alaska and adjacent islands; Brit. Columbia, *Rothrock*; Arctic Coast, *Franklin*; Ochotsk Sea, *Wright*. A variety with longer pedicels is found in Japan (*D. Sachalinensis*, Schmidt).

= = Cauline leaves one to three.

**D. hirta, L.** Loosely stellate-pubescent: caudex branched; stems low, usually lax: leaves narrow or the cauline ovate,  $\frac{1}{2}$  to 1 inch long or less, sometimes ciliate: pods oblong-lanceolate to oblong-ovate, glabrous or sparingly pubescent, often somewhat twisted, 3 to 5 lines long, usually exceeding the short pedicels; style short and stout; stigma often 2-lobed. — Syst. ed. 10, 1127; Fl. Dan. t. 2422; Lange, Medd. Gren. iii. 42. *D. rupestris*, R. Br. in Ait. f. Kew. ed. 2, iv. 91; Fl. Dan. t. 2421. *D. oblongata*, R. Br. in Ross, Voy. App. 143; DC. Syst. ii. 342. *D. gracilis*, Ledeb. Fl. Ross. i. 152. — Alaska, Cape Thompson to Unalaska; the Arctic Coast to Rensselaer Harbor, *Kane*. (Greenland, N. Eu., and Asia.)

**Var. ártica, WATSON.** Densely tufted and more densely pubescent: leaves short; the cauline ovate: pods pubescent. — Proc. Am. Acad. xxiii. 260. *D. arctica*, Vahl, Fl. Dan. t. 2294; Lange, l. c. 43. — Grinnell Land, *Greely*. (Greenland, Spitzbergen.)

+ + Stems diffusely branched above.

**D. ramosíssima, Desv.** Thinly stellate-pubescent: caudex much branched; stems slender, a span high: leaves oblanceolate, laciniately toothed, acute,  $1\frac{1}{2}$  to  $2\frac{1}{2}$  inches long: racemes

numerous, rather short: flowers rather large: pods oval to narrowly oblong, pubescent, twisted, 2 to 4 lines long, not including the very slender style ( $1\frac{1}{2}$  lines long); stigma lobed. — Jour. Bot. iii. 186 (1814); Torr. & Gray, Fl. i. 106. *Alyssum* (?) *dentatum*, Nutt. Gen. ii. 63. *D. dentata*, Hook. & Arn. Jour. Bot. i. 192; Hook. Ic. t. 31. — Mountains of Virginia and Tennessee; cliffs of the Kentucky River, *Short*.

§ 5. ΑΙΖÓΨΙΣ, DC. Leaves linear, entire, becoming rigid with reflexed margin and carinate by the prominent midnerve: scapose, alpine, and densely cespitose. — Syst. ii. 332.

**D. glaciális**, ADAMS. Caudex much branched; branches short and slender: leaves 2 to 9 lines long, more or less loosely stellate-pubescent, sometimes ciliate at base: scape slender,  $\frac{1}{4}$  to 6 inches high, pubescent or glabrate, raceme rather few-flowered; sepals somewhat villous or glabrous: petals yellowish: pods ovate to ovate-oblong, acute, rounded at base (or narrowly oblong and acute at both ends), usually finely pubescent, 1 to 4 lines long on pedicels 1 to 6 lines in length, 8 to 16-ovuled; style a quarter to half line long. — Mém. Soc. Nat. Mosc. v. 106; Regel, Bull. Soc. Nat. Mosc. xxxiv. pt. 2, 186, t. 5, f. 3, 4 (var.); Hook. f. Fl. Brit. Ind. i. 142. *D. oligosperma*, Hook. Fl. Bor.-Am. i. 51. *D. alpina*, var. *glacialis*, Dickie, Jour. Linn. Soc. xi. 33. — Frequent in the Rocky Mountains from Brit. America to Wyoming and Montana, more rare south and westward; South Park, Colorado, *Rothrock* & *Wolf*; Uinta Mountains, Utah, *Watson*; Blue Mountains, Oregon, *Cusick*; Mt. Dana, Calif., *Brewer*; Cascade Mountains of Washington, *Lyall*, *Tweedy*; McLeod's Lake and Stewart Lake Mountains, Brit. Columbia, *Macoun*; also collected in the arctic regions by *Richardson* in lat. 68°, on the Mackenzie River, and by *Franklin*. Very variable but well marked and apparently identical with Asiatic forms, as described, originally found on the arctic coast of Siberia and the banks of the Lena. The smaller higher alpine specimens have sometimes the pubescence very fine and dense. (Asia, Spitzbergen.)

**Var.\* pectináta**, WATSON.<sup>1</sup> Alpine and very densely cespitose, the short rigid leaves glabrous or nearly so, and ciliate with long rigid hairs: pods 4-6-seeded, pubescent with branched hairs, or glabrate; valves only moderately convex. — Proc. Am. Acad. xxiii. 260. *D. densifolia*, Nutt. in Torr. & Gray, Fl. i. 104. — California, Silver Mountain, *Brewer*, and Mt. Lola, *Lemmon*; Nevada, E. Humboldt Mountains, *Watson*; Idaho, *Nevius*; Utah, *Jones*; Uinta Mountains, *Watson*, no. 88, a form with fleshy shorter glabrous and less ciliate leaves.

**D.\* Douglásii**, GRAY.<sup>2</sup> Leaves firm or even somewhat cartilaginous, at first pubescent with short nearly simple hairs but glabrate except the strongly ciliated margins, not lucid: scapose stems half inch to inch and a half high, finely pubescent with simple hairs: flowers white: pods ovate, acuminate, 2 lines long: valves becoming very strongly convex, pubescent with simple hairs; style slender, half line to a line in length; ovules only two (or rarely four) in each cell, pendent from near the apex of the cells; seeds very large. — Proc. Am. Acad. vii. 328; Brew. & Wats. Bot. Calif. i. 29. *Braya Oregonensis*, Gray, l. c. xvii. 199. *Cusickia*, Gray, l. c. — High mountains of the Sierra Nevada, from San Bernardino Co., *Parish*, northward throughout California to Union Co., Oregon, *Cusick*, and *Klikitat*, Washington, *Howell*; also in N. & W. Nevada, *Anderson*, *Watson*; first coll. by *Douglas*; fl. April to June.

2. ATHÝSANUS, Greene. (ἀ privative, and θύσας, fringe, in reference to the lack of the distinct border which in *Thysanocarpus* is present and often cleft.) — A monotypic annual, formerly classed with *Thysanocarpus*, but, as Prof. Greene has pointed out, nearly related to *Draba unilateralis*, Jones, and generically

<sup>1</sup> Description amplified to exclude more clearly the following nearly related species.

<sup>2</sup> Dr. Watson omitted this species from his preliminary treatment of the genus, having probably noticed its identity with Dr. Gray's *Braya Oregonensis*. There can be little doubt, however, that Dr. Gray's earlier disposition of the plant in the genus *Draba* was the more accurate. The microscopic structure of the false septum in the fruit is of *Draba*, and very different from that of *Braya*, a genus to which on other accounts this species can scarcely be referred. *D. Crockeri*, Lemmon, Bull. Torr. Club, xvi. 221, is from character and habitat a synonym.



rather unsatisfactorily separated by its 1-celled, 2-4-ovuled, 1-seeded fruit; the silicles falling off without dehiscence but possessing valves, which divide regularly under the prolonged influence of moisture. From the European genus *Clypeola* of similar habit it is technically separated by the absence of any membranous or tooth-like appendages upon the filaments. — Bull. Calif. Acad. Sci. i. 72; Prantl in Engl. & Prantl, Nat. Pflanzenfam. iii. Ab. 2, 191. [By B. L. ROBINSON.]

**A. pusillus**, GREENE, l. c. Hirsute-tomentose, branched from near the base, 3 to 9 inches high; branches subsimple, spreading, terminating in elongated racemes: leaves oblanceolate, obtuse, toothed or pinnatifid, 4 to 6 lines long, forming a rosette at the base; the cauline more or less reduced: pedicels 1 to  $1\frac{1}{2}$  lines in length, recurved: flowers very small: petals minute, linear, or wanting: fruit  $\frac{1}{4}$  to 1 line in diameter, usually covered with spreading uncinuate hairs. — *Thysanocarpus pusillus*, Hook. Ic. t. 42; Torr. & Gray, Fl. i. 119. *T. oblongifolius*, Nutt. in Torr. & Gray, l. c. 118. — Dry hillsides from San Diego, Orcutt, to Brit. Columbia, Macoun; common.

**Var. glábrior**, WATSON, in herb. Leaves thin, nearly smooth, at least not hirsute; fruit ciliated but glabrous upon the faces. — Growing with the typical form near Fort Mohave, J. G. Lemmon, April, 1884. A form with pods smooth and free even from ciliation has been collected near San Francisco, Mrs. Brandegee.

**3. THYSANOCÁRPUS**, Hook. (Θύσανος, fringe, and καρπός, fruit.) — Slender erect annuals of the Pacific Slope, with subsimple or branched stems, minute white or purplish flowers, and very characteristic disk-shaped or concave indehiscent one-celled fruit; the latter often toothed like a cog-wheel or perforated near margin by a series of openings. — Fl. Bor.-Am. i. 69, t. 18, f. A; Benth. & Hook. Gen. i. 94; Brew. & Wats. Bot. Calif. i. 48, excl. *T. pusillus*. [By B. L. ROBINSON.]

\* Stem profusely branched; branches spreading at a considerable angle, commonly again once or twice branched: petals purplish or white, considerably exceeding the calyx: pods small ( $1\frac{1}{4}$  to 2 lines in diameter), often strongly concave and boat-shaped with a conduplicate divided or perforated wing.

**T. conchuliferus**, GREENE. Glabrous throughout, glaucous, 4 to 8 inches in height: leaves linear or lance-linear, sagittate-auriculate, runcinately toothed or parted; teeth 2 to 4 pairs: racemes 1 or 2 inches long, rather densely many-flowered: pedicels 2 to 3 lines long, spreading horizontally and gently recurved: pod markedly cymbiform, finely reticulated but quite glabrous. — Bull. Torr. Club, xiii. 218, & Pittonia, i. 31; K. Brandegee, Zoe, i. 132. — Rocky soil on the Island of Santa Cruz off coast of S. California, Greene, Brandegee.

**Var. planiúsculus**, ROBINSON, n. var. Fruit plano-convex or slightly concavo-convex, not perceptibly reticulated but hirsute upon both sides: pedicels 4 to 6 lines long. — Island of Santa Cruz with type, *T. S. Brandegee*, April, 1888.

\* \* Stems simple or with a few subsimple elongated nearly erect branches: pods 2 to 4 lines in diameter, plano-convex, rarely a little concave on one side; wing entire, divided, or perforated: flowers very small: petals little exceeding the calyx: upper leaves narrow.

**T. cúrripes**, Hook. Commonly more or less hirsute below, 8 to 12 inches in height: basal leaves rosulate, often persisting, oblong, pinnatifid with short blunt lobes or merely dentate; upper leaves lanceolate or linear-lanceolate, sagittate-auriculate and clasping at base, short (6 to 10 lines in length): pedicels very slender,  $1\frac{1}{2}$  to 3 lines long, leaving the axis at right angles and strongly recurved: fruit subject to much variation, 1 to  $2\frac{1}{2}$  lines in diameter (including wing), tomentose or glabrous; wing narrow or broad, usually entire, sometimes crenate or with a few perforations, sometimes involute (var. *INVOLÚTUS*, Greene, Fl. Francis. 275). — Fl. Bor.-Am. i. 69, t. 18, f. A; Torr. & Gray, Fl. i. 118; Brew. & Wats.

Bot. Calif. i. 48; M. E. Jones, Bot. Gaz. viii. 283. *T. pulchellus*, Fisch. & Mey. Ind. Sem. Hort. Petrop. ii. 1835, 25; Hook. Comp. Bot. Mag. ii. 9. — Dry ground on hills, from S. California and Arizona to Washington, *Suksdorf*, and Idaho, *Spalding*, *Wilcox*.

**Var. *élegans***, ROBINSON, n. var. (LACE-POD.) Fruit larger, 2 to 4 lines broad; wing usually perforated with regular series of roundish openings: upper leaves inclining to be broader than in typical form. — *T. elegans*, Fisch. & Mey. l. c. 26; Hook. l. c., & Ic. t. 39; Torr. & Gray, Fl. i. 118. *T. curvipes*, Brew. & Wats. Bot. Calif. i. 48, in part; Wats. Bibl. Index, 74. — Arizona, *Pringle*, *Palmer*, and California north at least to Chico, *Gray*. This variety, while in its extreme form strikingly different from the typical plant, is thoroughly connected with the latter by a very complete and gradual series of intermediate forms. Prof. Greene states that it does not grow in the Coast Range, but it has been collected on Mt. Diablo, *Brewer*, and in the Napa Valley, *Bigelow*.

**T. *laciniatus***, NUTT. Smooth or nearly so, glaucous, 8 to 15 inches high: leaves thinner than in the preceding; those near base not forming a dense or persistent rosette, linear or subentire or deeply pinnatifid into narrow linear acute segments; upper leaves entire, elongated (10 to 15 lines in length), scarcely a line in breadth, inserted by a narrow base: racemes 4 to 8 lines long: fruit obovate, elliptic, or orbicular,  $1\frac{1}{2}$  to  $1\frac{1}{2}$  lines in diameter (including the entire or subentire imperforate wing), distinctly reticulated, commonly but not always glabrous; pedicels slender, spreading and deflexed. — Nutt. in Torr. & Gray, Fl. i. 118; Wats. Bot. King Exp. 31; Brew. & Wats. Bot. Calif. i. 49. — Central and Southern California, Arizona.

**Var. *crenatus***, BREWER. Fruit with a deeply crenate-toothed or perforated wing, usually becoming 2 to  $2\frac{1}{2}$  lines in breadth: racemes usually shorter and denser than in type. — Bot. Calif. i. 49. *T. crenatus*, Nutt. l. c. *T. ramosus*, Greene, Bull. Calif. Acad. Sci. ii. 390. — Occurring with and not always distinguishable from the typical form.

\* \* \* Pods 4 to 5 lines in diameter, plano-convex or nearly so; the wing radiately nerved, neither toothed nor perforated: upper leaves ovate-oblong or ovate-lanceolate, cordate-auriculate.

**T. *rádians***, BENTH. Stems 10 to 15 inches high, simple or with a few simple elongated ascending branches, glabrous: lowest leaves runcinately toothed or pinnatifid; the upper sub-entire: racemes long, loosely flowered; pedicels usually ascending but nodding near apex, 4 to 8 lines long: petals purple, exceeding the calyx: fruit downy or quite smooth, white, with dark nerves radiating in the wing. — Pl. Hartw. 297; Brew. & Wats. Bot. Calif. i. 49. — Central California, Sacramento Valley, northward to Oregon, *Howell*. Not abundant, but striking on account of its large light-colored and radiately nerved fruit.

**4. BERTERÓA**, DC. (Dedicated to *Carlo Giuseppe Bertero*, a Piedmontese botanist, 1789–1831, who travelled in South America.) — A small genus often united with *Alyssum*, with which many of its technical characters agree, but so different in its tall branching habit, as well as its very deeply cleft petals and generally more numerous margined or winged seeds, as to appear worthy of generic rank, to which it has lately been restored by Prof. Prantl. — Mém. Mus. Paris, vii. 232, Syst. ii. 290, & Prodr. i. 158. Under *Farsetia*, Reichenb. Consp. 184. Under *Alyssum*, Benth. & Hook. Gen. i. 74. [By B. L. ROBINSON.]

**B. *INCÁNA***, DC. Erect or somewhat decumbent, 1 to 2 feet high, pale green: branches simple: radical leaves spatulate, 2 to 4 inches long; the cauline similar or lanceolate, smaller: petals white, much exerted, deeply bifid, almost as in *Stellaria*: capsule elliptic, somewhat inflated, about 3 lines long; cells about 6-seeded; style slender, persistent. — Syst. ii. 291. *Alyssum incanum*, L. Spec. ii. 650. — Grain, hay, and clover fields, becoming frequent, N. New England and Massachusetts, probably introduced with grass or clover seed; also a ballast-weed about New York City, *Judge Brown*. (Adv. from Eu.)

**B. *MUTÁBILIS***, DC., a very similar species with pods larger and flatter, 4 to 5 lines long, is reported as somewhat established at Hingham, Mass., *Bowé*. (Adv. from Eu.)

5. **LOBULÁRIA**, Desv. (New Latin *lobulus*, a little lobe, presumably in reference to the two-parted or lobed hairs.) — A small group of Old World plants, chiefly of the Mediterranean region, often united with *Alyssum*, but of distinct habit and with very different and characteristic pubescence. — Jour. Bot. iii. 162 (1814); Prantl in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 2, 195. *König*, Adans. Fam. ii. 420. *Aduseton*, Adans. l. c. ii. (23). *König*, R. Br. in Denh. & Clapp. App. 214. — The name here retained is the earliest desirable generic designation, since one of Adanson's names was not Latinized and the other spelled in two ways by the author himself, who completes their confusion by transposing them in his prefatory errata. [By B. L. ROBINSON.]

**L. MARÍTIMA**, Desv. l. c. (SWEET ALYSSUM.) Perennial, branching near the base, sometimes a little woody below: branches slender, leafy: leaves oblong-lanceolate to linear, appressed-pubescent with hairs attached in the middle: racemes numerous, becoming elongated; pedicels widely spreading or divaricate, 3 lines in length: flowers white, fragrant: petals fully twice as long as sepals; blades suborbicular, entire, patulous: filaments enlarged below but not toothed: capsule orbicular, a line in diameter; cells 1-seeded. — *Clypeola marítima*, L. Spec. ii. 652. *Alyssum marítimum*, Lam. Dict. i. 98; DC. Syst. ii. 318. *König* *marítima*, R. Br. l. c.; Britton, Mem. Torr. Club, v. 175. — Cultivated and occasionally spontaneous or somewhat established by roadsides. (Adv. from Eu.)

6. **ALYSSUM**, Tourn. (Etymology,  $\alpha$  privative, and  $\lambda\acute{\upsilon}\sigma\sigma\alpha$ , madness, the plants having been regarded in ancient times as an antidote for hydrophobia, see Pliny, N. H. xi. 57, 95.) — Herbaceous or suffrutescent plants, natives of the Old World north of the tropics. One species is indigenous in Alaska and another of different section is more or less established in the United States. — Tourn. acc. to L. Gen. no. 533; DC. Prodr. i. 160; Reichenb. Ic. Fl. Germ. ii. 18–21; Benth. & Hook. Gen. i. 73. [By B. L. ROBINSON.]

§ 1. **EUALYSSUM**, Boiss. Filaments laterally toothed: cells of the fruit 2-seeded. — Fl. Orient. i. 264. — Alaskan perennial (and many Old World species).

**A. AMERICÁNUM**, GREENE. Low, spreading, densely stellate-pubescent, perennial: stems decumbent, 3 to 5 inches in height, leafy up to the subcorymbose inflorescence: leaves spatulate, pale above, white beneath, entire, 3 to 6 lines long, a third as broad, rounded at the apex: racemes even in fruit but an inch in length; pedicels divaricate, becoming 3 lines long: sepals ovate-oblong, obtuse: petals with suborbicular narrowly notched blade and very slender claw: filaments appendaged: capsule broadly obovate, nearly 2 lines long, with a slender persistent style less than half its length. — Pittonia, ii. 224. — This plant appears to stand close to *A. montanum*, L., and better fruiting specimens are necessary to prove with much certainty its distinctness from this and other closely related species of the Old World.

§ 2. **PSILONÉMA**, C. A. Meyer (as genus). Filaments unappendaged: petals cuneate: cells of the fruit 2-seeded. — Meyer in Ledeb. Fl. Alt. iii. 50.

**A. CALYCFNUM**, L. Low spreading annual, stellate-pubescent, branching from near the base: leaves numerous, small, spatulate, entire, ascending: racemes becoming 2 to 8 inches long; pedicels 1 to 2 lines in length: calyx wholly or partially persisting until the maturity of the fruit: petals small, white or nearly so, scarcely surpassing the sepals: fruit orbicular, double convex but with thin margin. — Spec. ed. 2, ii. 908; Wats. & Coulter in Gray, Man. ed. 6, 68. *A. alyssoides*, L. Syst. ed. 10, ii. 1130. *Clypeola alyssoides*, L. Spec. 652. — Roadsides, etc., across the continent, not infrequent; fl. May, June. (Adv. from Eu.)

7. **LESQUERÉLLA**, Watson. - (Dedicated to *Leo Lesquereux*, distinguished palæontologist and bryologist, born near Neufchâtel, 1805, died 1889.) — A large and natural genus of North America, distinguished from *Alyssum* by having usually turgid pods (lenticular in a few species) and unappendaged filaments, from the gerontogeous genus *Vesicaria* by having smaller flowers, shorter spatulate rather than unguiculate petals, smaller pods with more or less nerved septum and generally immarginate seeds. The genus occupies the greater part of the continent from the western borders of the Great Basin, Arizona, and Lower California to Texas, Kentucky, the Saskatchewan, Labrador, and Greenland. A single species is S. American. — Proc. Am. Acad. xxiii. 249; Wats. & Coulter in Gray, Man. ed. 6, 68. *Vesicaria* of authors, not Lam., as to American species (excl. *Physaria*), thus Gray, Gen. III. i. 161, t. 70; Benth. & Hook. Gen. i. 73; Wats. Bibl. Index, 74. [By S. WATSON.]

§ 1. **ALÝSMUS**, Watson. Pubescence loosely or somewhat hispidly stellate: winter annuals, with several often simple leafy ascending or subdecumbent stems, not canescent or scarcely so: pods round or round-ovate, mostly sessile; the cells 4–8-ovuled. — Proc. Am. Acad. xxiii. 250.

\* Seeds margined: filaments dilated at base: style shorter than the pod.

✦ Pods flattened, round-ovate, strigose-hairy; septum not hyaline.

**L. Lescúrii**, WATSON, l. c. Stems slender, usually branching, a span high or less: leaves oblong-ovate or oblong, toothed; the cauline sessile and auriculate: petals broadly spatulate, 2 to 3 lines long: filaments inflated at the base: pods 2 or 3 lines long, ascending, the style not half so long; cells 4-ovuled; the funiculus free. — *Vesicaria Lescurii*, Gray, Man. ed. 2, 38. *Alyssum Lescurii*, Gray, Man. ed. 5, 72. — Hills near Nashville, Tenn.

✦ ✦ Pods globose, glabrous.

**L. grandiflora**, WATSON, l. c. Finely pubescent, rarely somewhat hispid: stems a foot high or more: radical leaves oblanceolate, more or less deeply sinuate or sinuate-pinnatifid; the cauline oblanceolate to oblong or oblong-lanceolate, narrowed at base or somewhat auriculate-clasping: petals obovate, 2 to 5 lines long: filaments gradually dilated below: pods suberect on ascending or divaricate pedicels, 2 or 3 lines in diameter, abrupt at base: the style rarely a line long; cells usually 8-ovuled. — *Vesicaria grandiflora*, Hook. Bot. Mag. t. 3464; Don in Sweet, Brit. Fl. Gard. ser. 2, t. 404; Torr. & Gray, Fl. i. 101, excl. var.; Gray, Pl. Lindh. pt. 2, 148. *V. brevistyla*, Torr. & Gray, Fl. i. 102. — Middle counties of Texas, from the Gulf to the Red River.

**L. auriculáta**, WATSON, l. c. More hirsute with spreading hairs: cauline leaves more or less auricled: petals narrower: filaments abruptly and broadly dilated at base: pods slightly narrowed at base; the style half its length. — *Vesicaria auriculata*, Engelm. & Gray, Pl. Lindh. pt. 1, 32. — Dry prairies near San Felipe, Texas, *Lindheimer*.

\* \* Seeds immarginate: filaments slightly dilated: pods subdepressed-globose.

✦ Pods hirsute.

**L. lasiocárpa**, WATSON. Low, and slightly hispid: leaves coarsely toothed or pinnatifid; the lower oblanceolate; the cauline oblong, sessile, not auriculate: petals obovate, 3 lines long: filaments subdilated for half their length: pod twice longer than the stout style; cells 6-ovuled. — Wats. l. c. 251. *Vesicaria lasiocarpa*, Hook. Bot. Mag. under t. 3464, the name only; Gray, Pl. Wright. ii. 13, in part. — Near Ringold Barracks on the Lower Rio Grande, Texas, *Capt. E. K. Smith*. (Tamaulipas, Mex., *Berlandier*, no. 3101.)

✦ ✦ Pods glabrous, substipitate.

**L. densiflora**, WATSON, l. c. Finely pubescent and the stems somewhat canescent, a foot high or less: leaves entire or sparingly repand-denticulate, oblanceolate, attenuate to the

base: petals broadly spatulate, 2 to 4 lines long: filaments slightly dilated for a third of their length: pods ascending, 2 lines in diameter; the very slender style as long; cells 6-8-ovuled; the fruiting raceme short and crowded. — *Vesicaria densiflora*, Gray, Pl. Lindh. pt. 2, 145. — Central Texas.

§ 2. **LESQUERÉLLA** proper. Canescent with fine appressed often compact or lepidote-stellate pubescence: seeds immarginate: filaments filiform or linear-subulate. — Wats. l. c.

\* Ovary and pod finely pubescent, sessile or very nearly so; cells 2-8-ovuled.

— Pods not globose: biennials or perennials with simple stems.

++ Pods ovate to oblong-ovate, compressed; the valves convex (especially toward the base), acute or acutish, erect on spreading or ascending pedicels: pubescence compact and rarely if at all distinctly stellate: western species.

**L. occidentális**, WATSON, l. c. Caudex usually simple; stems a foot high or less: lower leaves oblanceolate, coarsely sinuate-dentate; the cauline spatulate, entire: petals spatulate, about 3 lines long: pods oval, acutish, 3 or 4 lines long; the slender style 2 lines long; cells 4-ovuled. — *Vesicaria occidentalis*, Wats. Proc. Am. Acad. xx. 353. — Oregon, Mitchell and Multnomah Counties, *Howell*, and N. California, near Yreka, *Greene*. Taller specimens from the White Bluffs of the Columbia, Washington (*Brandegee*), have broadly obovate obtuse fruit and may be distinct.

**L. Kingii**, WATSON. Stems shorter, procumbent or decumbent: leaves entire; the radical ovate on slender petioles; the cauline spatulate: filaments filiform: pods on shorter pedicels, oblong-obovate, acute, 2 or 3 lines long; the cells 2-4-ovuled; style a line long. — Wats. l. c. xxiii. 251. *Vesicaria Kingii*, Wats. l. c. xx. 353.<sup>1</sup> — N. Nevada, Kaolin Hills, *Stretch*; East and West Humboldt Mountains, *Watson*; California, Lassen's Peak, *Lemmon*, *Mrs. Austin*.<sup>2</sup>

**L. alpína**, WATSON. Dwarf (1 to 3 inches high), usually cespitose and multicapital; stems slender: leaves entire, narrow, linear to linear-ob lanceolate: petals 2 or 3 lines long, spatulate, with the base somewhat broadly wing-dilated: pods on straight or more or less curved pedicels, compressed, oblong-ovate, acute, 2 lines long; the slender style about as long; cells 2-4-ovuled; septum sometimes perforate. — Wats. l. c. xxiii. 251. *Vesicaria alpina*, Nutt. in Torr. & Gray, Fl. i. 102. *V. Ludoviciana*, Gray, Proc. Acad. Philad. 1863, 58, not DC. — Cypress Hills, Canada, *Macoun*; to Colorado and Montana. Specimens from Greene River, Wyoming (*Parry*), have the pubescence more loosely stellate throughout.

**Var. intermedia**, WATSON, l. c. Stems stouter (1 to 6 inches high): flowers larger; the oblong sepals 2½ to 4 lines long and the petals more narrowly spatulate: pods ovate-elliptical; the cells 4-ovuled and the styles usually nearly as long. — *Vesicaria alpina*, Gray, Pl. Fendl. 9. — New Mexico, *Fendler*, no. 38; S. Colorado, Pueblo County, *Greene*; S. Utah, *Parry*.

**L. Arizónica**, WATSON. Dwarf, cespitose and multicapital, 1 to 3 inches high: leaves as in the preceding but the lower usually shorter and more broadly oblanceolate: flowers large, often bright yellow: sepals oblong-ovate, 2 lines long or less: petals with a broad wing-dilated undulate claw scarcely longer than the rounded blade: pods broadly ovate; cells 4-ovuled; the style usually about half as long. — Wats. l. c. 251, 254. — Arizona, Jupiter Mountains, near Prescott, *Palmer*; near Williams Station, *Lemmon*; Peach Springs, *Lemmon*, *Jones*; Mokiak Pass, near St. George, *Palmer*.

++ ++ Pods oblong or ovate-oblong, acute, not compressed or slightly so, erect on usually divaricate curved pedicels: Rocky Mountain species.

**L. montána**, WATSON, l. c. 251. Pubescence often evidently stellate: caudex rarely branched; the stems less than a foot long: leaves oblanceolate, or the radical often sub-ovate on slender petioles, often with one or two obscure teeth: petals spatulate, 3 or 4 lines

<sup>1</sup> Add syn. *Vesicaria montana*, Brew. & Wats. Bot. Calif. i. 43; K. Brandegee, Zoe, iv. 171, not Gray. *Physaria montana*, Greene, Fl. Francis. 249.

<sup>2</sup> And on Snow Mountain, acc. to K. Brandegee, l. c.; also on Telescope Peak, Panamint Mts., acc. to Coville, Contrib. U. S. Nat. Herb. iv. 62.

long : pods about 3 lines long, with a long slender style ; the cells 4-8-ovuled. — *Vesicaria montana*, Gray, Proc. Acad. Philad. 1863, 58. — N. Colorado and S. Wyoming, near and on the mountains.

++ ++ Pods elliptical, somewhat obcompressed, acute or acutish, erect on spreading pedicels : pubescence very dense and compactly lepidote : Arizona.

- L. Wárdii**, WATSON. Caudex simple ; the short stems procumbent : radical leaves round-ovate on slender petioles ; the cauline short, linear to obovate-subulate : petals 3 lines long, ligular-spatulate : filaments linear-subulate : pods on short pedicels (2 or 3 lines long),  $1\frac{1}{2}$  to  $2\frac{1}{2}$  lines long ; the valves very convex ; cells 2-4-ovuled ; septum oblong ; style a line long or more ; seeds somewhat turgid and irregular ; the long radicle more or less curved to one side. — Proc. Am. Acad. xxiii. 252, 255. — Utah on the Aquarius Plateau, at 11,000 feet alt., *L. F. Ward*.

- L. cinérea**, WATSON, ll. cc. Resembling the last closely in habit, more whitely canescent, and the cauline leaves mostly linear-spatulate : flowers larger : sepals narrow, 3 lines long : petals 4 lines long with a very broad undulate claw, somewhat contracted below the rounded blade : pedicels longer : ovary obcompressed ; the cells 12-ovuled (mature pod unknown). — Arizona, *Palmer*. Like the last abnormal in its obcompressed pods and perhaps to be transferred to *Physaria*.

+ + Pods globose or nearly so and obtuse (acutish in *L. Ludoviciana*) ; cells 2-6-ovuled.

++ Annual or sometimes biennial : southern.

- L. globósa**, WATSON. Pubescence dense, but evidently stellate : stems slender, often branched, a foot high or more : leaves entire or sparingly repand-denticulate ; the lower oblong-spatulate ; the cauline linear-oblancoolate : petals spatulate, 2 or 3 lines long : pods on widely spreading pedicels, a line in diameter, shorter than the style ; cells 2-ovuled. — Proc. Am. Acad. xxiii. 252. *Vesicaria globosa*, Desv. Jour. Bot. iii. 171 (1814). *V. Shortii*, Torr. in Short, Pl. Ky. Suppl. iii. 336 ; Torr. & Gray, Fl. i. 102 ; Gray, Man. ed. 2, 38. — Tennessee, Kentucky, and E. Missouri.

- L. Berlandieri**, WATSON, l. c. Pubescence often somewhat sparse : stems slender, simple or branched, a foot high or less : lower leaves lyrate pinnatifid ; cauline repandly toothed, ovate to oblong-lanceolate or oblanceolate, petiolate : petals spatulate, about 3 lines long : pods globose or ellipsoidal,  $1\frac{1}{2}$  to  $2\frac{1}{2}$  lines long, equalling the style ; cells 4-6-ovuled. — *Vesicaria Berlandieri*, Gray in Wats. Bibl. Index, 75, without description. — Near Matamoras on the Rio Grande and at San Fernando, Tamaulipas, *Berlandier*, nos. 819, 884. To be confidently expected upon the Texan side of the river.

- L. Pálmeri**, WATSON. Pubescence dense and compact : apparently biennial, with a stout caudex ; the simple stems a foot long or more : lower leaves narrowly oblanceolate, repand ; the cauline linear-oblancoolate, entire or sparingly toothed : petals spatulate, 3 lines long : pods ovate-globose to broadly ellipsoidal, erect on spreading or ascending pedicels,  $2\frac{1}{2}$  to  $3\frac{1}{2}$  lines long ; the style as long, cells 2-4-ovuled. — Proc. Am. Acad. xxiii. 252, 255. — Arizona, *Palmer* ; specimens cult. at Washington, D. C. (Topo Cañon, Lower Calif., *Orcutt*.)

++ ++ Biennial or sometimes perennial : northern.

- L. Ludoviciana**, WATSON, l. c. 252. Pubescence evidently stellate or compact below : caudex very rarely multicapital and stems rarely branched, a foot high or less : leaves mostly narrowly oblanceolate to linear ; the radical frequently sparingly toothed : petals spatulate, 3 or 4 lines long : pods more or less pendulous upon recurved pedicels,  $1\frac{1}{2}$  to  $2\frac{1}{2}$  lines long, usually somewhat longer than broad and acutish ; the style about as long ; cells 4-6-ovuled. — *Vesicaria Ludoviciana*, DC. Syst. ii. 297 ; Torr. & Gray, Fl. i. 101. *Myagrum argenteum*, Pursh, Fl. ii. 434. *Alyssum Ludovicianum*, Nutt. Gen. ii. 63. — W. Minnesota and Central Dakota to Nebraska and N. E. Colorado ; N. Arizona, *Palmer*.

**Var. arenósa**, WATSON, l. c. Low (rarely 6 inches high) and very slender with shorter narrow leaves. — *Vesicaria arenosa*, Richards. in Frankl. 1st Journ. ed. 1, App. 743 (reprint, p. 15). *V. arctica*, Hook. Bot. Mag. t. 2882. *V. arctica*, var., Hook. Fl. Bor.-Am. i. 48. — Saskatchewan region, *Richardson*, *Bourgeau*, *Macoun*.

- L. Douglásii**, WATSON. Distinguished from the last by the small obovate and very obtuse pod, with the cells 2-ovuled, erect upon spreading pedicels : lower leaves sometimes ovate

upon a narrow petiole. — Wats. l. c. 252, 255. *Vesicaria Ludoviciana*, Hook. l. c. as to hab.; Torr. Bot. Wilkes Exped. 232. — Washington, on the Columbia River, east of the Cascade Mountains, Wilkes, Lyall, Suksdorf; in the Wallowa Mountains, E. Oregon, Cusick; first collected by Douglas, but locality not given.

\* \* Ovary and pod glabrous (or pubescent in *L. Gordoni* and *L. arctica*), not at all compressed.

+ Pods oblong or pyriform, substipitate, on long ascending pedicels: Arkansan annuals.

**L. repánda**, WATSON, l. c. 252. Pubescence finely and for the most part sparingly scurfy-stellate; stems simple or branched, a foot high: lower leaves somewhat lyrate-pinnatifid; the upper linear-spatulate, entire: petals broadly spatulate, 3 lines long: young pods oblong, acutish, somewhat narrowed to a very short stipe; the style about as long. — *Vesicaria repanda*, Nutt. in Torr. & Gray, Fl. i. 101. — Banks of the Red River, Arkansas.

**L. Nuttállii**, WATSON, l. c. Resembling the last, but the radical leaves and flowers unknown: pods erect on long spreading pedicels, broadly pyriform, somewhat constricted above the abrupt base,  $2\frac{1}{2}$  lines long, upon a short stipe; the slender style one or two lines long; cells 6-8-ovuled. — *Vesicaria Nuttallii*, Gray, Pl. Lindh. pt. 2, 148. — Prairies of the Red River, Arkansas, Leavenworth. Probably the fruiting form of the last.

+ + Pods globose: southwestern (except *L. arctica*).

+ + Pods pendent on recurved pedicels, sessile or scarcely stipitate; cells 2-6-ovuled.

= Flowers white or rose-colored.

**L. purpúrea**, WATSON, l. c. 253. Biennial or perennial with simple or branched caudex; the firm pubescence scattered or on the lower leaves more or less compact; stems simple or branched, often a foot high or more: leaves oblanceolate; the lower often coarsely repandly toothed or pinnatifid: petals spatulate-obovate, 3 to 5 lines long: pods rarely ascending, not or scarcely at all stipitate,  $1\frac{1}{2}$  to 3 lines broad; the style a line long or less; cells 2-6-ovuled. — *Vesicaria purpurea*, Gray, Pl. Wright. ii. 14. — From extreme W. Texas to Arizona. (N. Mex.) Specimens from Coahuila, Palmer, no. 29, have a longer style.

**L. pállida**, WATSON, l. c. Annual, finely and rather sparingly scurfy-pubescent, branching, a foot high: leaves oblanceolate, repandly toothed: pod shortly stipitate, 2 lines broad; the style about a line long; cells 6-ovuled. — *Vesicaria pallida*, Nutt. in Torr. & Gray, Fl. i. 668. *V. grandiflora*, var. *pallida*, Torr. & Gray, l. c. 101. — Prairies near San Augustine, E. Texas, Leavenworth. Much resembling large-podded forms of *L. recurvata*, but leaves toothed, style somewhat shorter, and flowers said to be white.

= = Flowers yellow.

**L. recurváta**, WATSON, l. c. Annual, thinly pubescent; the slender stems often branched, a foot high or less: leaves entire, oblong-oblanceolate or -spatulate, an inch long or less: petals spatulate,  $1\frac{1}{2}$  to 3 lines long: pods sessile, 1 or 2 lines broad; the very slender style about as long; cells 2-4-ovuled. — *Vesicaria recurvata*, Engelm. in Gray, Pl. Lindh. pt. 2, 147. *V. angustifolia*, Scheele, Linnæa, xxi. 584, in part. — Central Texas.

+ + + Pods suberect upon ascending or curved pedicels.

= Annual (rarely biennial?), mostly branched: pods often stipitate: very closely allied species.

**L. Lindhéimeri**, WATSON, l. c. Pubescence very fine or densely compact and lepidote: stems a foot long: leaves oblong- or narrow-lanceolate, more or less repand: petals spatulate-obovate, 3 lines long: pods 2 lines long, on a short stipe; the style rather shorter; cells 6-8-ovuled. — *Vesicaria Lindheimeri*, Gray, l. c. 145. — Texas, McMullen, Berlandier, no. 179; Victoria, Lindheimer, no. 327; Dallas, Reverchon, distributed as no. 186\*.

**L. grácilis**, WATSON, l. c. Pubescence very fine, usually scanty; stem slender and lax, branching, a foot high or more: leaves narrowly oblanceolate, entire or sparingly repand: petals spatulate-obovate, 3 lines long: pods stipitate,  $1\frac{1}{2}$  or 2 lines broad; the style nearly or quite as long; cells 4-6-ovuled. — *Vesicaria gracilis*, Hook. Bot. Mag. under t. 3464, 3533; Gray, l. c. 148. *V. polyantha*, Schlecht. Bot. Zeit. xi. 619. — Central Texas to Kansas, Montgomery Co., Plank.

**Var. séssilis**, WATSON, l. c. Pods sessile. — *Vesicaria angustifolia*, Gray, Pl. Wright. ii. 13, in part. — Texas, Frio Co., Wright, no. 848. Lindheimer's specimen from New Braunfels, no. 326, in flower, referred to *V. angustifolia* (Pl. Lindh. pt. 2, 145), is probably the same.

**L. Gordóni**, WATSON, l. c. Pubescence somewhat coarser: stems a foot high or less: leaves linear-oblongate, entire or rarely repand: petals spatulate, 3 lines long: pods stipitate, 2 lines in diameter; the style somewhat shorter; cells 6-ovuled. — *Vesicaria Gordóni*, Gray, Pl. Lindh. pt. 2, 149. — Extreme W. Texas to New Mexico and Arizona. Very near the last.

**Var. séssilis**, WATSON, l. c. Pods sessile or nearly so, and often pubescent. — *Vesicaria angustifolia*, Gray, Pl. Wright. ii. 13, in part. — With the same range, and S. Utah,<sup>1</sup> Parry. Forms approach *L. argyrea*.

**L. angustifolia**, WATSON, l. c. Finely lepidote: stems simple or branched, a foot high: leaves at base lyrate-pinnatifid; the cauline narrowly linear and petiolate; petals spatulate,  $2\frac{1}{2}$  lines long: pods sessile or on slender ascending or spreading pedicels, 2 to  $2\frac{1}{2}$  lines broad; the style somewhat shorter; cells 2-ovuled. — *Vesicaria angustifolia*, Nutt. in Torr. & Gray, Fl. i. 101. — Prairies of Red River, Arkansas, *Leavenworth*, Nuttall.

== Biennial or usually perennial (but often fruiting the first year): pods sessile or nearly so on ascending or spreading pedicels; cells 6-10-ovuled.

a. Pubescence evidently stellate.

**L. Engelmánni**, WATSON. Pubescence dense: caudex usually multicapital; stems usually simple, often dwarf, sometimes tall and branched: lower leaves ovate and petiolate to linear-oblongate, entire or sparingly repand; the cauline linear-oblongate or -spatulate: petals broadly spatulate, 3 to 6 lines long: pods usually in a short raceme, substipitate, 3 lines long; the style as long or longer; cells 6-8-ovuled. — Wats. l. c. 254. *Vesicaria Engelmanni*, Gray, Gen. III. i. 162, t. 70, & Pl. Lindh. pt. 2, 144. *V. pulchella*, Kunth & Bouché, Ind. Sem. Berol. 1845, 15, & Ann. Sci. Nat. ser. 2, xi. 229. — Central Texas, Austin and New Braunfels, Lindheimer, &c.; Indian Territory, Gordon; W. Kansas, Ellis, *L. Watson*; Colorado, bluffs of the Arkansas at Pueblo, Greene.

**L. argyrea**, WATSON, l. c. Pubescence more or less dense: caudex often simple and apparently annual or biennial; the leafy stems decumbent or procumbent, simple or branched, often a foot long or more: leaves very variable, from ovate and petiolate to usually more or less narrowly oblongate, entire or often repandly toothed: petals spatulate, about 3 lines long, often turning purple: pods sessile in a long raceme, on straight and ascending or spreading and curved pedicels, 2 to  $2\frac{1}{2}$  lines broad; the style as long or somewhat shorter; cells 6-10-ovuled. — *Vesicaria argyrea*, Gray, Pl. Lindh. pt. 2, 146. — S. W. Texas, from the Colorado River southward. (Northern Mex. to San Luis Potosi.)

b. Pubescence compactly lepidote, rarely evidently stellate.

**L. ártica**, WATSON, l. c. Caudex usually simple and stems unbranched, 6 inches high or less: leaves spatulate, 3 lines long: pods on ascending pedicels,  $2\frac{1}{2}$  to 3 lines long; the style a line long or less; cells 6-ovuled; septum perforate. — *Vesicaria arctica*, Richards. in Frankl. 1st Journ. ed. 1, App. 743 (reprint, p. 15). *Alyssum arcticum*, Wormsk. Fl. Dan. t. 1520. — West coast of Greenland and the arctic coast of N. America, east of the Mackenzie River.

**Var. Púrshii**, WATSON, l. c. Pod somewhat pubescent; septum entire. — Anticosti Island, Shepherd, Macoun; "Canada," Pursh (in herb. Torrey).

**L. Féndleri**, WATSON, l. c. Usually evidently perennial, with a multicapital caudex, often dwarf; the simple stems rarely a foot high: leaves numerous, entire, mostly very narrowly linear-oblongate, in the typical form somewhat wider: petals broadly spatulate, 3 to 5 lines long; pods in a dense and usually short raceme, 2 or 3 lines broad, sometimes ellipsoidal and acutish; the style as long or a little shorter; cells 10-16-ovuled. — *Vesicaria Fendleri*, Gray, Pl. Fendl. 9. *V. stenophylla*, Gray, Pl. Lindh. pt. 2, 149, Pl. Wright. i. 10, & ii. 13. — S. Colorado to W. Texas, Arizona.<sup>2</sup> (N. Mex.)

<sup>1</sup> Also in Vegas Wash, S. W. Nevada, acc. to Coville, Contrib. U. S. Nat. Herb. iv. 62.

<sup>2</sup> Also in California at San Pedro Martir, acc. to T. S. Brandegee, Zoe, iv. 202.



8. **PHYSÁRIA**, Gray. (Name from *φυσάριον*, a diminutive of *φῶσα*, a pair of bellows, suggested by the didymous fruit and slender style. The name first applied by Nuttall in Torr. & Gray, Fl. i. 102, as a sectional designation in the genus *Vesicaria*.) — A small genus with the whole aspect of *Lesquerella*, but to be distinguished by its strongly didymous fruit with a narrow partition. Perennials, many-stemmed and spreading. — Gen. Ill. i. 162; Wats. Proc. Am. Acad. xvii. 363; Prantl in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 2, 187. — Species with excellent characters in the fruit, but otherwise very difficult to distinguish. [By B. L. ROBINSON.]

\* Fruit at maturity much inflated: upper sinus acute, usually narrow.

**P. didymocárpa**, GRAY, l. c. Very canescent and lepidote with close white stellate pubescence: radical leaves petiolate, with roundish toothed angled or entire blade or oblanceolate and more or less sinuately toothed below: cauline leaves mostly entire, spatulate: racemes dense; pedicels becoming 6 or 7 lines long, ascending or spreading: flowers variable as to size: sepals lanceolate, surpassed by the rather narrow pale yellow petals: fruit strongly didymous, rather deeply notched above, entire or more or less cordate at base, becoming 6 or 8 lines in breadth; lobes subglobose with no demarcation between the dorsal and lateral surfaces; walls papery. — Wats. Bot. King Exp. 20, & Proc. Am. Acad. xvii. 363. *Vesicaria didymocarpa*, Hook. Fl. Bor.-Am. i. 49, t. 16; Torr. & Gray, Fl. i. 102. — The commonest species and rather variable; Colorado to N. Nevada and Oregon, northward to Brit. America, chiefly in mountainous regions. A noteworthy form from Middle Park, Colorado, *Parry*, has a laxer inflorescence and fruit divided almost to the base.

**P. Newbérry**, GRAY. Very similar in habit and foliage: flowers mostly larger: petals sometimes 8 lines in length, usually narrow: cells of the fruit provided with two angles or keels rather sharply separating the convex dorsal portion from the flattish lateral portions; walls firmer in texture than in the preceding, and in drying tending to fold regularly along the keels. — Bot. Ives Rep. 6, & Am. Jour. Sci. ser. 2, xxxiii. 243; Wats. Proc. Am. Acad. xvii. 363. — Mountain valleys, New Mexico near Tegua, *Newberry*, Ft. Wingate, *Matthews*; Arizona, on Cave Dwellers' Mountain, *Lemmon*; S. Utah, *Parry*; Nevada, *Pahranagat Mts.*, *Miss Searle*, and Mountain Spring, *Bailey*.

\* \* Fruit strongly compressed laterally, only moderately or scarcely at all inflated: sinus at the apex of the fruit shallow, rounded: species of Oregon and Washington.

**P. Géyeri**, GRAY. Whitish with very dense stellate tomentum: radical leaves with short broadly ovate entire obtusely-pointed blades narrowed below to long channelled petioles; cauline leaves small, spatulate: racemes rather dense, an inch or two long; pedicels spreading or curved-ascending, 3 lines long: fruit small for the genus, broadly and shallowly obcordate, narrowed toward the base; cells but  $2\frac{1}{2}$  to  $3\frac{1}{2}$  lines long at dehiscence; replum ovate, much exceeded by the persistent style. — Gen. Ill. i. 162; Torr. Bot. Wilkes Exped. 232; Wats. l. c. *Vesicaria Geyeri*, Hook. Lond. Jour. Bot. vi. 70, t. 5. — Sandy soils and volcanic ash; Upper Spokane Valley, *Geyer*; on prairies between the Spokane River and Ft. Colville, *Wilkes*, and on Spokane River, *Henderson*.

**P. Oregóna**, WATSON, l. c. Leaves larger, canescent, not so white as in the preceding: pedicels mostly curved-ascending, 6 lines or more in length: sepals ovate-lanceolate to lance-oblong,  $2\frac{1}{2}$  lines in length, considerably exceeded by the pale yellowish petals: capsule becoming 6 to 8 lines broad, rounded or very shallowly cordate at base; cells somewhat inflated but dorsally narrowed to a more or less distinct keel; style scarcely a line in length. — Oregon, gulches near mouth of Pine Creek and upon gravelly banks of Snake River below Brownlee Ferry, *Cusick*; fl. April, fr. June.

9. **SYNTHLÍPSIS**, Gray. (*Σύνθλιψις*, compression, in reference to the flattened fruit.) — A small genus of spreading grayish-pubescent herbs of the Southwest, nearly related on the one hand to *Lyrocarpa* and on the other to *Lesquerella*. Stems leafy: leaves sinuate-toothed or pinnatifid. Racemes lax.

— Pl. Fendl. 116, & Bot. Mex. Bound. 34; Baill. Hist. Pl. iii. 282; Prantl, l. c. [By B. L. ROBINSON.]

**S. Gréggii**, GRAY, ll. cc. Canescent-tomentose, rarely smoothish: root single: stems several, slender, elongated, spreading, simple or branched; leaves ovate, few-toothed, slender-petioled or subsessile by a narrowed base: racemes in fruit 6 inches or more in length; pedicels 3 to 4 lines long, widely spreading but commonly somewhat ascending: sepals narrow, linear, spreading in anthesis: petals roseate or white, 4 lines long, with a broad rounded blade: capsules suberect, broadly oblong, wing-appendaged and obcordate at summit, rounded or subcordate at base, 5 lines long, two thirds as broad. — Wats. l. c. 322; Coulter, Contrib. U. S. Nat. Herb. iv. 21. — Collected several times upon the Mexican side of the Lower Rio Grande, *Berlandier*, and doubtless extending into Southwestern Texas. (Coahuila, *Gregg*, *Palmer*; San Luis Potosi, *Schaffner*, *Parry* & *Palmer*, *Pringle*.)

**S. Berlandieri**, GRAY. Spreading habit of the preceding, finely stellate-pubescent: leaves more deeply sinuate-toothed or shallowly pinnatifid: pedicels longer and usually recurved, 6 to 8 lines in length: flowers yellowish or purplish, probably changing color with age: fruit orbicular, 3 lines in diameter, neither wing-appendaged nor notched, commonly deflexed. — Bot. Mex. Bound. 34; Walp. Ann. vii. 171. *S. heterochroma*, Wats. l. c. 321, appears insufficiently separated. — Similar situations as the last, S. W. Texas, *Nealley*, *Heller*. Passing into var. *hispida*, Wats. l. c., with stem more or less hirsute with simple hairs, which partially replace the stellate tomentum. — Laredo, Texas, *Berlandier*. (Mexico, *Palmer*.)

**10. LYROCÁRPA**, Hook. & Harv. (*Λύρα*, a lyre, and *καρπός*, fruit.) — Erect annual or perennial herbs with fine stellate pubescence. Leaves toothed or runcinately pinnatifid: sepals long and narrow, linear-oblong: capsule broadly obcordate or with rounded ear-like appendages on each side of the subtruncate end. — Lond. Jour. Bot. iv. 76, t. 4; Benth. & Hook. Gen. i. 93. [By B. L. ROBINSON.]

**L. Coulteri**, Hook. & Harv. l. c. Distinctly perennial: stems several, 1½ to 2 feet high, sparingly branched: leaves lyrate pinnatifid, 1 to 2 inches long, petioled; terminal segment triangular or 5-lobed, acute, much exceeding the (sometimes obsolete) lower segments: flowers 8 to 10 lines broad, in a loose raceme, sweet-scented: pedicels spreading, shorter than the slender calyx: blades of the petals linear or lance-linear, attenuate: capsule oblong, 8 lines in length, conspicuously bi-auriculate above. — Brew. & Wats. Bot. Calif. i. 44; Wats. Proc. Am. Acad. xxiv. 39; Brandegee, Bull. Calif. Acad. Sci. ser. 2, ii. 127. — Ascribed to California from Dr. Thomas Coulter's original specimens so labelled, but without exact locality, and perhaps from Lower California, where the species is not infrequent. Also collected near the southern boundary of Arizona, *Pringle*. Flowers said to be sweet-scented in the evening and of ochroleucous color. (Sonora, Lower Calif.)

**L. PALMERI**, Watson (Proc. Am. Acad. xi. 123), from Tantillas Mountains, but a few miles south of the Californian boundary, may be expected in the southern part of that State, and can be readily recognized by its broadly obovate obcordate pods only 3 or 4 lines in length. Still a third species, from Cape St. Lucas, with much broader bright purple petals, has been recently added to the genus.

**11. DITHÝREA**, Harv. (*Δίς*, two or double, and *θυρεός*, shield; the name intended as a Greek equivalent of *Biscutella*, a Mediterranean genus of similar aspect.) — A small genus of cinereous-tomentose plants of the Southwest, habitally and in fruit considerably resembling *Biscutella*, but differing markedly in their sessile or subsessile stigmas and dense stellate pubescence, as well as in widely different geographic position. — Harv. in Hook. Lond. Jour. Bot. iv. 77, t. 5; Prantl in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 2, 187. Under *Biscu-*

*tella*, Benth. & Hook. Gen. i. 91; Brew. & Wats. Bot. Calif. i. 48. [By B. L. ROBINSON.]

**D. Californica**, HARV. l. c. Spreading annual, usually branching from the base, 4 inches to a foot in height: leaves thickish, ovate or almost orbicular, coarsely and obtusely few-toothed or subentire; the radical narrowed below to slender petioles; the cauline nearly sessile, somewhat cuneate at base: racemes very dense, often branched; pedicels scarcely a line in length: stellate-tomentose sepals erect in anthesis, acutish, about 3 lines long, much exceeded by the spreading white or purplish petals: fruit notched both above and below; lobes suborbicular, margined, tomentose at the edge, 3 lines or more in diameter. — Engelm. in Wislitz. Tour N. Mex. 96; Gray, Pl. Wright. ii. 14. *Biscutella Californica*, Brew. & Wats. l. c. — Sandy soil, S. California, *Th. Coulter, Parry & Palmer*; White Water, San Bernardino Co., Calif., *Parish, Jones*; Lincoln Co., Nev., *Coville & Funston*. (Lower Calif., *Orcutt*.)

**Var. maritima**, DAVIDSON, in litt. Leaves thicker, distinctly fleshy, more densely canescent-tomentose: inflorescence very dense; pedicels "dark purple." — *Biscutella Californica*, var. *maritima*, Davidson, Erythraea, ii. 179. — Sand dunes of coast, Los Angeles Co., Calif., *Monica, Lyon*; Redondo, *Miss Merritt*.

**D. Wislizeni**, ENGELM. l. c. 95. Erect, subsimple or occasionally branching from below and somewhat spreading, 1 to 2 feet high, becoming rather stout: leaves crowded, lanceolate or ovate-lanceolate to linear-oblong, narrowed to a slender and often distinctly petiolate base; the upper sessile: racemes elongated, loose; divaricate or ascending pedicels 4 to 8 lines in length: petals white: fruit notched below, but more frequently short-beaked above, or if notched very shallowly so. — Gray, Pl. Wright. i. 10, ii. 14, & Pl. Thurb. 299; as *Dithyrea*, Gray, Pl. Lindh. pt. 2, 150, & Pl. Fendl. 116; Torr. in Marcy, Rep. 280, t. 2; Torr. & Gray, Pacif. R. Rep. ii. 159. *Iberis*, n. sp., Torr. Ann. Lyc. N. Y. ii. 166. *Biscutella Wislizeni*, Brew. & Wats. Bot. Calif. i. 48; Coulter, Contrib. U. S. Nat. Herb. ii. 21. — Common on sandy hills, Arkansas and Texas to Arizona and S. Utah; fl. April to August. (Mex., *Pringle*.)

**12. THLASPI**, L. (Θλάν, to crush, in reference to the pods and seeds, which are strongly flattened as if crushed.) — A genus of moderate size, chiefly of S. Europe and Central Asia; glabrous annuals or perennials with undivided sessile and often amplexicaul leaves. Flowers white or purplish. — Gen. no. 530; DC. Prodr. i. 175; Reichenb. Ic. Fl. Germ. ii. t. 5; Prantl, l. c. 166. [By B. L. ROBINSON.]

\* Capsules large, orbicular or nearly so, broadly winged, very strongly obcompressed; sides nerved but not keeled; apex deeply notched: introduced annual.

**T. ARVENSE**, L. (PENNY CRESS.) A span to a foot high, decumbent or erect, simple or considerably branched above: leaves obtusely and rather remotely toothed or angled; the lower spatulate; the upper oblong, obtuse: flowers small: sepals greenish, a line in length, exceeded by the spatulate white petals. — Spec. ii. 646; Eng. Bot. t. 1659; Pursh, Fl. ii. 435; Hook. Fl. Bor.-Am. i. 58. — Streets of cities, about dwellings, etc., generally distributed and locally common in the northern and eastern parts of the United States and Canada, most copious, however, in Manitoba and adjacent Minnesota, where it bears the name of "French Weed." (Nat. from Eu.)

\* \* Capsules obovate or oblanceolate, not broadly winged, nor so strongly obcompressed, sides more or less distinctly keeled; apex until dehiscence entire or very shallowly notched: indigenous species of the West and Southwest.

**T. alpestre**, L. Perennial, quite simple or more commonly branched from the base, 2 to 8 inches, rarely a foot or more high: rootstock slender, elongated: leaves small, subentire or finely toothed; the radical obovate or oval, rounded at the apex, narrowed to slender petioles: the cauline ovate or oblong, 3 to 8 lines long, sessile with somewhat auriculate bases: racemes simple, terminal, rather dense; pedicels divaricate, in fruit 2 to 4 lines long: sepals purplish, thin-margined: petals white or pale purple,  $2\frac{1}{2}$  to 4 lines long: capsule

obovate, obtuse, truncate, or shallowly retuse at the apex, cuneate at the base, becoming 4 lines long and  $2\frac{1}{2}$  lines broad, tipped with a slender persistent style. — Spec. ed. 2, ii. 903; DC. Syst. ii. 380; Hook. Fl. Bor.-Am. i. 58; Torr. & Gray, l. c. 114. *T. montanum*, Hook. l. c.; Torr. & Gray, l. c. 113; not L. *T. cochleariforme*, DC. Syst. ii. 381; Torr. & Gray, l. c. *T. Fendleri*, Gray, Pl. Wright. ii. 14; Torr. Bot. Mex. Bound. 34. — Common throughout the West, especially in hilly and mountainous regions, Montana to New Mexico and westward to the Pacific. (Mex., *Pringle*.) Somewhat variable but neither divisible into good species nor satisfactorily separable from the Old World form of the species.

**T. Califórnicum**, WATSON. Similar in stature and habit to the preceding: radical leaves oblanceolate, toothed: racemes more elongated, less densely flowered: petals white: fruiting pedicels ascending: capsules oblanceolate, acute or acutish at the apex, 5 lines long, 2 lines broad: sides strongly carinate; slender style persistent. — Proc. Am. Acad. xvii. 365. — Kneeland Prairie, Humboldt Co., Calif., 2,500 feet alt., *Rattan*.

**13. LEPÍDIUM**, Tourn. PEPPERGRASS. (*Λεπίδιον*, a little scale, in reference to the small flat pods from the scale-like appearance of which, it is said, some species have been used, according to the doctrine of signatures, as a folk-remedy for cutaneous diseases.) — A genus of considerable size, widely distributed in temperate and warmer regions of the world, seldom if ever truly alpine or arctic. Flowers small, often considerably reduced by abortion. Plants of little or no beauty, possessing, however, a characteristic habit from their copious erect or ascending regular and usually rather dense ebracteate fruiting racemes, with equal slender generally divaricate pedicels. Foliage, pubescence, and duration very variable. Most species are slender annuals or subsucculent biennials, several being used as salad plants; a few are perennials or even suffrutescent. The fruit, sometimes collected as food for birds, has given the commoner species the name “Canary-grass” in some regions. — Inst. 215, t. 103; L. Gen. no. 527; DC. Syst. ii. 527, & Prodr. i. 203; Reichenb. Ic. Fl. Germ. ii. t. 9, 10; Gray, Gen. III. i. 167, t. 73. [By B. L. ROBINSON.]

§ 1. Style slender, sometimes rather short but distinctly developed and persistent.

\* Capsule ovate, cordate, more or less pointed at the apex, neither winged nor retuse; valves strongly convex. — *Cardaria*, Desv. Journ. Bot. iii. 163 (1814). *Lepidium* § *Cardaria*, DC. Syst. ii. 528. — A coarse introduced perennial.

**L. DRÁBA**, L. Pubescent or somewhat tomentulose: stems decumbent, 10 to 15 inches high, corymbosely branched: leaves large, elliptic-obovate or elliptic-lanceolate, 2 to 3 inches long, obtuse, denticulate and narrowed below to an auriculate base: flowers white: pods broader than long, shallowly cordate with rounded more or less inflated lobes; valves 1-nerved but furrowed not keeled in the middle. — Spec. ii. 645; Gray, Man. ed. 5, 74; Greene, Fl. Francis. 275; Eastwood, Zoe, ii. 228. — Sparingly adventive in waste places and cultivated grounds in the Eastern and Middle States; Grand Junction, Colorado, acc. to Miss Eastwood; Yreka and Berkeley, Calif., *Greene*. (Nat. from Eu.)

\* \* Capsule ovate, rounded at the base, more or less pointed at the apex, neither winged nor retuse; valves not convex but somewhat keeled: native species of the West.

**L. JÁREDI**, BRANDEGEE. A slender glaucous pubescent annual, 4 to 8 inches high, with narrow lanceolate entire or somewhat toothed leaves and branched rather loose inflorescence; pedicels filiform, 5 lines in length: flowers yellow, a little over a line in length: capsule glabrous, not retuse until by incipient dehiscence. — Zoe, iv. 398. — California, near Goodwin, San Luis Obispo County, *Jared*; near Riverdale, Fresno County, *A. Eaton*.

**L. NÁNUM**, WATSON. A compact caespitose perennial: leaves very small, spatulate, 3-lobed at the apex, ciliate, densely clustered upon a multicapital caudex: stems a third to half inch high, 1-5-flowered: capsule glabrous, about a line in length. — Bot. King Exp. 30, t. 4,

f. 5-7. — N. Nevada, Holmes Creek Valley, 6,000 feet alt., *Watson*, and near Halleck Station, *Wheeler*; fr. September. A species very distinct in its matted habit; the flowers still unknown.

\* \* Capsule orbicular, broadly elliptic or rarely ovate, abrupt or retuse at the apex.

+ Capsule wingless or inconspicuously winged at the apex, not exceeding 2 lines in breadth.

++ Flowers bright yellow: style very slender and relatively long (half the length of capsule).

**L. flavum**, TORR. A glabrous prostrate annual, branched from the base: leaves lanceolate or oblong-lanceolate in outline, slightly fleshy; the radical rosulate, regularly pinnatifid with short rounded lobes and narrow acute sinuses; the cauline less toothed: racemes short and dense, subcapitate, somewhat corymbosely arranged in robust individuals: capsule glabrous, finely reticulated, bifid at the apex; teeth acute; sinus open. — Pacif. R. Rep. iv. 67; Wats. Bot. King Exp. 30; Coville, Contrib. U. S. Nat. Herb. iv. 65. — California, Mohave Creek, *Frémont*, *Bigelow*; Mohave Desert, *Parry*, *Mrs. Bush*; Ash Meadows, Vegas Valley, and Shepherd Cañon, *Coville & Funston*; N. Nevada, Humboldt Valley, *Watson*, Humboldt Wells, *Greene*; fl. March, April; fr. May. (Lower Calif., *Orcutt*.)

++ ++ Flowers white or nearly so.

**L. alyssoides**, GRAY. Smooth: stems 1-several, erect, leafy, corymbosely branched above: upper leaves entire, narrow, long-linear, acute, ascending; the lower similar or pinnately divided into a few usually rather narrow acutish entire or cleft segments: pedicels about 3 lines long: sepals short, oval, usually caducous, much exceeded by the more persistent long and slender-clawed petals: capsule rhombic-ovate. — Pl. Fendl. 10, Pl. Wright. i. 10, & ii. 15; Wats. Bot. King Exp. 29. *L. montanum*, var. *alyssoides*, Jones, Zoe, iv. 266. — Plains and mountain valleys, W. Texas to Arizona, northward to Colorado, *Porter*, and Trinity Mountains, Nevada, *Watson*.

**L. montanum**, NUTT. Probably biennial, low and branched from near the base or less frequently with a single erect stem branching above, minutely pulverulent to rather densely hirsute: leaves even the upper ones more or less deeply toothed or pinnatifid (very rarely entire); segments ovate to oblong-elliptic or very rarely linear: sepals not falling before the petals: capsule ovate-elliptic to suborbicular. — Nutt. in Torr. & Gray, Fl. i. 116, 669; Gray, Pl. Wright. ii. 15; Torr. Pacif. R. Rep. vii. 8; Wats. Bot. King Exp. 29. *L. corymbosum*, Hook. & Arn. Bot. Beech. 323. *L. Utahviense*, Regel, Act. Hort. Petrop. i. 92. — In similar places as the last, with which it may occasionally intergrade; the majority of forms, of the two, however, are too distinct to be united. The southern range is similar to that of the last, but westward and northward the present species extends to California and N. Idaho, *Spalding*.

**L. scopulorum**, JONES, in herb. Perennial, becoming suffruticose at the base, irregularly branched, quite glabrous: leaves subcoriaceous; the lower ones obovate or oblanceolate in outline, toothed or rather deeply parted into broad obtuse segments and narrowed at the base into more or less elongated petioles; the upper leaves narrower, sessile, commonly with a few spreading teeth near the apex: racemes usually numerous, rather dense; pedicels  $2\frac{1}{2}$  to 3 lines long: petals white, conspicuous, much exceeding the sepals; blade suborbicular; claw slender: stamens 6: capsule broadly ovate, somewhat narrowed to the slightly retuse apex, glabrous,  $1\frac{1}{2}$  lines long; sides with low keels. — *L. montanum*, var. *alpinum*, Wats. Bot. King Exp. 29. *L. integrifolium*, var. *heterophyllum*, Wats. Am. Nat. ix. 268. *L. heterophyllum*, Jones, Zoe, iii. 284, not Benth. — Rocky cliffs of mountains, at moderate altitudes, Utah, Wasatch Mountains, *Watson*, *Jones*, and near Cedar City, *Parry*. Certainly a distinct species.

**Var. spatulatum**, ROBINSON, n. var. More decidedly fruticose: leaves spatulate, quite entire except at the subtruncate and obscurely 3-toothed apex: style very short. — *L. spatulatum*, Vasey, in herb. — Headwaters of the Bear River, Colorado, *Vasey*, no. 51, September, 1868.

**L. integrifolium**, NUTT. Herbaceous, glabrous or puberulent, probably biennial, branched from the base, 7 to 15 inches high: root single, stout, commonly more than half inch in diameter: leaves oblong, oblanceolate, or spatulate, acute or apiculate, thickish, 1 to 2 inches long,  $2\frac{1}{2}$  to  $3\frac{1}{2}$  lines broad, entire: racemes single, terminal or more commonly several, 1 to 2 inches long: pedicels spreading, 3 to 4 lines long: petals obovate, white,

about twice the length of the sepals, indistinctly and broadly clawed, deciduous with the sepals: stamens 2: capsules ovate-oblong,  $1\frac{1}{2}$  lines long, barely retuse, inconspicuously reticulated when quite ripe. — Nutt. in Torr. & Gray, Fl. i. 116; Hook. Lond. Jour. Bot. vi. 71. *L. Utahense*, Jones, Bull. Torr. Club, viii. 70, & Zoe, iv. 266, is exactly the same. — Rocky Mountains of Wyoming, *Letterman*, westward to Utah, *Ward, Jones*; S. E. Washington, *Nuttall*, and the Muddy River on the Upper Missouri, *Geyer*, acc. to Hooker. A very characteristic species, distinguished by its thick root, relatively broad-clawed petals, and reduced stamens.

— Capsule ovate or ovate-oblong, distinctly winged at the retuse or bifid apex, seldom exceeding 2 lines in breadth: annuals, introduced from the Old World.

**L. SARIFVUM**, L. (GARDEN CRESS.) Erect, glabrous: branches ascending: leaves cleft nearly to the rhachis; segments few, oblanceolate or linear, entire or obtusely toothed or lobed toward the apex: racemes elongated; pedicels erect or nearly so, shorter than the capsules; style included in the narrow sinus between the thin erect obtuse lobes of the pod. — Spec. ii. 644; Porter in Hayden, Rep. 1870, 473, & Fl. Col. 10; Coulter in Hayden, Rep. 1872, 761. — Sparingly introduced about dwellings in Brit. America from Gaspé to Vancouver, *Macoun*; and in the Northern States across the continent, but infrequent. (Introd. from Eu.)

**L. CAMPÊSTRE**, R. Br. (COW CRESS.) Erect, pubescent: stem simple and very leafy up to the inflorescence: leaves oblong, obtuse, denticulate, erect; the lower ones narrowed to slender petioles; the upper sessile by a sagittate-clasping base: pedicels horizontally spreading, a little shorter than the thickish papillose capsule: petals white: anthers yellow: style slightly exserted from the narrow notch. — R. Br. in Ait. f. Kew. ed. 2, iv. 88; Beck, Bot. 27; Torr. & Gray, Fl. i. 115; Lockwood, Bot. Gaz. v. 14; Wats. & Coulter in Gray, Man. ed. 6, 73. — Becoming locally common in cultivated ground, Cape Breton and S. Canada, *Macoun*, to Virginia, not infrequent in the interior; also near Waldo, Oregon, *Rattan*; fl. May, June. (Nat. from Eu.) The subspecies *L. SMITHII*, Hook., with smoother pod and purple anthers, has been collected at Milton, Mass., *Dr. Kennedy*, but the differences do not appear significant. Yellow-anthered individuals with smoothish pods are not infrequent. Nor does the length of the style furnish a satisfactory distinction.

— Capsule suborbicular or somewhat obcordate, flat and broad,  $2\frac{1}{2}$  to 4 lines in diameter.

**L. FLEMONTII**, WATSON. Suffrutescent, glabrous and glaucous, much branched, 10 to 20 inches high: leaves narrow, linear, acute,  $1\frac{1}{2}$  to 3 inches long, entire or with 1 to 2 pairs of narrow linear spreading acute teeth: racemes very numerous: flowers on slender spreading often flexuous pedicels: petals  $1\frac{1}{2}$  lines long: pods thin, light colored, usually but not always more or less pointed at the base, shallowly obcordate with broad rounded lobes. — Bot. King Exp. 30, t. 4, f. 3, 4; Coville, Contrib. U. S. Nat. Herb. iv. 65. — Arid places, Colorado, *Rothrock & Wolf*, to Nevada, Arizona, and S. California; especially abundant in the Mohave Desert; fl. May, June. A species well marked by its large pods.

§ 2. Stigma sessile or subsessile; capsule emarginate or retuse at the apex.

\* Capsule merely emarginate.

— Cotyledons accumbent (parallel with the surfaces of the capsule and seed), relatively broad.

**L. VIRGINICUM**, L. (PEPPERGRASS.) Puberulent, erect, 8 inches to 2 feet high: lower leaves pinnate or deeply pinnatifid, seldom persisting until fruit; segments incisely serrate; the terminal one much the largest; upper leaves linear or lanceolate, erect, incisely toothed or entire; teeth unequal and upwardly pointed: racemes 1-several, many-flowered; pedicels slender, widely spreading,  $1\frac{1}{2}$  to 2 lines long: petals spatulate, white, exceeding the oblong obtusish sepals: stamens 2 (to 4): capsule orbicular, smooth, often purple-tinged at maturity, narrowly margined above,  $1\frac{1}{2}$  lines in diameter; seeds light brown, narrowly wing-margined, very flat; the faces traversed by a curved and eccentric groove marking the division between the radicle and flat cotyledons. — Spec. ii. 645; Michx. Fl. ii. 27; Pursh, Fl. ii. 435; Gray, Gen. III. i. 168, t. 73; Ell. Sk. ii. 140; Torr. Fl. N. Y. i. 65; Darl. Fl. Cest. 381; Torr. & Gray, Fl. i. 115; Leggett, Bull. Torr. Club, i. 5. *L. Iberis*, Schk. Handb. ii. 222, t. 180. *L. triandrum*, Stokes, Bot. Mat. Med. iii. 426. *L. majus*, Darracq, Bull. Soc. Bot. Fr.

xy. p. xiii. [Hist. et Descr. Bayonne, ed. 2, 454]. *Clypeola Caroliniana*, Walt. Car. 173. *Cynocardium Virginicum*, Webb & Berth. Hist. Nat. Canar. i. 97. *Thlaspi Virginianum*, Poir. Dict. vii. 544. *Dilepticum diffusum* & *D. præcox*, Raf. Fl. Ludov. 85, 86. — A common weed in dry soil of roadsides and cultivated ground. New England to Florida, westward to Kansas and Texas. (W. Ind., also introduced into Europe.) The position of the cotyledons is exceptional in the genus, and forms by far the best distinction between this and the two following species, which in many respects closely simulate it.

+ + Cotyledons incumbent (parallel to the dissepiment of the capsule); mature fruit seldom exceeding  $1\frac{1}{2}$  lines in length.

+ + Erect annuals with stem simple below: the first species more or less pubescent, the others nearly or quite glabrous, if granular very minutely so.

— Petals present, white, equalling or exceeding the sepals: western.

**L. Menziésii**, DC. Root long, slender, perpendicular, simple or at length branched, sometimes biennial or perennial (?): stem 2 inches to a foot high, puberulent, simple below, erect, branched above: basal leaves pinnately parted, petiolate, pubescent or somewhat hirsute; segments lanceolate, acutish, subentire or rather deeply toothed; cauline leaves merely toothed, the upper linear, entire: racemes 1 to several, not contracted near the summit; pedicels slender, early spreading or divaricate, longer than the capsules: stamens varying from 2 to 4: capsules orbicular, retuse, glabrous, about a line and a half in diameter: seeds narrowly margined upon one edge. — Syst. ii. 539; Torr. & Gray, Fl. i. 115, in part; Torr. Bot. Wilkes Exped. 233; Macoun, Cat. Canad. Pl. 57; not Hook., nor Brew. & Wats., nor of authors as to apetalous Californian plant. ? *L. Californicum*, Nutt. in Torr. & Gray, l. c. *L. intermedium*, & *L. Virginicum*, Brew. & Wats. Bot. Calif. i. 46, not 47. *L. occidentale*, Howell, Erythea, iii. 32, has no distinguishing character. — Cliffs and rocky banks, Oregon, Howel, to Vancouver, Macoun, first coll. by Menzies. Of the identity of the type, there can be no doubt, from De Candolle's accurate description, as well as from a tracing of and notes upon the original in herb. Brit. Mus. Plants appear, however, to have been early cultivated at Geneva as *L. Menziesii*, which, being quite distinct, have led to a general confusion.

**L. médium**, GREENE. Very similar to the preceding in flowers and fruit: root shorter, more often branched, probably only of annual duration: stem usually taller, becoming  $1\frac{1}{2}$  feet high: leaves lanceolate, dentate, but scarcely ever pinnatifid, nearly or quite glabrous; the rameal linear, entire. — Erythea, iii. 32. *L. intermedium*, Gray, Pl. Wright. ii. 15; Wats. Bot. King Exp. 25, in part; not A. Rich., nor Gray, Man. ed. 2-6, nor of authors as to plant of Eastern States. *L. lasiocarpum*, var. *tenuipes*, Wats. Proc. Am. Acad. xvii. 322, in great part (a form with slightly flattened pedicels connecting this with *L. lasiocarpum*). — Texas and New Mexico to S. California and northward to Puget Sound and N. Idaho. (Mex.) Perhaps intergrading with the preceding, but of very different and much more extended range.

**Var. pubescens**, ROBINSON, n. var. Somewhat stouter, velvety-pubescent: leaves thickish: petals in type of the variety and specimens seen always present as in typical form: capsule a little larger, glabrous. — *L. intermedium*, var. *pubescens*, Greene, Bot. Gaz. v. 157. — Arizona, Palmer, 1876, and New Mexico, at Mangos Springs, Greene, 1880.

**L. apétalum**, WILLD. Habit of *L. Virginicum* but more slender, odorless: leaves somewhat narrower and paler duller green; the basal more or less incisely toothed or pinnatifid; segments usually acutish: flowers apetalous (minute petals present in some foreign varieties), diandrous, closely aggregated, the pedicels remaining nearly erect during anthesis, thus making the racemes appear contracted just below the summit: fruiting pedicels approximate, regularly and widely spreading, scarcely longer than the glabrous orbicular retuse siliels. — Spec. iii. 439 (poorly described from a fragmentary Siberian specimen, but type still extant and identified by Prof. Ascherson, Verh. Bot. Brandenburg, 1891, 108). *L. incisum*, DC. Syst. ii. 541, and various authors, but probably not of Roth; see Ascherson, l. c. 109. *L. micranthum*, var. *apetalum*, Ledeb. Fl. Ross. i. 205; Grütter, Deutsch. Bot. Monatsschr. viii. 80; Winkler, Verh. Bot. Brandenburg, 1891, 106. *L. rudérale*, Hook. Fl. Bor.-Am. i. 68; Torr. & Gray, Fl. i. 115; Torr. in Frém. Rep. 87; Gray, Pl. Fendl. 10; Hook. f. Arct. Pl. 286, 320; not L. *L. intermedium*, Gray, Man. ed. 2-6; Wats. Bot. King Exp. 29, in part, and authors, as to eastern plant. *L. lasiocarpum*, var. *tenuipes*, Wats.

Proc. Am. Acad. xvii. 322, in small part. *L. Virginicum*, Macoun, Cat. Canad. Pl. 57, as to eastern plant; MacMillan, Metasp. Min. Val. 257.—Common and widely distributed, extending from New England across the continent and south to Texas, where, as in the northwest, probably indigenous; in the Eastern States a wayside weed appearing as though introduced. (N. & Centr. Asia, adv. in Eu.)

- L. RUDERÁLE**, L. Nearly or quite glabrous, 8 to 12 inches high, exhaling a strong disagreeable odor (like that of *Senebiera didyma*): lowest leaves bipinnatifid, seldom persisting; the upper narrow, linear, entire or few-toothed: racemes more slender and loosely flowered than in the preceding: flowers small, apetalous, diandrous: capsule smooth, marginless, broadly ovate rather than orbicular, commonly less than a line in diameter: pedicels slender,  $1\frac{1}{2}$  lines long, more scattered and less regularly spreading than in the preceding.—Spec. ii. 645; Gray, Gen. III. i. 168, t. 73, f. 8-10; Wats. & Coulter in Gray, Man. ed. 6, 73.—Waste places and roadsides, Nova Scotia, *Macoun*, to Texas, *Reverchon*, becoming frequent about the larger cities of the Atlantic seaboard; fl. a little earlier than the two preceding, May to July. (Nat. from Eu.) Leafy and paniculately branched specimens not differing from this species in their essential characters have been collected in the Winnipeg Valley, at Fort Ellis, and in the Saskatchewan region, *Bourgeau*, and at Maple Creek, *Macoun*.

++ ++ Lower and more spreading, pubescent or hirsute.

- L. lasiocárpum**, Nutt. Branching from or near the base, decumbent (rarely if ever with a single erect stem), hirsute with spreading hairs or tomentulose: lower leaves pinnately parted; segments usually rather broad, obtuse or rounded, sparingly toothed or entire: racemes several; pedicels distinctly flattened, horizontally spreading,  $1\frac{1}{2}$  lines long: sepals broadly oblong, usually purple, with thin white margins: petals minute or none: capsule suborbicular, thin-margined near the apex, hispid-pubescent upon both faces or at least upon the edge (very rarely quite smooth).—Nutt. in Torr. & Gray, Fl. i. 115; Wats. Proc. Am. Acad. xi. 113, & xvii. 322; Brew. & Wats. Bot. Calif. i. 46. *L. Wrightii*, Gray, Pl. Wright. ii. 15. *L. ruderale*, var. *lasiocarpum*, Engelm. in Gray, l. c.—S. W. Colorado, *Brandegge*, and Texas to S. California. (Adj. Mex.) Also introduced upon railway ballast in Oregon, *Henderson*. A species of definite geographic distribution, distinguished from the following by its almost invariably hispid pods and less deeply divided leaves.

- L. BIPINNATÍFIDUM**, Desv. Low, branching from or near the base: leaves all pinnatifid, the lowest bipinnatifid; segments roundish to oblong or linear: flowers apetalous: fruiting pedicels divaricate, seldom exceeding the orbicular glabrous silicles.—Journ. Bot. iii. 165 (1814); K. Brandegge, Zoe, iii. 49, & iv. 300. *L. Menziesii*, Hook. Fl. Bor.-Am. i. 68, as to descr.; Torr. & Gray, Fl. i. 115, in part; Brew. & Wats. Bot. Calif. i. 46, and authors as to pl. Calif., not DC.—A common weed by beaten paths, &c., Centr. and S. California, eastward to Arkansas, *Pringle*, *Letterman*. (Probably introduced from Mex. and S. Amer.)

++ ++ ++ Stem conspicuously granular: southwestern annual or biennial.

- L. sórdidum**, Gray. Spreading from the base or forming an erect flexuous much branched stem, a foot in height: leaves all deeply pinnatifid, 6 to 9 lines long; segments more or less cleft: racemes many, 8 to 16 lines in length: flowers very numerous, minute, apetalous or nearly so: stamens 4: capsules orbicular, smooth, wingless, three fourths line in diameter, on slender ascending pedicels of about the same length.—Pl. Wright. i. 10, & ii. 15; Coulter, Contrib. U. S. Nat. Herb. ii. 21.—Mountain valleys and rocky hills, W. Texas, *Wright*, *Girard*, *Havard*; fl. in summer. (Chihuahua, *Pringle*.)

+ + + Cotyledons incumbent: fruit larger, 2 to  $2\frac{1}{2}$  lines long at maturity; the thin margin slightly involute toward the upper or dorsal surface: Pacific species.

- L. nítidum**, Nutt. Erect or branched from the base and spreading, 4 inches to a foot or more in height: pubescent or nearly smooth: lower leaves deeply pinnatifid with narrow rhachis and attenuate segments; the upper leaves often entire: racemes one to several, rather loosely flowered: petals white, considerably exceeding the sepals: capsule smooth and shining, convex below and nearly flat or even concave above,  $1\frac{1}{2}$  to 2 lines broad, often purple: pedicels strongly flattened.—Nutt. in Torr. & Gray, Fl. i. 116; Benth. Pl. Hartw. 298; Torr. Pacif. R. Rep. iv. 66, vii. 8, & Bot. Mex. Bound. 34; Brew. & Wats. Bot. Calif. i. 46. *L. leiocarpum*, Hook. & Arn. Bot. Beech. 324, not DC.—Washington, Rockland, *Suksdorf*, *Klikitat*, *Howell*, to San Diego, California, *Thurber*, *Orcutt*; common on dry hillsides; fl. through spring.



**Var. insigne, GREENE.** "Stoutish and mostly simple, 4-8 inches high; the mostly solitary fruiting raceme shorter and denser: pods twice as large [as  $1\frac{1}{2}$  lines in diameter], round-obovoid." — Fl. Francis. 274, & Man. Bay-Reg. 24. — Mt. Diablo Range, Central Calif., acc. to Greene.

\* \* Apex of the capsule produced into two distinct teeth or lobes: western annuals.

**L. látipes, Hook.** Pubescent or somewhat hirsute, branched from the base; branches short, stout, procumbent: leaves long, narrow, linear, entire or coarsely pinnatifid with a few linear segments: racemes dense; pedicels strongly compressed, ascending or nearly erect: petals obovate, rounded at the apex,  $1\frac{1}{2}$  lines long, much exceeding the short sepals: pods ovate, conspicuously reticulated, puberulent, or coarsely pubescent, ending in two approximate ovate-lanceolate acutish teeth; the latter being a line or more in length; sinus very narrow. — Ic. t. 41; Torr. & Gray, Fl. i. 116; Brew. & Wats. Bot. Calif. i. 45. — Flats and salt marshes, but also in hard clayey soil, California, near the coast from Martinez southward.

**L. dictyótum, GRAY.** Decumbent, spreading, much branched from the base: leaves linear, tapering at both ends, 10 to 22 lines long, a line or less in width, usually entire, more rarely with one or two narrow teeth near the middle: pedicels strongly flattened: sepals scarious-margined, not persisting: petals usually none, when present narrow, white: capsules ovate, strongly reticulated, pubescent at least when young,  $1\frac{1}{2}$  lines broad; teeth short, obtuse; sinus narrow. — Proc. Am. Acad. vii. 329; Wats. Bot. King. Exp. 30, t. 4, f. 1, 2; Greene, Fl. Francis. 273, & Man. Bay-Reg. 23. — Damp and especially alkaline soil, Washington, Duck Lake, *Suksdorf*, Walla Walla, *Brandegee*, southward to San Diego Co., Calif., *Jones*, *Cleveland*; also Nevada, *Anderson*, *Watson*; fl. February to June.

**Var. acútídens, GRAY.** Racemes more elongated, loose: pedicels widely spreading or deflexed: teeth of the capsule longer, acute or acutish, more or less spreading; sinus triangular. — Proc. Am. Acad. xii. 54. — Alkaline soil, Yreka, Calif., *Greene*; Oregon, *Howell Bros.*; San Diego, Calif., *Jones*. The southern specimens collected by Prof. Jones show a transition to the type.

**L. strictum, RATTAN.** Finely pubescent, branched, nearly erect or more or less spreading: leaves pinnatifid; segments narrow, toothed, obtuse or acutish: racemes mostly rather dense; pedicels short, erect or ascending, exceeded by the capsules: the latter broadly ovate, glabrous, inconspicuously reticulated, 1 to  $1\frac{1}{4}$  lines in breadth; teeth short, acutish; sinus triangular: petals none: calyx often persisting to mature fruit. — Anal. Key, 25.

*L. oxycarpum*, var. (?) *strictum*, Wats. Bot. Calif. i. 46, & Bibl. Index, 65. *L. Oreganum*, Greene, Fl. Francis. 274, in part. — Preferring alkaline soil, Centr. and N. California; fl. March to June.

**Var. Oregánum, ROBINSON, n. var.** Segments of the leaves attenuate: capsule larger,  $1\frac{1}{4}$  lines broad: calyx promptly deciduous. — *L. Oreganum*, Howell, Pacif. Coast Pl., coll. of 1887; Greene, l. c. in part. — Rogue River Valley, Oregon, *Howell*:

**L. oxycárpum, TORR. & GRAY.** Slender, branched from the base, nearly or quite smooth; branches ascending, 4 to 6 inches long, loosely floriferous more than half their length: leaves narrow, linear, acute, subentire or pinnatifid with a few narrow acute teeth: racemes looser than in the preceding species; pedicels widely spreading or deflexed, more slender than in the other members of the group,  $1\frac{1}{2}$  lines long: flowers small, apetalous: sepals very unequal, half line long: stamens 2: capsule suborbicular, glabrate, finely reticulated,  $1\frac{1}{4}$  lines broad, tipped with two very short widely divergent teeth. — Fl. i. 116; Hook. & Arn. Bot. Beech. 323; Brew. & Wats. Bot. Calif. i. 46; Greene, l. c. — Central Calif. to Cadboro Bay, Vancouver, *Macoun*, preferring saline soil; fl. March, April.

**14. SENEBIÉRA, DC. WART CRESS, SWINE CRESS.** (Dedicated to *Jean Senebier*, vegetable physiologist of Geneva, 1742-1809.) — Prostrate spreading and slightly succulent weeds from the Old World, exhaling a characteristic and disagreeable odor. — Mém. Soc. Hist. Nat. Paris, i. 140-146, t. 8, 9, 1799 (An 7), & Syst. ii. 521; Poir. Dict. vii. 75; Reichenb. Ic. Fl. Germ. ii. t. 9. *Coronopus*, Gärttn. Fruct. ii. 293. [By B. L. ROBINSON.]

- S. PINNATIFIDA**, DC. Annual or biennial: stems numerous and slender: leaves short, an inch or less in length, pinnately parted; segments 7 to 9, lanceolate, entire, or sparingly toothed: flowers very small, greenish white: petals minute or none: fruit small, 1 to  $1\frac{1}{2}$  lines broad, notched both above and below, thus appearing transversely 2-lobed; its segments turgid and finely wrinkled. — Mém. Soc. Hist. Nat. Paris, i. 144, 1799 (An 7), & Syst. ii. 523; Torr. & Gray, Fl. i. 114. *S. didyma*, Pers. Syn. ii. 185. *Lepidium didymum*, L. Mant. 92. *Coronopus didymus*, Smith, Fl. Brit. ii. 691; Pursh, Fl. ii. 434; Nutt. Gen. ii. 65. — Preferring moist soil of ditches, surface drains, &c., frequent along the seaboard from Newfoundland to Florida and Louisiana, also from California to Vancouver Isl., *Macoun*; occasionally found in dry situations; not frequent in the interior; fl. spring and early summer. (Intro. from Eu.)
- S. CORONÓPUS**, Poir. Annual or biennial: stems stouter: leaves longer and segments relatively narrower: fruit flattened,  $1\frac{1}{2}$  to  $1\frac{3}{4}$  lines broad, not notched above nor divided into two lobes, but strongly roughened and somewhat crested by radiating prominences. — Dict. vii. 76; Pers. Syn. ii. 185; DC. Syst. ii. 525; Torr. & Gray, Fl. i. 115; Wats. & Coulter, in Gray, Man. ed. 6, 74. *Coronopus Ruellii*, All. Ped. n. 934; Pursh, Fl. ii. 435; Ell. Sk. ii. 139. *Coronopus Coronopus*, Karsten, Deutsch. Fl. 673. — Roadsides and rubbish heaps, chiefly in the Middle Atlantic States, but occasionally westward; Portland, Oregon, *Henderson*; less common than the preceding. (Intro. from Eu.)

**15. SUBULÁRIA**, L. AWLWORT. (Latin *subula*, an awl, in reference to the leaves.) — Small aquatic perennials with clustered subulate attenuate leaves and scapose loosely racemose inflorescence of minute white flowers. — Gen. no. 526; Gray, Gen. Ill. i. 163, t. 71; Hiltner in Engl. Jahrb. vii. 264; Prantl in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 2, 159. — An interesting and practically monotypic genus of which the exact affinities are still somewhat doubtful. The following species is widely distributed in the northern temperate zone. A second species from the mountains of Abyssinia is doubtfully distinct. [By B. L. ROBINSON.]

**S. aquática**, L. Submersed or growing on muddy banks, glabrous: root a dense cluster of bright white fibres: leaves 12 to 20, unequal, erect or slightly spreading, thickish at the base,  $1-1\frac{1}{2}$  (-3) inches in length, tapering very gradually to the end: floral axis naked, 1 to 4 inches high, floriferous from below the middle: the submersed flowers minute, cleistogamous, and somewhat simplified: fruit obovate, upon short distant spreading pedicels. — Spec. ii. 642; DC. Syst. ii. 698; Torr. & Gray, Fl. i. 113; Gray, l. c. 164, t. 71; Brew. & Wats. Bot. Calif. i. 43; Slosson, Bull. Torr. Club, xi. 118; Day, *ibid.* xvi. 291. — Edges of ponds and lakes, also muddy banks of running water, Newfoundland, on the Exploits Riv., *Robinson & Schrenk*; Maine, *Nuttall*, near Portland, *Chickering*; New Hampshire, Franconia, *Tuckerman*, *Oakes*, *Miss Slosson*, *Faxon*, Squam Lake, *J. Schrenk*; Ontario, Slater's Bay near Port Sandfield, coll. by botanists of Am. Assoc. 1889; Manitoba, Eagle Lake, *Fletcher*, acc. to *Macoun*; Wyoming, Yellow-stone Lake, *Parry*; California, Mono Pass, 10,000 feet, *Bolander*, Summit Valley, *Pringle*, Webber Lake, *Lemmon*; and Vancouver, Sproat Lake, *Macoun*. Said to have been collected on the Delaware Riv. by *Durand*, but its occurrence in that region has not been recently substantiated. Easily overlooked and doubtless much more widely distributed; the foliage somewhat resembles an *Isoetes*.

**16. CAPSÉLLA**, Medic. (Latin *capsella*, a little box, alluding to the fruit.) — A small genus, difficult of circumscription; branching annuals with small white flowers and rosulate leaves. — Pflanzeng. i. 85; Moench, Meth. 271; DC. Syst. ii. 383; Torr. & Gray, Fl. i. 116; Benth. & Hook. Gen. i. 86; Prantl, l. c. 189. *Bursa*, Tourn. Inst. 216, t. 103. *Hymenolobus*, Nutt. in Torr. & Gray, Fl. i. 117. [By B. L. ROBINSON.]

§ 1. **BURSEÆ**. Fruit obcordate, cuneate, reversed-deltoid in outline: introduced from the Old World.

**C. BURSA-PASTÓRIS**, Medic. l. c. (SHEPHERD'S PURSE.) Finely stellate-pubescent and somewhat hirsute: basal leaves oblong or oblanceolate in outline, narrowed below to winged petioles, dentate or deeply sinuate-pinnatifid; cauline leaves lanceolate, sessile by sagittate clasping bases: racemes in fruit loose, elongated, often branched; pedicels filiform, spreading. — *Thlaspi Bursa-pastoris*, L. Spec. ii. 647. *Bursa Bursa-pastoris*, Weber acc. to Britton, Mem. Torr. Club, v. 172. — One of the commonest door-yard weeds, doubtless of gerontogeous origin, but now cosmopolitan. (Nat. from Eu.)

§ 2. **HYMENOLÓBÆÆ**. Fruit elliptical, entire at the apex: indigenous, chiefly in the West.

**C. elliptica**, C. A. MEYER. Low, weak and spreading, very minutely stellate-pubescent or glabrous throughout: leaves thin, small, spatulate or lanceolate; the lower commonly with a few blunt teeth or more or less deeply pinnatifid: stems nearly filiform, flexuous: flowers minute: sepals ovate-elliptic, obtuse, thin-margined, about equalled by the narrow white petals: capsule elliptic-oblong, 1 to  $1\frac{1}{2}$  lines in length; stigma nearly sessile. — Meyer in Ledeb. Fl. Alt. iii. 199. *C. procumbens*, Fries, Mant. i. 14; Reichenb. Ic. Fl. Germ. ii. t. 11; Britton, Bull. Torr. Club, xvii. 311. *C. divaricata*, & *C. erecta*, Walp. Rep. i. 175. *Hymenolobus divaricatus*, Nutt. in Torr. & Gray, Fl. i. 117; Hook. Ic. t. 277. *H. erectus*, Nutt. l. c. *Lepidium procumbens*, L. Spec. ii. 643. *Hutchinsia procumbens*, Desv. Jour. Bot. iii. 168 (1814). — Dead Islands, Labrador, Allen; widely distributed in the West, from Wyoming, Porter, to Brit. Columbia, Macoun, and S. California. (Asia, &c.)

**C. púbens**, BENTH. & HOOK. Tall, erect, quite simple or with several ascending branches, finely and rather closely stellate-tomentose throughout: stem rather stout, leafy: leaves lanceolate or oblong, pinnately toothed or merely repand: racemes rather dense, becoming much elongated; pedicels 4 to 8 lines long: sepals spreading in anthesis: capsules sub-inflated, stellately pubescent and hispid, 3 to 4 lines long, tipped with a short slender style. — Benth. & Hook. acc. to Wats. Bibl. Index, 52, & Proc. Am. Acad. xvii. 322. *Hymenolobus pubens*, Gray, Pl. Wright. i. 9, & ii. 14. — Prairies of Texas, Wright, Girard, Havard, and New Mexico, Wright. (Mex., Palmer, Pringle.)

**17. CAMÉLINA**, Crantz. FALSE FLAX. (Name doubtfully derived from χαμαί, on the ground, dwarf, and λίνον, flax, perhaps referring to a stunting influence upon flax, in fields of which it often grows.) — Erect gerontogeous annuals with sagittate-clasping oblong to linear entire or dentate thickish leaves (the lowermost rarely pinnatifid), and pale yellow or white flowers of no beauty. — Stirp. Austr. i. 18; Reichenb. l. c. t. 24; Benth. & Hook. Gen. i. 83; Prantl in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 2, 189. [By B. L. ROBINSON.]

**C. SATIVA**, Crantz, l. c. Stem simple or sparingly branched above,  $1\frac{1}{2}$  to 4 feet high, leafy, nearly glabrous or somewhat hirsute: leaves erect,  $1\frac{1}{2}$  to  $2\frac{1}{2}$  lines long, entire or nearly so: flowers rather small, light yellow: fruiting pedicels spreading-ascending: fruit obovate, becoming  $3\frac{1}{2}$  to 4 lines long, three fourths as broad, glabrous, margined, finely reticulated and slightly ribbed upon the faces. — DC. Syst. ii. 515; Beck, Bot. 27; Darlingt. Fl. Cest. 379; Torr. & Gray, Fl. i. 110. — A weed not infrequent in cultivated ground, especially in flax-fields in Canada and the Middle States, extending across the continent; fl. early summer. (Introd. from Eu.)

**18. NÉSLIA**, Desv. (Dedicated to *J. A. N. De Nesle*.) — An erect annual monotype of the Old World, adventive in America. — Journ. Bot. iii. 162 (1814); Reichenb. l. c. [By B. L. ROBINSON.]

**N. PANICULÁTA**, Desv. l. c. Pubescent, a foot or more in height, simple up to the inflorescence: leaves oblong, obtusish, 1 to 2 inches in length, erect, sessile and clasping by a sagittate base: racemes 1 to 5, ascending; pedicels widely spreading, very slender, 3 to 4 lines long: sepals oblong, pale yellow: petals spatulate, bright yellow: capsule subglobose, reticulated,

a line in diameter, tipped with a slender persistent style. — *Myagrum paniculatum*, L. Spec. ii. 641. — Winnipeg Valley, *Bourgeau* (1858), and more or less established along the track of the Canadian Pacific Railway, at Canmore, *Macoun* (1885), also coll. on ballast, Jersey City, *Judge Brown*; fl. through the summer. (Adv. from Eu.)

**19. CAKÍLE**, Tourn. SEA ROCKET. (Name of doubtful perhaps Arabic origin.) — Fleshy maritime annuals, generically readily recognized by their characteristic fruit. Flowers purplish or white. Leaves more or less sinuate-toothed or incised. — Inst. Suppl. 49, t. 483; Gärtn. Fruct. ii. 287; Benth. & Hook. Gen. i. 99. [By B. L. ROBINSON.]

**C. marítima**, Scop. Leaves either narrow, linear or nearly so and subentire, or more often very deeply sinuate pinnatifid, with narrow rhachis and segments: upper cell of the fruit considerably exceeding the lower, lanceolate in outline or ensiform, slightly 4-angled and narrowed to an acutish point; the lower cell often but not always appendaged at the summit with two spreading teeth. — Fl. Carn. ed. 2, no. 844; DC. Syst. ii. 428. — The typical form of this species occurs as a ballast-weed upon the Atlantic Coast of the Middle States, *Brown*, *Parker*, and a form unsatisfactorily separable by its usually more slender and elongated spindle-shaped pods is indigenous in Florida, Indian River, *Palmer*, Marquesas Keys, *Curtiss*, Key West, *Binney*. This form, the var. *ÆQUALIS*, Chapm. Fl. 31, is not exactly the *C. æqualis*, L'Her. of the West Indies, which has more entire apparently thinner leaves and still more slender almost linear fruit.

**Var. Cubénsis**, CHAPM. "Stem and branches erect; leaves linear, obtuse, dentate-serrate, tapering into a petiole; loment obovate." — Fl. ed. 2, 606. — "Keys of South Florida." Not seen, but from the description of the fruit apparently different from *C. Americana*, var. *Cubensis*, DC.

**Var. geniculáta**, ROBINSON, n. var. Foliage of the type: axes of the racemes very stout and strongly geniculate: fruit fully inch in length; both cells with several prominent ribs; the upper cell elongated, oblong, scarcely acute. — *C. marítima*, var. *æqualis*, Coulter, Contrib. U. S. Nat. Herb. i. 31, & ii. 22, not Chapm. — Gulf Coast, Texas, *Berlandier*, no. 3103, Galveston, *Lindheimer*, May, 1843.

**C. Americána**, Nutt. Leaves oblanceolate or obovate, shallowly sinuate-toothed or crenate: upper segments of fruit ovate in outline, 4-angled near the base, acuminate narrowed to a compressed truncate often retuse tip. — Gen. ii. 62; Gray, Gen. Ill. i. 170, t. 74; Greene, Bot. Gaz. vii. 94; Wats. & Coulter in Gray, Man. ed. 6, 74; K. Brandegee, Zoe, ii. 340. *C. marítima*, Pursh, Fl. ii. 434. *C. edentula*, Hook. Fl. Bor.-Am. i. 59. *C. marítima*, var. *Americana*, Torr. & Gray, Fl. i. 119. *Bunias edentula*, Bigel. Fl. Bost. 157. — Sea beaches Gulf of St. Lawrence to Fla.; on the Pacific in Central California (perhaps introduced), *Greene*, and along the shores of the Great Lakes. Not always readily distinguishable from the preceding species, of which it has sometimes been regarded as a variety. The difference of foliage, however, is usually striking, and of geographic range noteworthy. A marked form from Enterprise, Fla., *Canby*, has an elongated oblong strongly ribbed pod, but the upper cell has the characteristic flattened and retuse apex of this species, with which the foliage also closely agrees.

**20. RÁPHANUS**, L. RADISH. (*Ράφανος*, used for *ῥάφανις*, radish.) — A genus of six to ten species, stout annuals or biennials, all natives of the Old World and most of them of the Mediterranean region. — Gen. no. 539; DC. Prodr. i. 228. [By B. L. ROBINSON.]

**R. RAPHANÍSTRUM**, L. (WILD RADISH, JOINTED CHARLOCK.) Leaves lyrate pinnatifid, hirsute: petals most often light yellow or white and dark veined, rarely purplish: pod strongly moniliform, 2-8-seeded; the more or less ribbed or corrugated segments only  $1\frac{1}{2}$  to 2 lines in breadth; beak elongated, slender, and gradually narrowed to a point. — Spec. ii. 669; Torr. & Gray, Fl. i. 120; Torr. Bot. Mex. Bound. 35; Wats. & Coulter, l. c. — A rapid growing and troublesome weed in waste and cultivated ground. (Introd. from Eu.)

**R. SATIVUS**, L. l. c. (RADISH.) Much like the last in foliage: petals pale purple: pod usually 2-3-seeded; segments becoming  $3\frac{1}{2}$  to 4 lines in breadth, less corrugated and less distinct from the joining necks than in the preceding: beak elongated, thickish but gradually narrowed to a point. — Gray, Man. ed. 5, 75; Coulter in Hayden, Rep. 1872, 761; Brew. & Wats. Bot. Calif. i. 49. — Occasionally escaping from cultivation in the East; becoming a prevalent weed in California. In the wild plant the root is rather slender and tough-fibred. (Introd. from Eu.)

**21. BRÁSSICA**, Tourn. (Classical Latin name for cabbage.) — Erect annuals or biennials of European and Asiatic origin, usually somewhat succulent; several species adventive in America or tending to escape from cultivation. Leaves, at least the lower ones, usually lyrate. — Inst. 219, t. 106; L. Gen. n. 542; DC. Syst. ii. 582; Reichenb. Ic. Fl. Germ. ii. t. 91-98; Benth. & Hook. Gen. i. 84; Prantl in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 2, 177. *Sinapis*, L. Gen. no. 543. *Rapa*, Tourn. Inst. 228, t. 113; Adans. Fam. ii. 417. *Sinapistrum*, Spach, Hist. Veg. vi. 343. — Economically the most important genus of the order. *B. oleracea*, with its numerous artificial varieties, furnishes cabbage, cauliflower, Brussels sprouts, kohlrabi, kale, broccoli, &c. *B. campestris* has yielded in cultivation the turnip and rutabaga, as well as the colza and rape raised for the oil in the seeds. *B. nigra* and *B. alba* furnish the mustard of commerce. In their wild state these species form rapid growing coarse and unsightly weeds of roadsides and waste ground. [By B. L. ROBINSON.]

**B. CAMPESTRIS**, L. (TURNIP, RUTABAGA.) Stout, smooth or nearly so, often very glaucous, succulent: lower leaves sparingly toothed or pinnatifid; the upper entire or subentire, oblong-lanceolate, sessile by a clasping cordate-auriculate base, usually obtuse at the apex: flowers pale yellow: sepals scarcely spreading: petals about 3 lines long: pedicels spreading: pods terete,  $1\frac{1}{4}$  to  $2\frac{1}{2}$  inches long, gradually narrowed into a subulate beak tipped with a flattish stigma; seeds dark brown. — Spec. ii. 666; Wats. Bot. King Exp. 28; Wats. & Coulter in Gray, Man. ed. 6, 73. — Generally cultivated in its various forms and constantly tending to escape, sometimes becoming a noxious weed in grain fields; fl. earlier than the other species. (Introd. from Eu., Asia.)

**B. NIGRA**, Koch (BLACK MUSTARD.) Tall, 2 to 5 feet in height: stem finely striate, nearly or quite glabrous: leaves large, coarse, petiolate, commonly beset at least upon the veins beneath with scattered spreading bristles, lyrate pinnatifid or divided; the terminal segment much the largest, ovate or suborbicular, shallowly lobed and sharply dentate; the uppermost leaves simpler in outline, often reduced to linear bracts but always with slender petioles: racemes long and dense: calyx spreading a little in anthesis: petals spatulate, about  $3\frac{1}{2}$  lines in length: siliques half inch long, glabrous, torulose, indistinctly quadrangular, short-pedicelled and appressed at maturity, tipped with slender beaks (half line long); valves nerveless; seeds nearly black, highly pungent. — Koch in Roehl. Deutschl. Fl. ed. 3, iv. 713; Wats. l. c. 28; Wats. & Coulter, l. c. 72. *Sinapis nigra*, L. Spec. ii. 668; Torr. & Gray, Fl. i. 99; Reichenb. Ic. Fl. Germ. ii. t. 88. — Extensively cultivated, also well established and widely distributed as a coarse wayside weed, extending across the continent, preferring rich soil; fl. from June to late autumn. (Nat. from Eu., Asia.)

**B. SINAPISTRUM**, Boiss. (CHARLOCK.) An erect annual, hispid with scattered hairs: lower leaves toothed or pinnatifid with a large ovate-oblong or deltoid shallowly lobed and dentate terminal segment and usually a pair or two of much smaller segments below: upper leaves ovate-lanceolate, sessile or subsessile by a narrow base, not clasping: flowers relatively large: sepals spreading: petals nearly 6 lines long: pods ascending, erect or sometimes appressed; the fertile portion 9 to 15 lines long, torose; valves nerved; beak slender, flattish, nearly half as long, tipped with a globular stigma; valves at maturity rather prominently 3-5-nerved. — Voy. Espagne, ii. 39; Wats. & Coulter, l. c. *Sinapis arvensis*, L. Spec. ii. 668; Torr. & Gray, Fl. i. 99; Eng. Bot. t. 1748. — A common and trouble-

some weed in cultivated ground; fl. June to August. The form which is naturalized in America has glabrous pods, while in the Old World they are quite as often hispid. (Nat. from Eu., Asia.)

- B. JÚNCEA**, COSSON. Glabrous or nearly so: upper leaves narrowly lanceolate to linear-oblong, nearly or quite entire, always cuneate at the base: valves of the capsule 3-nerved with lateral nerves obscure and flexuous: other characters nearly as in the preceding. — Bull. Soc. Bot. France, vi. 609; Hook. f. & Thom. Journ. Linn. Soc. v. 170. — Sparingly introduced in the Eastern States. (Intro. from Eu., Asia.)
- B. ALBA**, BOISS. l. c. (WHITE MUSTARD.) Habitally resembling the two preceding: leaves usually all pinnatifid: pods spreading, densely hispid, tipped with long flat beaks; seeds pale yellow. — Gray, Man. ed. 5, 70. *Sinapis alba*, L. Spec. ii. 668. — Often cultivated and not infrequently spontaneous, especially in grain fields, Maine, *Fernald*, to Vancouver, *Macoun*, and S. California, *Hasse*. (Intro. from Eu.)
- B. ADPRÉSSA**, BOISS. l. c. 38 (*Erucastrum incanum*, Koch), with pinnately parted leaves and finely tomentose racemes of short closely appressed pods, has become locally established as a wayside weed in and near the city of San Bernardino, Calif., *Parish*.

**22. DIPLOTÁXIS**, DC. (Διπλός, double, and τάξις, row, in reference to the biseriate seeds.) — A gerontogeous genus of some twenty species, not very satisfactorily distinguished from *Brassica*. Two species are becoming so frequent upon waste ground in America as to merit notice. — Syst. ii. 628; Benth. & Hook. Gen. i. 84; Prantl, l. c. 176. Included in *Brassica* by Baill. Hist. Pl. iii. 248, and others. [By B. L. ROBINSON.]

- D. MURÁLIS**, DC. Branching from near the base, smooth or sparingly hispid: stems often naked above: leaves oblanceolate, shallowly and bluntly toothed or pinnatifid, attenuate below: flowers rather small: sepals erect: petals  $3\frac{1}{2}$  lines long, pale yellow: fruiting raceme loose, flexuous; pedicels spreading, 4 to 6 lines long: capsules over inch in length, nearly terete, tipped with subulate beaks; valves distinctly nerved; seeds ovoid, brown. — Syst. ii. 634; Reichenb. l. c. t. 82. — A ballast-weed near the ports of the Atlantic seaboard, Camden, *Parker*; Philadelphia, *Martindale*; New York, *Brown*; Chelsea, Mass., *Young*; Carleton, N. B., *Fowler*; Pictou, N. S., *Macoun*; fl. July to September. (Adv. from Eu.)
- D. TENUIFÓLIA**, DC. Similar in habit: leaves deeply sinuate-pinnatifid with narrow segments: flowers larger: petals 5 lines in length: fruiting pedicels about inch long: capsules slender,  $1\frac{1}{2}$  inches in length. — Syst. ii. 632; Reichenb. l. c. — Similar situations as the last and about equally frequent. (Adv. from Eu.)

**23. CONRÍNGIA**, Heist. (*Professor Hermann Conring*, born at Norden, 1606; died at Helmstedt, Brunswick, 1661.) — A small natural genus of characteristic habit, but without sharp technical characters. — Heist. acc. to L. Syst. Nat. ed. 1; Link, Enum. ii. 172; Reichenb. Ic. Fl. Germ. ii. t. 61. Under *Erysimum*, L. Gen. no. 545; DC. Syst. ii. 507. — One species, perhaps of eastern origin but now of general distribution in Centr. Europe, is adventive in America. [By B. L. ROBINSON.]

- C. PERFOLIÁTA**, Link, l. c. Glabrous annual, with elliptical obtuse deeply cordate and amplexicaul leaves, yellowish white flowers, and long widely spreading acutish and rather sharply 4-angled pods. — *C. orientalis*, Dum. Fl. Belg. 123. *Brassica orientalis*, L. Spec. ii. 666. *B. perfoliata*, Lam. Dict. i. 748. *Erysimum perfoliatum*, Crantz, Stirp. Austr. i. 27. *E. orientale*, R. Br. in Ait. f. Kew. ed. 2, iv. 117. *Conringia orientalis*, Andr. in DC. l. c. 508. — Waste places in the Canadian Provinces, *Macoun*, and Minnesota, *Sandberg*; as yet scarcely more than a ballast-weed. (Adv. from Eu., Asia.)

**24. ALLIÁRIA**, Adans. (The Linnean specific name of *Erysimum Alliaria*, derived from *Allium*, onion, garlic, in reference to the odor.) — A small

and natural genus of the Old World, distinguished from *Sisymbrium* by its white flowers and characteristic foliage rather than by technical characters. — Fam. ii. 418 (the earliest known post-Linnean reference; the name is ascribed to Matthioli by Ruppis); DC. Syst. ii. 488; Reichenb. Ic. Fl. Germ. ii. t. 60; Prantl, l. c. 168. [By B. L. ROBINSON.]

**A. OFFICINALIS**, Andr. Biennial, hispid-pubescent or quite glabrous: stem tall, terete, often branched above: leaves ovate-deltoid to suborbicular, broadly cordate, sinuate-toothed, 1 to 2 inches in diameter, thin and green upon both surfaces, slender-petioled: flowers rather small and crowded: siliques firm, spreading-ascending, tapering at the apex,  $1\frac{1}{2}$  inches or more in length, on short stout spreading pedicels. — Andr. in Marschall v. Bieberst. Fl. Tauro-Cauc. iii. 445; DC. Syst. ii. 489. *Erysimum Alliaria*, L. Spec. ii. 660. *Sisymbrium Alliaria*, Scop. Fl. Carn. ed. 2, ii. 26; Thomé, Fl. Deutschl. ii. t. 289; Wats. & Coulter in Gray, Man. ed. 6, 72. *Alliaria Alliaria*, Britton, Mem. Torr. Club, v. 167. — Sparingly naturalized on roadsides near Georgetown, D.C., *J. D. Smith*, and near New York City, *Miss Rich.* (Adv. from Eu., Asia.)

**25. EUTRÉMA**, R. Br. (Εὖ, well, and τρήμα, an opening; in the sense of well perforated, referring to the often incomplete dissepiment of the capsule.) — A small genus of perennials, chiefly of alpine and arctic habitat, attaining its chief development in Siberia, closely related to *Sisymbrium* but of different habit. Leaves entire, crenate, or shallowly dentate, usually ovate, oblong or subtrund, often fleshy; the radical ones long-petioled. — R. Br. in Parry, 1st Voy. Suppl. to App. 267, t. A, Flora, vii. pt. 1, Beilage 73, & Misc. Works, i. 193; Benth. & Hook. Gen. i. 78; Prantl, l. c. [By B. L. ROBINSON.]

\* Septum fenestrate.

**E. Edwardsii**, R. Br. ll. cc. Glabrous: root thick, fleshy, perpendicular: stems one to several, decumbent or nearly erect, 1 to 8 inches high: leaves entire, ovate, mostly rounded at the base and obtusish at the apex; the radical and lowest cauline upon petioles often two or three times as long as the blade; the upper cauline sessile or nearly so: flowers small, pale purple or white, at first densely crowded: fruiting raceme elongated; pedicels erect or ascending, about 2 lines long: the capsule lance-oblong, about 4 lines in length. — Hook. in Parry, 2d Voy. App. 267, t. A, & Fl. Bor.-Am. i. 67; C. A. Mey. in Ledeb. Fl. Alt. iii. 163; Ledeb. Ic. t. 258, Torr. & Gray, Fl. i. 112. *Smelowskia cinerea*, Walpers, Rep. i. 171, in part. *Draba* (?) *levigata*, Cham. & Schlecht, Linnæa, i. 25. *Sisymbrium Edwardsii*, Trautv. Act. Hort. Petr. i. 59. — Crevices of rocks, Digges Island, Hudson Bay, *Bell*, to the Arctic Ocean, from Grinnell Land, *Greely Exped.*, to Alaska. (Siberia.)

**E. (?) Eschscholtzianum**, ROBINSON, n. sp. Root slender, somewhat fibrous-branched, bearing at its apex one or more elongating rhizomes covered with the subulate bases of old petioles: leaves clustered at the ends of the rhizomes, spatulate, long-petiolate, entire, obtuse or rounded; scapes half inch to two inches high, naked below but bearing just under the inflorescence an involucre of 2 to 4 approximate lanceolate foliaceous bracts: flowers small, corymbose, white: fruit aseptate; seeds adhering to the placenta long (sometimes months) after the falling of the valves. — *Aphragmus Eschscholtzianus*, Andr. in DC. Prodr. i. 210. *Oreas involucreta*, Cham. & Schlecht. Linnæa, i. 30, t. 1. *Braya Eschscholtziana*, Benth. & Hook. Gen. i. 83, acc. to Wats. Bibl. Index, 51. — An interesting and too little known plant growing in loose stony soil, on mountains of Unalaska, *Chamisso*, and in the Aleutian Islands, *Andrzejewski*. The affinities appear to be with the present genus (as suggested by Robert Brown acc. to Hook. Fl. Bor.-Am. i. 68), rather than with *Braya*. Although the involucre leaves are exceptional, satisfactory flower- or fruit-characters for the separation of this species as a monotypic genus have not yet been found.

\* \* Septum imperforate.

**E. (?) Labradoricum**, TURCZ. Dwarf, scarcely 2 inches high: stems solitary or several, 1-few-flowered, springing from the nodes of an oblique rhizome: leaves entire, ovate,

acutish; the cauline 1 to 2, mostly petiolate, rarely one of them sessile: fruit narrowly linear, many times exceeding the pedicel: septum complete. — Bull. Soc. Nat. Mosc. xxvii. pt. 2, 305; Wats. Bibl. Index, 64. — Labrador. A species not seen by the writer, and perhaps to be referred to *Braya*. The description is condensed from that of Turczaninow.

**E. arenicola**, RICHARDS. Glabrous, half inch to two or three inches high: stems several, springing from a slender elongating branching rhizome: leaves spatulate, slender-petioled, chiefly clustered at the base, obtuse, entire or nearly so; the cauline two or three: flowers purplish: pods linear-oblong; stigma nearly capitate; septum imperforate, sometimes obscurely nerved. — Richards. in Hook. Fl. Bor.-Am. i. 67, t. 24; Torr. & Gray, Fl. i. 112. *Smelowskia cinerea*, C. A. Mey. l. c. 171, in part. *Parrya arenicola*, Hook. f. Arct. Pl. 285, 315; Benth. & Hook. Gen. i. 67. — In sand on the shores of Arctic America between 107° and 150° west long., Richardson, Franklin, Back; Glovonin Bay, Alaska, Muir; Grinnell Land? Greely.

**26. SMELÓWSKIA**, C. A. MEYER. (*Professor T. Smelowski*, a botanist of St. Petersburg, who died 1815.) — Low and caespitose perennials, canescent with fine stellately branched hairs and sometimes suffrutescent below. Leaves pinnatifid or bipinnatifid, rarely some of them entire. Flowers small, white, pale yellow, or purplish tinged. Two species are natives of W. N. America, the others of mountainous districts in Central Asia. — Mey. in Ledeb. Fl. Alt. iii. 165; Ledeb. Ic. t. 151; Benth. & Hook. Gen. i. 79; Prantl. l. c. 192. [By B. L. ROBINSON.]

**S. calycina**, C. A. MEYER. Very variable in foliage, finely stellate-pubescent and usually cinereous-villous with longer simple hairs: caudex stout, branched, clothed with the scaly bases of former leaves: leaves soft in texture, usually deeply pinnatifid, with 2 to several pairs of linear to obovate obtuse segments and a terminal one of similar shape and size; rarely a few of the radical leaves oblanceolate, quite entire: stems several, an inch to a span high: racemes at first dense and subcorymbose, but becoming elongated in fruit; pedicels ascending or erect, villous as well as the narrow sepals: petals exserted, with a broad patulous rounded blade, white or nearly so, about 2 lines in length: capsule usually lanceolate, attenuate at each end (but very variable, occasionally short and obovate), tipped with a short slender style, and capitate obscurely 2-lobed stigma; seeds few. — Mey. l. c. 170; Gray, Proc. Acad. Philad. 1863, 58; Wats. Bot. King Exp. 24. *Hutchinsia calycina*, Desv. Jour. Bot. iii. 168 (1814); Hook. Fl. Bor.-Am. i. 58, t. 17, f. B. *H. calycina*, var. *Americana*, Regel & Herder, Pl. Seminov. ii. 145. — Mountain slopes, often at considerable altitudes, Colorado to N. Central California, and northward to Alaska. (Siberia.)

**S. Fremontii**, WATSON. Less canescent: foliage more finely divided and much more rigid in texture: leaves all pinnate; segments narrow, linear, bristle-tipped and pungent: sepals ovate or oblong, glabrous: petals white: pedicels ascending or spreading, smooth: capsules linear, tetragonal, 4 to 5 lines long, tipped with a short style; seeds rather numerous. — Proc. Am. Acad. xi. 123; Brew. & Wats. Bot. Calif. i. 42. *Braya pectinata*, Greene, Erythea, iii. 69, as to character and habitat. — A very distinct species, but apparently to be referred to this genus. Growing on hills and in mountain valleys of N. California, Lemmon, Mrs. Austin, Miss Plummer, and Oregon, Frémont, Howell, Cusick.

**27. SISÝMBRIUM**, Tourn. HEDGE MUSTARD. (Name from the ancient Greek *σισύμβριον*, which designated some pungent plant, not certainly identified.) — A large and somewhat heterogeneous group, of late considerably divided by various authors. The genus *Alliaria*, through its strikingly different habit, may well be separated. *Stenophragma*, on the other hand, if extended as suggested by Prantl, loses its sharpness of definition, both as to habit and technical character. *Descurainia*, if confined to *S. Sophia* and its allies, undoubtedly forms a natural and homogeneous group; but satisfactory technical characters



have not yet been found to exclude from it various species of western and Mexican *Sisymbria* with branched hairs, but much less divided foliage, and connecting with others of South America still more nearly of the *Eusisymbrium* type. The pubescence, which if all species of both continents are considered passes from simple or occasionally forked hairs to dense stellation, fails to give a really satisfactory generic distinction. In view of the paucity of good technical characters for its subdivision, it seems best therefore to retain the genus in its comprehensive sense, the closer affinities of its species being more conveniently and just as clearly indicated by subgenera and sections. Sharp limitation from *Thelypodium* is most difficult. The orientation of the stigma-lobes, brought forward by Prantl, is unsatisfactory, since the stigma is so nearly circular in many species of both genera that distinction is impossible, and in at least one species (*T. elegans*) of obvious thelypodioid habit and affinities, the stigma-lobes lie over the placenta. The color of the flower ranges from white to yellow in *Sisymbrium* (as here limited) and in *Thelypodium* from cream-color to deep purple (in the exceptional *T. aureum*, deep yellow). The problematic *S. salsugineum*, Pall., with glabrous entire cordate-clasping leaves, purplish flowers, and undivided stigma, may well be referred to *Thelypodium*, from which it appears to be distinguished only by its small size and slender habit. — Inst. 225, t. 109; L. Gen. no. 547; DC. Syst. ii. 458; Reichenb. Ic. Fl. Germ. ii. t. 72–80; Gray, Gen. III. i. 151, t. 64; Fournier, Recherches sur Fam. Crucif. et Gen. Sisymb. *Descurainia* & *Pachypodium*, Webb & Berth. Phyt. Can. i. 72, 74. *Stenophragma*, Čelak. Flora, 1872, 438. [By B. L. ROBINSON.]

§ 1. VELÁRUM, DC. Siliques subulate, tapering almost from the base to the apex: stigma slightly 2-lobed: pubescence of simple hairs: leaves pinnatifid. — Syst. ii. 459. *Chamæplium*, Wallr. Sched. Crit. i. 376. — An Old World type represented in America by a single species widely introduced.

S. OFFICINÁLE, Scop. (HEDGE MUSTARD.) Slender, erect, somewhat hirsute near the base, less frequently pubescent throughout: leaves slender-petioled; segments toothed; the uppermost leaves narrow, lanceolate, subentire or hastate at the base: racemes spiciform and with 2 to 7 divaricately spreading branches: flowers small, pale yellow: pods on very short erect pedicels. — Fl. Carn. ed. 2, ii. 26; Torr. & Gray, Fl. i. 91; Reichenb. Ic. Fl. Germ. ii. t. 72. ? *S. Niagarensis*, Fourn. Sisymb. 85, *vide* Gray, Am. Jour. Sci. ser. 2, xlii. 278. *Erysimum officinale*, L. Spec. ii. 660. — Roadsides and waste places, very common. (Nat. from Eu.)

§ 2. EUSISÝMBRIUM, Gren. & Godr. Leafy-stemmed: siliques cylindrical, prismatic, or tapering both ways: stigma usually slightly bifid: pubescence of simple hairs or none, never glandular: leaves entire to pinnatifid. — Fl. Fr. i. 95.

S. ALTÍSSIMUM, L. (used comprehensively to include *S. sinapistrum*, Crantz, & *S. Panonicum*, Jacq.), with runcinate-pinnatifid leaves and long firm spreading pods (at maturity 3 or 4 inches in length), is scarcely more than a ballast-weed, about the large cities of the Atlantic seaboard; but has been found occurring sparingly in S. Missouri, *Bush*. (Adv. from Eu.)

S. IRÍO, L., with runcinate-pinnatifid leaves and slender pods of delicate texture (about an inch and a half in length), is said to be locally established in some parts of the S. E. Atlantic States. (Adv. from Eu.)

\* Leaves lyrate or runcinately pinnatifid, petiolate; petioles with auriculate stipuliform appendages at the base.

**S. auriculatum**, GRAY. Erect, 1 to 3 feet high, branched, somewhat hirsute or hispid below with scattered hairs: leaves 3 to 6 inches long; segments triangular or oblong, toothed or more frequently entire; the upper segments opposite; the lower reduced and scattered upon the slender petioles: racemes becoming elongated; fruiting pedicels divaricate, 3 to 5 lines long: flowers small, white or nearly so: siliques 15 to 20 lines long, slender, widely spreading, often curved. — Pl. Wright. i. 8, & ii. 12; Fourn. Sisymb. 102. *Thelypodium auriculatum*, Wats. Proc. Am. Acad. xvii. 321; Coulter, Contrib. U. S. Nat. Herb. ii. 15. — Mountain valleys of W. Texas, Wright, Harvard; fl. March to July. (Mex., Gregg, Palmer, Pringle.) The 2-lobed stigma with lobes lying over the placenta argues for the present restoration of this species to *Sisymbrium*.

\* \* Leaves (at least the cauline) entire, sessile by a sagittate-clasping base.

**S. (?) Vaséyi**, WATSON, in herb. Tall, erect, glabrous, probably glaucous, branching above: leaves oblong, acutish, 2 to 4 inches long, half inch broad: flowers small, white or nearly so, in numerous short racemes together forming an open corymbose panicle: pedicels short, spreading: pods terete, erect, 8 to 12 lines long. — *Thelypodium Vaseyi*, Coulter, Contrib. U. S. Nat. Herb. i. 30, & ii. 15, t. 1, as to plant of Vasey. (The plate is confused, the fruiting branch being evidently of Neally's plant and distinct.) — Mountains west of Las Vegas, New Mexico, G. R. Vasey, 1881, nos. 29, 41. A little known plant of thelypodoid habit but with the short round buds, short anthers, and placental stigma-lobes of *Sisymbrium*.

\* \* \* Leaves entire or with one or two teeth or lobes (very rarely pinnatifid), subsessile by a cuneate base.

**S. linifolium**, NUTT. Perennial, slightly woody at the base, quite glabrous: stems several, slender, terete, erect, flexuous: leaves narrowly oblanceolate or oblong to linear, thickish, 1 to 3 inches long: flowers 4 lines long, yellow: pods slender, spreading, curved upwards, 1 to 1½ inches long, half line in thickness; pedicels 3 lines in length. — Nutt. in Torr. & Gray, Fl. i. 91, 667. *S. junceum*, Hook. Fl. Bor.-Am. i. 61; Torr. & Gray, Fl. i. 91; not Biebers. *Nasturtium linifolium* & *pumilum*, Nutt. Journ. Acad. Philad. vii. 12. *Erysimum* (?) *glaberrimum*, Hook. & Arn. Bot. Beech. 323. — Colorado, Jones, and Wyoming, Parry, to S. Brit. America, Macoun; Washington, Suksdorf; Oregon, Howell Bros., to N. Arizona, Palmer; fl. May to August.

§ 3. DESCÚREA, C. A. Meyer (extended). Pubescence branched, rarely glandular, very rarely none: stigma small, entire. — Mey. in Ledeb. Fl. Alt. iii.

135. *Descrainia*, Webb & Berth. Phyt. Can. i. 72 (as to § *Sophia*).

\* Cauline leaves entire or nearly so, sessile, sagittate-amplexicaul.

**S. virgatum**, NUTT. A cinereous-tomentose biennial, 6 to 15 inches high, often branched from the base: radical leaves numerous, rosulate, oblong, toothed, obtuse, petiolate: fruiting pedicels spreading, 3 to 5 lines long: siliques 8 to 14 lines in length, erect. — Nutt. in Torr. & Gray, Fl. i. 93; Fourn. l. c. 105; Gray, Proc. Acad. Philad. 1863, 57; Coulter, Man. Rocky Mt. Reg. 23. — Rocky Mountains of Colorado and Wyoming, northward to Brit. America, from Wood Mt. to Medicine Hat, Macoun. The northern specimens are more paniculately branched; fl. early summer.

**S. PAUCIFLORUM**, Nutt. l. c., of the same region, described as a biennial with branched pubescence, white flowers, and long pendulous siliques, has always been obscure, and appears to have been founded upon immature specimens of *Arabis canescens*.

\* \* Cauline leaves more or less undulate-dentate or pinnatifid with broad rounded segments, not clasping: capsules attenuate, pubescent.

**S. diffusum**, GRAY. Tall and slender, diffusely branched, cinereous-tomentose: stem terete, leafy, often flexuous above: petioles short; the upper leaves subsessile: petals white, 2½ lines in length; fruiting pedicels nearly horizontal: pods widely spreading, almost divaricate, rarely suberect; midrib of the septum very broad. — Pl. Wright. i. 8; Torr. Bot. Mex. Bound. 33; Coulter, Contrib. U. S. Nat. Herb. i. 30, & ii. 16. — Mountains and rocky hills of W. Texas, Harvard; New Mexico, Wright; S. Arizona, Lemmon; Coso Mountains, Calif., Coville & Funston. (Chihuahua, Pringle.)

\* \* \* Leaves pinnately parted with narrow segments, or bi- to tri-pinnatifid (with segments narrow or broad): capsules glabrous, obtuse or merely acutish.

— Seeds biseriate in each cell.

**S. canescens**, NUTT. (TANSY MUSTARD.) Annual, cinereous-tomentulose to pulverulent-glandular or rarely glabrate and green: leaves very variable, always finely dissected, thinish, and delicate: segments small, elliptical, or especially in the upper leaves linear-oblong: racemes one to several, erect; pedicels 3 to 5 lines long, spreading: flowers small, the spatulate petals equalling or somewhat exceeding the short oblong sepals: capsule 4 to 6 lines long, erect or ascending, glabrous or nearly so; seeds roughened. — Gen. ii. 68; DC. Syst. ii. 475; Gray, Gen. III. i. 152, t. 64. *S. Sophia*, Pursh, Fl. ii. 440, not Linn.; Gray, Proc. Acad. Philad. 1863, 57, in part. *S. brachycarpon*, Richards. in Franklin 1st Journ. ed. 1, App. 744 (reprint, p. 16). *S. incanum*, Bernh. in Fisch. & Mey. Ind. Sem. Hort. Petrop. 1835, 38 (Ann. Sci. Nat. ser. 2, iv. 337). *S. Sophia*, var. *canescens*, Hook. Fl. Antarct. ii. 242. *S. canescens*, var. *brachycarpum*, Wats. Bibl. Index, 69. *S. canescens*, var. *alpestre*, T. D. A. Cockerell, Bull. Torr. Club, xviii. 168 (so far as the brief characterization shows). *S. pinnatum*, Greene, Bull. Calif. Acad. Sci. ii. 390, not Barn. *Erysimum pinnatum*, Walt. Car. 174. *Cardamine*? *multifida*, Pursh, Fl. ii. 440. *C.*? *Menziesii*, DC. Syst. ii. 267. *Nasturtium multifidum* & *Menziesii*, Spreng. Syst. ii. 883. *Descurainia canescens*, Prantl in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 2, 192. *D. pinnata*, Britton, Mem. Torr. Club, v. 173. — Common and widely distributed, Florida to S. California, northward to lat. 66° according to Macoun. The numerous forms distinguished by Torr. & Gray and others appear completely confluent. (Mex.)

**S. Cumingianum**, FISCH. & MEY. Leaves thickish, less finely dissected, densely canescent-tomentose: pods longer, more slender and acute, finely pubescent, 6 to 9 lines long, on spreading pedicels of similar length. — Ind. Sem. Hort. Petrop. 1835, 38; Fournier, l. c. 63. — Not infrequent in cañons, &c. of New Mexico, *Wright*, *Greene*, and Arizona, *Palmer*, *Rothrock*. (Adj. Chihuahua, *Hartman*; S. Am.) The type from Chili has more finely dissected leaves, but is connected with other forms of Uruguay, &c., closely like our own.

++ Capsules very slender, half to two thirds line in diameter; seeds uniseriate in the cells (or obscurely biseriate in short-podded forms of *S. incisum*).

**S. SÓPHIA**, L. Slender branching annual with the habit of the preceding: leaves tripinnate with small linear or lance-linear segments: racemes elongated, especially the terminal one; pedicels filiform, half inch long, spreading: siliques 9 to 11 lines long. — Spec. ii. 659; Torr. & Gray, Fl. i. 92; Hook. f. Arct. Pl. 286, 319; Wats. & Coulter in Gray, Man. ed. 6, 72. *Descurainia Sophia*, Webb, acc. to Prantl, l. c. — In certain localities sparingly introduced, across the continent, more common in Canada. (Adv. from Eu.)

**Var. sophioides**, BENTH. & HOOK. Leaves somewhat less finely divided: fruiting racemes very short and dense, umbelliform: pods an inch or more in length. — Gen. i. 78; Trautv. Act. Hort. Petrop. v. 25. *S. Sophia*, Cham. & Schlecht. Linnæa, i. 28, not L. *S. sophioides*, Fisch. in Hook. Fl. Bor.-Am. i. 61, t. 20; Torr. & Gray, Fl. i. 92. — Brit. America from Lake Winnipeg, *Back*, acc. to Macoun, to the Arctic Ocean. (Kamtsch., Siberia.)

**S. incisum**, ENGELM. Delicate annual, subglabrous or more frequently finely glandular-puberulent or stellate-tomentulose, scarcely canescent: leaves thin, pinnatifid to bipinnatifid; segments varying greatly in contour: racemes elongated; pedicels 2 to 3 lines long, spreading, exceeded by the sharp-pointed spreading or curved-ascending capsules; the latter glabrous or nearly so. — Engelm. in Gray, Pl. Fendl. 8; Torr. Pacif. R. Rep. iv. 66; Fournier, l. c. 64, incl. var. *β*, *hygrophilum*; Brew. & Wats. Bot. Calif. i. 41. *Descurainia incisa*, Britton, Mem. Torr. Club, v. 173. — The typical form extends from New Mexico to S. California and northward to N. Nevada and Winnipeg. The species is polymorphous as to foliage, pubescence, and length of pods. The chief varieties are

**Var. Hartwegianum**, WATSON. Leaves pinnate; the leaflets narrowly oblong or lanceolate, obtuse, and obtusely or acutely toothed: pods short, 1½ to 3 lines in length, erect, borne upon ascending or appressed pedicels of equal length, in a usually crowded raceme; seeds sometimes irregularly biseriate. — Bot. Calif. i. 41. *S. canescens*, Benth. Pl. Hartw. 9, not Nutt. ? *S. canescens*, var. *brevipes*, Torr. & Gray, Fl. i. 92. *S. Sophia*, Gray, Proc. Acad. Philad. 1863, 57, in part. ? *S. brachycarpum*, Hook. & Arn. Bot. Beech. 323. — Colorado to Moose Jaw, Northwest Territory, acc. to Macoun, westward and southwestward. *S. Californicum*, Wats. Bot. King Exp. 23 (*Smelowskia* ? *Californica*, Gray, Proc. Am. Acad. iv. 520), is merely a form with exceptionally short capsules.

**Var. Sónnei**, ROBINSON, n. var. Leaves deeply bipinnatifid; pinnae ovate or broadly oblong, pinnules very short and broad, rounded at the ends: pods short, on moderately spreading pedicels (3 or 4 lines in length). — Sierra Nevada Mountains at Truckee, Calif., *C. F. Sonne*, July, 1890, no. 19.

**Var. filipes**, GRAY. Foliage more nearly of the type, but the segments of the upper leaves tending to become elongated, linear, and nearly or quite entire: fruiting raceme lax; pedicels 5 to 9 lines long: capsules 5 to 7 lines in length. — Pl. Fendl. 8; Brew. & Wats. Bot. Calif. i. 41; Macoun, Cat. Canad. Pl. 47. *S. longepedicellatum*, Fournier, l. c. 59, excl. syn. *S. incisum*, var. *a*, *xerophilum*, Fournier, l. c. 64. — Carson City, Nevada, to Oregon and Brit. Columbia. Reported by various collectors from S. California, but specimens so labelled which have been received from that region are rather to be referred to the type.

§ 4. **STENOPHRAGMA**, Čelak. l. c. (as genus). Leaves chiefly rosulate at base, entire or serrate; those of the stem few or reduced, sessile by a narrow base: pubescence of branched hairs, not canescent: flowers small, white: siliques slender, tetragonal-cylindric, slender-pedicelled: midrib of the septum so broad and thin as to be wholly obscure.

**S. THALIÁNUM**, Gay. (MOUSE-EAR CRESS.) A slender fibrous-rooted annual, a span high, more or less branched: leaves oblanceolate, obtuse, an inch or two in length: pods purplish, scarcely half inch long on spreading filiform pedicels of nearly equal length. — Ann. Sci. Nat. ser. 1, vii. 399, in note; Fournier, l. c. 126; Gaud. Fl. Helv. iv. 348. *Arabis Thaliana*, L. Spec. ii. 665; DC. Syst. ii. 226. *Conringia Thaliana*, Reichenb. Ic. Fl. Germ. ii. t. 60. *Stenophragma Thaliana*, Čelak. l. c. — Frequent in dry light soil, Massachusetts to Georgia and westward to Kansas; fl. in early spring. (Intro. from Eu.) Mr. Thomas Meehan has found the earliest flowers sometimes apetalous.

**28. BRÁYA**, Sternb. & Hoppe. (*Count F. G. de Bray*, born at Rouen, 1765, ambassador to Bavaria and while there for some time president of the Regensburg Botanical Society.) — Root single, usually thickish, bearing a multicapital caudex. Leaves chiefly tufted at the base. Flowers white or purplish, during anthesis commonly in a globular head. Fruit sub-terete or somewhat compressed, varying in outline from lanceolate to linear: septum of peculiar and characteristic structure, with cells thick-walled and elongated transversely or very obliquely. — Regensb. Denkschr. i. pt. 1, 65; DC. Syst. ii. 210; Benth. & Hook. Gen. i. 82. *Platypetalum*, R. Br. in Parry 1st Voy. Suppl. to App. 266. — Arctic and alpine plants of low growth, distinguished from *Parrya* chiefly by their smaller flowers and incumbent cotyledons, from the still more nearly related *Eutrema* by the less leafy stems, less ancipital pods, larger and usually bifid stigma, as well as by the branched pubescence and complete septum of peculiar structure. [By B. L. ROBINSON.]

**B. purpurascens**, BUNGE. Perennial from a stout fusiform root: leaves fleshy, spatulate, entire, glabrate, often ciliate toward the base, crowded upon the dense multicapital caudex: stems one to several, usually leafless, half inch to three or four inches in height, commonly more or less puberulent with rusty branched hairs: pods lanceolate or short-oblong, style slender, nearly half line in length; stigma shortly but distinctly 2-lobed. — Bunge in Ledeb. Fl. Ross. i. 195. *B. alpina* of authors as to Am. pl. so far as specimens show, not of Sternb. & Hoppe, which has more slender pods in denser raceme, shorter styles, and more entire stigma. *B. alpina*, var. *Americana*, Hook. Fl. Bor.-Am. i. 65; Torr. & Gray, Fl. i. 111. *B. glabella*, Richards. in Franklin 1st Jour. ed. 1, App. 743 (reprint, p. 15), a form with somewhat leafy stem and more elongated fruiting raceme. *B. arctica*, Hook. in Parry, 2d Voy. App. 387. *B. alpina*, var. *glabella*, Wats. Bibl. Index, 51. *Platypetalum purpurascens*, & *P. dubium*, R. Br. in Parry, 1st Voy. Suppl. to App. 267, & Flora, vii. pt. 1, Beil. 71, 72. — Rocky Mountains, lat 52° to 57°, Drummond, and Hudson Strait, Bell, to the Arctic Sea. (Greenland, N. Asia, Spitzbergen.)

**B. pilósa**, Hook. Perennial, similar in habit to scapose forms of the preceding species: leaves densely clustered at the base, linear-lanceolate, pilose upon both surfaces and margin, chiefly with simple hairs: flowers considerably larger than in the last, fragrant (odor said to resemble that of the *lilac*). — Fl. Bor.-Am. i. 65, t. 17; Torr. & Gray, Fl. i. 111; Seem. Bot. Herald, 51. ? *B. rosea*, Bunge, Del. Sem. Dorp. 1839 (Linnæa, Lit.-Ber. 1840, 118). — "Sandy shores of the Arctic Sea at the mouth of the Mackenzie River," Dr. Richardson; coast west of Cape Bathurst, Pullen, acc. to Seemann.

**B. húmilis**, ROBINSON, n. sp. Pubescent throughout with branched hairs: root single, not strongly thickened: stems several, spreading-ascending, simple or not infrequently branched, leafy, 2 inches to a span high, terete, slender, wiry: leaves linear-oblong or spatulate, subentire to shallowly sinuate-pinnatifid, chiefly basal; the cauline rather small and remote: flowers small, white or purplish: pods linear, terete, more or less torulose, erect, 5 to 9 lines in length; septum nerveless. — *Sisymbrium humile*, C. A. Mey. in Ledeb. Fl. Alt. iii. 137; Fournier, Sisymb. 136; Ledeb. Ic. t. 147. *Arabis petrea*, Hook. Fl. Bor.-Am. i. 42; Gray, Man. eds. 1-5; not Lam. *vide* Wats. Bot. Gaz. xii. 200. — Willoughby Mt., Vermont, Mann, Deane, Grout & Eggleston, &c.; Anticosti, Pursh, Macoun, to Oregon, and northward to Alaska, Stoney. (Siberia.) A species in habit, pubescence, and technical characters quite as near *Braya* as *Sisymbrium*, and possessing the characteristic septum of the former genus. Dr. Watson in an herbarium note has expressed the opinion that the American plant is distinct from the Asiatic, but in what characters does not appear.

**29. TROPIDOCÁRPUM**, Hook. (Τρόπος, keel, and καρπός, fruit, from the carinate valves of the capsules.) — A small Californian genus of slender erect simple or sparingly branched more or less hirsute-pubescent annuals, reducible to three species. — Ic. t. 43, 52; Benth. & Hook. Gen. i. 82; Davidson, Erythea, ii. 179. — The fruit in *T. dubium* and *T. capparideum* is highly anomalous, even to the suggestion of monstrosity, and merits anatomical and developmental study with more copious material. Aside from the fruit, satisfactory characters for specific distinction are most difficult to define. The leaf-outline, pubescence, length of pedicels, size of flowers, &c., all vary greatly but as it seems independently of each other. [By B. L. ROBINSON.]

**T. grácile**, Hook. Leaves shallowly or deeply pinnatifid; segments acutish, cleft or entire, very variable in number, form, and size; the cauline leaves gradually reduced; the spreading pedicels axillary, 3 to 10 lines long: pods lance-linear to linear, strongly obcompressed throughout; style slender; seeds in 2 rows. — Hook. l. c. t. 43; Torr. & Gray, Fl. i. 94; Torr. Pacif. R. Rep. iv. 66; Brew. & Wats. Bot. Calif. i. 44. *T. scabriusculum*, Hook. Ic. t. 52; Torr. & Gray, l. c., only a roughish form. — Centr. and S. California, chiefly near the coast. The septum of the fruit, not found by Hooker, appears to be regularly present, although very narrow.

? **T. dúbium**, DAVIDSON, l. c. Closely similar in habit and foliage to forms of the preceding: capsule linear, 2-celled and strongly obcompressed toward the apex, but 1-celled and with valves flattened below; both parts fertile; placenta 2. — W. California in vicinity of Los Angeles, Nevin, Davidson; and Contra Costa Co. at Antioch, Brandegee (collected with *T. gracile*); Byron Springs, Brandegee (collected with *T. gracile* and *T. capparideum*).

? **T. capparideum**, GREENE. Foliage much as in *T. gracile*; the upper leaves somewhat more deeply parted and with longer subentire segments: fruit lance-oblong, 8 to 11 lines in length, 2 lines in breadth, 1-celled, 6-nerved, 4-valved, tipped with a slender style; placenta commonly 4, and seeds distinctly 4-seriate. — Pittonia, i. 217, & Fl. Francis. 278. — Alkaline soil, Centr. California, at Lathrop, Lemmon, and Byron Springs, Greene, Brandegee. The fruit of this noteworthy plant is not only anomalous in the order, but manifests a tendency to vary, being sometimes divided, sometimes assuming contorted forms, and commonly containing a small capsule-like structure at the base, as described and figured by Masters, Gard. Chron. New (2d) Ser. xvii. 11, f. 1. However, many apparently fertile specimens have been collected, and the species must be retained at least until the development of the fruit can have more careful study.

**30. GRÉGIA**, Gray. (Dedicated to *Dr. Josiah Gregg*, an active botanical explorer, who lived in the first half of the century, and collected chiefly in Northern Mexico.) — A genus essentially of the S. W. United States, a single species being South American. Branching plants, somewhat frutescent at base. — Pl. Wright. i. 8, t. 1, & ii. 13, also referred to but unnamed in Pl. Fendl. 116; Benth. & Hook. Gen. i. 80; Prantl, l. c. 193; not of Gärtn. nor Engelm. *Parrasia*, Greene, *Erythra*, iii. 75. [By B. L. ROBINSON.]

**G. camporum**, GRAY. Stellate-canescens, much branched from the base, a span to a foot high, leafy: leaves obovate to oblanceolate, shallowly few-toothed, or less frequently pinnatifid, narrowed to a slender base or winged petiole: racemes terminal, at first dense, becoming lax; pedicels widely spreading, often curved downward, 2 to 6 lines long: flowers light yellow, changing to purple: sepals linear or oblong-lanceolate, exceeded by the broad petals (4 lines long): capsule 6 to 12 lines in length,  $1\frac{1}{2}$  to  $2\frac{1}{2}$  lines broad, straight or curved upwards. — Pl. Wright. i. 9, t. 1, & ii. 13; Torr. & Gray, Pacif. R. Rep. ii. 159; Torr. Bot. Mex. Bound. 37; Coulter, Contrib. U. S. Nat. Herb. iv. 20. *Parrasia camporum*, Greene, l. c. — Dry table-lands and calcareous hills of S. W. Texas.

**Var. angustifolia**, COULTER, l. c. Leaves narrower, linear to linear-oblong, entire or subentire. — Occurring with and passing freely into the type. Abundant material of the narrow-leaved form seems to show a complete transition to *G. linearifolia*, Wats. Proc. Am. Acad. xvii. 321 (*Parrasia linearifolia*, Greene, l. c.), which can scarcely be maintained as a species, since equally narrow pods and short styles are to be found with typical foliage of *G. camporum*.

**31. HÉSPERIS**, Tourn. ROCKET. (Ἑσπερα, evening, the flowers being thought more fragrant at that time.) — Attractive plants with flowers large and showy for the order and sometimes fragrant. Natives of the northern temperate regions of the Old World. — Inst. 222, t. 108; L. Gen. no. 588; DC. Prodr. i. 188; Reichenb. Ic. Fl. Germ. ii. t. 57–59. — One species often cultivated in country gardens has become locally established in America. [By B. L. ROBINSON.]

**H. MATRONÁLIS**, L. (DAME'S VIOLET.) Tall erect pubescent biennial or perennial with slender terete subsimple stem: leaves lanceolate, acuminate, or ovate-lanceolate, acutish, denticulate; the upper short-petioled or subsessile; the lower long-petioled and sometimes pinnatifid toward the base: petals purple, 8 to 10 lines long, much exceeding the erect oblong sepals: capsules slender, ascending, nodulose, attenuate, becoming 4 inches in length. — Spec. ii. 663; Hook. Fl. Bor.-Am. i. 59; Torr. & Gray, Fl. i. 90; Wats. & Coulter in Gray, Man. ed. 6, 71. — Roadsides, &c.; fl. April to August. (Introd. from Eu., Asia.)

**32. ERÝSIMUM**, Tourn. TREACLE MUSTARD. (Classic Greek ἐρύσιμον, the name of a garden plant.) — A large genus, chiefly of the Old World, here combined with *Cheiranthus*, from which it has been commonly but very unsatisfactorily separated by its supposedly incumbent cotyledons, the accumbent position being assumed for the latter genus. However, as the cotyledons are not infrequently oblique and in some cases even vary from almost accumbent to incumbent in the seeds of the same capsule, this character cannot form a basis for generic division in the presence of much habitual similarity and default of other technical differences. — Inst. 228, t. 111; L. Gen. no. 545; DC. Syst. ii. 490, & Prodr. i. 196; Gray, Gen. III. i. 149, t. 63; Reichenb. Ic. Fl. Germ. ii. t. 62–70; Gay, Erys. Nov. Diag.; Benth. & Hook. Gen. i. 79; Prantl, l. c. *Cheiranthus*

L. Gen. no. 537; DC. Syst. ii. 178; Reichenb. l. c. t. 45; Benth. & Hook. l. c. 68; Prantl, l. c. 194. [By B. L. ROBINSON.]

\* Flowers small: petals 2 to 2½ lines long, yellow: siliques subterete, short, 5 to 10 lines in length: cotyledons incumbent or nearly so.

**E. cheiranthoides**, L. (WORM-SEED MUSTARD.) Stem slender, erect, nearly terete; quite simple or more frequently copiously branched above: leaves lanceolate, acute at each end, entire or remotely and inconspicuously denticulate, 1½ to 3 inches long, thin, green upon both sides, very finely pubescent; hairs mostly trifid: fruiting pedicels straight, filiform, widely spreading, about 4 lines long: capsule erect or spreading, glabrous, tipped with a slender but very short beak; dissepiment only half line broad. — Spec. ii. 661; DC. Syst. ii. 498; Wats. Bibl. Index, 63. *E. parviflorum*, Pers. Syn. ii. 199; Nutt. Gen. ii. 68. *Sisymbrium cheiranthoides*, Eat. & Wright, N. A. Bot. 429. — Preferring rich moist soil of river bottoms, but also found in dry situations, common and with wide range, Newfoundland, Robinson & Schrenk, to N. Carolina, Curtiss, acc. to Chapman, and across the continent to Oregon, Howell, and Alaska, Meehan.

\* \* Flowers larger; petals 3 to 12 lines long, yellow or orange (in *E. asperum* sometimes purple): pods terete or 4-angled, not strongly flattened, elongated (except in the first species), 1 to 4 inches long; cotyledons incumbent (rarely very oblique or even subaccumbent).

— Petals 3 to 5 lines long.

**E. parviflorum**, Nutt. Erect perennial, 10 to 18 inches high, cinereous and scabrous with appressed 2-pointed hairs: leaves narrow, lance-linear or oblong-linear, mostly quite entire; the radical crowded, sometimes repand-dentate: sepals linear-oblong, acute, 3 lines in length, little exceeded by the rather narrow sulphur-yellow petals: pedicels 2 to 3 lines in length, spreading in fruit: siliques slender, erect or nearly so, at maturity usually 1 to 2 inches long, scarcely contracted above but tipped with a short stout style and distinctly 2-lobed stigma. — Nutt. in Torr. & Gray, Fl. i. 95, not Pers. (which is *E. cheiranthoides*). *E. lanceolatum*, Hook. Fl. Bor.-Am. i. 64, not R. Br. ? *E. hieracifolium*, Hook. f. Arct. Pl. 286, 319, so far as American specimens are concerned. *E. asperum*, var. *inconspicuum*, Wats. Bot. King Exp. 24. *E. inconspicuum*, MacMillan, Metasp. Minn. Val. 268. — Minnesota, Schnette, to Colorado, Vasey, N. Nevada, Watson, Washington, Greene, and northward, to Alaska. *E. syrticolum* (erroneous form for *syrticola*), Sheldon, Bull. Torr. Club, xx. 285, is probably from character a form of this species.

*E. repandum*, L., a gerontogeous annual with somewhat similar flowers, but repand-denticulate leaves, and widely spreading usually curved pods, has been rather frequently found about New York City and Philadelphia, but upon made land, &c., and deserves mention only.

— Petals longer, half inch or more in length.

**E. asperum**, DC (WESTERN WALL-FLOWER.) Erect biennial or perennial, somewhat scabrous and usually more or less canescent with minute mostly 2-3-pointed hairs: stem commonly simple, 2 inches to 3 feet in height, angled, in favorable situations becoming thick and pithy: leaves very variable, lanceolate to linear, entire or repand-dentate or the lowest pinnatifid, thickish and very canescent or thin and green: sepals oblong to linear, green, pale yellow, or whitish: petals yellow or more usually orange, rarely purple, 8 to 12 lines in length; blade broadly obovate or suborbicular; claw very slender, considerably exceeding the sepals: fruiting pedicels 2 to 6 lines long, spreading: capsule usually rather sharply tetragonal, erect or more commonly widely spreading, 2 to 5 inches in length, a line or less in breadth; style 1 to 1½ lines long; stigma commonly broad, somewhat 2-lobed; seeds oblong, brown, often slightly wing-appendaged at the end; cotyledons incumbent or oblique. — Syst. ii. 505; Hook. Fl. Bor.-Am. i. 64, t. 22. *E. lanceolatum*, Pursh, Fl. ii. 436. *E. asperum*, var. *Purshii*, Durand, Fl. Utah, 159. *E. elatum*, Nutt. l. c. *E. asperum*, var. *elatum*, Torr. Pacif. R. Rep. vii. 7. *E. asperum*, var. *perenne*, Wats. in Coville, Proc. Biol. Soc. Washington, vii. 70, & Contrib. U. S. Nat. Herb. iv. 64. *Cheiranthus asper*, Nutt. Gen. ii. 69, not Cham. & Schlecht. ? *Hesperis Pallasii*, Porter & Coulter, l. c. 9. — Rare, local, and perhaps introduced in the East, but abundant and widely distributed westward; Mingan Islands, Gulf of St. Lawrence, Linden; Columbus, Ohio, Sullivan; common from Illinois to Texas, California, and northward to the Saskatchewan. A handsome and exceedingly

polymorphous species, incapable, however, of satisfactory division even into varieties. The form of the leaves, pubescence, color of the flowers, and dimensions of every part exhibit in specimens from different localities the most striking differences, but the variation of each part is shown in a long series of specimens to be thoroughly independent of every other so that varieties could have no more than formal value. Only two noteworthy forms need be mentioned: var. *ARKANSANUM*, Gray (Man. ed. 5, 69; *E. Arkansanum*, Nutt. in Torr. & Gray, Fl. i. 95; Gray, Gen. Ill. i. 150, t. 63), with leaves thin, lanceolate, and repand-dentate, and var. *PUMILUM*, Porter & Coulter (Fl. Col. 8; *E. pumilum*, Nutt. l. c.), a very small alpine form, 2 to 6 inches high, with entire or subentire leaves; possessing, however, no other satisfactory difference from the taller form with which it intergrades.

**E. insulære**, GREENE. Suffrutescent, pubescent with very minute 2-pointed hairs: stem stout, sharply angled, decumbent, profusely branched: leaves linear, crowded, attenuate and often recurved at the tip,  $1\frac{1}{2}$  to  $2\frac{1}{2}$  inches long: inflorescences short; pedicels in fruit stout, somewhat angulate, divaricate, 5 to 8 lines long; capsule erect, about 2 inches long, abruptly contracted to a short style; partition a line in breadth; valves sharply carinate; stigma disk-shaped; cotyledons often oblique or nearly accumbent. — Bull. Torr. Club, xiii. 218; Brandegee, Proc. Calif. Acad. Sci. ser. 2, i. 207. — Cuyler's Harbor, San Miguel Island off S. California, Greene; Santa Rosa Island, Brandegee; fr. June.

\* \* \* Flowers large or medium sized: petals yellow or orange (in *E. arenicola* unknown): pods more strongly flattened parallel to the broad partition; valves 1-nerved or somewhat keeled.

+ Cotyledons obliquely incumbent: capsule very gradually narrowed to a beak.

**E. arenicola**, WATSON. Cespitose perennial with densely multicapital caudex: stems several, terete, 6 to 8 inches high: leaves chiefly clustered at the base, very numerous, oblanceolate, repandly denticulate, including petioles only  $1\frac{1}{2}$  inches long, 2 to 3 lines wide, pubescent with white appressed 2-3-pointed hairs: racemes short, rather few-flowered; pedicels 2 lines in length, spreading: sepals 4 lines long. — Proc. Am. Acad. xxvi. 124. — Olympic Mountains, Washington, 5,000 feet alt., Piper; fr. September.

+ + Cotyledons accumbent: capsule rather abruptly contracted to a beak.

**E. grandiflorum**, NUTT. Biennial or perennial, erect, leafy, finely pubescent with appressed 2-parted hairs: stem 3 inches to 2 feet high, somewhat angled, becoming stout, simple or less frequently branched, sometimes from the base: leaves oblong, oblanceolate, or spatulate to linear, attenuate below, quite entire or more or less deeply repand-dentate: flowers at first subcapitate; raceme elongating, in fruit sometimes a foot or more in length; pedicels variable, 2 to 8 lines long: petals about an inch in length, light yellow (rarely white), with broad rounded blade: capsules  $1\frac{1}{2}$  to 4 inches long,  $1\frac{1}{4}$  to  $1\frac{1}{2}$  lines broad; valves flattish, 1-nerved; style  $\frac{1}{2}$  to 1 line long, stout; stigma usually rather broad; seeds brown, oblong, sometimes margined but not winged. — Nutt. in Torr. & Gray, Fl. i. 96, 667. *E. capitatum*, Greene, Fl. Francis. 269. *Cheiranthus asper*, Cham. & Schlecht. Linnæa, i. 14, excl. syn. *C. capitatus*, Dougl. in Hook. Fl. Bor.-Am. i. 38. — A maritime and saline species of the Pacific Coast, from the salt-works of Los Angeles Co., Calif., Mrs. Bush, and Santa Rosa Island, Brandegee, northward to Curry Co., Oregon, Howell; common. The recently published *E. Californicum*, Greene, Erythea, iii. 69, not seen by the writer, is a nearly related (if not identical) species, not differing by satisfactory characters so far as described.

**E. occidentale**, ROBINSON, n. sp. Erect annual or biennial, 2 inches to  $1\frac{1}{2}$  feet high, finely pubescent with appressed 2-pointed hairs: stem becoming stout, angulate: leaves narrowly linear to lance-linear, acute, attenuate to long slender bases, entire or nearly so: floral rachis at first very short but becoming in fruit 4 to 6 inches in length, often branched below; pedicels stout, spreading, 2 to 4 lines long: petals lemon-yellow to deep orange, 8 to 10 lines long, much exceeding the pale narrowly oblong strongly saccate calyx: capsule 3 to 4 inches long,  $1\frac{1}{2}$  lines broad, beaked with a slender style (2 lines in length); stigma small; seeds oblong, rather broadly winged. — *E. asperum*, var. *pumilum*, Wats. Bot. King Exp. 24. *Cheiranthus occidentalis*, Wats. Proc. Am. Acad. xxi. 261. — Sandy soil, Carson City, Nevada, Watson, to Oregon, Henderson, and Washington, Lyall, Suksdorf; fl. April to June. Readily distinguished from *E. asperum* by its broad flat pods, from *E. grandiflorum* by its long style and narrow leaves.



\* \* \* Flowers large, both the petals and sepals deep purple: pod slender but somewhat compressed; cotyledons accumbent.

**E. pygmæum**, GAY. Dwarf biennial with simple stem and very numerous crowded linear or narrowly lance-linear entire or few-toothed leaves, pubescent with appressed 2-pointed white hairs: inflorescence very dense: sepals oblong strongly saccate at the base; margins thin, white; petals 5 to 9 lines long: pedicels ascending, 2 to 4 lines in length: pods pubescent, scarcely tapering at all at the apex; stigma slightly 2-lobed. — Gay, l. c. 4. *Cheiranthus pygmæus*, Adams, Mém. Soc. Nat. Mosc. v. 114. *C. Pallasii*, Pursh, Fl. ii. 436. *Hesperis pygmæa*, Hook. Fl. Bor.-Am. i. 60, t. 19. *H. minima*, Torr. & Gray, Fl. i. 90. *H. Pallasii*, Torr. & Gray, l. c. 667. *H. Hookeri*, Ledeb. Fl. Ross. i. 174. *Sisymbrium pygmæum*, Trautv. Act. Hort. Petrop. i. 60. — Arctic America from Greenland to Alaska. (Siberia.)

**33. COCHLEÁRIA**, Tourn. (Latin *cochlear*, spoon, from the form of the leaves.) — Glabrous succulent herbs of Northern Hemisphere, chiefly boreal and arctic, often maritime. — Inst. 215, t. 101; L. Gen. no. 528; DC. Syst. ii. 358, & Prodr. i. 172; Reichenb. Ic. Fl. Germ. ii. t. 17. — Considering its moderate size, one of the most confused and difficult genera of the order. Until all members of the group can be subjected to a thorough revision, the certain identification of our American forms with the closely related European species is impossible. However, as the occurrence of the European *C. Anglica*, *C. Danica*, and *C. officinalis* in Arctic America rests upon the high authority of Sir William Hooker, Torrey & Gray, and others, it seems best to continue to enumerate them, although no specimens from this continent in American herbaria can be cited as exactly representing the typical gerontogeous forms. The remaining species are here interpreted nearly as in Lange's careful treatment of the genus in his Conspect. Fl. Grœn. [By B. L. ROBINSON.]

**C. Ánglica**, L. Radical leaves long-petioled, ovate or sub-orbicular, rounded at the base or slightly and broadly cordate, subentire; lower cauline leaves similar, short-petioled; the middle and upper ovate-oblong, sparingly and bluntly toothed, sessile by a more or less auriculate base: capsule subglobose, reticulated with prominent veins. — Syst. Nat. ed. 10, 1128, & Spec. ed. 2, ii. 903; DC. Syst. ii. 364; Hook. Fl. Bor.-Am. i. 57; Torr. & Gray, Fl. i. 109. — Anticosti, *Macoun*; coast of Labrador to the Arctic Ocean and Alaska. A species dubiously distinguished from the following by its reticulated capsule.

**C. officínalis**, L. Very similar to the preceding in habit and technical characters: leaves somewhat more inclined to be lobed, and the radical more deeply cordate: pods globose, smooth or obsoletely reticulate-veined. — Spec. ii. 647; DC. l. c.; Hook. l. c. — Shores of the Arctic Ocean, acc. to Hooker and others. Specimens with the large flowers of the European form have not been seen from America by the writer. Our commonest *Cochlearia*, however, extending from Vancouver Island, *Macoun*, to Alaska, corresponds in all essential points with this species save in its smaller flowers and often more stunted growth, differences ascribable perhaps to climatic influences.

**C. tridactylites**, BANKS. Cauline leaves coarsely sub-trilobed with a single obtuse tooth on each side: silicles ovate-globose, as large as in the last; style short, capitate; seeds 2 to 4 in each cell. — Banks in DC. l. c. 367; Hook. l. c. — Labrador, *Banks*. No specimens accessible to the writer exactly represent this imperfectly described species (here characterized from the original description). Enough are at hand, however, to show much variation in the toothing of the leaves without change of more essential characters, thus casting much doubt upon the distinctness of a species separated upon this feature alone. Lange may be right in referring the plant doubtfully to *C. Grœnlandica*, or it may be a form of *C. Anglica*.

**C. Dánica**, L. Leaves smaller than in the first two species, only  $1\frac{1}{2}$  to 2 or 3 lines in diameter, "all petiolate," deltoid, and hastately toothed at the base: capsule ovate to ellipsoidal, nearly or quite as long as the pedicel. — Spec. ii. 647; Fl. Dan. t. 100; Eng. Bot.

t. 696; Hook. l. c.; Torr. & Gray, Fl. i. 110. — Shores of the Arctic Ocean, Parry, Franklin, Back, according to Hooker. American specimens with deltoid leaves and all petiolate as in the European specimens do not seem to be represented in the leading American herbaria.

- C. Grœnlândica**, L. Radical leaves ovate or sub-orbicular, rounded or shallowly and broadly cordate at the base, usually quite entire; cauline narrowly elliptic to rhombic, sub-entire or with a short tooth or two upon each side of the narrowed subsessile or slender-petioled base: capsule globose to ovoid, not strongly reticulated. — Spec. ii. 647; DC. Syst. ii. 366; Eng. Bot. t. 2403; Lange, Med. Grœn. iii. 34, & Jour. Bot. xxvii. 39. — E. Arctic America, Grinnell Land, *Greely Exped.* (Greenland.) A low mostly small-leaved species.

**Var. oblongifolia**, LANGE. Taller and more robust, 6 to 8 inches high: cauline leaves sessile, oblong; the upper ones auriculate at the base. — Lange, l. c. 35. *C. oblongifolia*, DC. Syst. ii. 363. — Across Arctic America from Greenland to Alaska.

- C. fenestrata**, R. Br. Foliage much as in the preceding species: flowers small: capsule more decidedly ellipsoidal, usually free from distinct reticulation; seeds about 8 in each cell. — R. Br. in Ross, Voy. 143, & Parry, 1st Voy. Suppl. to App. 266; DC. Syst. ii. 367; Lange, l. c. 36. *Eutrema Rossii*, Spreng. Syst. ii. 880. — Across Arctic America from Alaska to Ellesmere Land, Wetherill. (Greenland.) A species variously referred by authors to *C. Grœnlândica*, *C. Anglica*, and *C. officinalis*.

**34. NASTÛRTIUM**, L., R. Br. (The classical Latin name of some cress, from *nasus*, nose, and *tortus*, distortion, from the effect of its pungency upon the nostrils.) — A genus widely dispersed over the globe, of annual, biennial or perennial herbs, growing in damp or wet localities or truly aquatic, glabrous or somewhat puberulent or hispid with simple hairs. Leaves usually lyrate or pinnately parted or toothed, auricled at base. — L. Syst. ed. 1; R. Br. in Ait. f. Kew. ed. 2, iv. 109; DC. Syst. ii. 187, & Prodr. i. 137; Reichenb. Ic. Fl. Germ. ii. t. 50–54; Gray, Gen. III. i. t. 53.<sup>1</sup> *Roripa*, Bess. in Gren. & Godr. Fl. Fr. i. 125, in part. [By S. WATSON.]

\* Petals white, exceeding the calyx: glabrous perennials.

+ Pods linear; stigma small, entire: aquatic with pinnate leaves.

- N. OFFICINÁLE**, R. Br. l. c. 110. (WATER CRESS.) Stems spreading, rooting at the lower nodes: leaflets 3 to 11 (or lateral leaflets none on the lowest leaves), from orbicular to oblong-lanceolate, more or less sinuate or rarely obtusely toothed: pedicels and pods divaricately spreading or somewhat reflexed: pods 6 to 10 lines long, acuminate, a little exceeding the pedicels. — *Sisymbrium Nasturtium*, L. Spec. ii. 657.<sup>2</sup> — In running water and on wet banks of brooks and ditches; widely distributed. (Nat. from Eu., Asia.)

+ + Pods short; stigma broader than the style, lobed: leaves undivided or pinnatifid, or the submersed capillary-dissected.

- N. lacustre**, GRAY. Aquatic: stems elongated, branching above: submersed leaves petiolate and entire or pinnatifid, or mostly sessile and dissected into numerous capillary segments; emersed leaves oblong, sessile, entire or denticulate or sometimes pinnatifid: pods oblong to oblong-obovate, obtuse, 2 or 3 lines long, shorter than the divaricate pedicels; slender style half as long or more; septum nearly wanting. — Gen. III. i. 132. *N. natans*, Hook. Fl. Bor.-Am. i. 39, not DC. *N. natans*, var. *Americana*, Gray, Ann. Lyc. N. Y. iii. 323. *Cochlearia aquatica*, A. Eaton, Man. ed. 5, 181. *Armoracia Americana*, Hook. & Arn. Brit. Fl. ed. 7, 29.<sup>3</sup> — N. Vermont and Montreal to S. Ontario and S. E. Minnesota, southward to Florida and Louisiana. The submersed leaves are deciduous and often take root in the mud and start new plants.

- N. (?) ARMORÁCIA**, FRIES. (HORSE-RADISH.) Terrestrial, tall and stout: leaves crenate, rarely pinnatifid;<sup>4</sup> the radical very large, narrowly oblong-lanceolate to oblong-cordate or ovate-

<sup>1</sup> Add syn. *Rorippa*, Scop. Fl. Carn. 520. *Roripa* of authors.

<sup>2</sup> Add syn. *Roripa Nasturtium*, Scop. acc. to Rusby, Mem. Torr. Club, iii. no. 3, 5.

<sup>3</sup> Add syn. *Roripa Americana*, Britton, Mem. Torr. Club, v. 169.

<sup>4</sup> Prof. C. A. Davis, Bull. Torr. Club, xvii. 318, notes that the pinnatifid leaves are regularly pro-

oblong; the uppermost linear and entire: pedicels slender, ascending: pods "globose" or elliptical and somewhat obcompressed, 2 lines long; the cells 4-8-seeded; style very short: seeds smooth. — Fl. Scan. 65. *Cochlearia Armoracia*, L. Spec. ii. 648. *Armoracia rusticana*, Gærtn., Mey. & Scherb. Fl. Wett. ii. 426.<sup>1</sup> — An anomalous species; cultivated for its large pungent roots, which are used as a condiment. An escape in moist grounds, and rarely perfecting fruit. (Intro. from Eu.)

\* \* Petals yellow or yellowish, exceeding the calyx: stems from perennial underground rootstocks: leaves pinnate or pinnatifid: pedicels usually 3 or 4 lines long or more: style often slender.

**N. sylvestre**, R. Br. (YELLOW CRESS.) Stems slender and flexuous, erect or decumbent, 1 or 2 feet high: leaves pinnate or deeply pinnatifid with linear to oblong entire or toothed or lacinate segments: pods narrowly linear, 3 to 6 lines long, obtusish; style usually short or the broad stigma subsessile. — R. Br. in Ait. f. Kew. ed. 2, iv. 110. — In wet meadows, Massachusetts to Virginia;<sup>2</sup> rather rare. (Nat. from Eu.)

**N. sinuatum**, Nutt. Stems decumbent or more usually procumbent or prostrate, branching, pale green, glabrous or slightly scurfy-pubescent: leaves more or less narrowly oblong or oblanceolate, usually deeply and regularly pinnatifid; the subequal oblong to deltoid segments entire or with one or two teeth: pedicels mostly divaricately spreading, slender, 2 to 5 lines long: pods oblong to linear, mostly 3 to 5 lines long, acute at both ends and beaked by a slender style, more or less curved. — Nutt. in Torr. & Gray, Fl. i. 73; Brew. & Wats. Bot. Calif. i. 43. *N. trachycarpum*, Gray, Bull. U. S. Geol. & Geog. Surv. ii. 233; a frequent form with the axis of the raceme, the pedicels, and pods more or less papillose-puberulent, the pods sometimes densely so. — From the plains of the Saskatchewan to Minnesota and Arkansas, and westward to New Mexico, Arizona, Nevada, and E. Oregon.<sup>3</sup>

**Var. calycinum**, Watson, n. var. An extreme form of the papillose-puberulent condition with ovate pods (1 to 1½ lines long). — *N. calycinum*, Engelm. in Warren, Prelim. Report, 1855-57, 156, & Trans. Am. Phil. Soc. n. ser. xii. 184. — Sandy bottom of the Yellowstone, Montana, Hayden, 1854.

**Var. pubescens**, Watson, n. var. Very slender, pubescent throughout with a soft woolly pubescence, the long lax racemes with long and very slender pedicels (3 to 6 lines in length): ovary oblong-obovate, pubescent; style as long. — On Sauvie's Island, Oregon, J. Howell, 1884.

**Var.\* Columbiæ**, Suksdorf (as spec.). Low and spreading, pubescent throughout: leaves rather narrow: pedicels even in fruit scarcely exceeding the capsules; the latter short-oblong (about a line and a half or two lines in length), densely pubescent with short and rather fine scarcely papillose hairs. — Suksdorf, distr. 952. — Oregon, low gravelly banks of the Columbia River near Bingen, Suksdorf, 1890, and earlier at Baker City, Nevius, 1875.

\* \* \* Petals yellow or yellowish, rarely exceeding the short calyx: annuals or biennials, with mostly lyrate leaves: style short and thick.

— Pedicels usually 3 or 4 lines long: seeds tuberculate.

**N.\* terrestre**, R. Br. Biennial, erect, branching, glabrous or rarely slightly pubescent: lower leaves lyrate; the upper more or less deeply pinnatifid or toothed; the lobes narrowly to broadly oblong, dentate: pods turgid, oblong, 2 to 4 lines long, usually very obtuse. — R. Br. in Ait. f. Kew. ed. 2, iv. 110. *N. palustre*, DC.<sup>4</sup> Syst. ii. 191; Gray, Gen. III. i. 132, t. 53, f. 1-5. ? *N. amphibium*, of authors as to Am. pl., not of R. Br. *Sisymbrium palustre*, L. Spec. ii. 657; Pursh, Fl. ii. 440.<sup>5</sup> — Common in wet places from Arctic America to N.

duced in spring and autumn, while those with broader blades are developed in midsummer. Prof. Davis adds, l. c. xx. 291, that the lower stem-leaves are invariably pinnately dissected.

<sup>1</sup> Add syn. *Roripa Armoracia*, Hitchcock, Spring Fl. Manhattan, 18.

<sup>2</sup> Maine, *Miss Furbish*; Newfoundland, *Robinson & Schrenk*; also reported from N. Illinois by E. J. Hill, Bot. Gaz. xvii. 246. Add syn. *Roripa sylvestris*, Bess. Enum. 27.

<sup>3</sup> Klikitat Co., Washington, *Suksdorf*. Add syn. *Roripa sinuata*, Hitchcock, l. c.

<sup>4</sup> The name of this species has been altered to the earlier combination, in accordance with the general system of nomenclature adopted in the work.

<sup>5</sup> Add syn. *Roripa palustris*, Bess. l. c.

Carolina and westward to the Sierra Nevada and Oregon. (Mex., Greenland, acc. to Lange; Eu., Asia.)

**Var. hispidum**, FISCH. & MEYER.<sup>1</sup> More or less hispid with short spreading hairs or rarely glabrous: pods short, mostly broadly elliptical or subglobose, 1 or 2 or rarely nearly 3 lines long. — Ind. Sem. Hort. Petrop. iii. 1837, 41. *N. hispidum*, DC. Syst. ii. 201. *Brachylobus hispidus*, Desv. Journ. Bot. iii. 183 (1814). *Sisymbrium hispidum*, Poir. Suppl. v. 161. — From New Brunswick to the Northwest Territory, *Macoun*, and Oregon, *Hall*, south to Florida and New Mexico; the more common form eastward. *Tetrapoma barbareæfolium*, Turcz., & *T. Krupsianum*, Fisch. & Mey. Ind. Sem. Hort. Petrop. i. 1835, 39 (*Camelina barbareæfolium*, DC. Syst. ii. 517, Deless. Ic. Sel. ii. t. 70; *T. pyriforme*, Seem. Bot. Herald, 24, t. 2), is a very closely allied form with globose or pyriform pods, which are often abnormal in the number of carpels (2 to 6) and cells, as occasionally occurs also in *var. hispidum*. It is a native of E. Siberia and is found at Norton's Sound, Alaska, where it may have been introduced.

**Var. occidentale**, WATSON, n. var. Glabrous or the auricles of the leaves sometimes ciliate: pods stout, 4 to 6 lines long, not rarely 4-carpellary. — Shumagin Islands, Alaska, *Dall*, to Brit. Columbia, *Lyall*, *Macoun*, and the Lower Columbia Valley, *Hall*, *Suksdorf*, *Howell*.

— — — Pedicels short (1 or 2 lines long, rarely more): seeds tuberculate.

**N. curvisiliqua**, NUTT. Glabrous or slightly pubescent: stems branching, erect or decumbent: leaves oblanceolate, laciniately toothed or pinnatifid with broader and obtuser lobes: pedicels short (rarely 3 lines long): flowers very small: pods linear-oblong, terete, straight or usually more or less curved, very obtuse or acutish, 2 to 8 lines long; stigma sessile or on a short stout style. — Nutt. in Torr. & Gray, Fl. i. 73. *N. lyratum*, Nutt. l. c., the form with more lyrate leaves. Nuttall's specimens referred by him to this species are in part, and as described in Torr. & Gray, Fl., *N. sinuatum*; one of the specimens in herb. Gray represents the papillose form of that species.<sup>2</sup> *Sisymbrium curvisiliqua*, Hook. Fl. Bor.-Am. i. 61. — From Brit. Columbia to Lower California, *Orcutt*, and eastward to N. Nevada and Northwestern Wyoming; frequent.

**Var. Nuttallii**, WATSON, n. var. Flowers rather larger (petals 1 to 1½ lines long), and the pods 4 to 8 lines long, on pedicels 2 to 4 lines in length. — *N. polymorphum*, Nutt. l. c. 74. — In the Lower Columbia Valley, *Nuttall*, *Suksdorf*, *Howell*.

**N. obtusum**, NUTT. Usually low and depressed, glabrous or rarely subpubescent, branching: leaves lyrate pinnatifid (or the upper oblong to narrowly lanceolate and subentire); segments usually oblique and irregularly toothed: pedicels ascending, spreading or deflexed, 1 to 2 lines long, obtuse, straight or nearly so; style very short and thick. — Nutt. in Torr. & Gray, Fl. i. 74.<sup>3</sup> — From Keweenaw Co., Michigan, *Farwell*, Illinois, Missouri, and Texas, west to Brit. Columbia, *Macoun*, and S. California.

**Var. sphærocarpum**, WATSON, n. var. Pods subglobose, about a line broad. — *N. sphærocarpum*, Gray, Pl. Fendl. 6.<sup>4</sup> — Illinois to S. California.

**Var. (?) alpinum**, WATSON. Alpine: pedicels more elongated (2 to 4 lines long): pods oblong or oblong-ovate (2 to 3 lines long), beaked with a short style. — Bot. King Exp. 15. — In the Uinta and Wasatch Mountains, Utah, *Watson*, *Jones*, and on Frémont's Peak in the Wind River Mountains, *C. Richardson*.

— — — Pedicels short (1 or 2 lines long or less): seeds pitted.

**N. tanacetifolium**, HOOK. & ARN. Low and depressed or sometimes ascending, a foot high or less, branching from the base, usually somewhat scurfy-pubescent below: leaves pinnately divided or lyrate; segments very variable, more or less deeply and irregularly toothed or often pinnatifid: pedicels spreading: pods cylindrical, straight or slightly curved, 4 to 7 lines long, acutish, ascending or widely spreading; style short, a line long; seeds

<sup>1</sup> Prof. N. L. Britton, Bull. Torr. Club, xviii. 267, and Prof. J. Macoun regard this variety as a distinct species. Add syn. *Roripa hispida*, Britton, Mem. Torr. Club, v. 169.

<sup>2</sup> Add syn. *N. cernuum*, Nutt. in Torr. & Gray, Fl. i. 74, *fide* Wats. Bibl. Index, 66. *N. occidentale*, Greene, Fl. Francis. 268. *Roripa curvisiliqua*, Bessey, *fide* Britton, Mem. Torr. Club, v. 169.

<sup>3</sup> Add. syn. *Roripa obtusa*, Britton, l. c.

<sup>4</sup> Add syn. *Roripa sphærocarpa*, Britton, l. c.

reddish, rather obscurely and irregularly minutely pitted. — Hook. & Arn. in Hook. Jour. Bot. i. 190. *N. palustre*, var. *tanacetifolium*, DC. Syst. ii. 192. *N. micropetalum*, Fisch. & Meyer, Ind. Sem. Hort. Petrop. iii. 1837, 41. *N. Walteri*, Wood, Class-Book, ed. of 1861, 288. ? *Sisymbrium tanacetifolium*, Walt. Car. 174, not L. *S. Walteri*, Ell. Sk. ii. 146. *S. (?) teres*, Torr. & Gray, Fl. i. 93. *Cardamine teres*, Michx. Fl. ii. 29. — South Carolina to Florida and west to Texas and Mexico. What is recognized as *N. MEXICANUM*, DC., of Mexico, is a very similar species with somewhat stouter and obtuser pods, often deflexed, and larger minutely tuberculate paler seeds. The West Indian *N. brevipes*, Griseb., however, may rather be regarded as a variety (*insularum*) of *N. tanacetifolium*. Its seeds are similar in color and marking, but the pods are shorter and the style very short or stigma nearly sessile.

**N. sessiliflorum**, NUTT. Glabrous, erect, branching, 2 feet high or less: leaves oblanceolate, usually obtuse, coarsely toothed or lyrate-pinnatifid with few short segments: pedicels very short (the lowest rarely 1 to  $1\frac{1}{2}$  lines long): pods spreading, thick and cylindrical, 3 or 4 lines long, obtuse; style very short; seeds minutely pitted. — Nutt. in Torr. & Gray, Fl. i. 73; Gray, Gen. III. i. 132, t. 53, excl. f. 1-5. *N. limosum*, Nutt. l. c. — From Illinois and Missouri to Georgia and Texas.<sup>1</sup>

Recently published species not seen by the editor.

**N.\* dictyotum**, GREENE. "Stout, erect, 2 to 4 feet high, hirsute-pubescent: racemes rather dense: pods ovate-lanceolate; valves firm in texture, with strong tortuous midvein and anastomosing veinlets; partition thick, favose-reticulate." — Fl. Francis. 268. *Roripa dictyota*, Greene, Man. Bay-Reg. 20 (whence the foregoing descr.). — "Marshes of the Lower Sacramento."

**RORIPA TENÉRRIMA**, GREENE. "Annual, weak and decumbent, very sparingly branching, 6 to 10 inches high, of delicate texture and glabrous: leaves few, lyrate-pinnatifid, the terminal lobe acutish: rhachis of the few racemes almost capillary: pods rather distant, subconical, slightly curved, the tapering apex surmounted by a considerable beak-like style; valves and septum both very thin: seeds many, in 2 rows under each valve." — Erythea, iii. 46 (whence descr.). — "Modoc Co., Calif., Mrs. Austin."

**35. BARBARÉA**, R. BR. WINTER CRESS. (Name from *Erysimum Barbarea*, L., the most common species, and sometimes called Herb of St. Barbara.) — Chiefly biennials, somewhat succulent, sharing most of the characters of *Nasturtium*, but with somewhat stouter habit, more elongated rigid capsules and uniseriate seeds. — R. Br. in Ait. f. Kew. ed. 2, iv. 109; DC. Syst. ii. 205, & Prodr. i. 140; Gray, Gen. III. i. 147, t. 62; Reichenb. Ic. Fl. Germ. ii. t. 47-49; Benth. & Hook. Gen. i. 68. — Spec. of difficult limitation. [By B. L. ROBINSON.]

**B. vulgaris**, R. BR. l. c. (COMMON WINTER CRESS, YELLOW ROCKET.) Stems erect, furrowed-angulate, simple or corymbosely branched, leafy, 1 to 3 feet high: radical leaves and lower cauline usually pinnately parted; the terminal segment ovate or orbicular, rounded at the apex and varying from cuneate to cordate at the base, entire or with a few rounded teeth or lobes; lateral segments very variable, usually about 3 (0 to 5) pairs, oblong, entire or toothed; petioles auriculate-appendaged at the base; upper leaves simplified, oblanceolate, cut-toothed, sessile, clasping at base: flowers in a short dense oblong raceme, bright yellow: petals nearly or quite twice as long as the sepals: pods from the first ascending or suberect upon more or less spreading pedicels. — DC. Syst. ii. 206, in part. *Barbarea Barbarea*, MacMillan, Metasp. Minn. Val. 259. *Erysimum Barbarea*, L. Spec. ii. 660; Fl. Dan. t. 985; Eng. Bot. t. 443. — Moist meadows, brook-sides, &c.; in America chiefly the formal variety *ARCUATA*, Fries (Consp. fasc. vi. no. 17), with inflorescence somewhat lax and elongated even in anthesis and young pods rather widely spreading and more or less curved; a form common in the Northern and Middle States across the continent and northward to Labrador and Alaska, and on the Pacific Slope southward to Lower Calif., *Orcutt*. (Eu., Asia.)

<sup>1</sup> Near Richmond, Va., *Churchill*. Add syn. *Roripa sessiliflora*, Hitchcock, l. c.

**B. stricta**, ANDRZ. In its variable foliage not satisfactorily distinguishable from the preceding: flowers smaller, paler yellow, during anthesis closely aggregated and subcorymbose: petals usually not over a third or half longer than the calyx: pods mostly appressed to the elongated rhachis. — Andr. in Bess. Enum. 72; Reichenb. Ic. Fl. Germ. ii. 47. *B. parviflora*, Fries, Novit. ed. 2, 207. *B. vulgaris*, var. *stricta*, Gray, Man. ed. 2, 35. — Same range as the last, and eastward the commoner species. A noteworthy fruiting form of this species or perhaps distinct plant has been collected at Seattle, Wash., *Piper*. It has elongated rather loose racemes of very short erect pods (4 to 7 lines long), and bears a close resemblance to specimens from Central France.

**B. PRÆCOX**, R. Br. l. c. (EARLY WINTER CRESS, SCURVY GRASS.) Very similar in habit and floral characters: radical leaves usually interruptedly pinnate; segments more numerous, 4 to 8 pairs, commonly with smaller ones between the larger: siliques longer, often  $2\frac{1}{2}$  inches in length, larger and firmer in texture: valves more strongly carinate; fruiting pedicels very stout. — Chapm. Fl. ed. 2, 606; Wats. & Coulter in Gray, Man. ed. 6, 71. — Somewhat established in the Middle Atlantic States and southward, having escaped from cultivation as a salad plant. (Introd. from Eu.)

**36. IODÁNTHUS**, Torr. & Gray. (Ἰώδης, violet-colored, and ἄνθος, flower.) — A small American genus of rather doubtful affinities; but on account of its stigma elongated over the placentæ, its distinctly flattened pods and nearly accumbent cotyledons, not to be united with *Thelypodium*, to which it has been reduced. — Fl. i. 72 (under *Cheiranthus*); Gray, Gen. III. i. 133, t. 54; Proc. Am. Acad. vi. 188; Benth. & Hook. Gen. i. 70; Prantl, l. c. 183. Under *Thelypodium*, Wats. Bibl. Index, 73; Wats. & Coulter in Gray, Man. ed. 6, 72. — A single described species, but probably with a Mexican congener. [By B. L. ROBINSON.]

**I. pinnatifidus**, STEUD. Erect, slender, leafy, glabrous, often branched above: root a cluster of tough fibres: radical leaves ovate, rounded at the base or cordate, slender-petioled; the cauline ovate-lanceolate, acuminate at each end, usually sharply and often doubly serrate, sometimes merely repand; the upper sessile by narrow auriculate bases; the lower petiolate and occasionally pinnate, bearing 1 to 3 pairs of small leaflets near the base: sepals  $1\frac{1}{2}$  lines long, less than half the length of the spatulate slender-clawed purple petals: fruit 9 to 15 lines long, short-pedicelled, tipped with a slender style, widely spreading in elongated racemes. — Nomencl. ed. 2, 812; Gray, Proc. Am. Acad. vi. 188; Wats. Bot. King Exp. 19; Prantl, l. c. *I. hesperidoides*, Torr. & Gray in Gray, Gen. III. i. 134, t. 54, & Man. 33; Chapm. Fl. 25. *Hesperis pinnatifida*, Michx. Fl. ii. 31. *Cheiranthus hesperidoides*, Torr. & Gray, Fl. i. 72. *Arabis hesperidoides*, Gray, Man. ed. 5, 68. — Rich soil, W. Pennsylvania, Porter, to Texas, Lindheimer, and northward to Minnesota; fl. June; fr. July and August.

**37. DRYOPÉTALON**, Gray. (Name from δρῦς, an oak tree, the lobed petals resembling an oak leaf in outline.) — A branching annual with lyrate pinnatifid mostly radical leaves and pubescence of simple hairs. Petals white. — Pl. Wright. ii. 11. *Dryopetalum*, Prantl in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 2, 183. — A southwestern monotype. [By S. WATSON.]

**D. runcinátum**, GRAY. A foot high, glabrous above, more or less villous below with spreading hairs (sometimes short and dense): segments of the leaves irregularly rounded to oblong, coarsely and acutely or sinuately toothed, of the cauline leaves narrower: pedicels of the elongating racemes slender, divaricate, usually equalling the flowers, in fruit 2 to 8 lines long: petals 5-7-toothed, 2 to 3 lines long: pods very narrow, nearly straight, spreading; 1 to  $1\frac{1}{2}$  inches long. — Pl. Wright. ii. 12, t. 11; Torr. Bot. Mex. Bound. 32. — Mountains of W. Texas, Thurber; S. Arizona, Wright, Thurber, Palmer, Greene, Parish, Pringle. (The type from Chihuahua, Wright.)

**38. PLATYSPÉRMUM**, Hook. (Gr. πλατύς, broad, and σπέρμα, seed.)

— A single species, a slender early spring annual of the valleys of the Great Basin. — Fl. Bor.-Am. i. 68, t. 18, f. B. [By S. WATSON.]

**P. scapigerum**, Hook. l. c. Scapes 1 to 6 inches high in fruit: leaves small, lyrate-pinnatifid with few lobes, often reduced to a single rhombic or ovate toothed or entire lobe upon a slender petiole: flowers about a line long: petals varying from narrowly obovate to linear-spatulate: pod 3 to 5 lines long, 8-12-seeded. — In the dry interior region, from Kikitat County, Washington, to the Carson River, and eastward to the Clear Water, Spalding, and Kootenai County, Idaho, Geyer.

**39. SELÉNIA**, Nutt. (Gr. σελήνη, the moon, in allusion to the near relation of the genus to *Lunaria*.) — Septum occasionally perforate or nearly wanting. Seed-coats thick and sometimes separate. Species with golden yellow flowers, blooming in spring. — Jour. Acad. Philad. v. 132, t. 6; Torr. & Gray, Fl. i. 99; Gray, Gen. Ill. i. 157. [By S. WATSON.]

**S. aurea**, Nutt. l. c. Branching usually from the base, a span high or less: leaves pinnatisect; the narrow lobes entire or with one or two coarse teeth; floral leaves similar: pedicels ascending, a half to one inch long: sepals unappendaged: pod about six lines long and two or three lines broad. — Torr. & Gray, l. c.; Hook. f. Bot. Mag. t. 6607. — On wet prairies, from S. W. Missouri and S. E. Kansas to the Arkansas River.

**Var. apérta**, WATSON, n. var. Pedicels divaricate: pods broadly elliptical (6 to 8 lines long), with a style 4 to 6 lines long; septum reduced to a narrow margin. — *S. aurea*, var.  $\beta$ , Torr. & Gray, l. c.; Gray, l. c. t. 67. — Near St. Augustine, Texas, Leavenworth.

**S. dissécta**, Torr. Low (3 to 6 inches high), very leafy and flowering from the base: leaves doubly pinnatisect: outer sepals much the larger, appendaged near the apex: pod oblong-obovate, an inch long or less and 5 or 6 lines wide; the style 1 to 4 lines long: seeds nearly 3 lines broad. — Pacif. R. Rep. ii. 160, t. 1. — In extreme Western Texas; near the mouth of Delaware Creek, Capt. Pope, and prairies south of Ft. Davis, Dr. Havard.

**40. PÁRRYA**, R. Br. (*Capt. W. E. Parry*, upon whose first voyage for the discovery of a northwest passage, in the years 1819-20, the species upon which the genus was founded was collected.) — North American and Asiatic perennials with branching caudex and naked scape-like peduncles, glabrous or rough-pubescent. Ten Asiatic species are described, but they vary much in their characters and several of them are imperfectly known. The genus is here characterized according to the more typical species. — R. Br. in Parry, 1st Voy. Suppl. to App. 268; Benth. & Hook. Gen. i. 67; Regel, Enum. Pl. Semenov. Suppl. ii. 20. [By S. WATSON.]

§ 1. PÁRRYA proper. Stigma distinctly 2-lobed: seeds margined and cotyledons strictly accumbent: scape naked.

**P. ártica**, R. Br. Dwarf, glabrous: the slender branches of the caudex very short: leaves short, linear-oblancoate: scape becoming 2 or 3 inches high in fruit: pod oblong (6 to 9 lines long), obtuse, beaked by the very short nearly sessile stigmas, 6 to 8-seeded, spreading: seeds with loose rugose testa. — R. Br. l. c. 269, t. B. — Islands and coast of Arctic America, east of the Mackenzie River. The Siberian specimens referred to this species by Regel belong to the next.

**P. macrocárpa**, R. Br. Caudex stout; the branches usually covered with the remains of dead leaves: leaves oblong- to linear-oblancoate, 2 to 4 inches long including the long petioles, usually coarsely and sharply toothed, glabrous or more or less rough-pubescent throughout with short stiff glandular hairs: scape 2 to 6 inches high: flowers large: pods ascending, acute and beaked with slender style, an inch or two long, 6-8-seeded; seeds.

broadly winged. — R. Br. l. c. 270. *Cardamine nudicaulis*, L. Spec. ii. 654. *Arabis nudicaulis* & *Hesperis scapigera*, DC. Syst. ii. 240, 454. *Neuroloma nudicaule* & *scapigerum*, DC. Prodr. i. 156. *Parrya nudicaulis*, Regel, Bull. Soc. Nat. Mosc. xxxiv. pt. 2, 176. — Alpine peaks of the Uinta Mountains, Utah, Watson; Alaska, from the Shumagin Islands, Harrington, to the Arctic Coast. (Kamtschatka to Arctic Russia, Thibet, and Afghanistan.)

§ 2. PHENICAULIS. Scape leafy: stigma nearly entire and capitate: seeds immarginate; cotyledons obliquely accumbent. — Nutt. (as genus) in Torr. & Gray, Fl. i. 89.

P. Menziésii, GREENE. Caudex stout; the branches covered with remains of dead leaves: leaves spatulate or oblanceolate, acute or obtuse, densely tomentose both sides with fine stellate pubescence, entire, 1 to 4 inches long; the petioles often nearly glabrous: scapes twice longer than the leaves, nearly glabrous; bracts sessile, oblong to linear-lanceolate, acute or obtuse; raceme many flowered: pods spreading, 1 to 2 inches long, attenuate to the slender style, glabrous, 2-4-seeded. — Fl. Francis. 253. *Hesperis Menziésii*, Hook. Fl. Bor.-Am. i. 60; Hook. & Arn. Bot. Beech. 322, t. 75. *Phanicaulis cheiranthoides*, Nutt. l. c.<sup>1</sup> *Cheiranthus Menziésii*, Benth. & Hook. Gen. i. 68; Brew. & Wats. Bot. Calif. i. 35. — From the Lower Columbia River and E. Oregon to N. W. Nevada, and in the mountains to Alpine Co., California.

Var. lanuginósa, WATSON, n. var. Pubescence more loose and woolly. — Lower Columbia Valley east of the Cascades, Douglas, Suksoief; near the mouth of the Chelon, Watson; and in Sierra Co., Calif., Lemmon.

41. LEAVENWORTHIA, Torr. (*Dr. M. C. Leavenworth*, U. S. A., the discoverer of the first species, a botanist and early collector in Florida, Louisiana, and Arkansas.) — Species very similar in habit. Peduncles all radical and 1-flowered (1 to 6 inches long) or branching (a span high or less), with one or two leaves toward the base, and decumbent. Seeds with a firm thick testa, very minutely tuberculate. — Ann. Lyc. N. Y. iv. 87; Gray, Gen. Ill. i. 139, & Bot. Gaz. v. 25. [By S. WATSON.]

\* Cotyledons round-cordate; radicle straight.

L. aúrea, Torr. Leaves with few (1 to 7) mostly sinuate lobes: petals emarginate, 4 to 6 lines long, "yellow" or white to purplish with a yellow base: pod not torulose, oblong to linear, 5 to 12 lines long including a slender style 1 or 2 lines long, 4-14-seeded. — Torr. l. c. 88, t. 5, f. 1-8; Gray, Gen. Ill. i. 140, t. 57. *L. Michauxii*, Gray, Man. ed. 2, 31, in part. — N. Alabama, *Leavenworth*, *Hatch*, *Peters*; Tennessee, *Buckley*; "Fort Towson," Arkansas, and at "Irish Bayou settlement," N. W. Texas, *Leavenworth*.

\* \* Cotyledons broad-oval; radicle applied very obliquely to their base

L. Michauxii, Torr. Leaves with usually numerous (7 to 15) acutely toothed lobes: petals subtruncate, 2 to 4 lines long, white with a yellowish claw or purplish: pod not torulose, oblong to linear, 6 to 15 lines long, with a short stout style (a line long or less), 4-18-seeded: seeds rather larger. — Torr. l. c. 89, t. 5, f. 9-11; Gray, Bot. Gaz. v. 26.<sup>2</sup> *Cardamine uniflora*, Michx. Fl. ii. 29. — Tennessee, about Knoxville, *Michaux*, and near La Vergne and Nashville, *Gattinger*; barrens of Kentucky, *Short*; Clarke Co., Indiana, *Coulter*; St. Louis Co., Missouri, *Letterman*.

L. stylósa, GRAY, l. c. Leaves usually about 7-lobed: petals yellow, emarginate, 4 lines long: pods not torulose, oblong, 4 to 8 lines long, not including the slender style (2 to 4 lines long), 6-8-seeded. — In wet places in cedar barrens near La Vergne, Rutherford Co., Tennessee, *Gattinger*.

L. torulósa, GRAY, l. c. Leaves few-many-lobed: petals purplish with a yellow base, emarginate, 3 or 4 lines long: pods torulose even when young, linear, 8 to 15 lines long

<sup>1</sup> Add syn. *Phanicaulis Menziésii*, Greene, Bull. Torr. Club, xiii, 143,

<sup>2</sup> Add syn. *L. uniflora*, Britton, Mem. Torr. Club, v. 171.



including a stout style a line or two in length, 4-14-seeded. — *L. aurea*, Hook. f. Bot. Mag. t. 5730. — Barrens of Kentucky, *Short*; near La Vergne and about Nashville, Tennessee, *Gettinger*.

**42. DENTÁRIA**, Tourn. TOOTHWORT, PEPPER-ROOT. (Latin *dens*, a tooth, from the toothed rootstocks of some of the species.) — Nearly or quite glabrous perennials, growing in damp woods, and blooming in early spring, rarely fruiting; flowers large. Distinguished from *Cardamine* (with which it has been united by R. Brown and Bentham & Hooker) most obviously by its habit. The foliage of many species is very variable. The stem is rarely branched, and the styles are usually slender and elongated. The remaining species are confined to temperate regions of Europe, with a single species in Eastern Asia; none are arctic or alpine. — Inst. 225, t. 110; L. Gen. no. 540; Gray, Gen. III. i. 137, t. 56; Reichenb. Ic. Fl. Germ. ii. 30-32. [By S. WATSON.]

\* Rootstock elongated: leaves 3-foliolate: species of the Atlantic States and Mississippi Valley.

**D. diphýlla**, Michx. (PEPPER-ROOT.) Rootstock several inches in length, often branched, strongly toothed at the numerous nodes: cauline leaves two, approximate or opposite; the leaflets very shortly petiolulate, ovate or oblong-ovate, sometimes obscurely lobed, coarsely crenate, the teeth abruptly acute, glabrous or sparingly hispid on the veins beneath, often minutely scabrous on the margin, 1 to 4 inches long: peduncle glabrous: petals white or pale purple: pods "an inch long, the style a third of the whole or more." — Fl. ii. 30; Sims, Bot. Mag. t. 1465; Torr. & Gray, Fl. i. 87. *D. bifolia*, Stokes, Bot. Mat. Med. iii. 443. *Cardamine diphylla*, Wood, Bot. & Fl. 37. — Nova Scotia to South Carolina, and westward to Minnesota and Kentucky.

\* \* Rootstock tuberous, more or less moniliform.

+ Cauline leaves divided (rarely all entire in *D. Californica*).

++ Eastern closely related species.

**D. laciniáta**, Muhl. Tubers usually not jointed, nor prominently tubercled, becoming longitudinally sulcate: peduncle often pubescent and margin of the leaves scabrous, as in the following species: cauline leaves three or two, usually verticillate or approximate, divided or parted into three segments; the lateral segments often deeply 2-lobed, all broadly oblong to linear, more or less laciniately toothed (very rarely entire), 1 to 4 inches long; basal leaves similar: petals pale rose-color to white: pods an inch long or more, not including the style (3 to 6 lines); seeds orbicular or oblong; cotyledons very unequal, one very thick, the other very small, half the length of the acute radicle, which is cleft to the middle. — Muhl. in Willd. Spec. iii. 479; Barton, Fl. N. Am. iii. 4, t. 72; Torr. & Gray, l. c. 86, excl. var.  $\delta$ . *D. concatenata*, Michx. l. c. *Cardamine laciniata*, Wood, l. c. 38. — From Quebec to Ontario and Minnesota, and southward to Florida and Louisiana.

**Var. multifida**, J. F. JAMES. Tubers deep-seated and stems erect in fruit: a slender form with the narrowly linear segments of the leaflets usually more or less divided into linear lobes. — Bot. Gaz. xiii. 234. *D. multifida*, Muhl. Cat. 60; Torr. & Gray, l. c. 87. *D. dissecta*, Leavenworth, Am. Jour. Sci. ser. I, vii. 62. *Cardamine multifida*, Wood, l. c., not Pursh. — N. Carolina and Georgia to Tennessee and Alabama.

**D. heterophýlla**, Nutt. Tubers jointed, narrowly oblong, or thick-clavate, with scattered prominent "eyes" or tubercles: leaves two (rarely three), opposite or alternate, 3-foliolate; leaflets distinctly petiolulate, oblong-lanceolate to linear, entire or rather deeply crenate, rarely laciniate or lobed, 1 to 3 inches long; basal leaves with ovate or sometimes lanceolate leaflets, usually lobed or crenate: pods nearly as in the last; seeds orbicular; cotyledons equal in length, one narrower by the thickness of the acute radicle, which is cleft to above the middle. — Gen. ii. 66; Torr. & Gray, Fl. i. 87. *Cardamine heterophylla*, Wood, l. c. — Pennsylvania to Georgia and west to Kentucky and Tennessee; said to bloom a week later than the preceding species.

**D. máxima**, Nutt. Tubers near the surface and stems reclined in fruit: leaves two or three, alternate, 3-foliolate; leaflets ovate or oblong-ovate, coarsely toothed and somewhat cleft or lobed, 1 or 2 inches long: pods as in *D. laciniata*; seeds round-oblong; cotyledons unequal, the smaller cuneate-oblong, half as wide as the larger; radicle acute and curved, cleft to the middle. — Gen. ii. 66; Gray, Gen. III. i. 138, t. 56. *D. laciniata*, var.  $\delta$ , Torr. & Gray, Fl. i. 86. *Cardamine maxima*, Wood, l. c. — Vermont, Morgan, to Pennsylvania and Western New York; said to bloom two weeks later than *D. laciniata*. Nuttall's original specimens from Pennsylvania and W. New York are described as two feet tall and with five to seven leaves. Nothing corresponding to this appears to have been found since. The single small specimen, so named by Nuttall in the herb. Brit. Mus., from Pennsylvania, has a pair of separate ternate leaves and probably belongs to this species or possibly to *D. diphylla*.

++ ++ Western species.

**D.\* macrocarpa**, Nutt. Glabrous or slightly pubescent: stems simple, 4 to 15 inches high; joints of the rootstock about an inch long: leaves 1 to 3, approximate, shortly petiolate, palmately or pinnately 3-5-parted or -divided, the segments linear to oblong, entire, obtuse or acute,  $\frac{1}{2}$  to 2 inches long; basal leaves sometimes merely lobed or cleft; the leaflets sessile or petiolulate, often 3-5-lobed or -toothed: raceme usually nearly sessile: flowers purple or rose-color: pods one or two inches long (including the style, usually 3 lines long) and a line broad; stigma capitate and entire; seeds oblong; cotyledons somewhat unequal; the oblique radicle cleft to the base. — Nutt. in Torr. & Gray, Fl. i. 88; Brew. & Wats. Bot. Calif. i. 30. *D. tenella*, Brew. & Wats. l. c. as to pl. Calif.; Wats. ms. of present work, not Pursh. *D. gemmata*, Wats. as to pl. of Howell, Pacif. Coast Pl. 1887 (not as to type which was later identified with *D. tenella*). *Cardamine Nuttallii*, Greene, Bull. Calif. Acad. Sci. ii. 389. *C. gemmata*, Greene, Pittonia, i. 162. — N. California (Plumas and Siskiyou Counties) to Brit. Columbia, Lyall.<sup>1</sup>

**Var.\* pulcherrima**, Robinson, n. var. Flowers larger than in the type: petals 6 to 8 lines long, 4 to 5 lines broad. — *Cardamine pulcherrima*, Greene, Erythea, i. 148. — Mosier, Oregon, T. Howell. Very nearly related species, if distinct at all, are the following: *CARDAMINE SINUATA*, Greene, l. c., with suborbicular sinuate-dentate radical leaves and roots said to be tuberous, from Crescent City, Calif., T. Howell, and (?) Cow Creek Mts., Oregon, Henderson; also *C. QUERCETORUM*, Howell, Erythea, iii. 33, with radical leaves 3-foliolate; leaflets ovate to elliptic-oblong, dentate, from Silverton, Oregon, T. Howell. In their flowers, young fruit (so far as known), cauline foliage, and general habit, these plants show such a close resemblance to each other and to more robust forms of *D. macrocarpa*, that the specific distinctions, derived chiefly from the subdivision of the radical leaves (in this genus notably inconstant), appear very doubtful. Good specimens of the roots (not at hand) may furnish better distinctions.

**D.\* tenella**, Pursh. Rootstock bearing small irregular tubers: basal leaves simple, round-cordate, coarsely crenate or sinuate, one or two inches broad; the petiole bearing usually several clusters of bulblets: stem 6 to 12 inches high, with one or two nearly sessile 3-foliolate leaves, sometimes bulbiferous in the axils; leaflets linear-oblong or linear, obtuse, entire,  $\frac{1}{2}$  to  $2\frac{1}{2}$  inches long: raceme sessile or shortly pedunculate: flowers rose-color: pods an inch long and a line wide, with a slender style tipped with a broad distinctly lobed stigma. — Fl. ii. 439; Torr. & Gray, Fl. i. 87. *D. tenuifolia*, Hook. Fl. Bor.-Am. i. 46, not Ledeb. — Banks of the Columbia, Lewis; Washington, Klickitat Co., Suksdorf, Upper Nesqually Val., Allen.

**D. Califórnicæ**, Nutt. Tubers of the submoniliform rootstock mostly small: stem  $\frac{1}{2}$  to 2 feet high, rather stout, simple or branched above, glabrous or slightly pubescent: foliage very variable; basal leaves entire or 3-foliolate; the leaflets petiolulate, suborbicular, cuneate to subcordate at base, sinuate or coarsely toothed; cauline 2 to 4, mostly shortly petiolate and above the middle of the stem, 3- or pinnately 5-foliolate, rarely simple or lobed;

<sup>1</sup> The treatment of *D. macrocarpa* and the following species has been revised in the light of more copious material. Nuttall's species was unfortunately characterized as having 3-foliolate radical leaves with "reniform" leaflets. It is stated that the species was founded upon a single specimen, and a plant, so labelled by Nuttall himself, is now in herb. Brit. Mus., and is (acc. to Dr. Watson) of the species here described.

the leaflets mostly petiolulate, ovate to lanceolate or linear, entire or toothed, 1 to 3 inches long; flowers white or rose-colored: pods 1 to  $2\frac{1}{2}$  inches long (style 2 or 3 lines long); seeds oblong; cotyledons thick; radicle decidedly oblique, cleft to the middle. — Nutt. in Torr. & Gray, Fl. i. 88. *D. integrifolia*, Nutt. l. c. *Cardamine purpurea*, Torr. & Gray, Fl. i. 85. *C. paucisepta*, Benth. Pl. Hartw. 297; Brew. & Wats. Bot. Calif. i. 30.<sup>1</sup> *C. cuneata*, Greene, Bull. Calif. Acad. Sci. i. 74. — In the Coast Ranges from San Diego to Oregon; Chico, Calif., Mrs. Bidwell; Vancouver Island, Macoun. *C. cuneata*, Greene, from the San Antonio Mountains, Monterey Co., Calif., appears to be only a slender form with more divided (5–7-foliolate) leaves, the terminal leaflet 3-parted and the lateral with one or two lobes on the petiole. A specimen from Vacaville, Solano Co., Ratán, represents the opposite extreme, having the leaves all simple and cordate.

+ + Cauline leaves undivided (sometimes 3-foliolate in *D. pachystigma*).

**D.\* cardiophylla**, ROBINSON, n. sp. Glabrous: stem erect from a small tuber, usually simple, 6 to 12 inches high: leaves 2 to 4, alternate or the pair nearly opposite, round-cordate to lanceolate, sinuate or acutely toothed,  $\frac{1}{2}$  to  $1\frac{1}{2}$  inches long, exceeding the petioles: peduncle short: flowers rose-color: pods 1 to  $1\frac{1}{2}$  inches long and a line broad or somewhat more, with a slender style ( $1\frac{1}{2}$  to 2 lines long); seeds ovate; radicle oblique, cleft nearly to the base, as long as the subequal cotyledons. — *D. Californica*, Wats. Proc. Am. Acad. xiv. 289, & Bot. Calif. ii. 430, in part. — Plumas Co., Calif., Mrs. R. M. Austin, Lemmon. This species, characterized and given an unpublished name, by Dr. Watson, is with scarcely a doubt the *Cardamine cardiophylla* of Greene, Fl. Francis. 266, described from specimens collected in Solano Co., Calif., Jepson. Specimens from Rock Creek, Washington, G. R. Vasey, appear to be the same.

**D. pachystigma**, WATSON, n. sp. Glabrous: stem stout, 6 inches high: leaves 2 or 3, approximate, simple and cordate to reniform, or sometimes 3-foliolate and the lower leaflets ovate to lanceolate, somewhat crenate or sinuate or more frequently coarsely and acutely dentate: raceme sessile or nearly so: pods 1 or 2 inches long,  $1\frac{1}{2}$  or 2 lines broad, with a very short stout style and small stigma; seeds nearly orbicular; cotyledons very thick, oblique; the short radicle cleft nearly to the base. — *D. Californica*, var. *pachystigma*, Wats. Proc. Am. Acad. xiv. 289, & Bot. Calif. ii. 430. — Plumas Co., Calif., Mrs. Ames, Mrs. Austin.

**43. CARDÁMINE**,<sup>2</sup> Tourn. (*Καρδαμίνη*, a name cited by Dioscorides as given to some species of cress, probably *Lepidium sativum*.) — Mostly glabrous plants, growing along watercourses or in moist places, for the most part with smaller flowers, narrower pods, and smaller seeds than in *Dentaria*. Natives of temperate, arctic, and alpine regions of the globe. — Inst. 224, t. 109; L. Gen. no. 541; DC. Syst. ii. 245, & Prodr. i. 149; Benth. & Hook. Gen. i. 70, excl. subgenera. [By S. WATSON.]

\* Leaves undivided perennials.

+ Alpine or arctic; dwarf.

**C. bellidifolia**, L. Rootstock slender with a branching caudex; stems very short: leaves with a long slender petiole, ovate or elliptical, occasionally subcordate and usually obtuse, rarely with one or two lateral teeth, 1 to 6 lines long: peduncles  $\frac{1}{4}$  to 2 inches long: flowers few, white or pinkish: pods erect, 6 to 15 lines long, on pedicels 1 to 3 lines long, the style very short and stout; radicle cleft to the middle; caulicle thick. — Spec. ii. 654; Fl. Dan. t. 20. *C. alpina*, Willd. Spec. iii. 481; Reichenb. Ic. Fl. Germ. ii. 10, t. 25. *C. Lenensis*, Andr. in Ledeb. Fl. Alt. iii. 33; Ledeb. Ic. t. 268. — Mountains of Northern New England; Rocky Mountains of Brit. America,<sup>3</sup> Drummond; Mt. Shasta and Lassen's Peak, Calif.; Alaska and Arctic Coast. (Greenland, Eu., N. Asia.)

<sup>1</sup> Add syn. *Cardamine Californica*, Greene, Fl. Francis. 266.

<sup>2</sup> The accent of this name, variously given in botanical works, should be determined by the quantity of the *iota* of the Greek, which according to excellent authority is short, contrary to the marking in Harper's Latin Lexicon.

<sup>3</sup> Also reported from Avalanche Mountain in the Selkirk Range, by J. M. Macoun, Bot. Gaz. xvi. 286; and coll. in Chiquash Mts., Washington, Suksdorf.

+ + Meadows and mountain sides; eastern species.

**C. rotundifolia**, MICHX. Rootstock very short, fibrous-rooted and very rarely at all tuberiferous: stem lax, decumbent, becoming one or two feet long; the branches at length rooting at the end and the raceme proliferous: leaves all rounded or ovate and petiolate, usually subcordate, sinuate; the larger 1 or 2 inches long, exceeding the petioles: flowers white: pods few-seeded, attenuate to a long slender style, 6 to 9 lines long, on spreading pedicels about as long. — Fl. ii. 30; Hook. Bot. Misc. iii. 241, t. 109. *C. rotundifolia*, var.  $\gamma$ , Torr. & Gray, Fl. i. 83. — In cool shaded springs, Middletown, N. J., Willis, Pennsylvania, Kentucky, *Short*, and southward in the mountains to N. Carolina.

**C. rhomboidea**, DC. Stem from a small tuberous base and slender rootstock bearing small tubers, erect, usually simple,  $\frac{1}{2}$  to 2 feet high, glabrous or sometimes puberulent especially at base: leaves at base long-petiolate, rounded to ovate and somewhat cordate, sinuate or entire; the cauline becoming oblong-lanceolate and sessile and often acutely toothed: flowers white: pods 9 to 18 lines long including the slender style (1 to 3 lines long), about equalling the ascending pedicels; seeds small, orbicular; radicle cleft to or below the middle. — Syst. ii. 246; Hook. l. c. 239, t. 108; Gray, Gen. III. i. 136, t. 55. *C. rotundifolia*, Torr. & Gray, l. c. excl. vars.<sup>1</sup> *Arabis bulbosa*, Schreb. in Muhl. Trans. Am. Phil. Soc. iii. 174. *A. rhomboidea* & *A. tuberosa*, Pers. Syn. ii. 204. — Common in Ontario and Minnesota, southward to Florida and Texas.

**Var. purpurea**, Torr.<sup>2</sup> Low (a foot high or less), somewhat loosely pubescent or rarely glabrous: flowers purplish or rose-color. — Fl. N. Y. i. 56. *C. rotundifolia*, var.  $\beta$ , Torr. & Gray, Fl. i. 83. *Arabis rhomboidea*, var. *purpurea*, Torr. Am. Jour. Sci. iv. 66. — Ontario to W. Maryland, *J. D. Smith*, and westward to Wisconsin and Kentucky; reported as also collected by Drummond farther to the north. This species closely approaches *Dentaria*. *Thlaspi tuberosum*, Nutt. Gen. ii. 65, is probably the same, from its tuberous root, rose-colored flowers, and pubescence, though the pod is described as orbicular.

+ + + Western mountain species, sometimes subalpine.

**C. cordifolia**, GRAY. Glabrous or more or less pubescent with spreading hairs: stems erect from a slender rootstock, 1 or 2 feet high, simple: leaves (a dozen or more) petiolate; the lowest cordate; the rest ovate to oblong-ovate, acute or acutish, cordate or truncate at base, more or less repand or coarsely crenate, 1 to  $2\frac{1}{2}$  inches long: raceme sessile: flowers white: pods 10 to 15 lines long with the short style, on ascending pedicels; radicle cleft to the middle. — Pl. Fendl. 8. *C. rhomboidea*, Durand, Fl. Utah, 159. — Rocky Mountains, Colorado to New Mexico; Wasatch Mountains, Utah.

**C. Lyallii**, WATSON. Glabrous: stem erect from a running rootstock, simple or branched, 1 or 2 feet high: leaves few (4 to 8), petiolate, reniform to cordate, sinuate, 1 to 3 inches broad: raceme pedunculate: flowers white: pods an inch long or less, rather shortly attenuate to a very short style, on spreading pedicels; radicle cleft to the middle. — Proc. Am. Acad. xxii. 466. *C. cordifolia*, Wats. Bot. King Exp. 19, in part; Gray, Proc. Am. Acad. viii. 376; Torr. Bot. Wilkes Exped. 229. — Cascade Mountains, Wilkes, *Lyall*, Hall (no. 29), *G. R. Vasey*, *J. Howell*; Blue Mountains, Oregon, *Cusick*; Clover Mountains, N. Nevada, *Watson*; and Placer Co., Calif., near Truckee, *Sonne*. Resembling the European *C. asarifolia*, the stem of which is branched above and the pod more attenuate.

\* \* Radical leaves mostly entire; the cauline 3-5-foliolate.

+ Eastern species.

**C.\* (?) curvisiliqua**, SHUTTLE.<sup>3</sup> Aquatic, glabrous, decumbent, rooting in mud at base: stems elongating, furrowed: earliest leaves entire, suborbicular, long-petioled; the later ones pinnate; leaflets obovate or oval, rounded at the apex, very shallowly lobed or quite entire, acute at the base: flowers small: petals narrow, a line and a half in length: fruiting raceme elongated, very loose, the rachis often flexuous, the pedicels divaricate: pods

<sup>1</sup> Add syn. *C. bulbosa*, Britton, Sterns & Poggenburg, Prelim. Cat. N. Y. 4.

<sup>2</sup> This variety has been raised to specific rank by Dr. Britton as *C. Douglassii*, Trans. N. Y. Acad. Sci. ix. 8, being the *Arabis Douglassii*, Torr. (used as synonym) in Torr. & Gray, Fl. i. 83.

<sup>3</sup> This species, although referred by Dr. Watson to *Cardamine*, was not described in his manuscript.

slender, nearly terete, curving upward, about 10 lines in length. — Shuttleworth in distr. Rugel; Gray, Proc. Am. Acad. xv. 46. *Nasturtium officinale*, Torr. & Gray, Fl. i. 666, not L. *N. stylisum*, Shuttl. acc. to Gray, l. c. — On river banks, &c., Florida, *Rugel*, *Leavenworth*, *Garber*, *Rothrock*, *Simpson*, *Curtiss*. A species with the habit of *Nasturtium officinale*, and, but for its long slender pods and uniseriate seeds, to be referred to that genus.

- C. Clematitis**, SHUTTL. Glabrous: rootstock slender: stem lax, simple or branched, a foot high: radical leaves small, reniform-cordate, occasionally with a pair of much smaller leaflets on the petiole; cauline petiolate; the petiole sagittately appendaged at base; terminal leaflet reniform to oblong and subhastately 3-lobed; the lateral oblique and very variable: raceme nearly sessile: flowers white: pods about an inch long, with a long slender style; radicle cleft a third of its length. — Shuttl. in Wats. Bibl. Index, 53, excl. syn.; Chapm. Fl. ed. 2, 605; Gray, Proc. Am. Acad. xv. 45. — Springs and moist places in the Southern Alleghanies;<sup>1</sup> Smoky Mountains, *Rugel*, Roan Mountain, *Gray*; Alabama, *Buckley*.

— Western species.

- C. Bréweri**, WATSON. Glabrous or slightly pubescent below: stems from a slender running rootstock, erect or decumbent at base, usually branched, a foot high or more: radical leaves simple or with a pair of small rounded lateral leaflets, round-cordate, entire or sinuate; the cauline with usually rounded and sinuate or sometimes lobed leaflets; the upper more oblong or lanceolate: flowers small, white: pods 8 to 12 lines long, with a short thick style, ascending or erect on pedicels 2 to 4 lines long; radicle scarcely cleft. — Proc. Am. Acad. x. 339; Brew. & Wats. Bot. Calif. i. 31. — In the Sierra Nevada near Sonora Pass, *Brewer*, and near Carson City, *Anderson*; Humboldt Co., Calif., *Rattan*; Oregon, *Hall* (no. 31), *Howell*; Teton Range, Idaho, *Coulter*; Henry's Fork, *Hayden*.<sup>2</sup>

- C. angulata**, Hook. Glabrous or more or less pubescent: stem erect from a rather slender running rootstock, simple, 1 or 2 feet high: leaves all 3-foliolate or sometimes 5-foliolate; leaflets ovate to oblong, usually cuneate at base and coarsely 3-5-toothed or the lateral entire; the terminal not greatly larger than the lateral, about an inch long, exceeding the petioles: racemes short, few-flowered: flowers white, larger: pods about 9 lines long including the style (1 line long), on spreading or divaricate pedicels. — Fl. Bor.-Am. i. 44, & Bot. Misc. i. 343, t. 69. — Cascade Mountains of Oregon and Washington; Puget Sound, *Wilkes*.

- C. purpurea**, CHAM. & SCHLECHT. Glabrous or sparingly hirsute: stems erect, 2 to 6 inches high: cauline leaves one or two; leaflets entire, round-oval or ovate, acute; the terminal subcordate and somewhat 3-lobed: raceme few-flowered, often subtended by a 3-lobed foliaceous bract: flowers rather large, often purple or rose-colored: pods erect, nearly an inch long; style short, stout. — Linnaea, i. 20; Hook. Fl. Bor.-Am. i. 44. — Arctic Alaska; also on the Asiatic side of Bering Strait, *Wright*. A very imperfectly known species.

\* \* \* Leaves all pinnately divided with several pairs of leaflets.

— Flowers rather large: petals (except in *C. pratensis*, var. *occidentalis*) 3 or 4 lines long.

- C. pratensis**, L. Glabrous or somewhat pubescent below: stems erect from usually a very short rootstock or rarely subterraneous fibrous-rooted base, branched, a foot high or more: radical leaves with small rounded leaflets 1 to 4 lines broad; leaflets of the upper leaves oblong to linear or oblanceolate, entire or rarely toothed, 2 to 10 lines long: flowers rather large (3 to 6 lines long) in a broad corymb, white to deep rose-color: pods 9 to 15 lines long and a line wide, on ascending pedicels; style short, rather stout. — Spec. ii. 656; DC. Syst. ii. 256; Hook. Fl. Bor.-Am. i. 45; Torr. & Gray, Fl. i. 84; Lange, Medd. Gren. iii. 48. *C. digitata*, Richards, in Frankl. 1st Journ. ed. 1, App. 743 (reprint, p. 15). — Labrador to New Brunswick; Bristol, Vermont, *Pringle*; New Jersey; Central New York, Ontario,<sup>3</sup> and Lake Superior and northward to the Arctic Ocean; Alaska. Rarely collected in fruit. *C. digitata*, Richards, appears to be an arctic form with the leaves reduced to a few approximate linear leaflets.

<sup>1</sup> Northward to White Top Mt., S. W. Virginia, *Small*; also on Grandfather Mt., N. C., *Small* & *Heller*.

<sup>2</sup> Northward to Vancouver Isl., *Macoun*.

<sup>3</sup> Southward into Michigan and even N. Indiana, *Van Gorder*.

**Var. occidentális**, WATSON, n. var. A stout leafy form, with small flowers (2 lines long), fruiting freely. — Sauvies Island and Oregon City, Oregon, *Howell, Henderson*. Specimens from Eagle and Washoe Valleys, Nevada, *Stretch*, have blunt styleless pods 18 lines long, and are perhaps distinct.

- C. Gambellii**, WATSON. Rather stout and tall (2 or 3 feet high) but lax, decumbent at base and rooting at the lower joints, glabrous or sparingly soft-villous, branched: leaflets 4 to 6 pairs, ovate-oblong to linear, usually cuneate at base and acute, mostly few-toothed,  $\frac{1}{4}$  to 1 inch long: raceme nearly sessile, becoming elongated: flowers white, 3 or 4 lines long: pedicels slender, divaricate, equalling the narrow erect or ascending often curved pod (6 to 12 lines long): style slender, a line long. — *Proc. Am. Acad.* xi. 147, & *Bot. Calif.* i. 30 (where by error *Gambellii*). *C. Schaffneri*, Hook. f. in *Hemsl. Diag. Pl. Nov.* i. 2, & *Biol. Cent.-Am. Bot.* i. 32. — S. California from San Bernardino to Santa Barbara, in swamps and ditches. (Mex.)

+ — Flowers smaller: petals a line or two in length.

++ Capsule mostly 20–30-seeded.

- C.\* hirsúta**, L.<sup>1</sup> Low, 3 to 8 or 10 inches high; root single, very slender and with or without long filiform branches: leaves chiefly basal and persisting in a rosulate cluster: leaflets roundish in outline, undulately few-lobed, appressed-hispidulous above; those of the few cauline leaves oblong: flowers small: petals white, once and a half to twice the length of the sepals: stamens 4: pods erect on nearly erect or even appressed pedicels. — *Spec.* ii. 655; *DC. Syst.* ii. 659; *Reichenb. Ic. Fl. Germ.* ii. t. 26; *Britton, Bull. Torr. Club*, xix. 219. — Woods, Middle Atlantic States from S. Pennsylvania, *Small*, to N. Carolina, *T. J. Browne*. Abundant about Washington, D. C.; perhaps introduced; fl. April, May.

- C.\* parviflora**, L. Very slender, glabrous or sparingly pubescent upon the stem, subsimple, erect or nearly so: root at first single, becoming a fascicle of delicate fibres: stem often somewhat flexuous, 6 or 8 inches high, leafy: leaflets small; those of the lower leaves oblong (rarely suborbicular), of the upper linear, very narrow: flowers as in the preceding, but petals mostly narrower and relatively longer: stamens normally 6: pods erect upon spreading-ascending pedicels. — *Syst. Nat.* ed. 10, 1131, & *Spec.* ed. 2, ii. 914; *DC.* l. c. 261; *Reichenb.* l. c.; *Britton*, l. c. 220. *C. Virginica*, Michx. *Fl.* ii. 29, not *L.* *C. hirsuta*, var. *sylvatica*, of Am. authors, not *C. sylvatica*, Link. *C. flexuosa*, *Britton*, *Trans. N. Y. Acad. Sci.* ix. 9. *C. arenicola*, *Britton*, *Bull. Torr. Club*, xix. 220. — Sandy and rocky soil, E. New England to Georgia and across the continent to Oregon. In moist situations becoming stouter and perhaps passing to the usually well marked

- C.\* Pennsylvánica**, MUHL. Larger, a foot or two in height, more leafy, branching and of laxer growth, nearly or quite glabrous: roots a fascicle of numerous slender fibres: leaflets of the lower leaves roundish or short-oblong; of the upper oblong, with rounded apex and narrowed base, commonly more or less decurrent upon the rhachis, usually half inch or more in length and 1 to 3 lines in breadth: flowers as in the last: stamens 6: pods suberect upon ascending and more or less spreading pedicels. — *Muhl. in Willd. Spec.* iii. 486; *DC.* l. c. 258; *Ell. Sk.* ii. 144; *Britton*, l. c. 219. *C. hirsuta*, of authors, as to Am. pl. in great part, not *L.* *C. flexuosa*, *Britton*, *Mem. Torr. Club*, iv. 103, if correctly shown by Mr. Small's specimen from Mt. Rogers, Va., appears to be a form of the same species with somewhat more spreading pods. — Moist places, chiefly in shade, Newfoundland to Florida and across the continent to Central California and north to Alaska; common; fl. according to locality from April to July. Var. *Brittoniana*, O. A. Farwell (*Asa Gray Bull.* no. 7, 46; the measurements obviously incorrect), if of this species, must be an exceptional form, with lateral leaflets few, reduced, or obsolete. — N. Michigan.

++ — Capsule fewer (8–20)-seeded: western species.

- C. oligosperma**, NUTT. Annual, rarely sending out roots at the lower joints, slender, hirsute or nearly glabrous, a foot high or less: leaflets small, petiolulate, roundish, often 3–5-lobed or -toothed, in the upper leaves sometimes narrower: raceme usually few-flowered and shortly pedunculate: flowers small (1 line long), white: pods erect, 6 to 10 lines long, 8–20-seeded; style very short. — *Nutt. in Torr. & Gray, Fl.* i. 85; *Brew. & Wats. Bot. Calif.* i. 30. — From Central California to Vancouver Island, in low wet places.

<sup>1</sup> Dr. Watson's description of this species has been revised to exclude the two following, which, although very nearly related, generally appear distinct, as recently pointed out by Dr. Britton.

44. **ARABIS**, L. ROCK CRESS. (Name from the country *Arabia*.) — Annuals or perennials mostly of erect habit, nearly all of the Northern Temperate and Arctic Zones. Pubescence branched or stellate, rarely simple or none. Flowers white, purple, or more rarely stramineous, in more or less elongated racemes. Leaves mostly lanceolate or spatulate, entire, dentate, or less frequently pinnatifid. — Gen. no. 544; DC. Syst. ii. 213; Reichenb. Ic. Fl. Germ. ii. t. 33-44; Gray, Gen. III. i. 58; Benth. & Hook. Gen. i. 69. *Turritis*, L. Gen. no. 546. [By S. WATSON.]

§ 1. **SISYMBRINA**, Watson.<sup>1</sup> Seeds oblong or elliptical, very small, wingless; cotyledons often more or less oblique. Biennial or perennial. Pubescence, if any, usually simple upon the upper parts, but invariably forked to some extent when present upon the lowest leaves.

\* Leaves all pinnately divided; segments filiform.

**A.\* filifolia**, GREENE. A delicate glabrous somewhat glaucous annual, 8 inches to a foot in height, stem flexuous or somewhat geniculate and branched above: flowers roseate or purple: petals obovate, patulous, 2 to 3 lines in length, about twice the length of the calyx: pods narrowly linear, acute, about 15 lines in length, spreading-ascending. — Bull. Calif. Acad. Sci. ii. 390. *Cardamine filifolia*, Greene, Pittonia, i. 30. — Santa Cruz Isl., Calif., Greene, Brandegee. A species of doubtful position. Mature seeds have not been seen. *A. pectinata*, Greene, Pittonia, i. 287, of Lower California, is nearly related.

\* \* Radical leaves lyrate pinnatifid; segments short and broad; cauline not auriculate at the base.

**A. lyrata**, L. Slender, branching from the base, glabrous or rarely somewhat hairy at the base: the stems ascending, a foot high or less: basal leaves with few and small lateral segments or pinnately lobed, often all entire, oblanceolate or spatulate to linear: petals white or pinkish, 2 to 4 lines long: pods ascending on slender pedicels 3 to 6 lines long, very narrow with a short stout style, straight or slightly curved; the valves rather thick, firm, and nerved nearly to the top. — Spec. ii. 665. *A. petræa*, Gray, Man. ed. 5, 67, in part. *Sisymbrium arabidoides*, Hook. Fl. Bor.-Am. i. 63, t. 21, at least in part. *Cardamine spatulata*, Michx. Fl. ii. 29. — From the Great Lakes to Connecticut and New Jersey, and southward along the Alleghanies to N. Carolina and Tennessee.<sup>2</sup> Southward it becomes decidedly perennial, with more lax and slender stems, and the pods with thinner and scarcely nerved valves. No seeds have been examined with cotyledons so strictly incumbent as figured and described by Hooker.

**Var. occidentalis**, WATSON, n. var. Pods with sessile stigma or a very short and thick style; the valves rather thin but often faintly nerved to the top. — *A. ambigua*, DC. Syst. ii. 231; in part; Torr. & Gray, Fl. i. 81. *A. petræa*, var., Regel, Bull. Soc. Nat. Mosc. xxxv. pt. 2, 163. — From Alaska to British Columbia and the eastern side of the Rocky Mts. in Brit. America; Point Pelee on Lake Erie, Macoun. (Kamtschatka, Wright.) The true *A. petræa*, Lam., as it occurs in Europe, appears to be distinguished from all American forms by its usually broader and blunter pod, more broadly elliptical or nearly orbicular seed, and the cotyledons strictly accumbent. The Greenland specimens referred to this species as a variety, with pilose siliques and pedicels (Lange, Medd. Græn. iii. 49), are more probably the same as Hooker's *Sisymbrium humile*.

\* \* \* Radical leaves oblanceolate, toothed or entire.

† Cauline leaves not auriculate.

**A. humifusa**, WATSON. Glabrous, branching from the base; the low decumbent stems 6 inches high or less, simple or branched: radical leaves usually numerous, few-toothed, an inch long or less; the petioles rarely slightly ciliate; cauline leaves spatulate-oblanceolate,

<sup>1</sup> *Pseudarabis*, Wats. in Gray, Man. ed. 6, 67, & Proc. Am. Acad. xxv. 124, but not of Endl., which, being *Pseudoarabis* of C. A. Meyer, depends upon a different subdivision of the genus.

<sup>2</sup> S. Missouri, Eggert.

mostly entire: petals white, 2 lines long: pods (immature) an inch long by two thirds line wide, straight, abruptly tipped with a very short thick style, ascending on slender pedicels 3 to 4 lines long; valves nearly nerveless (3-nerved acc. to Vahl): seeds in 2 rows; the "cotyledons incumbent." — Proc. Am. Acad. xxv. 124. *Sisymbrium humifusum*, Vahl, Fl. Dan. t. 2297: Lange, Medd. Grøn. iii. 51. — Ungara Bay, N. Labrador, Turner. (Greenland.) The cotyledons are said to be incumbent, but are represented only partially so in the figure.

**Var. pubescens**, WATSON, n. var. Lower leaves and base of the stem pubescent. — York Factory, Bell, Macoun. The mature pods of this variety, which appears to differ only in its pubescence from the Greenland form, have the valves distinctly nerved, and the narrow acute seeds with oblique cotyledons, as represented.

- A.\* Nuttállii**, ROBINSON, n. sp.<sup>1</sup> Biennial or usually perennial with a branching rootstock: stems simple and slender, a span high or less, erect or ascending, glabrous above, more or less hirsute below with rather long simple and often forked hairs: radical leaves spatulate-oblongate, acutish or obtuse, entire, an inch long or less; cauline narrowly oblong to elliptical, sessile: petals 2 to 3 lines long, white: pods short, 6 to 9 lines long by one third line wide, somewhat attenuate to a rather stout style; valves slightly convex, 1-nerved and faintly veined: seeds in 1 row, elliptical; cotyledons accumbent! — *A. spathulata*, Nutt. in Torr. & Gray, Fl. i. 81; Brew. & Wats. Bot. Calif. i. 32; not DC. — Mountains of W. Montana to N. Utah, N. Nevada; and E. Washington, chiefly on low ground in valleys.

+ + Cauline leaves auriculate.

- A. Hoókeri**, LANGE. Stems several from a biennial (or perennial?) branching rootstock, slender, ascending, branched, a span high, hirsute below with simple or forked hairs: radical leaves oblanceolate, acute, sinuate-dentate, 2 inches long or less, rather densely hirsute with short forked hairs; petioles ciliate; cauline leaves lanceolate to linear with a clasping sagittate base, mostly entire: sepals and pedicels hairy: petals white, 2 lines long: pods 1 to 1½ inches long by three fourths line broad, somewhat attenuate to a very short thick style, ascending or spreading upon spreading pedicels 3 to 6 lines long; valves 1-nerved; seeds in 2 rows, minute, oblong; cotyledons incumbent though slightly oblique. — Medd. Grøn. iii. 50. *Turritis mollis*, Hook. Fl. Bor.-Am. i. 40; Hornem. Fl. Dan. t. 2296. — Shore of the Arctic Sea between 107° and 130° W. longitude, Richardson. (Greenland.)

- A. dentáta**, TORR. & GRAY. Biennial, branching from the base, pubescent throughout with fine mostly stellate pubescence: stems lax, ascending or decumbent, 1 to 2 feet long: leaves all acutely and irregularly dentate, very rarely the lower lyrate-pinnatifid; the radical petiole, obovate to oblanceolate: flowers very small and nearly sessile; petals white, a line long: pods very narrow, nearly straight, widely spreading, 8 to 12 lines long, glabrous, on pedicels an inch long, beaked by a very short thick style; valves very faintly 1-nerved at base; seeds oblong, in 1 row, wingless, minute; cotyledons oblique. — Fl. i. 80; Torr. Fl. N. Y. i. 54, t. 7. *Sisymbrium dentatum*, Torr. in Short, Pl. Kentucky, 3d Suppl. 338. — New York to Michigan and Minnesota, south to the Potomac, Tennessee, and Missouri.

- A. perfoliáta**, LAM. (TOWER MUSTARD.) Glauous: stem erect, solitary, simple, usually stout and 2 to 5 feet high, commonly hairy near the base: radical leaves lyrate-pinnatifid to spatulate-oblongate and toothed, usually more or less hirsute or coarsely stellate-pubescent; cauline glabrous, entire or the lower toothed, lanceolate to oblong, auricled at base, 1 to 4 inches long: petals yellowish white, 2 to 3 lines long: fruiting pedicels 2 to 6 lines in length: pods strictly erect, 1½ to 4 inches long by one half to two thirds line wide, beaked with a short stout style or the broad scarcely 2-lobed or cupulate stigma nearly sessile; valves rather rigid, 1-nerved and veined; seeds crowded, irregular, somewhat turgid, nearly marginless; cotyledons partially incumbent. — Dict. i. 219. *Turritis glabra*, L. Spec. ii. 666. *T. macrocarpa*, Nutt. in Torr. & Gray, Fl. i. 78. — From the Lower St. Lawrence through New England (where infrequent) to New Jersey and westward to the Saskatchewan, south in the Rocky Mts. to Colorado and N. Utah; on the Pacific Slope from Oregon to S. California. (L. Calif., Eu., Asia.) The cotyledons vary from accumbent to incumbent in the same pod.

§ 2. EUÁRABIS. Seeds in one row, at least when mature, orbicular or broadly elliptical, more or less wing-margined; cotyledons strictly accumbent.

<sup>1</sup> The name of this species has been altered on account of the older and still valid homonym.



\* Leaves (at least the basal) more or less lyrate pinnatifid; the cauline not cordate nor auriculate at base: pubescence of simple (rarely forked) hairs.

**A. Ludoviciana**, C. A. MEYER. Decumbently branching from the base, somewhat hirsute with short spreading simple hairs: leaves narrowly oblong, all deeply pinnatifid with nearly uniform oblong to linear segments, mostly obliquely 1-2-toothed: flowers small, white, on very short pedicels: pods spreading, 9 to 15 lines long by two thirds line broad, on pedicels 1 to 3 lines long, beaked by a short pointed style; valves faintly veined and obscurely 1-nerved at base; seeds narrowly winged. — Ind. Sem. Hort. Petrop. ix. 60.<sup>1</sup> *Cardamine Virginica*, L. Spec. ii. 656. *C. Ludoviciana*, Hook. Jour. Bot. i. 191. *C. Engelmanniana*, "Ind. Sem. Hort. Berol. 1840." — Virginia to S. Carolina, and west to Missouri and Texas; Pt. Loma, S. Calif., *Cleveland*; fl. March to May.

**A. petiolaris**, GRAY. Stem erect, tall, simple or branching above, glabrous or sparingly pubescent with reflexed simple hairs: radical leaves few, often large and rather thick, somewhat lyrate pinnatifid with a few (5 to 7) sinuately toothed segments, glabrous or somewhat hairy; cauline leaves all petioled; the lower pinnatifid or usually hastately lobed; the upper lanceolate to linear, acuminate, entire or somewhat sinuate: flowers purplish, 2 to 3 lines long: pods ascending, 2 to 3 inches long by  $1\frac{1}{2}$  to 2 lines broad, on pedicels 3 to 5 lines long, beaked by a slender style; valves veined, 1-nerved below the middle; seeds broadly winged. — Proc. Am. Acad. vi. 187. *Streptanthus petiolaris*, Gray, Pl. Fendl. 7. *S. Brazoensis*, Buckl. Proc. Acad. Philad. 1861, 448. — W. Texas, from the Colorado to the Rio Grande; fl. March to May.

\* \* Radical leaves dentate (rarely lyrate pinnatifid in *A. Canadensis*); the cauline not cordate nor auriculate at base: pubescence of simple, forked, or somewhat stellately branched hairs.

**A. blepharophylla**, HOOK. & ARN. Biennial or perennial, branched at base or simple: stems glabrous or somewhat hirsute below with forked hairs, a foot high or less: radical leaves oblong to obovate-oblong, obtuse or acutish, ciliate with forked hairs; cauline oblong, sessile, dentate or entire: flowers large, rose-colored: pedicels and calyx substellately pubescent; sepals often colored, broad, 2 to 3 lines long; petals 6 lines long: pods erect or ascending on pedicels 2 to 4 lines long, nearly straight, 9 to 12 lines long by about a line broad, abruptly beaked by a short stout style; valves veined, 1-nerved; seeds round-elliptical, narrowly winged or scarcely margined. — Bot. Beech. 321; Hook. f. Bot. Mag. t. 6087. — California, on low hills near the coast, from San Francisco to Monterey; fl. in very early spring.

**A. furcata**, WATSON. Perennial: stems several from a branching rootstock, slender, erect or ascending, glabrous, a foot high or less: radical leaves ovate to oblong-oblong, obtuse or acute, sparingly toothed, 1 to 2 inches long; cauline sessile, oblong to linear, entire or sparingly toothed: petals white, 3 to 5 lines long, more than twice longer than the calyx: pods 8 to 20 lines long, straight or nearly so, attenuate to a rather short style: seeds oblong-elliptical, winged at the lower end. — Proc. Am. Acad. xvii. 362. — Cascade Mts. of Oregon and Washington near Hood River and Mt. Adams, *Suksdorf*, *Howell Bros.*, *Mrs. Barrett*, *Brandegge*, *Henderson*.

**Var. purpurascens**, WATSON, n. var. Whole plant usually purplish: stem somewhat pubescent: flowers purple. — *A. purpurascens*, *Howell*, *Pittonia*, i. 161. — Eight Dollar Mt., Waldo Co., Southwestern Oregon, *T. Howell*.

**A. repanda**, WATSON. Biennial: stem stout and tall, branching, pubescent throughout with short and mostly stellately forked hairs, usually longer and simpler at base: leaves narrowly obovate to oblong, 1 to 3 or 4 inches long, sparingly toothed or nearly entire; cauline mostly narrowed to a winged petiole, acute or obtuse: flowers white, small: petals narrow, 2 lines long, but little exceeding the sepals: pods recurved-spreading on usually stout ascending pedicels, 2 to 4 lines long, faintly 1-nerved at base; seeds elliptical, broadly winged. — Proc. Am. Acad. xi. 122; Brew. & Wats. Bot. Calif. i. 32. — California, *Yosemite Valley*, *Bolander*; near Mineral King, *Tulare Co.*, *Coville & Funston*; *San Bernardino*, *Parish Bros.*

<sup>1</sup> Add syn. *A. Virginica*, Branner & Coville, Rep. Geol. Surv. Ark. 1888, 165; Britton, Bull. Torr. Club, xix. 220.

**A. Canadensis, L.** (SICKLE-POD.) Stems erect, tall, solitary, simple or rarely branched above, sparingly hirsute near the base with forked hairs: radical leaves soon disappearing, obovate or oblong, petiolate, 1 to 3 inches long, sometimes lyrate or runcinate; cauline narrowly oblanceolate (widest above the middle), acute or acuminate, sessile, remotely toothed or the upper entire, somewhat pubescent with short simple or branched hairs: flowers spreading or pendulous in a soon open raceme: pedicels and calyx pubescent: petals white, narrow, 2 lines long, twice longer than the sepals: pods pendulous, falcate, 2 to 3 inches long by  $1\frac{1}{2}$  lines wide, beaked by a short thick style or stigma nearly sessile; valves 1-nerved and veined; seeds with a broad orbicular wing. — Spec. ii. 665; Deless. Ic. Sel. ii. 9, t. 28. *A. falcata*, Michx. Fl. ii. 31. — From New England to Ontario and Minnesota and southward to Georgia and Texas; fl. June.

\* \* \* Radical leaves dentate (sometimes nearly entire in *A. hirsuta*, rarely lyrate pinnatifid in *A. levigata*); the cauline more or less auriculate lobed at base (except in *A. levigata*, var. *Burkii*).

**A. lævigata, Poir.** Glabrous throughout and glaucous, usually tall, simple or often branched above: radical leaves spatulate and toothed to lyrate pinnatifid; cauline oblanceolate to linear; the lowest usually petioled and sometimes pinnatifid; the rest sessile and toothed or entire, 1 to 6 inches long: flowers on ascending or somewhat spreading pedicels: petals narrow, white or purplish, 2 to 4 lines long, half longer than the sepals. pods loosely spreading on pedicels 2 to 5 lines long, straight or often recurved, 2 to 4 inches long by two thirds line broad, beaked by a usually very short stout style or the stigma sessile; valves thin, faintly 1-nerved; seeds elliptical, winged. — Suppl. i. 411 (as *levigata*). *A. heterophylla*, Nutt. in Torr. & Gray, Fl. i. 81. *Turritis lævigata*, Muhl. in Willd. Spec. iii. 543. — Quebec and Ontario to Minnesota and southward to N. Carolina, Tennessee, and Arkansas.

**Var. Burkii, PORTER.** Leaves narrower; the cauline linear to linear-lanceolate, entire, scarcely or not at all auricled at the base: flowers smaller: petals about equalling the sepals. — Bull. Torr. Club, xvii. 15. — Dry hills, Centr. & S. Pennsylvania; first coll. by I. Burk, 1852.

**A.\* atrorubens, SUKSDORF.** Erect, 1 to 3 feet high, scabrous-pubescent upon the oblanceolate obtuse dentate basal leaves: stem and broadly lanceolate or ovate-oblong cauline leaves quite glabrous and somewhat glaucous: pedicels and calyx puberulent: flowers rather large, very dark purple, almost black, about 4 lines in length: pods at first ascending or almost erect but soon widely arcuate-spreading, 3 to 5 inches long, a little over a line broad; seeds uniseriate. — Suksdorf in Greene, Erythea, i. 223. — Rocky ground on mountain summits, Klickitat Co., Washington, *Suksdorf*; and earlier in the Simcoe Mts., *J. Howell*.

**A. patens, SULLIV.** Biennial, 1 to 2 feet high: stems erect, simple or branched, pubescent throughout with spreading mostly simple hairs, or very rarely with some fine stellate hairs, or rarely glabrous above: radical leaves ovate and petiolate to oblanceolate; cauline lanceolate, sessile with clasping auriculate base, acutish to short-acuminate, mostly somewhat serrate, 1 to  $2\frac{1}{2}$  inches long: petals white, 3 to 4 inches long, twice longer than the sepals: flowers on spreading pedicels: pods spreading,  $1\frac{1}{2}$  to 3 inches long by one half to two thirds line wide, attenuate to a slender style; valves faintly 1-nerved to the middle; fruiting pedicels 4 to 12 lines long; seeds oblong, narrowly winged at the lower end. — Am. Jour. Sci. lxii. 49; Gray, Gen. Ill. i. 142, t. 58. — Pennsylvania and Ohio to N. Alabama.

**A. hirsuta, Scop.** Biennial, more or less hirsute, at least at the base, with spreading simple or forked hairs (rarely stellate upon the leaves): stems erect, solitary or several from a branching caudex, simple or strictly branched, 1 to 3 feet high, pubescent, rarely nearly glabrous: radical leaves oblanceolate, including the winged petioles an inch or two long; the cauline sessile, lanceolate or oblong to linear, more or less erect, coarsely toothed or nearly all entire, even the uppermost more or less hairy or ciliate, cordate or auricled at base: petals greenish white,  $1\frac{1}{2}$  to 3 lines long: pods strictly erect on slender pedicels, very narrow, 1 to 2 inches long, half line broad; style very short and stout or the stigma nearly sessile; valves faintly nerved below the middle and more or less veined; seeds suborbicular, very narrowly margined. — Fl. Carn. ed. 2, ii. 30. *A. sagittata*, vars.  $\gamma$  &  $\delta$ , DC. Syst. ii. 222.

<sup>1</sup> Also at Roanoke, Va., acc. to Small & Heller, Mem. Torr. Club, iii. pt. 1, 1, 22.

*A. rupestris*, Nutt. in Torr. & Gray, Fl. i. 81. *Turritis ovata*, Pursh, Fl. ii. 438. *T. spathulata*, Nutt. l. c. 78. — Mouth of the St. Lawrence to Virginia, westward to New Mexico and the Sierra Nevada; Oregon, and northward to N. Alaska. (Eu., Asia.) Some of the Oregon and Alaskan specimens have slightly broader pods and longer seeds, but are not otherwise distinguishable, nor referable to Asiatic or European forms.

**A. Macounii**, WATSON. Slender biennial, branched from the base, pubescent below with mostly stellate hairs, glabrous above or nearly so: leaves small and narrow, half inch long; the lower few-toothed: flowers very small, pale rose-color, 2 lines long: pods very narrow, 1 to 1½ inches long, half line broad, glabrous, slightly curved, widely spreading; pedicels very slender, 2 to 4 lines long: seeds wingless. — Proc. Am. Acad. xxvi. 124. — Revelstoke, Brit. Columbia, *J. Macoun*; fl. May.

**A. alpina**, L. Biennial and perennial, loosely stellate-pubescent throughout or the inflorescence glabrous: stems erect or decumbent, from a branching subcespitose rootstock, leafy: radical leaves oblanceolate, ½ to 3 inches long, with broadly margined petioles; cauline oblong- to ovate-lanceolate and sessile with a more or less cordate or auricled base: petals white or lacteous, 3 to 4 lines long, twice longer than the yellowish or purplish sepals: fruiting pedicels 3 to 8 lines long, glabrous, beaked by a short thick style or stigma sessile; valves nearly nerveless, faintly veined; seeds orbicular, winged. — Spec. ii. 664. — Lower St. Lawrence, Gaspé, *Macoun*, to Labrador and Hudson Strait. (Greenland, arctic and alpine regions of Eu., and Asia.) The *A. stricta* of Pursh's Flora, collected in Labrador by *Colmaster*, is probably this species.

\* \* \* \* Leaves all entire; cauline not cordate nor auriculate (or very slightly so) at base: pubescence, when present, finely stellate, sometimes very fine and dense: perennial.

**A. platysperma**, GRAY. Glaucous, sometimes wholly glabrous: stems erect or ascending from a branching rootstock, 2 to 3 inches to a foot high, simple or branched: lower leaves oblanceolate, about 1 inch long or less; the upper oblong- to linear-lanceolate, sessile: petals rose-color or nearly white, 2 to 3 lines long: pods erect or a little spreading, 1 to 2½ inches long by 1½ to 2½ lines broad, attenuate to a short stout style; valves distinctly veined, 1-nerved toward the base; seeds orbicular, broadly winged. — Proc. Am. Acad. vi. 519. — San Bernardino Mts., Calif., *Parish Bros.*, *W. G. Wright*, and in the Sierra Nevada northward to Mt. Hood, Oregon, *Howell Bros.*; also on E. Humboldt Mts., Nev., *Watson*.

§ 3. **TURRITIS**, Dill (as genus). Winged seeds narrower than the valves and somewhat in two rows.

\* Radical leaves dentate; cauline more or less cordate or auriculate at base.

— Pods erect or spreading.

**A.\* confinis**, WATSON. Scarcely glaucous: the lower leaves usually dentate and finely stellate-pubescent or glabrous: pedicels mostly erect or ascending: pods more or less spreading or erect, about 3 inches long, a line broad or less, usually more or less attenuate above and beaked; seeds rather small, numerous, narrowly oblong, winged. — Proc. Am. Acad. xxii. 466. *A. lavigata*, Hook. Fl. Bor.-Am. i. 43, not Poir. *A. Drummondii*, Gray, Man. ed. 5, 69. *Turritis glabra*, & var., Torr. & Gray, Fl. i. 78, 666. *T. stricta*, Torr. Fl. N. Y. i. 53, not Grah.; Gray, Gen. Ill. i. 144, t. 59. — From the Lower St. Lawrence along the Great Lakes to Lake Winnipeg, *Bourgeau*, and rare southward to Dracut, on the Merrimac, Concord, and Brookline, Mass., *C. E. Faxon*, *W. Deane*; Thimble Islands, Conn., *A. L. Winton*; Cayuga Co., New York, *Dudley*; Elgin and Dixon, Illinois, *G. Vasey*.<sup>1</sup>

**Var.\* brachycarpa**, WATS. & COULTER. More slender and less strict: flowering pedicels becoming almost horizontal or even reflexed: fruit short, 1 to 2 inches long, spreading; septum thin, almost hyaline; ovules mostly abortive. — Wats. & Coulter in Gray, Man. ed. 6, 67. *A. Drummondii*, var. *brachycarpa*, Gray, Man. ed. 5, 69. *Turritis brachycarpa*, Torr. & Gray, Fl. i. 79. — Canada from Tadoussac, *Pickering*, to Milk River Ridge, Alberta, *Macoun*; also on the south shore of Lake Superior, *Farwell*. In its extreme form very marked, but certainly intergrading with the type.

— — Pods reflexed or widely arcuate-spreading.

<sup>1</sup> Northwestward to the foothills of the Rocky Mts. of Canada, *Macoun*. The description of this species has been modified to exclude the variety.

**A. Holbœllii**, HORNEM. Biennial, very finely stellate-pubescent below or throughout: stems simple or branched, one or more, erect or ascending,  $\frac{1}{2}$  to  $2\frac{1}{2}$  feet high: radical leaves narrowly oblanceolate, entire, an inch long or less; cauline leaves linear-oblanceolate to narrowly oblong, acutely sagittate: flowers becoming more or less reflexed and second on pubescent pedicels: petals 3 lines long: pods more or less abruptly reflexed, straight or somewhat curved,  $1\frac{1}{2}$  to  $2\frac{1}{2}$  inches long by nearly two thirds line broad; valves 1-nerved to the middle; stigma sessile; seeds in one row, orbicular, winged. — Fl. Dan. t. 1879. *A. retrofracta*, Grah. Edinb. New Phil. Jour. 1829, 344. ? *A. declinata*, *heteromalla*, & *lilacina*, Schrad. Ind. Sem. Hort. Gött. 1831, 1832, & Linnæa, viii. 1833, Lit.-Ber. 22, 25. *Turritis retrofracta*, Hook. Fl. Bor.-Am. i. 41. ? *Streptanthus virgatus*, Nutt. in Torr. & Gray, Fl. i. 76.<sup>1</sup> — Rocky Mountains from N. Colorado, Wolf, Vasey, to N. Idaho, Lyall, and Brit. America, Drummond, Bourgeau, Macoun. (Greenland.)

**Var. (?) patula**, WATSON, n. var. More glabrous, only the lower leaves and stem pubescent and the petioles somewhat ciliate: leaves sometimes toothed: pods somewhat broader and the seeds more evidently in two rows. — *Turritis patula*, Grah. l. c. 350; Hook. Fl. Bor.-Am. i. 40, excluding the more western localities. — Represented in herb. Gray only by specimens collected by Bourgeau in the Rocky Mountains of Brit. America, and on the Saskatchewan. *A. Columbiana*, Macoun, Cat. Canad. Pl. ii. 304, however, of Brit. Columbia, Macoun, and N. Washington, Piper, scarcely differs.

**Var. Fendleri**, WATSON, n. var. Stems often several and ascending from a biennial root, a foot high, hirsute below with simple or branched hairs, glabrous above: lower leaves roughly stellate-pubescent and petioles ciliate; the upper glabrous: pods somewhat curved. — From Colorado, Parry, no. 94, Hall & Harbour, no. 36; N. Nevada to New Mexico, Fendler, no. 27, Palmer, Rusby; and California, Tulare Co., Coville & Funston, no. 1388. (Chihuahua, Wright, no. 1313.)

**A. arcuata**, GRAY. Biennial or sometimes perennial, roughly stellate-pubescent throughout; stems usually simple and erect, 1 to 2 feet high: radical leaves narrow- or linear-oblanceolate; the petioles often ciliate, 1 to 2 inches long; the cauline linear-lanceolate, all somewhat toothed or entire: petals 3 to 6 lines long, more or less deeply rose-colored, more or less widely spreading: pods arcuate, 2 to 3 inches long by a line wide or somewhat more, acute, on divaricate or recurved usually pubescent pedicels 3 to 6 lines long; stigma nearly sessile; seeds orbicular, narrowly winged, as broad as the valves. — Proc. Am. Acad. vi. 187. *Streptanthus arcuatus*, Nutt. in Torr. & Gray, Fl. i. 77. — California, from Placer Co. to Santa Barbara and the San Bernardino Mountains.<sup>2</sup> To this typical form it appears necessary to add the following closely united varieties, which have been variously referred to *A. Holbœllii*, *patula*, & *retrofracta*.

**Var. subvillôsa**, WATSON, n. var. Biennial or rarely perennial, more glabrous above, the pubescence especially of the lower leaves stellate, but with more or less spreading mostly simple hairs, usually sparse above on the leaves, stem, pedicels, and calyx, but occasionally abundant on the pedicels. — ? *A. sparsiflora*, Nutt. in Torr. & Gray, Fl. i. 81. — N. Nevada and Oregon to Washington and W. Idaho. A low several-stemmed specimen from Downieville, Calif., Bigelow.

**Var. \*secunda**, ROBINSON, n. var.<sup>3</sup> Resembling var. *subvillôsa* but less villous, slender; the stem (1 to 2 feet high) usually single from a base of two or more years' growth: flowers often pale and smaller: pods  $1\frac{1}{2}$  to 2 inches long. — *A. secunda*, Howell, Erythea, iii. 33. — Washington, Mt. Adams, Suksdorf, Howell, Upper Yakima, Lyall. Approaching *A. perennans*.

**Var. longipes**, WATSON, n. var. Tall, biennial, glabrous above; the stem spreading-villous toward the base and lower leaves somewhat stellate-pubescent: sepals glabrous or hairy toward the top: petals pale, 3 lines long: pedicels glabrous, becoming elongated (1 to 2 inches long or less). — California, near Fort Mohave, Lemmon, 1884.

<sup>1</sup> A number of forms, all ascribed to this variable species, have been described by Miss A. Eastwood, Zoe, iv. 5, 6.

<sup>2</sup> And southward into Lower Calif., acc. to Brandegee, Proc. Calif. Acad. Sci. ser. 2, ii. 126.

<sup>3</sup> This variety, distinguished and given a manuscript name by Dr. Watson, has since been described by Mr. T. Howell as *A. secunda*. This name is here used in preference to Dr. Watson's to avoid publishing a second unnecessary designation. Of the varietal rather than the specific rank of the plant there can be no doubt.

**A. perénnans**, WATSON. Perennial, with a usually branching and somewhat woody base, about a foot high, roughly stellate-pubescent, sometimes glabrous above: lower leaves an inch long or less, broadly spatulate to narrowly oblanceolate; the petioles sometimes ciliate. flowers smaller (2 to 3 lines long), often pale: pods 1 to 2 inches long by a line wide or somewhat less; the small stigma sessile: calyx and pedicels stellate-pubescent to glabrous: seeds orbicular, very narrowly margined. — Proc. Am. Acad. xxii. 467. *A. arcuata* & *A. retrofracta*, Wats. Bot. King Exp. 18, in part. *Turritis patula*, Gray, Bot. Ives Rep. 6. Distributed by Pringle under the name *A. Holboellii*, var. *perennans*. — N. Nevada and Utah to Arizona, and the Colorado and Mohave Deserts, California.

**A. subpinnatifida**, WATSON. Very finely stellate-pubescent throughout: stems one or more from a biennial or sometimes perennial (?) root, a span to a foot high, rarely branched: leaves very densely and finely pubescent; the lower linear- or narrow-oblanceolate, entire or toothed, 1 to 2 inches long; the cauline lanceolate, more or less unequally incised or the uppermost entire: flowers rose-colored, 3 to 6 lines long: pods pubescent, slightly curved,  $1\frac{1}{4}$  to  $2\frac{1}{2}$  inches long by 1 to  $1\frac{1}{2}$  lines broad, attenuate to a short style, and pendent upon recurved pubescent pedicels (2 to 5 lines long); valves 1-nerved to the middle and veined; seeds in 1 row, as broad as the partition, winged. — Proc. Am. Acad. xx. 353. — N. W. Nevada, *Torrey*, *Watson*, no. 76, in part; Siskiyou Mountains, California, *Greene*; S. W. Oregon, *T. Howell*.

\* \* Culine leaves auriculate-clasping, entire; the radical also entire or (in *A. Breweri*, *A. Lyallii*, and *A. Beckwithii*) obsoletely denticulate (in *A. Bolanderi*, as yet unknown).

— Pods arcuate-spreading or divaricate.

**A. Bolánderi**, WATSON. Biennial, more or less pubescent throughout with soft stellate hairs: the solitary stem much branched, 1 to 2 feet high: radical leaves not known; cauline lanceolate, 1 to 2 inches long: flowers small (2 to 3 lines long), rose-colored: sepals and pedicels (in fruit, 1 to 2 lines long) pubescent: pods mostly divaricately spreading, glabrous, straight, 6 to 18 lines long, obtuse with a broad sessile stigma; valves 1-nerved to the middle; seeds orbicular to elliptical, narrowly winged, somewhat in two rows. — Proc. Am. Acad. xxii. 467. — Yosemite Valley, *Bolander*; Washington, *Brandegee*. Also collected by *Torrey*, a more glabrous form, probably in the mountains of California, though ticketed in his herbarium from Colorado.

**A. Bréweri**, WATSON. Perennial: stems several from a branching rootstock, 4 inches to a foot high, more or less villous with spreading simple or branched hairs or stellate-pubescent toward the base: lower leaves narrowly oblanceolate, entire or toothed, finely stellate-pubescent, an inch long or less; the petioles often ciliate; upper cauline leaves lanceolate to narrowly oblong, sessile with a subcordate base or obtusely auriculate, somewhat villous or pubescent or nearly glabrous: flowers bright rose-color or purplish to nearly white, 3 to 4 lines long; the pedicels and purplish calyx more or less villous: pods at length spreading and more or less arcuate,  $1\frac{1}{2}$  to 3 inches long by a line or more broad, acute with a sessile stigma; valves 1-nerved, veined; seeds orbicular, narrowly winged. — Proc. Am. Acad. xi. 123; Brew. & Wats. Bot. Calif. i. 33. — From Mt. Diablo<sup>1</sup> and Lassen's Butte, California, to Waldo Co., Oregon.

**A. Beckwithii**, WATSON. Resembling *A. subpinnatifida*, hoary with a fine dense stellate pubescence: stem erect from a biennial root, a span high: leaves entire; the radical oblanceolate, an inch long; the cauline lanceolate: pods glabrous (or slightly pubescent when young), spreading and arcuate,  $2\frac{1}{2}$  inches long; seeds mostly in 2 rows. — Proc. Am. Acad. xxii. 467. — N. Nevada, Quartz Mountains, *Beckwith*, near Carson City, *Watson*, near Candelaria, *Shockley*; California, San Bernardino Mountains, *Parish Bros.*

— Pods reflexed.

++ Pubescence densely and finely stellate.

**A. canéscens**, NUTT. Low (4 to 8 inches), biennial or perennial, finely stellate-pubescent throughout, stems one or several: lower leaves linear-oblanceolate, an inch long or less; cauline leaves linear, slightly auriculate: flowers small, 2 lines long or less, pale: pods pendulous, pubescent or glabrate, 1 to  $1\frac{1}{2}$  inches long by two thirds line broad, on pedicels

<sup>1</sup> Southward to Mt. Hamilton, acc. to *Greene*, Fl. Francis. 254, & *Erythea*, i. 87.

1 to 3 lines long; valves 1-nerved to the middle: seeds small, orbicular, winged, in 2 rows. — Nutt. in Torr. & Gray, Fl. i. 83. *A. puberula*, Nutt. l. c. 82; Hook. Ic. t. 359.<sup>1</sup> — “Rocky Mountains,” and Blue Mountains, Oregon, *Nuttall*; Camp Harney, Oregon, *T. Howell*; near Mt. Adams, Washington, *Suksdorf*.

++ ++ Pubescence stellately branched, scanty or wanting.

**A. suffrutescens**, WATSON. Perennial, usually glabrous throughout: stems several from a branching woody caudex, glabrous, a foot high: leaves glabrous or sometimes sparingly stellate-pubescent, narrowly oblanceolate; the cauline narrowly lanceolate, scarcely auriculate: flowers few, 3 lines long, purplish: pods pendulous on pedicels 4 to 6 lines long,  $1\frac{1}{2}$  to  $2\frac{1}{2}$  inches long by as many lines broad, more or less attenuate to a short thick style; valves 1-nerved, veined; seeds in 2 rows, orbicular, winged. — Proc. Am. Acad. xvii. 362. — Bluffs of Snake River, E. Oregon, *Cusick*; Mt. Adams, Washington, *Suksdorf*, *Howell*; Siskiyou Mountains, S. Oregon, *Howell*.

+ + + Pods ascending, rarely widely spreading.

++ Glaucous, hoary below with fine and dense stellate pubescence.

**A. Lemmóni**, WATSON. Perennial, low (6 inches high or less): stems several from a branching caudex, slender, glabrous above: lower leaves spatulate-oblanceolate, rarely with 1 or 2 teeth, 6 to 9 lines long; the petiole sometimes ciliate; the cauline leaves oblong-lanceolate, mostly glabrous or nearly so: flowers 2 to 3 lines long, rose-colored: the sepals pubescent: pods ascending or widely spreading, somewhat arcuate, 1 to  $1\frac{1}{2}$  inches long by two thirds line wide, on usually short pedicels (1 to 3 lines long), glabrous, more or less attenuate above to a sessile stigma or short style; valves 1-nerved to the middle or nearly nerveless: seeds in one row, orbicular, narrowly winged. — Proc. Am. Acad. xxii. 467. *A. canescens*, & var. *latifolia*, Wats. Bot. King Exp. 17. *A. canescens*, Brew. & Wats. Bot. Calif. i. 32. *A. canescens*, & var. (?) *stylosa*, Wats. *ibid.* ii. 431. — In the mountains of W. Wyoming, *Parry*, and Montana, *Richardson*, *Watson*, *Canby*, to Brit. America at Bow River Pass and Silver City, *Macoun*, westward to Mt. Adams, Wash., *Suksdorf*, and southward to N. California, *Lemmon*, *Mrs. Austin*, and N. Nevada, *Watson*.

++ ++ Pubescence stellate, scanty or wanting: green or scarcely glaucous.

**A. Drummóndii**, GRAY. Biennial (or rarely perennial), slightly glaucous: stems erect, one or several, a foot or two high: radical leaves narrowly oblanceolate, more or less pubescent with malpighiaceus hairs (attached by the middle and usually longitudinally appressed); the cauline leaves oblong to linear-lanceolate, 1 to 2 inches in length: petals white or pinkish, 3 to 4 lines long, twice longer than the narrow sepals: pods erect when mature, 1 to  $1\frac{1}{2}$  lines broad,  $1\frac{1}{2}$  to 3 inches long, obtuse; the stigma sessile or nearly so; valves 1-nerved, veined; seeds broadly elliptical, winged, two thirds line wide. — Proc. Am. Acad. vi. 187. ? *A. Breutelii*, Lange, Medd. Grøn. iii. 81 (only once collected and without fruit). *Turritis stricta*, Grah. Edinb. New Phil. Jour. 1829, 350. *Streptanthus angustifolius*, Nutt. in Torr. & Gray, Fl. i. 76. — Rocky Mountains from Brit. America to N. Utah; Cypress Hills, Canada, *Macoun*; E. Humboldt Mts., Nevada, *Watson*; Mono Pass, Calif., *Brewer*, no. 1729.

**A. Lyáalii**, WATSON. Perennial, low (rarely a foot high), glabrous throughout or sometimes more or less stellate-pubescent below: stems several or many from a branched caudex: lower leaves spatulate to linear-oblanceolate, usually one half to one inch long, sometimes 2 to 3 inches long; the cauline narrowly lanceolate to oblong, sometimes scarcely auricled: flowers rose-color, 2 to 3 lines long: sepals glabrous: pods erect or ascending, straight or nearly so, 1 to 2 inches long by two thirds to one line broad, narrowed to a short style or sessile stigma; valves 1-nerved, at least to the middle, veined: seeds orbicular, narrowly winged, usually in 1 row. — Proc. Am. Acad. xi. 122. *A. Drummondii*, & var. *alpina*, Wats. Bot. King Exp. 17, in part. — Frequent in the mountains, often alpine or subalpine, from Brit. America, *Ljall*, *Macoun*; W. Montana, *Canby*, and N. Utah, *Jones*, to the Sierra Nevada, Mono Co., Calif., *Brewer*, *Shockley*, and the Cascade Mts. of Oregon and Washington.

<sup>1</sup> Add syn. *A. pauciflorum*, Nutt. in herb. (Philad. Acad. Sci.), which is with scarcely a doubt Nuttall's *Sisymbrium pauciflorum*, described in Torr. & Gray, Fl. i. 93 (notwithstanding the character “not canescent”), a species otherwise wholly obscure.

**A. microphylla**, Nutt. Perennial: slender stems several from a slender branching caudex about 6 inches high, somewhat hirsute with spreading hairs at base or very nearly glabrate: lower leaves stellate-pubescent; petioles often ciliate, linear to narrowly oblanceolate, an inch long or less; cauline few, linear-lanceolate to narrowly oblong: flowers pale rose: sepals slightly pubescent or glabrous: pods usually very narrow, 1 to 2 inches long by one half to three fourths line broad, erect or somewhat spreading; valves slightly nerved toward the base; seeds small, in one row, slightly winged. — Nutt. in Torr. & Gray, Fl. i. 82. — Uinta Mts., Utah, *Watson*; Yellowstone Park, Wyoming, *Parry*, *Canby*; Blue Mts., Oregon, *Cusick*, *Howell*.

\* \* \* Leaves all entire, not cordate nor auriculate.

+ Pods ascending.

++ Glabrous, the petioles only sparingly ciliate, perennial.

**A. Howéllii**, *Watson*. Stems low (1 to 4 inches high), from a much branched cespitose caudex: leaves all narrowly oblanceolate, glaucous, inch long or less, acute or obtuse; the cauline somewhat drooping: flowers pale or bright pink: pods erect,  $1\frac{1}{2}$  inches long by 2 lines broad, acuminate; the stigma sessile; valves nearly nerveless; seeds orbicular, broadly winged. — Proc. Am. Acad. xxv. 124. — Ashland Butte, Siskiyou Mts., S. Oregon, *T. Howell*, 1887; White Mts., Mono Co., Calif., at 11,000 feet alt., *Shockley*, August, 1888.

++ Villous-hirsute with scattered spreading mostly simple hairs.

**A. Cusickii**, *Watson*. Stems usually several from a biennial root, a span high or less, simple, hirsute or glabrate above: radical leaves linear-oblanceolate, hirsute and ciliate, 1 inch long or less; cauline linear to linear-oblong, sessile, not auriculate: flowers rose-colored, 3 to 5 lines long: sepals villous: pods arcuate-ascending, glabrous, 2 to 3 inches long by  $1\frac{1}{2}$  lines broad, obtusish; stigma sessile; valves 1-nerved below the middle; seeds orbicular, winged, in 1 row. — Proc. Am. Acad. xvii. 363. — Blue Mts., Oregon, *Cusick*; Cascade Mts. of Oregon and Washington, *Howell*, *Brandegee*.<sup>1</sup>

++ ++ Finely stellate-pubescent.

**A. Parishii**, *Watson*. Low and cespitose (2 to 4 inches high), very finely stellate-pubescent throughout, the simple slender stems from a much branched rootstock: radical leaves numerous, linear-oblanceolate, half inch long or less, entire; the cauline few, linear, sessile: petals rose-color, 3 to 4 lines long, twice longer than the purplish sepals: pods glabrous, ascending on pedicels 2 to 3 lines long, an inch long including the filiform style (2 to 3 lines long), a line broad, attenuate above; valves 1-nerved and veined: seeds somewhat in 2 rows, elliptical, narrowly winged. — Proc. Am. Acad. xxii. 468. — Bear Valley, San Bernardino Mts., Calif., at 6,500 feet alt., *S. B. Parish*.

+ + Pods pendulous: finely stellate-pubescent.

**A. púlchra**, *Jones*. Canescent throughout with a fine stellate pubescence: stems erect from a branching woody rootstock, a foot high, leafy: leaves not rosulate at base; the lower narrowly oblanceolate and petiolate, 1 to 2 inches long; the upper linear-lanceolate, sessile: flowers usually large, soon spreading or reflexed: petals 3 to 6 lines long, rose-colored, usually twice longer than the pubescent sepals: pods pendent, finely pubescent,  $1\frac{1}{2}$  to  $2\frac{1}{2}$  inches long by  $1\frac{1}{2}$  lines wide on pedicels three fourths line long; stigma sessile; valves 1-nerved, veined: seeds small, in 2 rows, orbicular, winged. — Jones in Wats. Proc. Am. Acad. xxii. 468. — Borders of the desert, W. Nevada, *Stretch*, *Shockley*, *Jones*; to San Bernardino and San Diego Counties, Calif., *Vasey*, *Parish Bros.*, *W. G. Wright*.

**45. STREPTÁNTHUS**, Nutt. (*Στρεπτός*, twisted, and *ἄνθος*, flower, from the twisting of the petals.) — Caulescent branching often glaucous annuals or biennials of the Pacific Coast and drier interior region to the Lower Mississippi; with entire or toothed (rarely pinnatifid) usually sagittate and clasping leaves and purple to white (rarely yellowish) flowers. — Jour. Acad. Philad. v. 134; Gray, Gen. Ill. i. 145, & Proc. Am. Acad. vi. 182; Brew. & Wats. Bot. Calif. i. 33. [By *S. Watson*.]

<sup>1</sup> Also in Spokane Co., Washington, *Suksdorf*.

§ 1. *EUSTREPTANTHUS*, Gray, ll. cc. Flowers large: petals with a broad blade: filaments distinct: pods erect or ascending: glabrous annuals: species of the interior.

\* Pedicels conspicuously bracteate: pods narrow.

**S. bracteátus**, GRAY. Stem 1 to 3 feet high, branching above: lower leaves petiolate, entire or repand-toothed to lyrate pinnatifid, oblong to ovate-hastate; the upper sessile, oblong to ovate, cordately auriculate; floral bracts broadly cordate, the uppermost much reduced: flowers rose-colored on short pedicels: pods spreading, 4 to 6 inches long by 1 to 2 lines broad, attenuate to a short style and broad entire stigma; seeds oblong, broadly winged. — Gen. Ill. i. 146, t. 60, excl. f. 4-8, & Pl. Lindh. pt. 2, 143. — Southwestern Texas, *Lindheimer*, *Wright*, *Hall*, *Reverchon*.

\* \* Floral bracts minute or none.

**S. maculátus**, NUTT. Glaucous, 1 to 2 feet high: cauline leaves sessile, entire, oblong to elliptical or broadly ovate, deeply cordate-amplexicaul; floral bracts none: flowers deep rose-color: calyx purplish: pods 4 to 5 inches long by about a line broad, erect or ascending, straight or curved, beaked with a short style; stigma small; seeds oblong, winged. — Jour. Acad. Philad. v. 134, t. 7. *S. obtusifolius*, Hook. Bot. Mag. t. 3317; Gray, Gen. Ill. i. t. 60, f. 4-8. ? *Brassica Washitana*, Muhl. Cat. 61. ? *Stanleya Washitana*, DC. Syst. ii. 512. — Arkansas and E. Texas; St. Augustine, *Leavenworth*.

**S. platycárpus**, GRAY. Branching from near the base, a foot high or more, glaucous: lower leaves petiolate, lyrate pinnatifid; the upper lanceolate to oblong-ovate, sessile and amplexicaul, entire or pinnatifid: lower pedicels often minutely bracteate: flowers rose-purple; the calyx purplish: pods ascending on pedicels 3 to 6 lines long, slightly curved, 2 to 3 inches long by 2 to 2½ lines broad; the broad lobed stigma sessile: seeds somewhat in 2 rows, suborbicular, broadly winged. — Pl. Wright. ii. 10. — Valley of the Pecos, W. Texas to Sonora.

§ 2. *EUCLÍSIA*, Nutt. Petals narrow (the blade scarcely broader than the claw), undulate-crisped.

\* Filaments distinct: cauline leaves clasping: pods not reflexed.

+ Branches of the inflorescence bearing round cordate bracts; the bracts also frequently subtending or alternating with the lower pedicels: pods narrow: species of California and Arizona.

**S. tortuósus**, KELLOGG. Stem more or less branched, ½ to 3 or 4 feet high: lower leaves spatulate or oblanceolate and petiolate, somewhat toothed, becoming oblong to ovate, entire, sessile and clasping; the upper little reduced and of nearly uniform size, deeply clasping with overlapping lobes: sepals acuminate, connivent; the tips recurved in flower: petals purple (rarely white), 3 to 6 lines long: pods recurved, spreading, 2 to 6 inches long by about a line broad; the small stigma sessile; seeds orbicular, narrowly winged. — Proc. Calif. Acad. Sci. ii. 152, f. 46. *S. Breweri*, Gray, Proc. Am. Acad. vi. 184, in part.<sup>1</sup> — Frequent in the Sierra Nevada, from Mono Pass to Mt. Shasta; near Humboldt Bay, *Rattan*.

**S. diversifólius**, WATSON. Resembling the preceding in habit: cauline leaves pinnately divided; the few segments very narrowly linear; the slender petioles not auricled at the base: bracts rounded-cordate and deeply clasping: flowers similar; the white or pinkish petals 3 to 4 lines long: pods reflexed, about 3 inches long by two thirds line broad, beaked with a short style: pedicels 2 lines long or less: seeds broadly elliptical, narrowly winged. — Proc. Am. Acad. xvii. 363. — On the Cosumne River, Eldorado County, California, *Rattan*.

**S.\* suffrutéscens**, GREENE. "Perennial, suffrutescent, the stout leafy trunk 6 to 8 inches high; flowering branches 1 to 2 feet long: herbage glabrous, glaucous: stem-leaves cuneate-obovate, coarsely serrate-toothed; floral leaves round-cordate or more elongated: sepals purplish-green, their tips not reflexed: one pair of filaments connate; all the anthers equal and fertile." — Erythea, i. 147, & Man. Bay-Reg. 16 (whence foregoing characterization). — Hood's Peak, Sonoma Co., Calif., *Bioletti*.

<sup>1</sup> Add syn. *S. orbiculatus*, Greene, Fl. Francis. 258 (= *S. Breweri*, Gray, in part), a low and rather small-flowered form.



**S. Lemmóni**, WATSON. Paniculately branched: lower leaves unknown; the upper lanceolate, auriculate; the rameal bracts ovate to rounded, cordate-clasping, with very short lobes: flowers rather small (2 to 4 lines long): sepals acuminate with recurved or spreading tips: petals white (?): pods 2 to 3 inches long, narrow, on short pedicels; stigma sessile; seeds unknown. — *Proc. Am. Acad.* xxv. 125. — Santa Catalina Mts., Arizona, *Lemmon*, 1880.

+ + Glabrous and glaucous biennials or perennials (?), with broad thickish leaves obtuse or only acutish; the cauline cordately clasping: inflorescence ebracteate: stems mostly simple: sepals obtuse, mostly more or less setosely pubescent.

**S. barbátus**, WATSON, l. c. Stems apparently several from a perennial (?) root, simple or at length branching: the leaves all similar and nearly equal, crowded, cordate, sessile and clasping, obtuse or acutish, three fourths inch long or less; floral bracts none: flowers 3 to 4 lines long, purple; sepals obtusish, setosely bearded near the apex: pods spreading on pedicels 1 to 3 lines long, curved, 1 to 2 inches long by  $1\frac{1}{2}$  lines broad; stigmas sessile or nearly so; seeds roundish, narrowly margined. — *S. tortuosus*, Gray in Torr. Bot. Wilkes Exped. 227. — Sandy bottoms of the Upper Sacramento, *Wilkes Exped.*, 1842, *Lemmon*, 1879. Ripe fruit unknown.

**S. cordátus**, NUTT. Stems often stout, simple or sometimes branched from the base, 1 to 3 feet high: lower leaves spatulate, coarsely toothed, especially toward the summit; the teeth often bristle-tipped, and the petiole occasionally bristly ciliate; cauline leaves oblong to ovate or cordate, usually very obtuse and entire: sepals uniform and erect, 4 lines long; the narrow purple petals a half longer: filaments distinct: pods spreading, 3 to 5 inches long by 2 to  $2\frac{1}{2}$  lines broad, on short pedicels 3 to 5 lines long, beaked with a short thick style or the scarcely lobed stigma nearly sessile; seeds orbicular, winged. — Nutt. in Torr. & Gray, Fl. i. 77; Wats. Bot. King Exp. 19; Brew. & Wats. Bot. Calif. i. 34. — In the mountains of Colorado and westward to the Sierra Nevada, Elbett's Pass at 8,000 feet alt., *Brewer*. Specimens collected by Brewer (no. 1885) in Sonora Pass at 10,000 feet alt. differ in their entire and more lanceolate acutish leaves (the lower oblanceolate and ciliate), and approach the next species.

+ + + Glabrous and glaucous annuals or biennials (?), with cauline leaves lanceolate and acute: inflorescence ebracteate: pods broad except in *S. campestris*.

**S. Arizónicus**, WATSON. Leaves rather thin, all entire or nearly so; the lower oblong-lanceolate, petiolate, not ciliate; the upper oblong to narrowly lanceolate with rounded auricles: flowers pale; the sepals strongly saccate; the petals 6 or 7 lines long: filaments distinct: pods erect or ascending, 2 to 3 inches long by 2 to  $2\frac{1}{2}$  lines broad, obtuse or acute, with broad sessile 2-lobed stigma; seeds orbicular, very broadly winged. — *Proc. Am. Acad.* xxv. 125. — Mountains of S. Arizona, *Pringle*, 1881, *Parish*, *Lemmon*, no. 4170.

**S. campéstris**, WATSON, l. c. Stems stout, 2 to 4 feet high: leaves rather thick, often irregularly toothed; the teeth at first setosely tipped and the lower margin of the leaf sparingly setose-ciliate; cauline leaves lanceolate or oblanceolate: flowers somewhat dark purple, 4 to 5 lines long; the sepals often somewhat hairy at the top: filaments distinct: pods spreading and curved, 3 to 6 inches long by about a line broad, beaked with a short stout style and shortly 2-lobed stigma; seeds winged. — At Campo near the southern boundary of California, *G. R. Vasey*, *Parish Bros.* A specimen collected by *Parish Bros.* in the San Bernardino Mts. is apparently the same.

**S. carinátus**, WRIGHT. Stems 1 to 3 feet high: lower leaves lyrate pinnatifid; the upper lanceolate and usually entire: flowers large, dark purple to white: the sepals deeply saccate: filaments distinct: pods erect or ascending on pedicels 3 to 8 lines long,  $1\frac{1}{2}$  to  $2\frac{1}{2}$  inches long by  $2\frac{1}{2}$  to 3 lines broad, beaked with a very short style or the 2-lobed stigma sessile; seeds orbicular, broadly winged. — Gray, Pl. Wright. ii. 11. — W. Texas to S. Arizona. (Chihuahua, *Pringle*.)

\* \* Filaments distinct: leaves sagittate: pods reflexed, narrow: pubescent annuals.

**S. heterophýllus**, NUTT. More or less pubescent throughout with spreading simple hairs: stem usually simple, 3 feet high or less: leaves linear, at least the lowest pinnatifid with divaricate lobes or toothed; the upper usually entire: flowers purple or white, 4 to 6 lines long: the calyx narrow but slightly saccate: pods abruptly reflexed on slender pedicels,

2 to 3 inches long by less than a line broad, subtetragonal, beaked by a slender style; stigma sessile; seeds small and crowded, rather narrowly winged. — Nutt. in Torr. & Gray, Fl. i. 77, 666; Gray, Proc. Am. Acad. vi. 185, in part. — S. California, from the boundary to San Bernardino Mts. and Sta. Barbara (?).

\* \* \* Filaments distinct: leaves not clasping nor auriculate: pods narrow.

+ Glabrous and glaucous biennial (?).

**S. Howéllii**, WATSON. Stems stout, 1 to 2 feet high, simple: leaves all cauline, from obovate or obovate-spatulate and petiolate below to narrowly oblanceolate above, entire or rarely sparingly toothed, 1 to 2 inches long: flowers rather large, brown purple, 4 to 6 lines long: calyx more or less saccate, green or purplish: stigma broad and sessile; pods ascending, curved, 2 to 3 inches long, 1 to 1½ lines broad; seeds oblong, winged. — Proc. Am. Acad. xx. 353. — In the Coast Mts. of Curry Co., Oregon, *T. Howell*, 1884, and near Waldo, Josephine Co., 1887, by the same collector.

+ + Annuals.

**S. longiróstris**, WATSON. Glabrous and glaucous, branching, 1 to 2 feet high: radical leaves ovate-spatulate, soon deciduous; cauline linear to narrowly oblanceolate, entire or sparingly toothed: flowers spreading or reflexed, white, 2 to 3 lines long: sepals narrow: pods pendulous on short pedicels, straight, 1 to 1½ inches long by a line broad, attenuate to a slender style: seeds elliptical, winged. — Proc. Am. Acad. xxv. 125. *S. longifolius*, var., Torr. Pacif. R. Rep. iv. 65. *Arabis longirostris*, Wats. Bot. King Exp. 17, t. 2; Brew. & Wats. Bot. Calif. i. 31. — In the Great Basin from Washington to S. Utah. (Sonora and Lower Calif.)<sup>1</sup>

\* \* \* \* One or both pairs of longer filaments connate: cauline leaves more or less sagittately auriculate, scarcely so in *S. hyacinthoides*: pods narrow: annuals.

+ Sepals in approximately equal pairs: pods ascending or spreading.

++ Seeds wingless.

**S. Bréweri**, GRAY. Glabrous and glaucous (or calyx only pubescent), 1 to 2 feet high, branching: leaves mostly sessile and clasping; the lowermost broadly spatulate with a winged petiole, toothed; the cauline ovate and acute to narrowly lanceolate, toothed or entire: flowers 3 to 4 lines long, purplish: sepals acuminate: pods ascending on very short pedicels, 1 to 2½ inches long by one half line broad; stigma sessile or nearly so; seeds small, orbicular, wholly marginless. — Proc. Am. Acad. vi. 184, excl. first form. — On Mount Hamilton and San Carlos Mt., California, *Brewer*, 790, 1268.<sup>2</sup>

++ ++ Seeds winged.

= Plant glabrous.

**S. hyacinthoides**, Hook. Simple or sparingly branched, 1 to 4 feet high: leaves narrowly lanceolate to linear, attenuate at base and semiamplexicaul (slightly or not at all auriculate), entire or sparingly toothed: flowers purple, 4 to 5 lines long: calyx saccate; the sepals acute: pods ascending on short pedicels, 1 to 4 inches long by a line wide, beaked with a short style; seeds oblong, winged. — Bot. Mag. t. 3516; Gray, Gen. Ill. i. 146, t. 61. *S. glabrifolius*, Buckley, Proc. Acad. Philad. 1861, 448. — Indian Territory to Central Texas.

**S. bárbiger**, GREENE. A foot high, branched: cauline leaves linear, entire: flowers white or purple, 3 to 4 lines long, on very short pedicels: calyx saccate; sepals connivent with recurved whitish tips: petals unequal: the connate pair of stamens at length exserted: fruit deflexed, 2 inches long. — Pittonia, i. 217. — California, near Fout's Spring, Colusa Co., *Rattan*; Highland Springs, Lake Co., *Simonds*; near St. Helena, Napa Co., *Greene*; fl. June, July.

**S. niger**, GREENE. Stout, 2 to 3 feet high, much branched: leaves linear; the lower narrowly lobed or toothed, "all sagittately clasping": flowers purple, 4 to 5 lines long, long-

<sup>1</sup> *S. flavescens*, Hook., doubtfully placed after *S. longirostris* by Dr. Watson in his preliminary treatment of the genus, is here referred to *Thelypodium*.

<sup>2</sup> With the latter number of Prof. Brewer's collection, the recently published *S. hesperidis*, Bioletti, Erythra, i. 14, corresponds in all essential characters described.

pedicellate: calyx broad and saccate; the sepals obtuse: pods ascending, 1 to 2 inches long by 1 line broad, on pedicels 6 to 12 lines long; stigma entire, sessile; seeds broadly elliptical, narrowly winged. — Bull. Torr. Club, xiii. 141. — At Point Tiburon, Marin Co., California, *Greene*.

= = More or less pubescent, rarely glabrous throughout (in some forms of *S. glandulosus*).

**S. hispidus**, GRAY. Dwarf, hispid throughout: leaves cuneate-obovate to oblong, coarsely toothed, mostly sessile and but slightly auriculate: racemes short, sessile: flowers purple or purplish, 4 lines long, spreading: sepals acutish: pods erect or ascending on short pedicels, hispid,  $1\frac{1}{2}$  to 2 inches long by a line wide, with a short stout style and broad stigma; seeds broadly elliptical, winged. — Proc. Am. Acad. vi. 186.<sup>1</sup> — Near summit of Mt. Diablo, *Brewer*, 1084, 1096, *Bolander*, 6267.

**S. glandulosus**, HOOK. A foot or two high: lower leaves oblanceolate, coarsely toothed; the upper lanceolate to linear, toothed or entire, more or less hispid below, usually glabrous above: the teeth callous-tipped: flowers deep purple to white, 5 to 6 lines long: the calyx broad and saccate; the lower sepal carinate and usually spreading: pods curved and more or less spreading on short pedicels, glabrous or sometimes hispid, 2 to 4 inches long by a line wide; stigma broad and nearly sessile; seeds elliptical, narrowly winged. — Ic. t. 40. *S. peramænus*, *Greene*, Bull. Torr. Club, xiii. 142. *S. albidus*, *Greene*, Pittonia, i. 62 (white-flowered form).<sup>2</sup> — Central California, from Clear Lake to San Luis Obispo; frequent. Specimens collected by *T. Howell* at Waldo in S. Oregon seem to belong here.

**S.\* secundus**, GREENE. Slender, branched, 1 to 2 feet high, hispidulous: long lower leaves pinnately toothed or lobed; cauline lanceolate, sagittate: racemes rather dense, secund: flowers flesh-color, 4 lines long: sepals sharply carinate, hispid-ciliate on the keel; the remote lower one distinctly, the uppermost obscurely unguiculate: petals with ample purple-veined crisped limb: upper pair of filaments connate to near their scarcely divergent tips, the anthers small but polliniferous: slender pods 2 inches long, falcate-recurved: seeds wingless. — Fl. Francis. 261, & Man. Bay-Reg. 17. — Northern base of Mt. Tamalpais, Calif., *Greene*. Description condensed from the original characterization.

+ + Sepals very unequal; the outer pair much dilated: pods reflexed.

**S. polygaloides**, GRAY. Slender, simple or branched, 1 to 3 feet high, glabrous: leaves filiform, entire, some somewhat clasping and sagittate: flowers very shortly pedicellate, yellowish, 3 lines long: calyx very broad; the outer pair of sepals suborbicular, unequal; the inner lanceolate, acuminate: pods 1 to  $1\frac{1}{2}$  inches long by one half line wide, at length reflexed, attenuate to a short style; seeds oblong, winged (?). — Proc. Am. Acad. vi. 519. — California, near Jacksonville on the Tuolumne, *Brewer*, 1615, and on Mt. Bullion, *Bolander*.

**46. STANFORDIA**, Watson. (Dedicated to *Senator Leland Stanford*, 1824–1893, patron of the ‘Botany of California,’ and founder of the Leland Stanford, Jr. University.) — A rare and interesting Californian monotype, well characterized by its obcompressed fruit and 3-parted cotyledons. — Bot. Calif. ii. 479; Prantl in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 2, 206. [By B. L. ROBINSON.]

<sup>1</sup> *S. pulchellus* & *S. Biolettii*, *Greene*, Pittonia, ii. 225, appear to be forms of this species.

<sup>2</sup> The recently published *S. MILDREDE*, *Greene*, Fl. Francis. 260, of Centr. Calif., differs chiefly as to described character in its smaller very dark-colored flowers. *S. versicolor*, *Greene*, Erythea, iii. 99, appears to be only a form of *S. glandulosus*.

Several of the characters employed in the distinction of recent species appear untrustworthy. Thus the height to which the upper filaments are connate, as well as the degree of divergence of the free portions, varies much in different flowers of the same plant. The depth of color of the calyx and corolla is certainly to be distrusted as a specific character, and the wing of the seeds is most variable. In one of the type specimens of *S. glandulosus*, for instance, the seeds of the same pod exhibit sometimes a short broad wing at the end, sometimes a narrow wing around much of the circumference. By laying undue weight upon these characters the number of species could be almost indefinitely multiplied.

**S. Californica**, WATSON, l. c. Annual, branching, glabrous: radical leaves oblanceolate in outline, pinnatifid, 2 to 4 inches in length, narrowed to winged petioles; lobes subequal, entire, opposite; cauline leaves ovate, cordate, sessile, amplexicaul, shallowly few-toothed: racemes elongated, loosely flowered; pedicels 2 to 4 lines long, hispid-pubescent: flowers rather large, often pendulous: calyx ovoid or campanulate, 4 lines in length; sepals purple-tipped, paler or white toward the broad membranous bases: petals purplish, little exserted; the claw broad, almost ovate; the blade small, crisped: capsules suberect, 12 to 16 lines in length,  $1\frac{1}{2}$  to 2 lines broad, becoming chartaceous in texture, tipped with slender styles 1 to 2 lines long. — *Streptanthus Californicus*, Greene, Fl. Francis. 256. — California, near Tulare, Mrs. Bush; at Deer Creek, Tulare Co., Congdon; Bakersfield, Kern Co., Greene; fl. March, April.

**47. CAULÁNTHUS**, WATSON. WILD CABBAGE. (Καυλός, cabbage, and ἄνθος, flower, in reference to the popular name and the occasional use of certain species as a substitute for the garden vegetable.) — Coarse and more or less succulent herbs of the Far West, chiefly biennials and perennials, nearly related upon the one hand to *Thelypodium* and on the other to *Streptanthus*, to which several species were formerly referred. — Bot. King Exp. 19, 27, & Proc. Am. Acad. xvii. 364; Brew. & Wats. Bot. Calif. i. 36; Wats. Bibl. Index, 55; Prantl, l. c. 156. [By B. L. ROBINSON.]

\* Cauline leaves developed, sessile, cordate or auriculate-clasping at the base, usually oblong and little divided.

+ Stem glabrous or nearly so: pods ascending or widely spreading.

**C. amplexicaulis**, WATSON. Glaucous annual, more slender and flexuous than the other species, simple or more frequently with several spreading branches: leaves elliptic-oblong or ovate; the lowest somewhat narrowed toward the base, shallowly sinuate-dentate, obtuse; the upper broadly cordate-clasping, subentire, often acutish: racemes loosely few-flowered; flowers ascending; pedicels 4 to 12 lines long, widely spreading. — Proc. Am. Acad. xvii. 364. — Mountains about San Bernardino, Calif., at 4,000 to 6,500 feet alt., Parish Bros., Wright; fl. May and June. Whole plant tending to be purplish tinged.

**C. Lemmóni**, WATSON. Probably annual, becoming much branched, smooth or somewhat hispid below; hairs apparently always simple although sometimes clustered: leaves acute, denticulate or entire, rather short, not usually exceeding an inch in length, oblong or more commonly more or less deltoid, sagittate at the base, with acutish auricles; the lowest leaves somewhat narrowed below: racemes more densely flowered: flowers much as in the preceding but pendulous during anthesis: pedicels 3 to 4 lines long, often hispid: capsules strictly erect, stout, 3 to 4 inches long, 2 lines thick, tipped with stout spreading stigmas. — Proc. Am. Acad. xxiii. 261. *Streptanthus Parryi*, Greene, Fl. Francis. i. 257. — Near Cholame, San Luis Obispo Co., Calif., J. G. & S. A. Lemmon; fl. June.

**C. inflátus**, WATSON. Annual, essentially glabrous, occasionally a little hispid below: stem erect, very stout, becoming strongly inflated and fistulous: leaves erect, oblong, obtuse or obtusish, entire or denticulate, auriculate with rounded basal lobes: racemes rather dense; pedicels short, often hispid: flowers spreading or almost horizontal: sepals glabrous: pods 3 or 4 inches long,  $1\frac{1}{2}$  lines thick, ascending but not erect. — Wats. l. c. xvii. 364. *Streptanthus inflatus*, Greene, Fl. Francis. 257. — Dry hills, Mohave Desert, Lemmon, Parish Bros., Hasse; fl. March to May.

+ + Hirsute-pubescent: pods distinctly deflexed.

**C. Coulteri**, WATSON. Lower leaves oblanceolate, dentate, 2 to 3 inches long; the upper lanceolate, acute, subentire: racemes rather loosely flowered: flowers horizontal or nearly so: sepals narrow, recurved at the tip, strongly hirsute or quite smooth: pedicels 2 to 4 lines long, becoming deflexed in fruit: capsules terete, 3 to 4 inches long. — Bot. King Exp. 27; Bibl. Index, 55. *Streptanthus heterophyllus*, Gray, Proc. Bost. Soc. Nat. Hist. vii. 145, & Proc. Am. Acad. vi. 185, in part. *S. Coulteri*, Gray in Wats. Bot. King Exp. 19. — S. California, Th. Coulter; Ft. Tejon and vicinity, Xanthus.

- \* \* Cauline leaves often reduced to linear bracts, when well developed narrowed or distinctly petiolate at the base.

+ Sparingly pilose to hirsute.

**C. pilosus**, WATSON. Simple or branched, biennial, 2 to 4 feet high: stem leafy up to the inflorescence: leaves coarsely toothed or pinnatifid, 3 to 8 inches in length; terminal segment not greatly exceeding the others: raceme long, pedicels 2 to 8 lines in length, smooth or hispid, spreading: flowers rather small, greenish, or purple, ascending: calyx narrow; sepals linear-oblong, 3 to 4 lines in length, usually somewhat hispid, little exceeded by the petals: siliques long and very narrow, two thirds line in diameter, flexuous, widely spreading or recurved. — Bot. King Exp. 27; Brew. & Wats. l. c. — Sandy soil, in sage brush, &c., N. W. Nevada, Watson, Shockley, Crystal Spring, Eastern California, Coville & Funston, to Oregon, Howell, Cusick; fl. May and June. Immature and therefore doubtful specimens collected at Silver City, Brit. Columbia, along the Canad. Pacif. Railway, Macoun, are probably introduced from farther south.

+ + Stem glabrous.

++ Flowers ascending or erect.

**C. crassicaulis**, WATSON. Stem simple, erect, 1 to 3 feet high, very thick, fistulous: leaves chiefly clustered at or near the base, oblanceolate in outline, lyrate toothed or pinnatifid, 2 to 5 inches long; cauline leaves few, much reduced, linear or somewhat hastate: flowers subsessile, large: sepals oblong-lanceolate, 5 to 6 lines long, more or less pubescent, usually densely so, often velvety: pods ascending, slender, terete, 4 to 5 inches long. — Bot. King Exp. 27, & Bibl. Index, 55; Jones, Zoe, iii. 283. *Streptanthus crassicaulis*, Torr. in Stansbury, Rep. 383, t. 1, & Flora, 1853, 702; Durand, Fl. Utah, 159; Gray, Proc. Am. Acad. vi. 186. — Rocky ground and slopes of foothills, Utah to Central and S. California, north to Idaho, Miss Mulford; fl. May to July. A form with slender stem has been collected in Bear Valley, S. Calif., Parish Bros.

**Var. glaber**, M. E. JONES. Sepals as well as other parts quite glabrous. — Zoe, iv. 266. — S. Utah and E. Nevada.

**C. procerus**, WATSON. An erect stout sparingly branched biennial: basal and lower cauline leaves runcinate-pinnatifid, 4 to 8 inches long, narrowed at the base to a distinct petiole; uppermost lanceolate, attenuate, subentire: flowers greenish white: pedicels smooth, ascending, 3 lines long: sepals smooth, oblong, 4 lines in length, little exceeded by the petals. — Bot. King Exp. 27; Brew. & Wats. Bot. Calif. i. 36. *Streptanthus flavescens*, Gray, Proc. Am. Acad. vi. 186, in part. *S. procerus*, Brew. in Gray, l. c. 519; Bolander, Cat. 5; Wats. l. c. 19. *Thelypodium procerum*, Greene, Fl. Francis. 263. — Central California.

**C. glaucus**, WATSON. Branching, smooth and glaucous: leaves succulent, ovate or lanceolate, obtuse or acute, subentire; the cauline well developed, narrowed at the base or abruptly contracted and somewhat decurrent upon the petioles: sepals smooth, tinged with purple, oblong, 4 lines in length, a line in breadth: petals exerted and recurved: pedicels 3 to 5 lines in length, glabrous: fruit slender, terete, 3 to 4 inches long, falcate or flexuous, widely spreading. — Proc. Am. Acad. xvii. 364. — In clefts of rock, &c., Nevada, Candelaria, Esmeralda Co., at 6,500 feet alt., Shockley; Belleville, Jones; fl. May and June.

++ ++ Flowers horizontal or somewhat deflexed.

**C. hastatus**, WATSON. Perennial, erect, 2 to 4 feet high, simple or sparingly branched: cauline leaves well developed, variable, usually with a large deltoid to lanceolate acutish or obtuse subentire or hastately lobed segment and often, but not always, several much smaller segments arranged irregularly upon the long slender petioles: racemes dense and spike-like: flowers small for the genus, spreading and pendulous almost from the first: sepals narrow, glabrous, greenish white: capsules slender, spreading or ascending, somewhat knotted and often falcate or flexuous. — Bot. King Exp. 28, t. 3; Brew. & Wats. Bot. Calif. i. 36. — Shaded slopes of the Wasatch and Uinta Mountains, Utah, Watson, Hooker & Gray, to the Blue Mountains of Oregon, Cusick; fl. June.

48. **THELYPÓDIUM**, Endl. (Θήλυς, female, and πούς, foot, stalk, referring to the more or less distinctly stiped ovary.) — A considerable genus of the West and Southwest, most of the species biennials, often succulent, with

purple white or very rarely yellow flowers (mostly smaller than in *Caulanthus*) usually in rather dense racemes. — Gen. 876; Wats. Bot. King Exp. 25, & Bibl. Index, 72; Brew. & Wats. Bot. Calif. i. 37; Prantl, l. c. 155. *Pachypodium*, Nutt. in Torr. & Gray, Fl. i. 96; Benth. & Hook. Gen. i. 81. [By B. L. ROBINSON.]

§ 1. *HESPERIDÁNTHUS*. Stigma ovate, entire, with a more or less conical apex: flowers large, purple: petals with obovate blade: cauline leaves narrow, not auriculate.

**T. linearifólium**, WATSON. An erect smooth perennial, 2 or 3 feet high, with pale foliage and somewhat corymbosely branched above: basal leaves obovate, sharply toothed, not persisting; cauline linear or linear-oblong, entire, ascending: petals showy, rose-purple, slender-clawed, 10 lines in length: pods slender, 2 to 3 inches long, ascending or erect upon slender spreading pedicels. — Bot. King Exp. 25; Proc. Am. Acad. xvii. 321. *Streptanthus linearifolius*, Gray, Pl. Fendl. 7. *Iodanthus* or *Pachypodium linearifolium*, Gray, Proc. Am. Acad. vi. 187. — Colorado to Texas and Arizona. (Northern Mex.) A species without close affinities in the genus and with flowers and stigma somewhat of *Hesperis matronalis*.

§ 2. *EUTHELYPÓDIUM*. Style slender or short and thick, or obsolete, truncate or slightly 2-lobed; stigmatic surface circular or elongated over the valves (except in *T. elegans*): pubescence simple or none.

\* Upper cauline leaves sessile, cordate, or auriculate: pedicels very short, almost none: siliques arcuate, strongly deflexed.

**T. Coóperi**, WATSON. Slender erect annual: stems terete, flexuous, glabrous, usually branched, 8 inches to 1½ feet in height: leaves thickish, oblong, obtusish, the basal shallowly few-toothed, the others entire, cordate, or sagittate with clasping lobes; the uppermost and rameal leaves narrower, lance-linear; all tending to fall off, leaving the stem quite naked at fruiting: flowers small: sepals 1½ to 2 lines long, somewhat exceeded by the purplish petals; the latter narrower than usual in the genus: siliques 1½ inches long, attenuate at the end, commonly falcate, somewhat scabrous with fine stiff hairs. — Proc. Am. Acad. xii. 246, & Bibl. Index, 451. *T.* — ? Brew. & Wats. Bot. Calif. i. 38. — S. E. California, Fort Mohave, *Cooper*; Mohave River, *Palmer*; Cashenberry Springs, Mohave Desert, *Parish*; Inyo Co., *Coville* & *Finston*; Colorado Desert, *Orcutt*; Arizona, *Palmer*; fl. April to June. A very distinct species, suggesting by its habit and fruiting racemes *Arabis longirostris*, Wats.

\* \* Upper cauline leaves sessile, cordate-clasping or auriculate at the base: capsules erect, ascending or widely spreading, 6 to 15 lines in length (the mature fruit of *T. eucosmum* still unknown, perhaps somewhat longer).

+ Flowers even in anthesis subspicate or racemose, i. e. opening in young inflorescences considerably below the bud-bearing apex of the rhachis.

++ Inflorescence very dense and spike-like: flowers white or nearly so.

**T. brachycárpum**, TORR. Erect, 1½ to 2½ feet high, simple or branched, quite smooth or somewhat hispid-pubescent below: stem becoming stout: leaves thickish; the basal oblong or oblanceolate, sinuate-toothed or pinnatifid; the cauline as in the preceding: racemes very dense and spike-like; fruiting pedicels 1 to 1½ lines long: flowers small, white: sepals linear, nearly or quite equal at the base: petals narrow, much exserted: siliques slender, terete, somewhat knotted, slender-stiped and sharply beaked, 8 to 10 lines in length, ascending. — Bot. Wilkes Exped. 231, t. 1; Gray, Proc. Am. Acad. vi. 520; Wats. Bot. King Exp. 25, 26; Brew. & Wats. Bot. Calif. i. 37. — Abundant in meadows and mountain valleys, W. Nevada to Central and N. California; fl. May to August. Said to have the odor and taste of cabbage.

++ Inflorescence laxer: flowers roseate or purple.

**T. Howéllii**, WATSON. Erect or somewhat decumbent, slender, quite simple or with several slender simple ascending branches, hispid-pubescent near the base, glabrous above: radical leaves numerous, rosulate, about an inch in length, oblanceolate, obtusish, coarsely toothed,

narrowed at the base; cauline lance-linear, attenuate, sagittate-auriculate, erect and usually appressed, seldom an inch long: racemes 4 to 6 inches in length; buds and flowers ascending; pedicels  $1\frac{1}{2}$  to 2 lines long: sepals oblong, usually purplish tinged; the lateral distinctly saccate at the base: petals narrow, crisped, nearly twice as long as the calyx: capsules slender, 12 to 15 lines in length, slender-beaked. — Proc. Am. Acad. xxi. 445. — At Camp Polk and in Harvey Valley, Oregon, *Howell*; fl. June.

**T. eucósmum**, ROBINSON, n. sp. Biennial or perennial, glabrous: cauline leaves oblong or lanceolate, entire, spreading, 1 to 3 inches long: racemes several, very many-flowered; pedicels 2 to 3 lines long: buds and flowers widely spreading, usually horizontal, deep purple: petals spatulate, 4 lines long: pods arcuate, ascending,  $1\frac{1}{2}$  to  $1\frac{1}{2}$  inches long (not mature). — A very attractive species of Oregon, first collected at Baker City, *R. D. Nevius*, 1875, and later in the Blue Mts., *T. Howell*, 21 May, 1885, no. 345.

+ — Flowers opening close to the summit of the inflorescence, while still corymbosely clustered.

**T. sagittátum**, ENDL. Biennial, usually branched from the base, often somewhat hispid-pubescent below, quite smooth above, glaucous: stems subsimple, ascending or nearly erect, moderately leafy: leaves entire; the radical spatulate, 1 to 3 inches long; the cauline ovate-lanceolate to lance-oblong, sagittate-clasping with bluntish auricles: sepals about 2 lines long, but half the length of the roseate or purplish petals: fruit erect or spreading, often somewhat incurved, torulose and tipped with a slender style. — Endl. acc. to Walp. Rep. i. 172; Wats. Bot. King Exp. 25, in part; Brew. & Wats. l. c. *Pachypodium sagittatum*, Nutt. in Torr. & Gray, Fl. i. 97. — S. Utah, *Palmer*, to the Yellowstone Park, *Tweedy*, and Montana, *Watson*; in the "Snake Country," *Tolmie*, and Rocky Mts. of the Northwest, *Nuttall*, *Burke*. Said to prefer moist alkaline soil.

**T. flexuósum**, ROBINSON, n. sp. Stems slender, weak, and subdecumbent, flexuous, nearly naked above: radical leaves numerous, lanceolate, including the slender petioles 4 to 6 inches in length; cauline leaves distant, all or at least the upper much reduced, linear-oblong or lance-linear with narrow acutish auricles: flowers and fruit nearly as in the preceding. — *T. sagittatum*, Wats. Bot. King Exp. 25, in part; Anderson, Cat. 117; not Endl. — In alkaline soil among sage brush, &c. Nevada, near Carson City, *Anderson*, no. 140, Truckee Valley, *Watson*, no. 108; California, Surprise Valley, Modoc Co., *Lemmon*; Oregon, Union Co., *Cusick*, no. 921, Harvey Valley, *Howell*, no. 341.

**T. (?) salsugíneum**, ROBINSON, n. sp. A low branching annual, glabrous and glaucous throughout: stems slender, terete, often flexuous: cauline leaves ovate to oblong, half inch to inch and a quarter in length, entire, obtusish: flowers small: petals white or nearly so, a line to a line and a half in length: pods 6 to 8 lines long, erect on spreading pedicels. — *Sisymbrium salsugineum*, Pall. It. ii. App. no. 114, t. 5; Ledeb. Fl. Ross. i. 185. *S. glaucum*, Nutt. in Torr. & Gray, Fl. i. 93. *Turritis salsuginea*, DC. Syst. ii. 212. *T. (?) diffusa*, Hook. Fl. Bor.-Am. i. 41. — Rocky Mountains from Colorado at South Park, *Porter*, to Brit. America and the shores of the Arctic Sea, *Richardson*, acc. to Hooker, l. c. Apparently the same as the plant of Central Asia, but too little known in its American occurrence: scarcely differing from other *Thelypodia* except in its low slender habit and exceptional range, but very distinct from any American *Sisymbria*.

\* \* \* Leaves as in the preceding: pedicels developed (2 to 6 lines long): siliques elongated, usually 2 to 4 inches long, generally arcuate-spreading or somewhat deflexed.

+ — Petals with a distinctly developed blade, obovate or spatulate.

+ — Flowers white or purplish.

**T. Vaséyi**, COULTER. Rather slender, erect, glabrous and glaucous, branching from near the base: branches terete, leafy: cauline leaves obovate, obtuse or rounded at the apex, thin, narrowed toward the clasping base, repand-dentate: flowers very small, a line and a half in length, white, closely aggregated at the summit of the axis: fruiting racemes lax: pods rather few, 2 inches long, very slender, nearly erect on ascending pedicels 3 or 4 lines in length. — Contrib. U. S. Nat. Herb. i. 30, ii. 15, t. 1, as to pl. *Nealley*, the first mentioned type, not pl. *Vasey*, which is a *Sisymbrium* with much shorter fruit. In the plate, the stem on the left and the fruiting branch are of pl. *Nealley*. — A very interesting species as yet only collected near Rio Grande City, *Nealley*, evidently nearly related to *T. salsugineum*, from which it differs chiefly in its larger leaves and longer fruit.

**T. Nuttallii**, WATSON. Glabrous and glaucous, branching above: leaves entire from lanceolate to linear-oblong, acute: pedicels 3 to 6 lines long: flowers rather large, lilac-colored, nearly erect, all but the last usually opening some distance below the summit of the inflorescence: petals 7 to 8 lines long: pods 2 inches or more in length, nearly erect upon the spreading pedicels. — Bot. King Exp. 25, 26. *Streptanthus sagittatus*, Nutt. Jour. Acad. Philad. vii. 12; Torr. & Gray, Fl. i. 666. — S. Idaho, on the Little Goddard River, Wyeth, to Yakima Region, Washington, *Brandegee*; Oregon, *Nevius*, *Cusick*; N. Nevada and N. Utah, *Watson*; Arizona, *Ives*, acc. to *Watson*. A species of considerable variability as interpreted by Dr. *Watson*, but difficult to render more definite, owing to Nuttall's brief description and fragmentary type.

**T. ambiguum**, WATSON. Smooth, glaucous, stout, erect, branching, 2 to 5 feet high, leafy: leaves thick; the radical coarsely and irregularly toothed, 4 to 8 inches long; the upper cauline and rameal oblong, subentire, acutish or obtuse and cuspidate: racemes elongated; pedicels 2 to 3 lines long, divaricate: floral envelopes rather deep purple, strongly contrasting with the bright yellow anthers: sepals oblong, smooth, 3 lines in length: petals fully twice as long, with broad obovate patulous blade and slender claws: siliques slender, 3 to 4 inches long, widely spreading or somewhat deflexed; stipe  $1\frac{1}{2}$  to 2 lines in length. — Proc. Am. Acad. xiv. 290, & Bibl. Index, 451 (excl. syn. in part). *Streptanthus sagittatus*, Gray, Bot. Ives Rep. 6. — A showy but coarse species of N. Arizona, *Newberry*, *Palmer*, *Lemmon*.

**T. elegans**, M. E. JONES. Habit and foliage much as in the preceding: cauline leaves ovate or ovate-lanceolate, acutish, very glaucous: flowers opening at the summit of the raceme, somewhat smaller: petals narrower and much paler purple: capsules very short-stiped or sessile on the receptacle, sometimes suberect; stigma distinctly bifid; lobes nearly erect, and standing over the placenta. — Zoe, iv. 265. — S. W. Colorado, *Brandegee*, 1875, "common on adobe plains" near Westwater, *Jones*, 1890, and at Coal Mine, *S. H. Camp*, 1893; fl. May; fr. June. A specimen from North Park, *Crandall*, may also be of this species, but is too immature for certainty.

++ ++ Flowers bright yellow.

**T. aureum**, EASTWOOD. Glaucous biennial, branching from the base, somewhat pilose below, 1 to 3 feet high: branches numerous, terete, slender, leafy: basal leaves oblanceolate, dentate; cauline ovate, deeply cordate-clasping, entire, an inch or more in length: racemes rather dense; pedicels spreading, ascending, in fruit about 3 lines in length: sepals oblong, 2 lines in length, obtuse, glabrous, yellow as well as the spatulate moderately exserted petals: siliques well stiped, ascending, 2 to  $2\frac{1}{2}$  inches long. — Zoe, ii. 227. — Durango, Colorado, *Miss Eastwood*; fl. June. Exceptional in the color of the flowers but obviously close to the preceding.

+ + Petals very narrow, linear: cauline leaves narrowly oblong or linear.

**T. stenopetalum**, WATSON. Glabrous, much branched from the base, a foot or more in height: branches slender, terete, ascending: leaves sagittate-auriculate, erect, 1 to 2 inches long, acutish, somewhat fleshy: racemes elongated, many-flowered; pedicels ascending, thickened at the apex: buds lance-linear: sepals narrow, 5 lines long, purple, exceeded by the long narrow apparently white or roseate petals: siliques slender, suberect, flexuous. — Proc. Am. Acad. xxii. 468. — Stony hillsides, Bear Valley, San Bernardino Co., Calif., *Parish*; fl. June.

\* \* \* \* Leaves sessile by a narrowed base or distinctly petioled, not auriculate.

+ Inflorescence usually corymbosely branched: spikes very dense: pods widely spreading.

**T. integrifolium**, ENDL. Erect, glabrous: radical leaves ovate-lanceolate, varying greatly in size, 1 to 8 inches long, half as broad, obtusish, entire or repand, contracted below into petioles nearly equal in length; upper cauline leaves lance-linear, sessile, acute, erect: spikes very short, several to many; pedicels crowded, divaricate, 1 to 5 lines long, commonly rigid and somewhat thickened: pods slender, about an inch long, usually nodulose, sharp-pointed, curved upwards; gynophore short, a fourth to half line in length. — Endl. acc. to Walp. Rep. i. 172. *Pachypodium integrifolium*, Nutt. in Torr. & Gray, Fl. i. 96, 668; Hook. & Arn. Bot. Beech. 321, t. 74; Torr. in Frém. Rep. 87. — Plains from Colorado and Nebraska to S. California and Washington; fl. in midsummer, rather common.

**Var. gracilipes**, ROBINSON, n. var. Racemes more elongated, becoming 4 inches or more in length: pods borne upon a slender gynophore (1 to  $1\frac{1}{2}$  lines long). — S. W. Colorado, *T. S. Brandegee*, no. 1233.



**T. Wrightii**, GRAY. Slender-stemmed and paniculately branched: leaves rather narrow, lanceolate to linear, toothed or pinnatifid; segments mostly entire; the uppermost leaves often entire: racemes 2 to 5 inches long; pedicels filiform, divaricate, in fruit 3 to 5 lines in length: flowers somewhat larger than in the preceding: petals about 3 lines in length: capsules very slender,  $1\frac{1}{2}$  to nearly 3 inches in length. — Pl. Wright. i. 7, & ii. 12; Torr. & Gray, *Pacif. R. Rep.* ii. 126; Porter & Coulter, *Fl. Col.* 9; Coulter, *Man. Rocky Mt. Reg.* 21. — Colorado to New Mexico, Arizona, and S. Utah; growing in mountainous regions at moderate altitudes. (Mex., *Pringle*; Lower Calif., *Orcutt*.)

**T. laciniatum**, ENDL. Glabrous biennial, usually stouter than the preceding and less branched: leaves broader, somewhat fleshy, ovate or ovate-lanceolate, more irregularly cut; segments usually again toothed or lobed; the uppermost leaves often subentire; petioles rather long: racemes especially the terminal one sometimes a foot or more in length; pedicels short, even in fruit seldom exceeding 2 to 3 lines in length, rather rigid, divaricate: pods slender, widely and irregularly spreading,  $1\frac{1}{2}$  to 3 inches long. — Endl. l. c. *T. neglectum*, Jones, *Am. Nat.* 1883, 875, as to pl. descr. and type in part. *Macropodium laciniatum*, Hook. *Fl. Bor.-Am.* i. 43. *Pachypodium laciniatum*, Nutt. l. c. 96. — Mountain valleys, etc., Nevada and N. California to Washington; fl. May and June.

+ + Inflorescence simple, elongated, or branched; branches usually long and more loosely flowered than in the preceding division: pods erect or spreading, sometimes rigid.

**T. flavescens**, WATSON. Glabrous or more or less pilose: stem terete, erect, 2 feet or more in height, branched above: cauline leaves oblong-lanceolate, shallowly dentate or denticulate: pedicels about 3 lines in length, scattered, ascending: flowers nearly white: sepals linear-oblong, acute, 3 lines long, considerably exceeded by the narrow linear crisped petals: siliques  $2\frac{1}{2}$  inches long, rigid, taper-pointed, at first pilose, later quite glabrous. — Bot. King Exp. 25. *Streptanthus flavescens*, Torr. *Pacif. R. Rep.* iv. 65, not of Hook. — Central California, Benicia, *Bigelow*, Antioch, K. *Brandegee*.

**T. lasiophyllum**, GREENE. Erect annual, hispid below, often smoothish above: leaves oblanceolate or oblong in outline, irregularly sinuate-toothed or pinnatifid with spreading acute or obtuse entire or toothed segments,  $1\frac{1}{2}$  to 6 inches long, distinctly petioled or the upper sessile by a narrow base: flowers rather small, closely clustered, roseate or yellowish white: sepals oblong, scarcely more than half the length of the narrow spatulate oblong petals: fruiting pedicels very short,  $\frac{3}{4}$  to  $1\frac{1}{2}$  lines long, rather firm, curved: pods commonly deflexed, slender and somewhat curved, attenuate at the apex; stigma quite simple. — Bull. Torr. Club, xiii. 142. *Sisymbrium reflexum*, Nutt. *Proc. Acad. Philad.* iii. 26, & *Jour.* i. 183. ? *S. pygmaeum*, Nutt. in Torr. & Gray, *Fl.* i. 91, 667. *S. deflexum*, Harv. in Torr. *Pacif. R. Rep.* iv. 66. *S. lasiophyllum*, K. *Brandegee*, Zoe, ii. 339. *Turritis* (?) *lasiophylla*, Hook. & Arn. Bot. Beech. 321. *Erysimum retrofractum*, Torr. Bot. Wilkes Exped. 230. — Sandy and rocky soil, Utah, *Palmer*, *Jones*, and Arizona. *Palmer*, to California and Washington, *Suksdorf*. A common and variable species, with the attenuate pods, simple stigma, and often purplish flowers of this genus, but included by many and with almost equal propriety in *Sisymbrium*.

**Var. rigidum**, ROBINSON, n. var. Foliage and flowers as in type: pods deflexed but widely spreading, curved outwards, very rigid and pungent. — *T. rigidum*, Greene, *Pittonia*, i. 62. — Collected by *Jones* "on the Mexican boundary," 1882; by *May* at Elmira, Calif., 1883; and by *Greene* near Antioch, Calif.

**Var. inalienum**, ROBINSON, n. var. Whole habit as well as floral characters of the type: pods erect or slightly spreading, less rigid and pungent than in the last. — *Sisymbrium acutangulum*, Brew. & Wats. Bot. Calif. i. 41, not DC. — Central California near the coast; "back of Sta. Barbara and Los Angeles," *Brewer*, nos. 194, 417; *Oakland*, *Holder*, no. 2524; San Francisco, *Kellogg* & *Hurford*, no. 55. The European *Sisymbrium acutangulum*, DC., of similar habit, has shorter inflorescences, less numerous pods of less rigid texture, somewhat larger flowers and stigmas almost always slightly 2-lobed, with lobes lying over the placenta as usual in *Sisymbrium*.

**T. Hookeri**, GREENE. Annual with habit of the preceding species: leaves hispid-pubescent upon the midrib beneath: pedicels more widely spreading, 2 to 3 lines in length: flowers somewhat smaller: sepals narrowly oblong,  $1\frac{1}{2}$  to 2 lines in length, widely spreading, not greatly exceeded by the narrow although flat petals: fruiting pedicels short, curved

upward: pods slender, subterete, attenuate at the apex, sometimes a little pubescent when young. — Fl. Francis. 263. *Streptanthus flavescens*, Hook. Ic. t. 44. — Mountains of Central California.

- T. Lemmóni**, GREENE. Smooth glaucous annual, becoming rather stout: lower leaves large, 6 to 8 inches long, 2 to 3 inches broad, tapering to an obtusish point, abruptly contracted at the base, sinuate-dentate; several of the teeth especially toward the base much larger than the rest, irregular; petioles half inch long; upper leaves lance-linear, attenuate at both ends: pale purple flowers and fruit closely as in the preceding. — West Am. Scientist, iii. 156, & Fl. Francis. 263. — Central California, on adobe hills near San Luis Obispo, *Lemmon*, and, acc. to Prof. Greene, abundant in grain fields near Tracy. This species in floral characters is exceedingly close to the preceding; in foliage, however, very different. Intermediate forms are to be expected.

§ 3. **HETERÓTHRIX**. Stigma entire or subentire, circular in outline or slightly elongated over the placenta: pubescence at least in part of branched hairs.

- T. micranthum**, WATSON. Erect biennial, densely stellate-pubescent especially below: stem usually slender; branches elongated, virgate: lowest leaves oblanceolate, shallowly toothed, obtuse, attenuate below to slender petioles; upper leaves lance-linear, subentire; floral linear: racemes elongating before the opening of the flowers; pedicels short, ascending: buds subglobose: sepals short and broad, purple, sometimes pubescent, little exceeded by the whitish (?) petals: pods 9 to 16 lines long, nearly terete, ascending or spreading; valves 1-nerved; style very short. — Proc. Am. Acad. xvii. 321. *T. longifolium*, Rothrock in Wheeler, Rep. 65, not Wats. *Streptanthus micranthus*, Gray, Pl. Fendl. 7. *S. longifolius*, Gray, Pl. Wright. ii. 10, not Benth. — Mountains of S. W. Texas, *Havard*, *Nealley*; New Mexico, *Fendler*, *Wright*; Arizona, *Rothrock*, *Pringle*, *Lemmon*. (Mex., *Schaffner*, *Palmer*, *Pringle*.)

- T. longifolium**, WATSON. Erect, slender, densely pubescent below and somewhat hispid with branched hairs: lower leaves fugacious, long-lanceolate, repand-dentate; upper leaves long and very narrowly linear, entire: inflorescence as in the last but flowers larger, 2 to 2½ lines long: sepals short-oblong, obtuse, usually deep-purple: siliques at maturity 2½ to 3½ inches long, slender, deflexed, more or less attenuate to a slender style. — Bot. King Exp. 25, & Proc. Am. Acad. xvii. 321. *Streptanthus longifolius*, Benth. Pl. Hartw. 10. — New Mexico, *Fendler*; Arizona, *Lemmon*. (Mex., *Coulter*, *Hartweg*, *Schaffner*, *Seaton*.)

**49. STANLEYA**, Nutt. (Dedicated to *Lord Edward Stanley*, 1779–1849, distinguished as an ornithologist and at one time president of the Linnean Society.) — A small genus of stout western plants, usually glabrous and chiefly distinguished from the neighboring genera by having elongated clavate buds, cream-colored or yellow flowers, and long-stiped ovaries. — Gen. ii. 71; DC. Prodr. i. 200; Gray, Gen. III. i. t. 65; Benth. & Hook. Gen. i. 80. [By B. L. ROBINSON.]

\* Middle cauline leaves sessile, auriculate-clasping at the base, not deeply lobed.

- S. viridiflora**, Nutt. Stout, glabrous, mostly simple, erect or somewhat decumbent, 1 to 4 feet high: stem angulate: leaves thickish; the basal and lower cauline ovate to oblanceolate, sometimes a little angled or runcinately 1-2-toothed or even pinnatifid at the base, attenuate below into long flat winged and often somewhat toothed petioles: middle cauline lanceolate, hastate, acute, entire, gradually reduced upward: raceme long, usually simple; pedicels in fruit stoutish, 3 to 4 lines long, divaricate: buds becoming 7 lines long and scattered before opening by the rapid prolongation of the axis; flowers greenish. — Nutt. in Torr. & Gray, Fl. i. 98; Gray, Pl. Fendl. 9; Wats. Bot. King Exp. 25; Jones, Zoe, iii. 283. The suggested *S. collina* of Jones, l. c., appears to be the typical form of the species. — Rocky Mountains of Wyoming and S. Montana, westward to Oregon and Nevada; fl. May to July.

**Var. confertiflora**, ROBINSON, n. var. Stems terete: buds shorter, 4 to 5 lines long, densely packed together until they open; flowers smaller and much more numerous: fruiting pedicels very slender, 6 to 7 lines long, crowded, divaricate. — Base of Stein's Mountain,

Oregon, *Thos. Howell*, 30 May, 1885. A doubtful specimen with more slender and elongated pods but otherwise similar has been collected at Candelaria, Nevada, *Shockley*, September, 1882.

\* \* Middle cauline leaves distinctly petioled or sessile by a narrow base, not auriculate-clasping, often pinnatifid.

† White woolly-pubescent: cauline leaves slender-petioled, hastately lobed at the base, otherwise entire or nearly so.

**S. tomentosa**, PARRY. Stout, simple, erect: root thick, brown, branched, perennial: stem terete below, angled above: lower leaves lyrate-pinnatifid; terminal segment ovate-lanceolate, 1 to 3 inches in length, about an inch broad; the lower segments ovate-oblong, much smaller: raceme thick, 1 to 2 feet long, pedicels three fourths inch in length, clavate at the summit: flowers cream-colored: stipe of the capsule nearly or quite as long as the pedicels. — *Am. Nat.* viii. 212; *Wats. Bibl. Index*, 71. — Dry slopes, in gypsaceous soil, Owl Creek, N. W. Wyoming, *Parry*.

++ Glabrous or glabrate.

**S. elata**, M. E. JONES. Quite smooth, often glaucous, simple or branched; stem tall, terete: leaves coriaceous; the lower narrowed toward the petiole, entire or somewhat toothed at the base; the middle and upper cauline ovate-lanceolate, entire, acute, abruptly contracted to slender petioles of a third their length: inflorescence long-peduncled; pedicels 3 lines in length: sepals petaloid, bright yellow, with a well developed spatulate blade: petals of about equal length but much narrower and less conspicuous: filaments woolly: mature fruit not seen. — *Zoe*, ii. 16; *Coville, Contrib. U. S. Nat. Herb.* iv. 64. — Hawthorne, Nevada, *Jones*; Inyo Co., Calif., *Coville & Funston*.

**S. albescens**, M. E. JONES. Erect, branching: leaves thickish, very pale and glaucous, oblanceolate or oblong in outline, lyrate-pinnatifid or entire, distinctly petioled beneath the narrowed often hastately auricled base: pedicels 4 to 6 lines long: sepals greenish white, slightly enlarged above: petals 5 lines long, cream-colored, with a broad blade, smooth or somewhat pubescent below: anthers tightly coiled: silique curved-ascending,  $1\frac{1}{2}$  to 2 inches long; stipe 6 to 8 lines in length. — *Zoe*, ii. 17; *Eastwood, ibid.* ii. 227. — Dry soil, New Mexico, *Palmer*; Arizona, on the Moencoppa, *Jones*; Moqui Village, *Owens*; Colorado, Grand Junction, *Miss Eastwood*, on the Gunnison River, *Coven*.

**S. pinnatifida**, NUTT. Branching, glabrous or sparingly pubescent,  $1\frac{1}{2}$  to 3 feet high: stems terete or nearly so, flexuous, rather slender, leafy: leaves thickish, very variable, commonly pinnatifid or pinnately divided; segments lance-oblong or oblanceolate-elliptic, rarely linear, mostly entire; the terminal one somewhat larger; petioles narrow: racemes long; pedicels 2 to 5 lines in length: sepals narrow, pale yellow or greenish: petals bright yellow, spatulate, much exserted, usually rather narrow: anthers curved or loosely coiled: capsule  $1\frac{1}{2}$  to  $2\frac{1}{2}$  inches long, a line in diameter, widely spreading, ascending or somewhat deflexed; stipe 3 to 7 lines long. — *Gen.* ii. 71; *DC. Syst.* ii. 512; *Torr. & Gray, Fl.* i. 97; *Gray, Gen. Ill.* i. 154, t. 65, & Pl. Fendl. 9; *Wats. Bot. King Exp.* 24; *Jones, l. c.* *S. heterophylla*, Nutt. in *Torr. & Gray, Fl.* i. 97. *S. fruticosa*, Nutt. *Proc. Acad. Philad.* iii. 23. *S. pinnata*, Britton, *Trans. N. Y. Acad. Sci.* viii. 62. *Cleome pinnata*, Pursh, *Fl.* ii. 739. Var. *INTEGRIFOLIA*, Robinson, n. var. Leaves entire, ovate or elliptic, attenuate to each end (*S. integrifolia*, James, *Cat.* 185, & in *Long Exp.* ii. 17; *Torr. Ann. Lyc. N. Y.* ii. 166, & in *Sitgreaves, Rep.* 156, t. 1, occurring in similar situations with the type and not distinguished except by its foliage). — W. Kansas and Nebraska to Texas and S. California, northward to the Upper Missouri River. The commonest and most variable species, closely simulating the *Capparidaceæ* in habit; fl. May to August.

**50. WAREA**, Nutt. (*Mr. Nathaniel A. Ware*, 1789–1853, the discoverer, who was a teacher in S. Carolina and travelled somewhat widely in the Southern States.) — A genus of two erect slender glabrous annuals, separated from *Stanleya* chiefly by their white or roseate flowers and dense subcorymbose inflorescence, which together with the well stalked pods recall certain *Capparidaceæ*. — *Jour. Acad. Philad.* vii. 83, t. 10; *Torr. & Gray, Fl.* i. 98; *Gray, Gen. Ill.* i. 155, t. 66; *Benth. & Hook. Gen.* i. 80. [By B. L. ROBINSON.]

**W. cuneifolia**, NUTT. Root long, slender, vertical: stem  $1\frac{1}{2}$  to 2 feet high, with a few slender ascending simple branches: leaves obovate to oblong or linear, obtuse or retuse, sometimes mucronate, cuneate at the base, sessile, 8 to 12 lines long; the thyrsoid or corymbose inflorescence dense; the lower pedicels horizontally spreading: flowers white or purplish: petals sub-orbicular with a very slender claw: gynophore in fruit 3 to 6 lines long; siliques slender, curved, pendulous, 15 lines in length. — Nutt. l. c. 84; Gray, l. c. 156, t. 66; Chapm. Fl. 28. *Cleome cuneifolia*, Muhl. Cat. 61. *Stanleya gracilis*, DC. Syst. ii. 512, & Prodr. i. 200. — Sandy hills, Georgia to S. Florida; fl. August to November.

**W. amplexifolia**, NUTT. Resembling the preceding closely in habit and technical characters but with shorter ovate acutish leaves (6 to 7 lines long) with broad sessile slightly clasping bases: flowers purple, a little larger. — Nutt. l. c. 83, t. 10; Torr. & Gray, Fl. i. 98. *Stanleya amplexifolia*, Nutt. Am. Jour. Sci. v. 297. — Sandy hills, Florida, apparently less frequent than the other; fl. September.

## ORDER XI. CAPPARIDACEÆ.

By A. GRAY.

Herbs, or in warm countries some shrubs or trees; with pungent or acrid watery juice, alternate leaves, and 4-merous but 6-androus flowers after the type of *Cruciferae*, or some polyandrous, a usually one-celled ovary with (commonly two) parietal placentæ, and no false partition between them, amphitropous or campylotropous ovules, and reniform seeds filled with an incurved embryo, the cotyledons incumbent. Leaves mostly palmately compound. Flowers hermaphrodite. Receptacle often thickened or lengthened between the petals and stamens. Fruit when dehiscent with valves apt to separate from filiform placentæ in the way of *Fumariaceæ* and some *Papaveraceæ*. Fruit anomalous and 2-celled in *Wislizenia* and *Oxystylis*.

TRIBE I. CLEOMEÆ. Fruit a 2-valved capsule or 2-coccous. Chiefly herbs and annuals.

\* Shrubby: capsule inflated, many-seeded, tardily dehiscent.

1. **ISOMERIS**. Calyx 4-cleft, persistent. Petals 4, not unguiculate. Receptacle dilated into a hemispherical torus, bearing the 6 exserted equal stamens, enlarged and glandular on the upper side. Ovary long-stipitate, many-ovuled on the two placentæ: style very short: stigma minute. Capsule oval, inflated, coriaceous, tardily 2-valved. Seeds smooth.

\* \* Herbaceous: capsule membranaceous, several-many-seeded, one-celled, 2-valved: valves falling away from the nerviform placentæ.

+ Stamens 8 to 32, rarely fewer: torus depressed, bearing a gland on the upper side.

2. **CRISTATELLA**. Petals lacinate, cuneate-flabelliform; the two anterior smaller, all conspicuously unguiculate. Stamens 6 to 14. Ovary declined, behind it a conspicuous tubular truncate gland. Capsule ascending, short-stipitate, linear. Seeds cochleate-reniform.

3. **POLANISIA**. Petals entire or emarginate, little unequal, commonly unguiculate. A small solid gland usually on the torus behind the sessile or short-stipitate ovary. Capsule linear to oblong, many-seeded.

+ + Stamens 6: torus more or less thickened and sometimes elevated between the insertion of the entire more or less ascending petals and the stamens. Calyx usually deciduous.

4. **CLEOME**. Capsule linear to oval, several-many-seeded. Mostly a gland or projection of the torus on the upper side, behind the ovary.

5. **CLEOMELLA**. Capsule few-seeded, siliculose, more or less flattened contrary to the replum; valves cymbiform to elongated-conical! Gland of torus obsolete or wanting. Petals not unguiculate.

\* \* \* Herbaceous, annual: ovary 2-celled, didymous, the cells 1-2-ovuled; in fruit each carpel a nutlet or utricle separating\* by a small perforate cicatrix from the persistent and indurated axis and rigid style: seed conduplicate: torus very short between the obovate-spatulate petals and the 6 stamens.

6. **WISLIZENIA**. Stamens with long and filiform filaments and short anthers. Ovary with long filiform stipe: style long and filiform, soon indurated. Carpels divaricate and oblate-obovate, in fruit coriaceous, reticulated, filled by the solitary seed, tardily falling away from the oval pertuse replum, the scar with thickish border and small open centre. Flowers racemose.

7. **OXYSTYLIS**. Stamens little surpassing the petals. Ovary with short and stout stipe: style very long, subulate, and with the solid placental base soon indurated and spinescent. Carpels comparatively small, obovate; in fruit smooth, thin and soft, conformed to the obovate conduplicate seed, the testa of which is cartilaginous. Flowers densely glomerate.

TRIBE II. CAPPARÆ. Fruit indehiscent, more or less fleshy or baccate. Shrubs or trees.

8. **ATAMISQUEA**. Sepals dissimilar; two outer concave, valvate in the bud; two inner much smaller, spatulate. Petals 4, unequal, small. Torus cyathiform and oblique, dentate, bearing about 9 unequal stamens, of which three or four are reduced to staminodia. Ovary long-stipitate, ovoid, one-celled, with 4 parietal pluriovulate placenta and a subsessile stigma. Fruit globular, fleshy, lepidote-canescens, 1-2-seeded. Cotyledons plicate-convolute.

9. **CAPPARIS**. Sepals 4. Petals 4. Stamens numerous, on a short torus: filaments filiform or capillary. Ovary long-stipitate, one-celled with 2 parietal placenta in our species, or spuriously 2-celled: stigma sessile. Fruit many-seeded, baccate, or sometimes becoming dry and bursting irregularly. Embryo convolute: cotyledons foliaceous.

1. **ISÓMERIS**, Nutt. (Formed of *ἴσος*, equal, *μέρς*, part, perhaps in allusion to the equality of the stamens.) — Nutt. in Torr. & Gray, Fl. i. 124; Hook. Bot. Mag. t. 3842; Benth. & Hook. Gen. i. 106. — Single species.

I. **arborea**, Nutt. l. c. Low and stout or sometimes taller and arborescent shrub, with hard yellow wood, ill-scented, puberulent: leaves 3-foliolate; leaflets cblong to lanceolate, about the length of the petiole, entire, mucronate: flowers in terminal bracteate raceme: most of the bracts simple or unifoliolate: petals yellow: capsule inch or two long, long-stipitate.<sup>1</sup> — Dry ground, S. California, from Santa Barbara to the Mexican border and the Colorado Desert; first coll. by *Th. Coulter*; fl. summer.

Var.\* **globósa**, Coville. Young stems not glaucous as in the type: capsules short and thick, subglobose, truncate or nearly so. — Proc. Biol. Soc. Wash. vii. 73, & Contrib. U. S. Nat. Herb. iv. 67, t. 4. — Near Caliente, Kern Co., Calif., *Coville*. Said to intergrade freely with the longer-fruited form.

2. **CRISTATÉLLA**, Nutt. (A kind of diminutive of *crista*, a crest, probably in allusion to the fringe-toothed petals.) — Two very similar species of erect and branching annuals, leafy, puberulent and viscid; with petiolate palmately 3-foliolate leaves, linear leaflets, and small slender-pedicelled racemosely disposed flowers in the axils of upper leaves, some of which are reduced to bracts: petals white, cream-color, or yellowish, and stamens purplish. — Jour. Acad. Philad. vii. 85, t. 9; Torr. & Gray, Fl. i. 123; Gray, Gen. Ill. i. 177, t. 77. *Cyrbasium*, Endl. Gen. 891.

C. **erósa**, Nutt. l. c. 86. A foot or two high: petals very unequal; blade of the larger commonly 3 lines long, and with claw almost equalling the deeply dissected smaller ones: filaments elongated, at first declined: capsules inch or two long, on stipe of about twice the length of the marcescent gland: seeds smoothish. — *Cyrbasium erosum*, Endl. in Walp. Rep.

<sup>1</sup> Add syn. *Cleome arborea*, Greene, Pittonia, i. 200.

i. 196. — Sandbanks, &c., S. W. Arkansas and Texas; first coll. by *Nuttall*. (Here Drummond's Texan plant, which was referred to the next.)

- C. Jamésii**, TORR. & GRAY, l. c. 124. Flowers one half smaller: petals less unequal, larger, barely a line and a half long: stamens 6 to 9, rarely declined, little longer than the petals: capsules inch or less long, with stipe seldom much exceeding the gland. — Gray, Pl. Fendl. 10, & Gen. Ill. i. 178. *Cyrbasium Jamesii*, Endl. in Walp. l. c. — Sandbanks, S. Kansas to W. Louisiana and Texas; first coll. by *Jamés*.

**3. POLANÍSIA**, Raf. (Contraction of *πολύς*, many, and *άνισος*, unequal, referring to the stamens.) — Mostly glandular and viscid heavy-scented annuals; with palmately 3–5-foliolate leaves, uppermost reduced to bracts of the racemose flowers; fl. in summer. — Am. Monthly Mag. 1818, 267, Am. Jour. Sci. i. 378, & Jour. Phys. lxxxix. 98 (1819); DC. Prodr. i. 242; Torr. & Gray, Fl. i. 122; Gray, Gen. Ill. i. 181, t. 79.<sup>1</sup> *Jacksonia*, Raf. Med. Rep. hex. 2, v. 352.

*P. viscosa*, DC., of the East Indies, one of the ambiguous members of this genus, with hardly any claws to the (yellow) petals, and short stamens, is an occasional ballast-weed at eastern ports. The genuine members of the genus are N. American and Mexican.

\* Leaflets and capsules linear: habit of *Cristatella*: flowers white.

- P. tenuifolia**, TORR. & GRAY. Slender, freely branching, viscidulous-puberulent, but the (3) filiform-linear leaflets nearly smooth and glabrous: petals short-unguiculate, oval or ovate, unequal, larger 2 lines long, about the length of the 9 to 11 unequal stamens: capsule 2 inches long, terete, minutely but strongly reticulated, short-stipitate: seeds smooth. — Fl. i. 123. — Sandhills bordering the ocean, Georgia? (*Le Conte*) and E. Florida, *Rugel*, *Palmer*, *Garber*, *Curtiss*.

\* \* Leaflets 3, oblong-lanceolate to obovate: upper bracts of simple small leaves: capsules turgid, lanceolate-oblong: petals white or cream-color, sometimes changing to pink, slender-unguiculate, emarginate: filaments 12 to 24, purple.

- P. graveolens**, RAF. Raceme leafy or short: petals 2 or 3 lines long, little surpassed by the stamens: style only half the length of the ovary: capsule contracted at base into a short stipe: seeds smooth or nearly so. — Am. Jour. Sci. i. 379, Jour. Phys. l. c., & Med. Bot. ii. 61, f. 74; Deless. Ic. Sel. iii. t. 6; Torr. & Gray, Fl. i. 123. *Cleome dodecandra*, Michx. Fl. ii. 32; Bart. Fl. N. A. i. 83, t. 22; Bigel. Fl. Bost. ed. 2, 254; not *L. C. viscosa*, Spreng. Syst. ii. 125, partly. *C. graveolens*, Schult. Syst. vii. 45. — Gravelly shores, &c., Lake Champlain, the St. Lawrence at Montreal, and New York to Minnesota, southward to Missouri and Chesapeake Bay, acc. to Porter.

- P. trachysperma**, TORR. & GRAY. Mostly larger: petals 4 or 5 lines long: capillary purple filaments at length 5 or 6 lines long: style as long as the ovary or longer: capsule contracted more or less at base but not stipitate: seeds at maturity usually but not always roughish or verrucose. — Fl. i. 669; Gray, Pl. Fendl. 10, & Gen. Ill. i. 182, t. 79; Brew. & Wats. Bot. Calif. i. 51. *P. uniglandulosa*, Torr. Pacif. R. Rep. iv. 67, & Bot. Mex. Bound. 35; Wats. Bot. King Exp. 34; not Cav. — Gravelly and sandy banks, &c., Texas to Iowa and north to Manitoba, west to Arizona, Oregon, and interior of Brit. Columbia. (Adj. Mex., where sometimes petals become pink.) One extreme nearly passes into preceding, the other approaches the next. Becoming naturalized eastward.

- P. uniglandulosa**, DC. Petals (with their filiform claws) over half inch long: capillary filaments  $1\frac{1}{2}$  to 2 inches long: style long and capillary: capsule commonly 3 or 4 inches long, comparatively narrow, short-stipitate; valves with midnerve extending well toward the summit; seeds smooth. — Prodr. i. 242; Gray, Pl. Wright. i. 10; Wats. l. c. *Cleome uniglandulosa*, Cav. Ic. iv. 3, t. 306. — On the Mexican border near El Paso, *Wright*. (Mex.)

<sup>1</sup> Baron F. von Mueller and the Kew botanists have recently advocated uniting this genus with *Cleome*, from which, when extended to include foreign species, it is not separable upon very satisfactory or constant characters.

4. **CLEÓME, L.** (Name, of unexplained derivation, used in the fourth century for some mustard-like plant, taken up by Linnæus for this genus which Tournefort called *Sinapistrum*.) — Syst. Nat. ed. 1, Hort. Cliff. 341, & Gen. no. 550; R. Br., &c. *Cleome*, *Gynandropsis*, & *Peritoma*, DC. Prodr. i. 237, 238. — Largely tropical or subtropical, ours all annuals.

§ 1. **GYNANDRÓPSIS, Schult.** Torus enlarged at base, not appendaged, prolonged from the centre into a more or less stalk-like column which bears the stamens on its summit, and then into a filiform stipe of the ovary: capsule linear: petals slender-unguiculate. — Syst. vii. 23. *Gynandropsis*, DC. l. c. 237; Gray, Gen. III. i. t. 78. *Cleome* § *Gymnogonia* & § *Gynandropsis*, R. Br. in Denh. & Clapp. App. 220-223.

**C. PENTAPHÝLLA, L.** Viscid-pubescent, or leaves glabrate: leaflets 3 to 7, mostly 5, obovate: flower-buds not closed, the petals and stamens growing largely after the calyx is open: petals white or tinged with rose, quarter to half inch long: stamiferous portion of the torus a filiform column, of nearly the length of the petals, as long as the pedicel, and about the length of the stipe of the (at first glandular-hispidulous) capsule: seeds roughened. — Spec. ed. 2, ii. 938 (*gynandra* in ed. 1); Sims, Bot. Mag. t. 1681; Griseb. Fl. W. Ind. 15. *C. heptaphylla*, Audubon, Birds of Am. t. 379, not L. *Gynandropsis pentaphylla*, DC. Prodr. i. 238 (with *G. triphylla* & *G. palmipes*); Gray, Gen. III. i. t. 78. *G. palmipes*, Deless. Ic. Sel. iii. t. 1. — Sparingly introduced into waste grounds, Georgia to Louisiana; fl. summer. (Nat. from Trop. Am., but originally of Old World.)

§ 2. **EUCLEÓME.** Torus little or not at all columnar below the stamens, but commonly thickened, and bearing a glandular projection behind the ovary: this in all ours raised on a slender stipe or carpophore. — *Cleome*, Benth. & Hook., Eichler, &c.

\* Large-flowered, introduced from Tropical America, escaped from cultivation. Habit of *C. (Gynandropsis) speciosa*, HBK.

**C. SPINÓSA, Jacq.** Viscid-pubescent, strong-scented, 3 or 4 feet high: a pair of stipular short spines under the petiole of most leaves (in the tropics not rarely some little prickles on the petiole also): leaflets 5 to 7, oblong-lanceolate; bracts mostly simple: flowers rose-purple varying to white: petals commonly an inch and stamens 2 or 3 inches, and stipe of the linear capsule about 2 inches in length: style hardly any. — (Mill. ?) Jacq. Enum. Pl. Carib. 26; L. Spec. ed. 2, ii. 939; Sims, Bot. Mag. t. 1640. *C. pungens*, Willd. Hort. Berol. t. 18; Chapm. Fl. 32. — Waste ground, N. Carolina to Louisiana, and in ballast ground northward; or occasionally escaped from gardens. (Nat. from Trop. Am.)

\* \* \* Comparatively small-flowered, indigenous: petals indistinctly if at all unguiculate.

+ Calyx 4-cleft, tardily deciduous, mostly by circumcission at base: capsule 10-30-seeded: leaves petioled. — *Atalanta*, Nutt. Gen. ii. 73, not Corr. *Peritoma*, DC. Prodr. i. 237; Nutt. Jour. Acad. Philad. vii. 14.

**C. integrifolia, Torr. & Gray.** Glabrous, 2 or 3 feet high: leaves 3-foliolate; leaflets from lanceolate to obovate-oblong, entire, rarely with a few denticulations: bracts mainly simple, oblong-lanceolate to linear: raceme dense: petals 3-toothed, rose-color (rarely white): appendage to torus conspicuous, flat: stipe about the length of the pedicel, shorter than the pendulous capsule; this sometimes linear, terete and torulose, over 2 inches long, sometimes variously shorter, elongated-oblong, compressed: seeds mostly numerous, smooth. — Fl. i. 122; Gray, Am. Jour. Sci. ser. 2, xxxiii. 404. *C. serrulata*, Pursh, Fl. ii. 441; Torr. & Gray, Fl. i. 121, a false and misleading name. *C. (Atalanta) serrulata*, Nutt. Gen. ii. 73; the leaflets are not even "obsoletely subserrulate." *C. triphylla*, James in Long Exp., not L. *Peritoma serrulatum*, DC. l. c. *P. integrifolia*, Nutt. Jour. Acad. Philad. vii. 14. — Along streams in saline soil, on the plains, Saskatchewan and Dakota to Colorado and New Mexico, west to borders of Oregon, Nevada, and W. Arizona. Becoming naturalized in Mississippi Valley.

**C. lútea**, Hook. Glabrous, a span to 2 feet high: leaves 3-7-foliolate: leaflets from linear-lanceolate to oblong, entire: bracts simple, mostly slender-mucronate: raceme in flower dense: petals golden yellow: appendage to torus a short and thick gland: stipe shorter than or about the length of the pedicel, equalling or shorter than the oblong to nearly linear (half inch to inch and a half long) capsule: seeds 6 to 20, smooth or in age tuberculate. — Fl. Bor.-Am. i. 70, t. 25; Lindl. Bot. Reg. xxvii. t. 67; Brew. & Wats. Bot. Calif. i. 51. *C. lutea* & *C. aurea* (Nutt.), Torr. & Gray, Fl. i. 122; Wats. Bot. King Exp. 32. *Peritoma aurea*, Nutt. Jour. Acad. Philad. vii. 15. — Along streams, N. Wyoming and Idaho to Oregon and W. Nevada, south to Colorado; <sup>1</sup> first coll. by Douglas.

+ + Sepals distinct to base, deciduous.

**C. platycárpa**, Torr. A foot or two high, villous-pubescent and somewhat viscid: leaves long-petioled: leaflets 3, petiolulate, oval and oblong: bracts simple: raceme in flower dense: petals golden yellow: ovary in some flowers abortive: sepals slender-subulate: gland of torus obsolete: style short and slender: stipe equalling or shorter than the turgid oval 8-12-seeded capsule. — Bot. Wilkes Exped. 235, t. 2; Brew. & Wats. Bot. Calif. i. 51. — Alkaline soil, Oregon to N. California and W. Nevada; first coll. by Pickering & Brackenridge.

**C. sparsifolia**, Watson. Glabrous, a span or two high, diffusely branched: leaves minutely stipulate, 3-foliolate or upper simple (in original specimens small and scanty, in better ones slender-petioled): leaflets rather fleshy, spatulate or oblong-linear, 3 to 5 lines long: flowers few and sparse in the raceme, with linear petiolate bracts, short-pedicelled: sepals ovate: petals 3 or 4 lines long, yellow with tinge of green, spatulate, at length narrow and undulate, appendaged at base within by an adnate broad and inflexed nectariferous scale: stamens not longer than the petals: torus globular, with truncate summit obtusely 4-toothed outside the stamens and no gland within: stipe barely 2 lines long: capsule linear, three fourths to one and one half inches long, 8-10-seeded. — Bot. King Exp. 32, t. 5.<sup>2</sup> — W. Nevada, in the Carson Desert, Watson. In sand at Rhodes, with good flowers and foliage, Shockley.<sup>3</sup>

**C. Sonóræ**, Gray. Glabrous, erect, a foot or two high: leaves short-petioled and upper almost sessile: leaflets 3, very narrowly linear as also the simple similar bracts: raceme loose: petals white and rose-color, spatulate, 2 lines long: capsule cylindraceous, torulose, 6-8-seeded, pendulous on a usually shorter stipe from the much longer and spreading filiform pedicel: seeds smooth. — Pl. Wright. ii. 16; Rothrock in Wheeler, Rep. vi. 67. — Saline soil, S. Arizona, Wright, Thurber. S. W. Colorado in San Luis Valley, Rothrock.

**5. CLEOMÉLLA**, DC. (Diminutive of *Cleome*.) — South-central N. American and adjacent Mexican annuals, with trifoliolate leaves but sometimes simple bracts, small yellow flowers, and more or less stipitate odd-shaped capsules. Leaves except in one species petiolate and leaflets short-petiolulate. — Prodr. i. 237; Gray, Gen. III. i. 173, t. 75; Torr. in Gray, Pl. Wright. i. 11.

\* Smooth and glabrous: no stipules: flowers racemose: capsules pericarp on conspicuous pedicel and stipe.

+ Leaflets obovate or oblong, obtuse or retuse, barely mucronulate: seeds smooth, not tapering at base.

**C. MEXICÁNA**, DC. l. c., Moçino & Sessé, Ic. (Calques, t. 19 & xxxi), of Mexico, is low and diffuse; with small leaves, those subtending the flowers similar to the lower and little shorter than the pedicels; and stipe shorter than the very oblate capsule, the divaricate valves at maturity oblong-conical.

**C. longipes**, Torr. Erect, a foot or two high, rather robust, with naked and ample racemes: leaflets oblong or spatulate-obovate, inch or less long: bracts mostly simple and

<sup>1</sup> A fragmentary and dubious specimen comes from Nebraska, Wilcox; species also reported from N. Arizona, by M. E. Jones, Zoe, ii. 236.

<sup>2</sup> Add Jones, Bull. Torr. Club, x. 33.

<sup>3</sup> Also collected by Coville & Funston about Keeler, Calif., where it is said to be abundant; see Coville, Contrib. U. S. Nat. Herb. iv. 66.



small: filaments exserted: style distinct: stipe in fruit half or three fourths inch long, very slender, usually longer than the pedicel: valves of the capsule obliquely conical. — Torr. in Hook. Jour. Bot. & Kew Misc. ii. 255, & in Gray, Pl. Wright. i. 11; Wats. Bot. King Exp. 33; Brew. & Wats. Bot. Calif. i. 52, the var. *grandiflora* every way larger than the original Mexican specimens, but fully connected. — W. Texas to Nevada and adjacent border of California and Arizona, *Wright, Anderson, Watson, &c.* (North Mexico, *Berlandier, Gregg.*)

+ + Leaflets and simple bracts linear or the wider linear-lanceolate.

++ Stamens more or less prominently exserted: stipe of capsule elongated.

**C. angustifolia**, TORR. Erect, a foot or two high, with rather dense flowering racemes: leaflets mostly inch and a half long, 2 to 4 lines wide, acutely or acuminate mucronate: petals over 2 lines long: style hardly any: stipe shorter than the slender pedicel, longer than the rhomboidal capsule, the valves of which are obtusely conical or helmet-shaped, sometimes in age more extended and horn-shaped: seeds tapering at base, rugulose at maturity. — Torr. l. c. 12, & Bot. Mex. Bound. 35; Gray, Am. Jour. Sci. ser. 2, xxxiii. 404, & Proc. Acad. Philad. 1863, 58, as *C. tenuifolia*. *C. Mexicana*, Torr. Ann. Lyc. N. Y. ii. 167; Hook. Ic. t. 28; Torr. & Gray, Fl. i. 121; Gray, Gen. Ill. i. t. 75; not DC. — Plains of Arkansas or Kansas and Texas; first coll. by *James*.

**C. plocasperma**, WATSON. Diffuse, a span or two high, with rather open racemes: leaflets and bracts quarter to half inch long, obtuse, barely mucronulate: petals hardly 2 lines long: style conspicuous: stipe and pedicel each about a quarter inch long, twice or thrice the length of the broadly rhomboid capsule, the valves of which are helmet-shaped: seeds tapering at base, smooth or nearly so. — Bot. King Exp. 33; Brew. & Wats. Bot. Calif. i. 52. — Saline soil, Nevada, *Watson, Burgess, Brandegee*.

**C. oöcarpa**, GRAY. Erect, often diffusely branched, a span to a foot high: leaflets linear, obtuse, inch or less long: bracts similar but smaller and setaceous-mucronate: petals 3 lines long: style conspicuous: stipe and pedicel of about equal length (quarter to half inch): capsule small, not over 2 lines long, ovate, only obscurely rhomboidal, the valves only moderately navicular: seeds smooth and shining, of broadly obovate outline, not produced at base. — Proc. Am. Acad. xi. 72; Brew. & Wats. Bot. Calif. i. 52. — Saline plains of S. W. Colorado and Nevada, and on the Mohave Desert in California, *Brandegee, Torrey, Parish, &c.*

++ + Stamens not longer than the barely line long petals: stipe short. (Perhaps cleistogamous.)

**C. parviflora**, GRAY. Slender, a span to a foot high, at length diffuse: leaflets and bracts narrowly linear, the larger inch long: racemes loose: pedicels filiform, half inch to inch long in fruit: style very short or obsolete: capsule obovate, barely 2 lines long; valves gibbous-navicular: seeds smooth, not attenuate at base. — Proc. Am. Acad. vi. 520; Wats. l. c. — Mohave Desert, California (first coll. by *Cooper*), to N. W. Nevada, where first coll. by *Anderson*.

\* \* Smooth and glabrous: no stipules: flowers very small, short-pedicelled in the axils of nearly all the subsessile leaves: very short capsule deflexed.

**C. brevipes**, WATSON. A span or two high, diffusely branched and flowering from the base: leaves thickish, at most half inch long, mainly 3-foliolate and the subsessile leaflets linear-spatulate, but the upper of similar simple leaves: flowers barely a line long, on pedicels of hardly greater length: petals roundish, apparently whitish: stamens minute: style very short: capsule a line or two long, on a stipe not longer than the minute calyx, globose-ovate, 2-4-seeded, pendulous by the recurvation either of the minute stipe or of the pedicel. — Proc. Am. Acad. xvii. 365. — Mohave Desert, S. E. California, at Camp Cady (where also is found the preceding), *Parish*.<sup>1</sup>

\* \* \* Pubescent or hirsute: tufts of deciduous bristles for stipules: slender-stipitate capsule deflexed.

<sup>1</sup> Subsequently collected near Keeler, Inyo Co., Calif., by *Coville & Funston* (see Contrib. U. S. Nat. Herb. iv. 67), whose specimens show the capsule to be broadly deltoid in outline,  $1\frac{1}{4}$  lines long by  $2\frac{1}{4}$  lines in breadth. The species has also been reported from Newberry Sta., Calif. (see Zoe iv. 414).

**C. obtusifolia**, TORR. & FRÉM. Diffuse and procumbent: stems a span to a foot long, leafy throughout: leaves rather long-petioled and the three obovate rather succulent leaflets short-petiolulate, some of the upper simple and rather smaller: petals 2 or 3 lines long, spatulate: stamens exserted: style filiform, longer or even twice longer than the ovary: stipe of the fruit a quarter or third inch long, about as long as the ascending pedicel and at length deflexed upon it: ovary rhomboid-globose: mature capsule birostrate, the valves broadly conical and produced mostly into a long and narrow beak: seeds smooth. — Frémont, Rep. 311, & in Gray, Pl. Wright. i. 12; Gray, Proc. Am. Acad. vii. 329; Brew. & Wats. Bot. Calif. i. 52, & ii. 433. — Saline soil, S. E. California, on and near the Mohave Desert, and adjacent Arizona;<sup>1</sup> first coll. by Frémont. Varies from glabrate and ovary smooth to hirsute and the capsule also hirsute.

Species not seen and of doubtful affinity.

**C.\* Palmerana**, M. E. JONES. Erect glabrous annual, 2 to 10 inches high, branched from base: leaflets 3, oblong-elliptical, obtuse, mucronate; petiole an inch or less long: lower bracts leaf-like and petiolate; the upper subulate, attenuate to hairs and tufted at base: pedicels 3 to 4 lines long, reflexed in fruit: petals 2 lines long, oblong-lanceolate, obtuse, veiny, orange: stamens slightly exceeding the petals: stipe a line long: fruit subtruncate at apex, triangular, 4 to 5 lines wide, 2 to 2½ lines high; style half line long: seeds ovate, spotted, smooth. — Zoe, ii. 236. — Green River, Utah, Jones, 9 May, 1890. Description condensed from the original character.

**6. WISLIZÉNIA**, Engelm. (*Dr. Adolphus Wislizenus*, the first collector, after Coulter, of the original species.) — Erect and branching annuals (of the Arizona-Mexican plateau), glabrous or nearly so and not glandular, usually with some minute and fugacious bristles for stipules, and densely racemose small yellow flowers: filiform stipe in fruit refracted on the pedicel. — Bot. App. to Wisliz. Mem. of Tour to Northern Mexico, 99; Gray, Pl. Wright. i. 11, t. 2, & Proc. Am. Acad. viii. 622. — Two species:

**W. refracta**, ENGELM. l. c. Leaves all 3-foliolate; leaflets oblong to obovate: bracts mostly very small or obsolete: stipe of fruit quarter inch long, about the length of the pedicel, not much longer than the persistent style and replum: nucumentaceous mature carpels a line long, lightly reticulated and slightly tuberculate at the end. — Gray, Pl. Wright. i. 12. — S. New Mexico, Arizona, and S. California; first coll. by Th. Coulter (mentioned in Pl. Wright. l. c. as *Cleomella Coulteri*, Harvey), then by Wislizenus, Thurber, Wright, &c. Recently coll. on the San Joaquin River, Parry, Congdon, probably immigrant.<sup>2</sup> (Adj. Mex.)

**W. Palmeri**, GRAY. Leaves so far as known all simple,<sup>3</sup> linear or subspatulate, subsessile: racemes looser: nucumentaceous carpels 2 lines long, obovate-oblong, with truncate summit bordered by a row of erect tubercles, and sides striate-nervose. — Proc. Am. Acad. l. c.; Brew. & Wats. Bot. Calif. i. 52. — Near the mouth of the Colorado, Arizona and California, Palmer.

**7. OXYSTÝLIS**, Torr. & Frém. (Ὠξύς, sharp, στυλís, column or style.) — Frémont, Rep. 312. — A single little known plant.

**O. lútea**, TORR. & FRÉM. l. c. 313. Nearly glabrous winter annual: stem robust, erect, a foot or more high, but flowering from the base: leaves trifoliolate, long-petioled; leaflets oval, petiolulate, inch or more long, rather succulent: flowers in a capituliform sessile glomerule in the axil of each leaf: petals supposed to be yellow: carpels in fruit little over a line long, apparently long persistent on the partly excavated but imperforate indurated axis or base of the spiniform (quarter inch long) style, at length separating by a perforate

<sup>1</sup> Also extending to the Sacramento Valley, see Coville, Contrib. U. S. Nat. Herb. iv. 67.

<sup>2</sup> Now extending to Central California.

<sup>3</sup> A form with typical fruit of this species, but with slender-petioled mostly 3-foliolate leaves, has been collected at Guaymas, Mex., Palmer (see Wats. Proc. Am. Acad. xxiv. 39).

scar as in *Wislizenia*, the pericarp in time decaying away from the more indurated seed. — Desert of the borders of S. E. California and S. W. Nevada, on the Amagoza River, *Frémont*, April 28.

8. **ATAMÍSQUEA**, Miers. (A Chilian name.) — Trav. Chil. ii. 529, & Trans. Linn. Soc. xxi. 1, t. 1. — Single geographically dissevered species.

**A. emargináta**, Miers, l. c. Shrub or small tree, lepidote-canescant, with spinescent spreading branches: leaves short-petioled, entire, linear or oblong-linear, retuse, inch or so long: flowers solitary in the axils or terminating branchlets: peduncle about the length of the calyx: fruit over quarter inch long. — Brew. & Wats. Bot. Calif. i. 50; Wats. Proc. Am. Acad. xx. 354.<sup>1</sup> — Arid district, N. W. Sonora, Mexico, not far from the U. S. boundary, *Th. Coulter*, *Pringle*, *Brandegee*. (Lower Calif., Mendoza, Chili.)

9. **CÁPPARIS**, Tourn. (Ancient Greek and Latin name of the Caper-plant, *C. spinosa*.) — Large and diversified tropical genus, simple-leaved shrubs or trees, of which two W. Indian (unarmed) species have extended to Florida. — Inst. 261, t. 139; L. Gen. no. 437.

**C. Jamaicénsis**, Jacq. Shrub or shrubby tree, with minutely lepidote and yellowish herb- age: leaves soon smooth and shining above, coriaceous, elliptical, retuse: flowers corymbose, white or whitish: sepals equal and valvate: stamens 20 to 30, inch and a half long: fruit siliquiform, coriaceous, a span to a foot long, torose, lepidote-canescant. — Enum. Pl. Carib. 23, & Stirp. Am. 160, t. 101; Eichl. Fl. Bras. xiii. pt. 1, 270, t. 64, f. 2; Chapm. Fl. 32.<sup>2</sup> *C. emarginata*, A. Rich. Fl. Cub. 78, t. 9. *C. cynophallophora*, L. Spec. ed. 1, i. 504. *C. Breynia*, & *C. siliquosa* (excl. syn.), L. Spec. ed. 2, i. 721. *Breynia arborescens*, &c., P. Browne, Jam. 246. — Thickets, Key West, and probably on the mainland, S. Florida. (W. Ind. to Brazil.)

**C. cynophallóphora**, L. Smooth and glabrous shrub, with long and spreading branches: leaves coriaceous, shining above, veiny, from elongated-oblong to broadly oval, retuse, commonly a gland in the axil: peduncles few-flowered: sepals imbricated: stamens nearly 2 inches long: fruit a span or so in length, linear, but thickish and knobby, more fleshy, usually about twice the length of the stipe. — Spec. ed. 2, i. 721; Jacq. l. c. 158, t. 98; Griseb. Fl. W. Ind. 18; Chapm. l. c.; Eichl. l. c. 282, t. 63. *Breynia fruticosa*, &c., P. Browne, Jam. 246, t. 27. *Cynophallophorus*, &c., Pluk. Alm. 126, t. 172, f. 4. — Low thickets, Key West and Indian River, S. Florida. (Trop. Am.)

## ORDER XII. RESEDACEÆ.

By A. GRAY.

Herbs with watery and bland juice, alternate leaves, hermaphrodite irregular and mostly unsymmetrical flowers in terminal racemes or spikes, open in the bud; stamens always more numerous than the petals; carpels 2 to 6, usually united below into a one-celled ovary with parietal placenta bearing several or numerous campylotropous or amphitropous ovules, which become reniform seeds filled by the incumbently coiled or arcuate embryo. Stipules none or gland-like. Calyx herbaceous, more or less irregular, of 4 to 7 or rarely 8 sepals. Petals 2 to 6, usually lacinate or dentate. Stamens 3 to 40, borne on the base of the calyx or on a dilated nectariferous and oblique disk, declined or unilateral. At least the tips of the carpels distinct, not produced into evident styles, introrsely stigmatose.

<sup>1</sup> Add Brandegee, Proc. Calif. Acad. Sci. ser. 2, ii. 128.

<sup>2</sup> Add Sargent, Silva, i. 33, t. 19.

Fruit mostly capsular, but not splitting into valves. Seed-coat crustaceous. — Natives of the Old World: several naturalized [and one doubtfully indigenous] in the New.

1. **RESEDA**. Sepals and petals 4 to 8, unequal; the latter unguiculate, 2-many-cleft, and the claws of some or all of them dilated and internally appendaged at base. Stamens 10 to 40, inserted on a concave posteriorly dilated torus or disk. Ovary of 3 to 6 carpels united to near the tips, forming a 3-6-beaked capsule, which dehisces only at the beaks.
2. **OLIGOMERIS**. Sepals 4, or 2 to 5. Petals 2, posterior, without claws or appendages, entire or repandly 2-3-toothed at apex. No dilated torus or disk. Stamens 3 to 10. Ovary and capsule of *Reseda*.

1. **RESÉDA**, Tourn. (Old Latin name, from *resedo*, to assuage.) — Inst. 423, t. 238; L. Gen. no. 447; Muell. Arg. Monogr. Resed. 96; DC. Prodr. xvi. 555. — A genus of about 50 Old World species.

R. ODORÁTA, L., a N. African species is the MIGNONETTE of the gardens.

R. PHYTEÚMA, L., which, like the Mignonette, has foliaceous persistent sepals, occurs in Philadelphia and New York ballast grounds.

R. LUTÉOLA, L. (YELLOW-WEED, DYER'S ROCKET, DYER'S WEED.) — A tall strict biennial glabrous, leafy: leaves entire or with undulate-crisped margins, lanceolate to linear: flowers very numerous in a long spike, yellow or yellowish, minutely bracteate: sepals and petals 4; the former persistent; latter few-lobed: stamens 25, with long-persistent filaments: capsule broader than high, somewhat torose, 3-lobed, 3-pointed; seeds smooth and shining. — Spec. i. 448. — Sparingly established along roadsides in N. Atlantic States and California; fl. summer. (Nat. from Eu.)

R. LÚTEA, L. Rather low biennial, less leafy: leaves irregularly pinnately parted or bipinnatifid, with few linear obtuse lobes: flowers in a close raceme, pale yellow: sepals and petals 6, very unequal: stamens 16 to 20: capsule clavate-oblong, 3-pointed: seeds black. — Spec. i. 449. — Nantucket, Mass., and in ballast grounds. (Sparingly nat. from Eu.)

R.\* ALBA, L.<sup>1</sup> Tall and rather coarse: leaves pinnatifid with numerous oblong segments, somewhat glaucous: flowers greenish white: petals 5 or 6, all trifid: stamens 12 to 15. — Spec. i. 449. — Waste places and roadsides in a few localities, extending across the continent but scarcely established. (Adv. from Eu.)

2. **OLIGÓMERIS**, Camb. (Ὀλίγος, few, μέρις, member, i. e. a reduced *Reseda*.) — Low and glaucous, chiefly annuals (Indo-African), with narrow linear and entire leaves and small greenish flowers in terminal spikes. — Camb. in Jacquemont, Voy. Ind. iv. 23, 24, t. 25; Muell. Arg. in DC. Prodr. xvi. 584. *Oligomeris* & *Holopetalum* (Turcz.), Muell. Arg. Monogr. Resed. 213, 208.<sup>2</sup>

O.\* **glaucéscens**, CAMB.<sup>3</sup> l. c. Annual or biennial, a span or two high, much branched at base into ascending stems: leaves somewhat fleshy: petals oblong, obscurely lobed (sometimes united), occupying with the three stamens the posterior side of the flower: capsule depressed-globose, 4-lobed, 4-cuspidate; seeds smooth. — Gray, Pl. Wright. ii. 16; Hook. f. Fl. Br't. Ind. i. 181. *O. dispersa*, Muell. Arg. Monogr. Resed. 214. *O. subulata*, Webb, Frag. Æthiop. 26; Boiss. Fl. Or. i. 435; Muell. Arg. in DC. Prodr. xvi. 587; Brew. & Wats. Bot. Calif. i. 53. *Reseda subulata*, Delile, Fl. Ægypt. III. 15 (1813). *R. linifolia*, Vahl in Hornem. Hort. Hafn. 501 (1815). *R. dipetala*, Spreng. Syst. ii. 463. *Resedella subulata* & *R. dipetala*, Webb & Berth. Phyt. Canar. i. 107, t. 11. *Ellimia ruderalis*, Nutt. in Torr. & Gray, Fl. i. 125 (& 669). — Dry grounds, S. California to New Mexico.<sup>4</sup> (Adj. Mex., Lower Calif., N. Afr., Asia.)

<sup>1</sup> In Dr. Gray's ms. only mentioned as a ballast-weed.

<sup>2</sup> Add syn. *Dipetalia*, Raf. Fl. Tellur. iii. 73.

<sup>3</sup> Dr. Gray regarded this plant as introduced in America, but subsequent observations show it to be probably indigenous; see Parish, Zoe, i. 301.

<sup>4</sup> Eastward to El Paso, Tex., Jones. Add syn. *Dipetalia subulata*, Kuntze, Rev. Gen. i. 39; Coville, Contrib. U. S. Nat. Herb. iv. 68.

## ORDER XIII. CISTACEÆ.

By A. GRAY; the genus *Lechea* revised by B. L. ROBINSON.

Shrubby or nearly herbaceous plants; with regular and prevailingly polyandrous 5-merous or 3-merous flowers, hypogynous, the one-celled ovary with 3 or 5 parietal placentæ, bearing several or many orthotropous ovules, and seeds with an embryo curved or coiled in the copious albumen. Calyx and corolla convolute in the bud, usually turned opposite ways, or sometimes imbricated. Sepals 5, two wholly external, much smaller and bract-like (rather to be regarded as bracts), persistent. Petals 5 or 3. Stamens not rarely few, sometimes definitely so. Style single or none: stigmas either united or separate. Capsule loculicidally 3-5-valved. Leaves opposite or alternate, penniveined, entire, with or without small stipules. — Largely of the Old World (and Mediterranean) for species, but two of the four genera exclusively N. American, and one genus common. *Cistus*, the ROCK ROSE, belongs chiefly to the Mediterranean region.

\* Petals 5, fugacious, opening in sunshine, caducous at nightfall: ovary and capsule strictly one-celled, with 3 nerviform placentæ.

1. **HELIANTHEMUM.** Petals broad, in all well developed flowers crumpled in the bud. Stigma capitate or cristate and 3-lobed, in ours sessile or nearly so on the ovary. Ovules few or numerous, on long funiculi. Embryo much curved or coiled.
2. **HUDSONIA.** Petals not crumpled in the bud, cuneate or obovate. Stamens 9 to 30. Style long and filiform: stigma minute. Ovary with 2 ovules to each placenta. Sepals connivent in fruit, enclosing the 2-6-seeded capsule. Embryo uncinat-circinate. Foliage heath-like.

\* \* \* Petals 3, persistent: placentæ on incomplete dissepiments.

3. **LECHEA.** Petals alternate with the 3 proper sepals, not longer than they, plane in the bud, obovate or oblong, marcescent. Stamens 3 to 12 or rarely more, when reduced to three opposite the petals. Ovary short-stipitate: style very short or none: stigmas 3, fimbriate-plumose. Placentæ 3, broad and valve-like, each bearing a pair of erect subsessile ovules, one on each side of the posterior face. Capsule globose and obscurely triangular, crustaceous; valves separating from the broad placenta, which seem to be interior reversed valves. Embryo slender, arcuate or more curved in the hard albumen.

1. **HELIANTHEMUM**, Tourn. ROCK ROSE, but the name properly belongs only to *Cistus*. (Composed of *ἥλιος*, the sun, and *ἄνθεμον*, flower, the blossoms opening only in direct sunshine.) — The American species are essentially herbaceous or some with merely suffrutescent base, and with alternate leaves, strictly parietal placentæ, and yellow flowers. And in the first section there is a second kind of flower, more or less diminutive and cleistogamous. — Inst. 248, t. 128; Michx. Fl. i. 307; Gray, Gen. Ill. i. 203, t. 87.

\* Atlantic species, with dimorphous flowers; viz. the normal or ephemeral, with 5 large fugacious petals, indefinite stamens, and many-seeded capsules; and the Lecheoid, smaller, cryptopetalous or apetalous, 3-10-androus, cleistogamous, with very few ovules and seeds: herbage cinereous or canescent with minute and close pubescence, especially the lower face of the leaves, the upper face glabrate and green. — *Heteromeris*, Spach in Hook. Comp. Bot. Mag. ii. 290, & Ann. Sci. Nat. ser. 2, vi. 370.

**H.\* Canadense**, MICHX.<sup>1</sup> (FROST-WEED, so named because in this was first noticed the shooting forth of acicular ice-crystals from the dead and cracked bark at the root in late autumn.) Slender, with a few more or less elongated spreading flexuous branches, puberulent but scarcely canescent: leaves elliptic-oblong or oblong-linear, somewhat harsh and rigid, narrowly revolute at the margins: normal flowers large, bright yellow, usually an inch sometimes even an inch and a quarter in diameter, the earliest borne in the primary forks of the stem, later ones higher, becoming rather remote: capsules 3 lines in diameter: cleistogamous flowers borne rather few in a cluster at the ends of short branches or by 2's and 3's in the axils. fruiting calyx at maturity  $1\frac{1}{2}$  to 2 lines in diameter. — Fl. i. 308, as interpreted by Bicknell, Bull. Torr. Club, xxi. 258; Gray, Gen. III. i. 204, t. 87; Sprague & Goodale, Wild Flowers, t. 29. ? *H. ramuliflorum*, Michx. l. c. 307, form with cleistogamous flowers. — Massachusetts, on Martha's Vineyard to the Smoky Mts., N. Carolina, *Beardslee* & *Kofoed*, to Ft. Gratiot, Mich., *Pitcher*; Illinois, *Patterson*, and (?) Texas, *Berlandier*.

**H.\* május**, BRITT. STERNS & POGGENB. Somewhat taller, stricter, and more canescent-pubescent: branches short, ascending, seldom surpassing the rather close raceme of normal flowers: corolla paler yellow and somewhat smaller: cleistogamous flowers very small in dense many-flowered subsessile clusters: fruiting calyx about a line in diameter. — Torr. Club, Prelim. Cat. N. Y. 6, excl. syn. Michx.; Bicknell, l. c. *H. Canadense*, of authors, in part. ? *H. rosmarinifolium* & *H. corymbosum*, Pursh, Fl. ii. 364. *H. Canadense*, var. *Walkeræ*, Evans, Bot. Gaz. xv. 211. *Lechea major*, L. Spec. ii. 90, & Amœn. Acad. iii. 11, t. 1, f. 4. — S. Maine to New York, and westward and southward to the Black Hills, S. Dakota, *Forwood*, *Rydberg*; Colorado, *Mrs. Walker*, and Texas, *Hayes*; ? Alabama, *Mohr*.

**H. capitatum**, NUTT. More slender and branching: leaves linear, or spatulate-linear, even the upper face somewhat hoary, the margins revolute: normal flowers on filiform peduncles terminating the branches, with corolla less than half inch in diameter and calyx minutely canescent; cryptopetalous ones capitellate-glomerate. — Nutt. in Torr. & Gray, Fl. i. 151 (as syn.), & in Engelm. & Gray, Pl. Lindh. pt. 1, 4, inept name. *H. polifolium*, Torr. & Gray, Fl. i. 151. *Heteromeris polifolia*, Spach, ll. cc. — Sandy soil, Texas (first coll. by *Berlandier*), and Arkansas, *Nuttall*.

**H. corymbosum**, MICHX. Many-stemmed from lignescent base, a span to a foot high, canescent: leaves oval to oblong-lanceolate: flowers glomerate in a corymbiform terminal cyme, short-pedicelled to subsessile: calyx soft-villous: normal flowers over half inch in diameter and with sepals 3 or 4 lines long; cryptopetalous ones few. — Fl. i. 307; Torr. & Gray, l. c.; Chapm. Fl. 35. *Cistus corymbosus*, Poir. Suppl. ii. 272. *Heteromeris cymosa*, Spach, ll. cc. — Sands along the coast, N. Carolina to Florida.

\* \* S. Atlantic species with homomorphous flowers.

**H. arenicola**, CHAPM. Many-stemmed and diffuse from a woody base, canescent throughout: leaves oblong-linear or the lower spatulate, obtuse, inch or less long, nearly veinless: flowers solitary or few in a fascicle, on peduncles half or quarter inch long: corolla fully half inch in diameter: principal sepals 3 or 4 lines long, oval, obtuse. — Fl. 35. *H. Canadense*, var. *obtusum*, Wood, Classbook, ed. of 1861, 246. — Shifting sand of the coast, W. Florida, *Chapman*, to Mississippi, *J. Donnell Smith*.

**H.\* Náshi**, BRITTON. Similar to the last in its ligneous base, its habit and pubescence: leaves acute at both ends: flowers in leafy-bracted thyrsoïd clusters: inner sepals oval, very obtuse. — Bull. Torr. Club, xxii. 147. — In "scrub," near Eustis, Florida, *G. V. Nash*.

**H. Caroliniánum**, MICHX. Mostly simple-stemmed from slender merely lignescent subterranean shoots, a span or two high, villous-pubescent, not hoary, few-flowered: leaves obovate to oblong, inch or two long, radical ones rosulate-clustered: flowers terminal or lateral, slender-peduncled: corolla inch or more in diameter: principal sepals ovate, acuminate, about half inch long. — Fl. i. 307; Sweet, Cist. t. 99; Torr. & Gray, Fl. i. 152;

<sup>1</sup> The description of this plant has been rewritten to exclude the following species. The credit of the first clear distinction between these nearly related plants is due to the close observation of Mr. E. P. Bicknell, and the names here used are those he has employed, although there is still a doubt as to the identity of the Linnean *Lechea major*.

Chapm. l. c.<sup>1</sup> *Cistus Carolinianus*, Walt. Car. 152; Vent. Deser. Pl. Nouv. Jard. Cels, t. 74. *Crocanthemum Carolinianum*, Spach, Ann. Sci. Nat. ser. 2, vi. 370. — Sandy pine woods, near the coast, N. Carolina to Florida and Texas.

\* \* \* Pacific species: flowers homomorphous.

**H. scoparium**, NUTT. A foot or two high, suffrutescent at base, corymbosely much branched, slender, glabrous or glabrate up to the sparse paniculate inflorescence: leaves narrowly linear, small, often sparse and minute on the filiform branches: sepals minutely canescent or sometimes glandular-puberulent, 3 lines long, outer usually minute: corolla half or two thirds inch in diameter. — Nutt. in Torr. & Gray, Fl. i. 152; Lindl. Jour. Hort. Soc. v. 79; Brew. & Wats. Bot. Calif. i. 54. *Linum trisepalum*, Kellogg, Proc. Calif. Acad. Sci. iii. 42, f. 10.<sup>2</sup> — Dry hills through W. California.

**H.\* Greinei**, ROBINSON, n. sp. Base ligneous, much branched: stems 6 inches to more than a foot in height: younger parts except the inflorescence densely white woolly: leaves lance-linear, two thirds inch long, a line wide; margins revolute; inflorescence a rather close dichotomous cyme, densely covered with dark glandular hairs: calyx villous; the ovate acuminate inner sepals 3 to 4 lines in length, half longer than the linear outer ones: petals 2½ to 4 lines long: stamens about 22: fruit not seen, said to be as long as the calyx. — *H. occidentale*, Greene, Bull. Calif. Acad. Sci. ii. 144, not Nym. — Island of Santa Cruz, off the Californian coast, Greene, Brandegee.

## 2. HUDSÓNIA, L. (*William Hudson*, author of *Flora Anglica*.) —

**E.** North American fruticulose plants, with fine heath-like foliage, i. e. leaves very small, sessile, appressed or erect, alternate, closely imbricated on the stems and branches, persistent: flowers small, sessile or pedunculate, terminating crowded short branchlets, expanding in sunshine for one day only: petals yellow (about 2 lines long), as also the inner face of the three ovate principal sepals: fl. summer. — Mant. 11, & ii. 514; Willd. Hort. Berol. t. 15; Gray, Gen. III. i. 207, t. 90.

**H. tomentosa**, NUTT. (POVERTY GRASS.) A foot or less high, tomentose-canescant: leaves all appressed, subulate or uppermost broader, thickish, acutish, a line long: flowers sessile or some short-peduncled: sepals obtuse: ovary quite glabrous. — Gen. ii. 5; Sweet, Cist. t. 57; Torr. & Gray, l. c. 155; Torr. Fl. N. Y. i. 80, t. 9; Gray, Gen. III. i. 208, t. 90. *H. ericoides*, Richards. in Frankl. 1st Journ. ed. 1, App. 739 (reprint, p. 11). — Sandy beaches and shores, Virginia to Nova Scotia, shores of all the Great Lakes, and north to Slave Lake, rarely (as in Lee Co., Illinois) on banks of streams inland.

**H. ericoides**, L. A span or two high, diffuse, cinereous with loose pubescence, glabrate in age: leaves lax, nearly filiform, the cauline on vigorous shoots commonly 3 lines long: peduncles filiform, as long as the flower: sepals narrow, acutish: ovary pilose or glabrous only near the base. — Mant. 74; Berg. Stockholm Acad. Handl. xxxix. t. 1 (1778); Lam. III. t. 401; Willd. Hort. Berol. t. 15; Lodd. Bot. Cab. t. 192; Sweet, Cist. t. 36; Torr. & Gray, l. c. 154. *H. Nuttallii*, Don, Syst. i. 315. — Sandy or rocky ground, Virginia to Nova Scotia along and near the coast, extending into the interior to Conway, New Hampshire.<sup>3</sup>

**H. montana**, NUTT. l. c. A span high, green, minutely pubescent, only the calyx villous-tomentose: leaves erect, nearly filiform, 2 or 3 lines long: flowers short-peduncled, comparatively large: sepals ovate, acuminate, sometimes 2-pointed: ovary soft-villous. — Torr. & Gray, Fl. i. 155; Chapm. Fl. 36. — On the small summit of Table Mountain, N. Carolina; first coll. by Nuttall.

<sup>1</sup> Add Meehan, Native Flowers, ser. 2, ii. 77, t. 19.

<sup>2</sup> Add syn. ? *H. Aldersonii*, Greene, Erythea, i. 259. If Prof. Greene's species is represented as appears from character by Dr. Palmer's no. 18 from the same region, it is with little doubt merely a southern and more leafy form of *H. scoparium*, at least such was Dr. Gray's view.

<sup>3</sup> Also at Burlington Bay, Lake Champlain, Grout, Jones & Eggleston.

3. **LÉCHEA**, Kalm. PINWEED. (*Prof. J. Leche*, of Abo.) — Perennials, with base hardly suffrutescent, branching, and bearing numerous small purplish flowers: leaves from alternate to irregularly verticillate, oval to linear or on the branchlets subulate. Flower buds seldom larger than the head of a pin, expanding only in the absence of sunshine, produced in summer. Capsule in all more or less triangular. — Kalm in *L. Amœn. Acad.* iii. 10, & *Gen. ed.* 5, no. 102; Gærtn. *Fruct. t.* 129; Torr. & Gray, *Fl. i.* 152. *Lechea* & *Lechidium*, Spach in Hook. *Comp. Bot. Mag.* ii. 282, 286. [Revised by B. L. ROBINSON.]

§ 1. **EULÉCHEA**.<sup>1</sup> Flowers either glomerately or sparsely paniculate: placentæ in fruit thinnish, hardly crustaceous, fragile, free (the partitions becoming evanescent), their sides recurving around the one or two seeds: all or most of the species producing from the base of the flowering stem copious prostrate or barely ascending sterile shoots, which are thickly beset with mainly opposite or verticillate thyme-like leaves.

\* Pubescence villous and more or less spreading: leaves about half as broad as long: flowers glomerate-cymulose, very short-pedicelled.

**L. major**, Michx. Stem erect, 2 or 3 feet high, with short lateral flowering branches, very leafy: leaves thinnish, punctulate, abruptly mucronate; cauline half inch to inch long, oblong, many of them as well as the smaller ones of the radical shoots in whorls of 2 to 4: flowers at length much crowded: capsule depressed-globose, about one sixteenth of an inch long, at maturity slightly exceeding the calyx. — *Fl. i.* 76; Poir. *Suppl. iii.* 340; Pursh, *Fl. i.* 90; Torr. & Gray, *Fl. i.* 153; Gray, *Man.* 49; not *L.*, which is a *Helianthemum*. *L. minor*, Smith in Rees, *Cycl. xxi.*, not of *L.*, although a specimen in herb. belongs to it. *L. villosa*, Ell. *Sk. i.* 184; Nutt. *Gen. i.* 90.<sup>2</sup> *L. mucronata*, Raf. *Préc. Découv.* 37, & (?) in *Desv. Jour. Bot. iv.* 269 (1814). Probably *L. Drummondii*, Spach in Hook. *Comp. Bot. Mag.* ii. 284 (elaborately described from single and very imperfect fruiting specimen, coll. Apalachicola, *Drummond*), from the pubescence and thin leaves of the radical shoots; but capsule said to be "ellipsoid." — Dry sandy or gravelly soil, New England and adjacent Canada to Nebraska and W. Kansas, and south to Florida and Texas.

**Var. divaricata**, GRAY, n. var. Long-branched from near the base: flowering branchlets sometimes divaricate: leaves oblong-lanceolate, quarter to half inch long, mostly alternate; stamens commonly more numerous. — *L. divaricata*, Shuttl. in distr. coll. Regel.<sup>3</sup> — Sandy pine woods, Florida (Manatee, &c.), Buckley, Regel, Garber; Texas, Palmer. (Mex., Shaffner.)

\* \* Pubescence appressed: leaves narrower: flowers paniculate: capsule globose to ellipsoid.

— Leaves of the sterile basal shoots oval to oblong, relatively broad.

**L. minor**, L. About 2 feet high, quite erect or with ascending branches, finely pubescent but not canescent: cauline leaves oval or oblong, 3 to 4 or the larger 5 to 6 lines long, abruptly short-petioled, mucronate, some hairy (at least the margins), some whorled or opposite; those of the crowded panicles varying to linear: capsule obovate-globose, commonly surpassed by at least one of the outer sepals. — *Spec. i.* 90, as to one out of several specimens, *vide* Britton, l. c. 247. *L. thymifolia*, Michx. *Fl. i.* 77; Smith in Rees, *Cycl. xxi.* *L. Nova-Cesareæ*, Austin in Gray, *Man. ed.* 5, 81. — Dry ground, New England near the coast to S. Carolina and even to Florida.

**L. maritima**, LEGGETT. Stout and bushy, a foot or two high, canescent-tomentose: radical shoots formed late in the autumn, commonly ascending with thickish oblong leaves,

<sup>1</sup> Dr. Gray's latest views regarding this group have been largely incorporated in the sixth edition of the Manual, and his treatment of the genus for the present work has been somewhat freely modified in the light of Dr. Britton's careful revision (*Bull. Torr. Club*, xxi. 244-253) based upon the long study and extensive collection of W. H. Leggett, Esq.

<sup>2</sup> Add Britton, l. c. 248.

<sup>3</sup> Add Britton, l. c. 249.



hoary with appressed pubescence; cauline leaves puberulent or glabrous, linear to linear-oblong, 4 to 8 lines long,  $\frac{3}{4}$  to  $1\frac{1}{2}$  lines broad: panicle broad, dense, pyramidal: flowers reddish (at least in fading); calyx canescent; outer sepals nearly equalling or distinctly shorter than the inner: capsule globose, about half line in diameter. — Leggett in Britton, Prelim. Cat. N. J. 13, & Bull. Torr. Club, xxi. 249. *L. thymifolia*, Pursh, Fl. i. 91; Gray, Gen. Ill. i. 206, t. 88. *L. minor*, var. *maritima*, Gray, ms. Syn. Fl., & Man. ed. 6, 77. — Sandy soil along and near the coast, Maine, Blake, Fernald, to Georgia, and (acc. to Britton) apparently in White Mountains at Crawford Notch.

+ + Leaves of the sterile basal shoots relatively narrower, linear, linear-lanceolate, or oblong-linear, the edges usually revolute: outer sepals not exceeding the inner (except in *L. tenuifolia*).

++ Fruiting calyx globular or broadly ovoid, and with the nearly globose capsule mostly rather large for the genus.

= Inflorescence an elongated and usually narrow panicle, with short ascending branches.

**L.\* stricta**, LEGGETT. Appressed silky-pubescent and canescent: stems strict, a foot or more in height, very leafy: leaves and short branches ascending or often appressed, almost linear, 4 to 10 lines long; those of the sterile shoots only 2 or 3 lines in length: capsule globose, light brown, less than a line in diameter. — Leggett in Britton, l. c. 251. *L. minor*, forma *stricta*, Gray, ms. Syn. Fl. — Prairies of Illinois, Vasey, Bebb; Iowa and Wisconsin (acc. to Britton); Minnesota (acc. to E. J. Hill) and (?) to Belleville, Canada, Macoun. A well marked inland type but more doubtful in its eastern extension. Nearly related forms from Maine, Fernald, are probably better referred to the following.

**L.\* intermedia**, LEGGETT. Usually about a foot and a half high, not canescent nor silky-villous but finely strigose-pubescent: stem leaves narrowly oblong, acute or acutish at both ends, 6 to 12 lines long,  $\frac{3}{4}$  to  $1\frac{1}{2}$  lines broad: elongated panicle rather dense: capsule globose, a line or more in diameter, larger than in the related species. — Leggett in Britton, l. c. 252. ? *L. minor*, Pursh, Fl. i. 91; ? Hook. Fl. Bor.-Am. i. 72; Gray, ms. Syn. Fl., & Man. ed. 6, 77, in part; not Linn. nor Walt. nor Lam. — Dry rocky soil, very common from New Brunswick and Canada to Pennsylvania.

= = Inflorescence much broader, pyramidal or subcorymbose: branches slender and delicate, widely spreading.

**L.\* Leggettii**, BRITTON & HOLLICK. Ten inches to a foot and a half high, slender, finely strigose pubescent or glabrate: cauline leaves linear, 5 to 10 lines long, usually acute at both ends; those of the sterile shoots linear to oblong-linear, 2 or 3 lines long, scarcely over half a line wide: panicle diffuse, flowers mostly terminal and subterminal or shortly racemose at the ends of the slender branches: capsule obovoid, three fourths line in diameter: outer sepals shorter than or barely equalling the inner, the latter (at least in some cases) indistinctly 3-nerved. — Torr. Club, Prelim. Cat. N. Y. 6; Britton, Bull. Torr. Club, xxi. 251. *L. Leggettii*, var. *pulchella*, Britton & Hollick, l. c. Lamarck's *L. minor*, placed here by Britton, is a very poor and dubious sketch. — Dry soil, Long Island and New Jersey to Virginia and (acc. to Britton) west to Indiana. Distinguished from the following in its sepals, taller habit, and less distinctly racemose inflorescence.

**L. tenuifolia**, MICHX. Low, diffuse, slender, minutely appressed-pubescent or glabrous, or the caespitose radical shoots more pubescent: leaves all small and narrow; of the radical shoots 2 lines long not half a line wide; cauline filiform-linear and in the diffuse racemose-paniculate inflorescence reduced to small subulate bracts: flowers mostly very short-pedicelled: sepals wholly destitute of lateral ribs: capsule ovoid-globose. — Fl. i. 77; Pursh, Fl. i. 91; Ell. Sk. i. 185. *L. minor*, vars.  $\beta$  &  $\gamma$ , Torr. & Gray, Fl. i. 154. *L. thesioides*, Spach in Hook. Comp. Bot. Mag. ii. 285. — Dry and sterile soil, especially in pine barrens, E. Massachusetts to Florida, Texas, Arkansas, and Illinois.<sup>1</sup> (Cuba.)

+ + Smaller-flowered: fruiting calyx narrower: capsule ellipsoidal.

**L. racemulosa**, LAM. Erect, a foot or less high, with some soft silky pubescence when young, soon nearly glabrous except the radical shoots: leaves less rigid, broad for the section, mucronate; those of the radical shoots hirsutely pubescent when young, narrowly oblong, 2 or 3 lines long; cauline oblong-linear, 4 to 6 lines long, of the branchlets narrowly

<sup>1</sup> Northwest to Wisconsin, acc. to Britton, l. c. 250.

linear: inflorescence loosely racemose-paniculate, effuse; the pedicels commonly slender and spreading: fruiting calyx obovoid-oblong, glabrous. — Ill. ii. 423, t. 281, f. 3; Poir. Suppl. iii. 340 (describing more pubescent form than usual); Michx. Fl. i. 77. — Dry and rocky soil, Long Island, N. Y.,<sup>1</sup> to Florida and Kentucky.

**L. pátula**, LEGGETT. About a foot high, very copiously and effusely branched, appressed-pubescent and glabrate: branches filiform: leaves of radical shoots not seen; cauline linear or lower oblong-linear, 2 or 3 lines long, of branchlets subulate: flowers racemose-paniculate, short-pedicelled: calyx glabrate, rather shorter than the narrowly ellipsoid capsule. — Bull. Torr. Club, vi. 251; Curtiss, distr. N. Am. Pl. 231\*\*. — Dry pine barrens, S. Carolina to Florida, *Ravenel*, *Curtiss*.

**L. Torrèyi**, LEGGETT. Erect and slender, 2 feet high, with ascending branches, cinereous-puberulent or sparsely pubescent: leaves of radical shoots unknown; cauline narrowly linear, 3 to 6 lines long, alternate, ascending, uppermost reduced to minute bracts of the racemiform branches of the loose panicles: pedicels short: calyx externally canescent, little over half line long: immature capsules oval and triangular. — Leggett in Wats. Bibl. Index, 81. *L. racemulosa*, Hook. Jour. Bot. i. 193, not Lam. — Pine barrens of Florida,<sup>2</sup> *Drummond*; *Chapman*, *Torrey fide Leggett*.

§ 2. **LECHÍDIUM**, Torr. & Gray. Inflorescence at length racemiform and secund (pedicels distant from the bracts): placentæ firm and thick, at length crustaceous, plane, in dehiscence bearing on their back the firm dissepiments, which separate from the valves: apparently no radical depressed leafy branches. — Fl. i. 154. *Lechidium*, Spach in Hook. Comp. Bot. Mag. ii. 286.

**L. Drummóndii**, Torr. & Gray. A span to a foot high, with many slender stems from a somewhat lignescent base (or root possibly lignescent-annual), cinereous-puberulent, diffusely branched: leaves all very narrow- or filiform-linear, the larger half inch long: fructiferous pedicels slender, spreading or decurved: calyx and enclosed capsule globose. — Fl. i. 154; Gray, Gen. Ill. i. 206, t. 89; not Spach. *Lechidium Drummondii*, Spach in Hook. Comp. Bot. Mag. ii. 287, & Ann. Sci. Nat. ser. 2, vi. 372. *Linum San Sabeaenum*, Buckley, Proc. Acad. Philad. 1861, 450. — Sandy woods, Texas, *Berlandier*, *Drummond*, *Wright*, *Hall*, *Reverchon*. Reported from Kansas by Dr. Oyster.

## ORDER XIV. VIOLACEÆ.

By A. GRAY.

Herbs (except in the tropics), with watery juice, somewhat acrid, alternate (rarely opposite) and simple stipulate leaves, and axillary inflorescence. Flowers hermaphrodite, irregular but symmetrical and 5-merous throughout, except that the carpels of the one-celled pistil are three instead of five. Sepals nearly alike and persistent. Petals imbricated in the bud and the lower one different from the others. Stamens 5, with very short filaments or none, but broad connectives at top projecting beyond the adnate-introrse two-celled connivent or connate anthers. A single more or less club-shaped style and a single stigma. The three few-many-ovulate placentæ of the ovary parietal. Fruit a 3-valved capsule, with valves placentiferous in the middle. Seeds rather large, firm-coated, anatropous, having a large and straight embryo with broad and flat cotyledons nearly the length of the fleshy albumen. Valves of the capsule in drying after dehiscence condupli-

<sup>1</sup> Eastward to Martha's Vineyard, acc. to Britton, l. c. 248.

<sup>2</sup> To South Carolina, *Mellichamp*, and S. Virginia, acc. to A. A. Heller, Bull. Torr. Club, xxi. 23.

cately infolding, the gradually increasing pressure at length projecting the hard-coated seeds. (Ours all have decidedly irregular flowers: *Sauvagesiaceæ* we exclude.)

\* Sepals produced at base beyond the insertion into auricles.

1. **VIOLA.** Lower petal produced at base into a nectariferous spur or deep sac; the others of about equal length. Filaments very short or none. anthers connivent but distinct, at most lightly coherent, the two anterior each with a dorsal appendage or spur projecting into the sac or spur of the lower petal. Style often flexuous below, enlarged upward; stigma various. Capsule ovoid, crustaceous or coriaceous: valves several-seeded. Seeds obovoid or globular, smooth. Scape or peduncle 1-flowered, 2-bracteolate. Also some cleistogamous flowers, more fertile than the normal.

\* \* Sepals not auriculate or appendaged at base: capsule, seeds, &c. nearly of *Viola*: style as in most Violets club-shaped, the apex abruptly antrorse and beak-like, tipped with the small stigma.

2. **SOLEA.** Sepals linear and equal. Petals nearly equal in length, connivent almost to tip; lower one much larger, saccate at base, emarginate at the broad apex. Stamens with extremely short filaments and broad connectives wholly connate into an ovoid sac, open only between the free tips, a rounded or 2-lobed scale-like gland adnate to the base anteriorly.

3. **IONIDIUM.** Sepals somewhat equal, or the posterior smaller. Petals very unequal; two upper shorter; lower longest and largest, concave or slightly saccate at base, contracted in the middle. Stamens with distinct filaments or hardly any, the two anterior with a scale-like gland or sometimes a spur at base; the connective broad and merely connivent.

1. **VÍOLA**, Tourn. **VIOLET.** (Classical Latin name, digammated form of the Greek *ῥοι*.) — Widely diffused genus, chiefly of low herbs, mostly of temperate regions and the northern hemisphere; flowering in spring and early summer (but autumnal flowers of the conspicuous sort by no means infrequent), most of our species inodorous or faintly sweet-scented. Cleistogamous flowers, of greater fertility, produced by most species after the normal flowering. Leaves involute in the bud, in several caulescent species punctulate with brownish dots at maturity. — Inst. 419, t. 236; L. Gen. no. 679; Gray, Gen. III. i. 185, t. 80.

§ 1. Perennials: stipules never emulating the blade of the leaf; radical or lower ones more or less scarious: two upper petals turned backward and lateral ones forward toward the lower or merely spreading.

\* Strictly acaulescent; the (dissected) leaves and scapes all directly from a thick and short erect and proliferous-branched fleshy caudex, not at all stoloniferous: corolla saccate-spurred, beardless, not yellow: gibbous-clavate style bearing a rather large antrorse-terminal beakless stigma and beardless.

**V. pedáta**, L. Tuberous caudex often an inch wide and not longer: glabrous or mostly so: leaves pedately 9-12-parted, or 3-divided and the lateral divisions 3-4-parted, the lobes, &c., from linear to spatulate, some 2-3-dentate at apex: petals half to three fourths inch long, spatulate-obovate, light violet, or deeper, occasionally variegated, or as in all these species varying to white, obscurely or not at all lineate toward base. — Spec. ii. 933; Curtis, Bot. Mag. t. 89; Andr. Bot. Rep. t. 153; Sweet, Brit. Fl. Gard. t. 69; Torr. & Gray, Fl. i. 136; Meehan, Native Flowers, ser. 1, i. t. 26. — Sandy soil, New England near the coast to W. Florida, W. Louisiana, Indian Territory, and northwest to Minnesota.

**Var. bicolor**, PURSH. Two upper petals dark violet-purple as if velvety, in the manner of Pansy. — Pursh, *vide* Raf. in DC. Prodr. i. 291; Gray, Man. ed. 5, 79. *V. pedata*, var. *atropurpurea*, DC. Prodr. i. 291. *V. flabellifolia*, Lodd. Bot. Cab. t. 777, pale lateral petals spreading. *V. pedata*, var. *flabellata*, Don in Sweet, Brit. Fl. Gard. ser. 2, t. 247, figured and described as having lateral petals recurved-ascending with the two upper! — Sparingly with the type in the Eastern States, but abundant on shales in Maryland and District of Columbia.

\* \* Strictly acaulescent; the leaves and scapes directly from rootstocks (or rarely from runners): gibbous-clavate style with inflexed or truncate and beardless summit and an antrorsely beaked or short-pointed small proper stigma.

+ Rootstocks thick and comparatively short, ascending or little creeping, never filiform or producing runners or stolons, commonly scaly-toothed or knobby by persistent thickened bases of petioles: corolla only saccate-spurred, blue or violet-purple with occasional white varieties; lateral and sometimes other petals bearded toward base. Species or forms widely different in extremes as to foliage, but running together: cleistogamous flowers abundant and short-peduncled, close to the ground.

**V. pedatifida**, DON. Mostly puberulent: leaves imitating those of the preceding species, all pedately dissected or flabellately multifid into linear divisions or lobes: flowers smaller and more blue than in *V. pedata*, just as in the following. — Syst. i. 320. *V. pinnata*, Richards. in Franklin 1st Journ. ed. 1, App. 734 (reprint, p. 6), not L. which has longer and narrower spur. *V. pedata*, Hook. Fl. Bor.-Am. i. 74, mainly (excl. syn.); Macoun, Cat. Canad. Pl. 63. *V. delphinifolia*, Nutt. in Torr. & Gray, Fl. i. 136; Gray, Man. ed. 5, 78. — Prairies, Saskatchewan to Illinois, Colorado, and New Mexico. Occasional similar specimens occur in New England.

**V. palmáta**, L. From glabrous to villous-pubescent: earlier leaves roundish-cordate or reniform and merely crenate; later ones or some of them very various, palmately or pedately or hastately (or even subpinnately) lobed or cleft or parted, the divisions or lobes from obovate to linear. — Spec. ii. 933 (Gronov. Virg. 182; Pluk. Mant. 187, & Alm. t. 447, f. 9); Walt. Car. 218; Sims, Bot. Mag. t. 535; Michx. Fl. ii. 151 (including all the forms); Reichenb. Ic. Pl. Crit. i. 37, t. 41, 42; Torr. & Gray, l. c. 137. *V. cucullata*, var. *palmata*, Gray, Man. ed. 2, 43; Willis, Cat. Pl. N. J. 8. *V. ranunculifolia*, Juss. in Poir. Dict. viii. 626. *V. digitata*, Pursh, Fl. i. 171, form with much dissected leaves, answering to *V. septemloba*, Le Conte, from whom he had it. *V. heterophylla* (Muhl. Cat.), *palmata*, *congener* (*triloba*, Schwein.), & *septemloba*, Le Conte, Ann. Lyc. N. Y. ii. 139-141, &c. *V. edulis*, Spach, Hist. Veg. v. 508, superfluous name. — Moist or dryish ground, Nova Scotia and Canada to Florida and Texas, in rich or wet soil disposed to produce only undivided leaves, i. e. to become

**Var. cuculláta**, GRAY. Leaves all without division, variously rounded-cordate or reniform, or hastate-reniform, &c., the basal sides, especially in the later and enlarging leaves cucullate-involute. — Bot. Gaz. xi. 254. *V. obliqua*, Hill, Hort. Kew. 316, t. 12; Ait. Kew. iii. 288 (pale-flowered form); not Pursh. *V. cucullata*, Ait. l. c.; Sims, Bot. Mag. t. 1795; Don in Sweet, Brit. Fl. Gard. ser. 2, t. 298; & of authors generally. *V. sororia*, Willd. Enum. 263, & Hort. Berol. t. 72; Reichenb. l. c. 39, t. 44, f. 94. *V. papilionacea*, Pursh, Fl. i. 173. *V. asarifolia*, Pursh, Fl. ii. 732, late and large-leaved state. *V. cordata* & *V. villosa*,<sup>1</sup> Walt. l. c. 219 (*V. cordifolia*, Schwein. Am. Jour. Sci. v. 62, and *V. villosa*, var. *cordifolia*, Nutt. Gen. i. 148) are mainly vernal forms of drier or more sterile ground, and apt later to produce lobed leaves. *V. affinis*, & *V. congener*, Schwein. Am. Jour. Sci. v. 138, 140. *V. cucullata*, *affinis*, & *asarifolia*, Le Conte, l. c. 137-141. *V. cucullata*, var. *striata*, Willis, l. c., a form with pale petals and darker stripes. White or variegated flowers not uncommon. — Same range, and extending to mountains westward, from Brit. Columbia to Arizona. Most polymorphous; any of the forms may present some lobed or cleft leaves; but these are common in sterile soil.

**V. sagittáta**, ARR. From villous to glabrous: leaves from oblong-ovate or cordate-oblong to lanceolate, often with hastate (rather than sagittate) or subcuneate base; earlier with short and margined petioles and crenulate or almost entire; later longer-petioled and often hastately laciniate-lobulate at base: flowers comparatively large and bright violet-blue.

<sup>1</sup> These forms appear sufficiently noteworthy to receive varietal distinction as follows: Var. *VILLOSA*, Robinson, n. var. Leaves smaller, prostrate or nearly so, neither cucullate nor (with rare exceptions) lobed, either villous-pubescent and somewhat silvery (*V. villosa*, Walt.) or green and nearly glabrous (*V. cordata*, Walt.). — With the other varieties and intergrading with both the lobed and cucullate forms, yet generally distinguishable in sterile soil of the Southern Atlantic States. The contour of the leaf, varying upon the same individual from reniform to ovate and acute, forms no satisfactory distinction.

—Kew. iii. 287; Pursh, l. c. 172; Reichenb. l. c. 38, t. 42, f. 88; Torr. & Gray, Fl. i. 138; Lodd. Bot. Cab. t. 1471; Gray, Man. 45, & Gen. Ill. i. 186, t. 80; Meehan, Nat. Flowers, ser. 1, i. t. 33; Sprague & Goodale, Wild Flowers, t. 9. *V. primulifolia*, Pursh, Fl. i. 173. *V. dentata*, Pursh, Fl. i. 172; Lodd. l. c. t. 1485. *V. ciliata*, Muhl. Cat. 26. *V. ovata*, Nutt. Gen. i. 148; Bigel. Fl. Bost. ed. 2, 96. *V. fimbriatula*, Smith in Rees, Cycl. xxxviii. *V. Alleghaniensis*, Rœm. & Schult. Syst. v. 360. *V. sagittata*, *ovata*, & *emarginata*, Le Conte, l. c. 142-143.<sup>1</sup> — Gravelly and sandy moist or nearly dry ground, Nova Scotia and Canada to Florida, Texas, and Minnesota. Some forms pass into *V. palmata*.

+ + Rootstocks thickish and creeping, commonly sending off leafy and floriferous stolons or runners above ground: corolla blue or violet, with white varieties; lateral petals usually bearded; spur short and saccate: leaves round-cordate and merely crenulate.

**V. Langsdórfii**, FISCHER. A span or two high: radical petioles often 6 or 8 inches long: stoloniferous shoots when present short and ascending, becoming 2-3-leaved floriferous stems with rather large stipules: flower large, three fourths to full inch long; thick saccate spur as broad as long. — DC. Prodr. i. 296; Hook. Fl. Bor.-Am. i. 77; Ledeb. Fl. Ross. i. 250; Maxim. Diag. Pl. Nov. Asiat. i. 741. *V. mirabilis*, var. *Langsdórfii*, Regel, Bull. Soc. Nat. Mosc. xxxv. 240, t. 6, f. 24-29, but broad spur and scaly rootstock unlike *V. mirabilis*. — Arctic Alaska and Islands to Brit. Columbia.<sup>2</sup>

**V. ODORÁTA**, L. (SWEET VIOLET.) More or less pubescent, proliferous by long stolons: stipules glandular: flowers fragrant. — Spec. ii. 934. — Escaped from cultivation in various places. (Sparingly nat. from Eu.)

+ + + Rootstocks long and filiform (not thickened nor scaly except somewhat at base of older flowering plants), extensively creeping underground: plants low or small.

+ + Corolla blue or purple.

**V. Selkirkii**, PURSH, *vide* GOLDIE. Leaves from rounded- to ovate-cordate and with deep narrow sinus, serrate, commonly acutish (at first half inch, in age inch or two long), upper face hirsute-pubescent: sepals acute or acuminate: petals beardless, violet-blue, 3 or 4 lines long, little longer than the stout and very blunt cylindraceous spur. — Edinb. Phil. Jour. vi. 324 (1822); Hook. Fl. Bor.-Am. i. 75; Torr. & Gray, Fl. i. 137; Gray, Man. ed. 5, 78; Franch. & Savat. Enum. Pl. Jap. i. 41, & ii. 284; Maxim. l. c. 730. *V. Kamtschatica*, Ging. Linnæa, i. 406 (1826); Regel, Bull. Soc. Nat. Mosc. xxxv. 227, t. 6, f. 7-15. *V. umbrosa*, Fries, Novit. 271 (1828), &c. *V. borealis*, Weinm. Linnæa, x. 66. — Damp woods, New Brunswick and Nova Scotia to mountains of Massachusetts and Pennsylvania, Upper Michigan, Minnesota, and northward. (N. Eu. to Kamtsch., &c.)

**V. palustris**, L. Wholly glabrous: leaves reniform-cordate, with rounded summit and open sinus, crenulate (mostly an inch and in age often 2 inches broad): sepals ovate, obtuse: petals light blue or lilac (rarely white or nearly so), all nearly beardless, 3 or 4 lines long; spur short and saccate. — Spec. ii. 934; Fl. Dan. 83; Reichenb. Ic. Fl. Germ. iii. t. 2; Ging. in DC. Prodr. i. 294 (excl. var. *Pennsylvanica*, which, unless from White Mountains, must be a small form of *V. cucullata*, under which name Bigelow sent it); Torr. & Gray, Fl. i. 139; Gray, Am. Jour. Sci. ser. 2, xxxiii. 404; Wats. Bot. King Exp. 34. *V. epipsila*, Ledeb. is probably a variety of this. — Damp and shady ground, Labrador and alpine region of mountains of New England to Saskatchewan, and northward; higher Rocky Mountains in Colorado, and north to those of Washington and to arctic Alaska. (Eu., N. Asia.)

+ + + Corolla always white, mostly with brown-purple lines on lower or also on lateral petals, or lower purple-tinged; lateral ones bearded or beardless in the same species; spur short and saccate: stigma as if truncate and margined and antrorsely short-pointed. The three species seemingly run together.

— Leaves round-cordate or reniform, on slender marginless petioles.

<sup>1</sup> The recently published *V. sagittata*, var. *Hicksii*, C. L. Pollard, Bot. Gaz. xx. 326, with pubescent ovate-oblong cordate unlobed leaves, is one of several freely intergrading forms. The "recurved fruiting peduncles" and distinctly mottled seeds are not infrequently associated with quite different foliage.

<sup>2</sup> Southward apparently to Oregon (*Howell*, nos. 631, 1489), where the rootstock is more elongated and slender.

**V. blánda**, WILLD. Commonly glabrous or nearly so, and with only subterranean filiform rootstocks: leaves thin, crenulate, from ovate-cordate to round-reniform, at blossoming from half inch to inch and a half long: scapes 1 to 3 inches high: flowers faintly sweet-scented: sepals from oblong- to almost ovate-lanceolate: petals 3 or 4 lines long, usually all beardless; lower one usually conspicuously dark-veiny. — Hort. Berol. t. 24; Pursh, Fl. i. 172; Reichenb. Ic. Pl. Crit. i. 43, t. 51, f. 104; Le Conte, l. c. 144; Gray, Man. ed. 5, 77; Sprague & Goodale, Wild Flowers, t. 21.<sup>1</sup> — Low or wet and mostly open grounds, common from Newfoundland to N. Carolina north and west to Mackenzie River, lat. 66°, Brit. Columbia, and mountains of California.

**Var. palustrifórmis**, GRAY. Larger form, growing in shady and mossy ground or leaf-mould, where it is freely stoloniferous: leaves comparatively large, their upper face commonly and sparsely hirsutulous in the manner of *V. Selkirkii*, but less so: flowers rather larger; the petals usually 5 lines long; lower one less striate-veiny and lateral oftener bearded: scapes and tip of spur usually reddish or purplish. — Bot. Gaz. xi. 255. *V. obliqua*, Pursh, l. c., not Hill. *V. clandestina*, Pursh, l. c. 173, according to Torr. & Gray, Fl. i. 139, but probably not so, although this is freely cleistogamous. *V. amæna*, Le Conte, l. c. 144. *V. palustris* (Hook. f. Arct. Pl.), Wats. Bot. King Exp. 34.<sup>2</sup> — Canada to Delaware, and in Rocky Mountains, &c.: passes into the type, resembles *V. palustris* (with which Hooker would unite the whole), but has white corolla, narrower and acute or acutish sepals, &c.

**Var. renifólia**, GRAY, l. c. From slightly to strongly pubescent with soft and spreading multicellular hairs; but upper face of reniform leaves mostly quite glabrous: sepals lanceolate: petals usually beardless. — *V. renifolia*, Gray, Proc. Am. Acad. viii. 288. — Wet mossy woods and swamps, Nova Scotia to the country north of Lake Superior, Minnesota, and south to Massachusetts, W. New York, &c.

== Leaves from linear to spatulate or ovate or subcordate, the base decurrent into, a margined petiole: sometimes leafy along (chiefly subterranean) summer stolons.

**V. primulæfólia**, L. Glabrous or pubescent: leaves from deltoid-ovate or subcordate and acute to ovate or oblong with either obtuse or tapering base: flowers of the preceding: lateral petals oftener bearded. — Spec. ii. 934; Le Conte, l. c. 145; Reichenb. l. c. t. 45, f. 96; Torr. & Gray, l. c. 139. *V. acuta*, Bigel. Fl. Bost. ed. 2, 95. — Damp or almost dry soil, Lower Canada and New Brunswick to Florida and Louisiana, especially toward the coast.<sup>3</sup> Varies nearly to preceding and to following.

**Var. occidentális**, GRAY, l. c. Glabrous form, with oblong-ovate or spatulate-oblong leaves, all narrowed at base, apparently quite like eastern plants, was coll. at Waldo, S. W. Oregon, by Howell.

**V. lanceoláta**, L. Glabrous: leaves from broadly lanceolate or some earliest oblong-spatulate to linear or nearly so, attenuate at base, callous-denticulate: petals beardless; lower one often much colored. — Linn. l. c. (excl. pl. Sibir.); Michx. Fl. ii. 150; Pursh, l. c. 172; Lodd. Bot. Cab. t. 211; Reichenb. l. c. t. 52, f. 106; Sweet, Brit. Fl. Gard. t. 174; Gray, Man. ed. 5, 77. *V. attenuata*, Sweet, Hort. Brit. 37.<sup>4</sup> — Low and grassy ground, Nova Scotia, to L. Superior, and south to Florida and Texas.

++ ++ ++ Corolla yellow: otherwise nearly of last preceding section, but adult leaves much more accrescent.

**V. rotundifólia**, MICHX. Minutely pubescent when young, glabrate: leaves round-ovate and cordate with narrow or overlapped sinus, repand-crenulate, in flower seldom over inch long, becoming in summer 3 to 5 inches in diameter and flat on the ground, then lucid; base of some or all the petals lineate or sometimes tinged with brown-purple; lateral ones usually bearded. — Fl. ii. 150; DC. Prodr. i. 295; Torr. & Gray, l. c. 138; Reichenb. Ic.

<sup>1</sup> The recently published *V. Macloskeyi*, F. E. Lloyd, Erythea, iii. 74, is with little doubt a form of this species. Here as elsewhere in the genus small weak plants are apt to produce reduced flowers (with thin greenish or colorless petals), transitions from the cleistogamous ones (?).

<sup>2</sup> Add syn. *V. blanda*, var. *amæna*, Britt. Sterns & Poggenb. Torr. Club. Prelim. Cat. N. Y. 6.

<sup>3</sup> Also reported as far inland as Minnesota, by Upham, and by MacMillan.

<sup>4</sup> Add syn. *V. parva*, A. B. Simonds & others, Fl. Fitchburg, Mass., 7, as to character.

Bot. Exot. ii. t. 124; Gray, l. c. *V. clandestina*, Pursh, Fl. i. 173 (cleistogamous summer state), from descr. & habitat. — On slopes in cold and damp woods, Nova Scotia and Lower Canada to Penn.,<sup>1</sup> and along higher mountains to N. Carolina; first coll. by Michaux.

\* \* \* Low-caulescent only by stoloniform flowering branches or by ascending 2-3-leaved stems, slender, almost glabrous, multiplying by long filiform rootstocks: leaves reniform or cordate and only crenulate-denticulate: corolla pure light yellow, with short saccate spur: stigma terminal, beardless and beakless.

**V. sarmentósa**, DOUGL. Rootstock thickened and stipular-scaly under old flowering plants, bearing a cluster of roundish-cordate (in age brown-punctate) leaves and scapes of about the length of the petioles, later producing long leafy runners bearing axillary flowers: stipules brown-scarious, ovate-subulate: petals about 4 lines long; spur very short and broad: stigma obscurely margined. — Dougl. in Hook. Fl. Bor.-Am. i. 80; Torr. & Gray, Fl. i. 143. — Coniferous woods, Idaho and northward to Brit. Columbia, thence south to Coast Mountains of California; first coll. by Douglas.

**Var. orbiculáta**, GRAY, n. var. Leaves round-reniform, more lucid: leafy runners few and short, bearing only cleistogamous flowers. — *V. orbiculata*, Geyer in Hook. Lond. Jour. Bot. vi. 73. ? *V. rotundifolia*, Hook. l. c. — Mountains of Idaho and Washington, Geyer, Suksdorf.

**V. biflóra**, L. Flowering rarely from the rootstock, 1-2-flowered at summit of span high 2-3-leaved ascending stems: leaves round-reniform (about inch wide): stipules of cauline leaves green, ovate or oblong, obtuse: saccate spur conical: stigma margined on two sides. — Spec. ii. 936; Fl. Dan. t. 46; Sims, Bot. Mag. t. 2089; Reichenb. Ic. Fl. Germ. iii. t. 1, f. 4489; Gray, Am. Jour. Sci. ser. 2, xxxiii. 404. — Rocky Mountains of Colorado, Parry, Hall & Harbour. (Kamtsch. and Japan to Eu.)

\* \* \* \* Subcaulescent, first flowering from the ground, and later usually more caulescent (producing ascending or erect leaf-bearing stems a span or two high) on slender shoots from erect or ascending rootstocks, not stoloniferous or creeping: stipules partly and variably adnate: corolla wholly or partly yellow (except in last two species) and with short-saccate spur: stigma beakless, sometimes with a short lip, concave, mostly orbicular, antrorse-terminal or slightly oblique at the large and gibbous clavate summit of the style, bearded below its margin on each side by a tuft, or sometimes by nearly a ring, of stiff and reflexed or spreading bristles. Western species, one also cismontane.

+ Leaves undivided, round-ovate or subcordate to lanceolate: lateral petals either slightly bearded or beardless in the same species.

++ Ovary and oval capsule glabrous.

**V. pedunculáta**, TORR. & GRAY. Barely puberulent: short-caulescent stems commonly ascending from filiform subterranean base and soon spreading: leaves round-ovate or dilated subcordate, mostly repand-dentate (5 to 10 lines or at length inch and a half long), comparatively long-petioled: stipules narrow, uppermost often sparingly toothed: flower large, on peduncle (2 to 5 inches long) much surpassing the leaves: petals half inch long or more deep golden yellow, with brown-purple lines at base and upper ones sometimes particolored with same: sepals lanceolate. — Fl. i. 141; Hook. Bot. Mag. t. 5004; Brew. & Wats. Bot. Calif. i. 56; Fl. Serres, xxiii. t. 2426. — California, from San Francisco Bay to San Diego, and nearly to Arizona.

**V. Nuttállii**, PURSH. Villous-pubescent, glabrate, or nearly glabrous: leaves ovate to oblong-lanceolate, obtuse, entire or slightly repand-crenate or barely denticulate, more or less decurrent into long margined petiole: stipules narrow, entire: peduncles shorter than or rarely surpassing the leaves, and light yellow petals 4 or 5 lines long, or (in var. *major*, Hook.) longer than the leaves, and petals half inch or so long: sepals lanceolate to linear, acute. — Fl. i. 174; Nutt. Gen. i. 151; Hook. Fl. Bor.-Am. i. 79, t. 26; Wats. Bot. King Exp. 35, excl. var.; Brew. & Wats. Bot. Calif. i. 57. *V. premorsa*, Hook. Fl. Bor.-Am. i. 80, partly, as to pl. Scouler; Torr. & Gray, l. c.; not Dougl. in Lindl. *V. linguefolia*, Nutt. in Torr. & Gray, l. c. — Plains of Kansas, Dr. L. Watson, and Colorado to Saskatchewan, Brit. Columbia, and south to Centr. California.

<sup>1</sup> Jefferson Co., Indiana? *Hubbard*, and reported from Minnesota by Upham and MacMillan.

++ ++ Ovary and globular capsule pubescent.

**V. præmorsa**, Dougl. Puberulent or cinereous-pubescent, sometimes glabrate: caudex either short and rather stout, or longer and slender: leaves ovate or subcordate to oblong-lanceolate, or some even linear-lanceolate, from undulate or obtusely serrate to irregularly dentate (blade half inch to inch or more long): upper stipules lanceolate, mostly laciniate: peduncles usually much surpassing the leaves: sepals lanceolate or linear, acute: petals from a third to half inch long, bright yellow, or brownish-tinged outside, sometimes two upper purple-brown. — Dougl. in Lindl. Bot. Reg. t. 1254; Hook. Fl. Bor.-Am. i. 80, as to pl. Dougl. *V. præmorsa* (small form), & *V. Nuttallii*, Benth. Pl. Hartw. 298. *V. Nuttallii*, var. *præmorsa*, Wats. Bot. King Exp. 35. *V. aurea*, Kellogg, Proc. Calif. Acad. Sci. ii. 185, t. 54; Brew. & Wats. l. c. 56. *V. Brooksii*, Kellogg,<sup>1</sup> Calif. Horticulturist, ix. 281. — Gravelly or sandy soil, S. W. Idaho and Washington to W. Nevada<sup>2</sup> and S. (and Lower) California, extending to the higher mountains; in very variable forms.

**Var. venosa**, Gray, n. var. (*V. Nuttallii*, var. *venosa*, Wats. Bot. King Exp. 35, *V. aurea*, var. *venosa*, Brew. & Wats. Bot. Calif. i. 56, and *V. purpurea*, Kellogg, Proc. Calif. Acad. Sci. i. 56) is a depressed or reduced form of the higher and drier Cascade Mountains and Sierras, commonly with laciniate-dentate and more veiny (often purple-veined) leaves.

+ — Leaves dissected: mainly subcaulescent; the cluster of slender stems mainly subterranean from a short and usually deep fascicled-rooted rootstock or caudex: peduncles therefore scapiform, least so in the last species.

++ Petals beardless, yellow or upper merely brownish.

**V. chrysántha**, Hook. Leaves mostly bipinnately dissected into linear lobes, short-pubescent or glabrate: petals half inch long or smaller, deep orange-yellow, commonly with some brown-purple lines, upper ones often partly and sometimes largely brown-purple. — Ic. t. 49; Torr. & Gray, Fl. i. 143, 671; Brew. & Wats. Bot. Calif. i. 58; not Schrad., which is of no account. *V. Douglasii*, Steud. Nomencl. ed. 2, 771.<sup>3</sup> — Open and dry ground, California, from Mendocino Co. to San Diego, first coll. by Douglas.

**V. Sheltónii**, Torr. Glabrous, slender: leaves of orbicular outline, palmately 3-divided, the obovate-cuneate divisions palmately or pedately 3-parted or again cleft into linear-spatulate or oblong-linear obtuse lobes: petals beardless, pale yellow, a third to nearly half inch long. — Pacif. R. Rep. iv. 67, t. 2; Brew. & Wats. l. c. — Mountains of California from Colusa and Plumas Co.<sup>4</sup> (first coll. by Mr. Shelton) to S. Oregon, Howell, partly cleistogamous; hillsides in White Salmon Valley, Washington, Suksdorf. The stigma is subtended by two small bearded tufts, as in the others.

++ ++ Lateral petals with a tuft of beard; upper ones deep blue or violet purple.

**V. Beckwithii**, Torr. & Gray. Hirsutulous-pubescent, sometimes nearly glabrous: leaves of rounded outline, palmately about thrice 3-parted into linear or spatulate-linear obtuse (or barely mucronulate) lobes; primary divisions more or less petiolulate: petals nearly half inch long; lateral and lower ones light blue or bluish or white and purple-veined, with merely yellowish base. — Pacif. R. Rep. ii. 119, t. 1; Wats. Bot. King Exp. 35; Brew. & Wats. Bot. Calif. i. 58 (in latter lower petals inadvertently described as yellow). *V. montana*, Kellogg, Proc. Calif. Acad. Sci. i. 56. — From N. W. Nevada (Diamond Mountain, Beckwith) and adjacent Sierra Nevada, California to Oregon.

**V. Hállii**, Gray. Glabrous: leaves of ovate or oblong and irregular outline, subpinnately or pedately about twice parted into lanceolate or linear obscurely veined or nerved or veinless callous-apiculate lobes: stipules variable, upper often enlarged and foliaceous, adnate, laciniate or entire: petals strongly two-colored, lateral and lower yellow or cream-color. — Proc. Am. Acad. viii. 377; Brew. & Wats. Bot. Calif. i. 57. — Dry ground, from Salem, Oregon (where discovered by E. Hall and later coll. by Howell, &c.), to Humboldt Co., California, Rattan.

<sup>1</sup> Add syn. *V. pinetorum*, Greene, Pittonia, ii. 14. *V. purpurea*, var. *pinetorum*, Greene, Fl. Francis. 243.

<sup>2</sup> Yellowstone Nat. Park, Dewart.

<sup>3</sup> Add Greene, Pittonia, ii. 14.

<sup>4</sup> Snow Mountain, Lake Co., Calif., Mrs. Brandegee, Zoe, iv. 171.



**V. trinerváta**, HOWELL. Glabrous: leaves once or twice pedately or palmately 3-5-parted or divided; the lateral divisions upturned; all lanceolate or ovate-lanceolate, tapering to a mostly acute callous apex, thickish and firm, at length coriaceous, and prominently 3-ribbed, lateral ribs intramarginal: stipules small and entire, free or nearly so: lower petals "yellow": stigma with a beak-like lip. — Howell in distr., & (under var. ? of *Beckwithii*) Bot. Gaz. viii. 207; Gray, *ibid.* xi. 290. *V. chrysantha*, var. *glaberrima*, Torr. Bot. Wilkes Exped. 238. — Dry prairies or rocky ground, Washington; between the Spipen and the Columbia, *Pickering & Brackenridge*, and *Klikitat Co., Howell, Suksdorf*.<sup>1</sup>

\* \* \* \* \* Caulicent; the few-several-leaved stems erect from short or creeping rootstocks, no stolons, no radical flowers: spur of corolla short and saccate: lateral petals commonly with a little papillose beard: stigma beakless, more or less bearded at the sides.

+ Petals yellow: stems mostly naked at base, few-leaved and few-flowered above, at least the early and main stems.

++ Leaves all or some cleft or incised, or hastate, not round-cordate: plants glabrous or pubescent, the simple long naked stems rarely over a span or two high.

**V. lobáta**, BENTH. Leaves very various, dilated-reniform or flabelliform in outline, pedately or digitately 3-9-lobed, parted, or only lacinate, the lobes from linear to ovate: upper stipules usually large and foliaceous: petals half inch or less in length, the upper often brownish or purple-tinged. — Pl. Hartw. 298; Torr. Pacif. R. Rep. iv. 68; Brew. & Wats. Bot. Calif. i. 57. *V. Sequoiensis*, Kellogg, Proc. Calif. Acad. Sci. ii. 185, f. 55. — Woods, sparsely from S. California to within the borders of Oregon; first coll. by *Hartweg*, later by *Bigelow, &c.*

**Var. integrifolia**, WATSON, l. c. Ambiguous between this and *V. glabella*: leaves deltoid- or rhombic-ovate, often caudate-acuminate, only the radical cordate. — Sierra Co., California,<sup>2</sup> and adjacent Nevada, *Lemmon*; Waldo, Oregon, *Howell*.

**V. hastáta**, MICHX. Commonly glabrous, with slender stem from a short and horizontal fleshy rootstock: leaves 2 to 4, approximate at summit, lanceolate-hastate to deltoid and subcordate, acuminate or acute, denticulate-serrate; radical usually cordate-ovate: stipules rather small, entire or with few slender teeth: petals quarter inch or more long. — Fl. ii. 149; Pursh, Fl. i. 174; Le Conte, Ann. Lyc. N. Y. ii. 150; Torr. & Gray, Fl. i. 141.<sup>3</sup> *V. gibbosa*, Raf. in DC. Prodr. i. 305. *V. hirta*, Lewis, in DC. l. c. 300, pubescent form. — Rich woods, of the Alleghanies and adjacent lower country, W. Florida to Penn. and N. Ohio; first coll. by *Michaux*.

**Var. tripartíta**, GRAY. Sometimes villous-pubescent: lower leaves 3-parted or 3-foliolate; divisions or leaflets lanceolate or broader, sessile or slender-petiolulate. — Bot. Gaz. xi. 291. *V. tripartita*, Ell. Sk. i. 302; Torr. & Gray, l. c. 142. — Georgia to N. Carolina, an aberrant form.

++ ++ Leaves merely serrate, nearly all cordate. Species, along with the N. Asian *V. uniflora*, L., successively nearly or quite confluent.

**V. glabélla**, NUTT. Glabrous or puberulent, bright green: stems a span to at length often a foot high from a creeping fleshy-dentate rootstock, mostly weak: leaves crenulate-serrate, round-cordate and with a small acumination, or radical reniform; uppermost short-petioled: stipules small, ovate to lanceolate, thin-membranaceous or scarious: capsule oblong, glabrous. — Nutt. in Torr. & Gray, Fl. i. 142; Brew. & Wats. l. c. 57. Maxim. Diag. Pl. Nov. Asiat. i. 752. *V. Canadensis*, var. *Sitchensis*, Bong. acc. to Ledeb. Fl. Ross. i. 255. *V. Canadensis*, Hook. Fl. Bor.-Am. i. 80, as to pl. N. W. Coast, "*V. Scoulerii*, Dougl."; Bong. Veg. Sitch. 125. *V. striata*, Hook. Lond. Jour. Bot. vi. 72, not Ait. *V. biflora*, var. *Sitchensis*, Regel, Bull. Soc. Nat. Mosc. xxxv. 253; Rothrock, Fl. Alaska, 444. — Woods, Alaska and Islands to Monterey and Mariposa Co., California,<sup>4</sup> east to the northern Rocky Mountains, where it seems to pass into *V. pubescens*. (Japan.)

<sup>1</sup> Also N. Yakima, *Nevius*.

<sup>2</sup> And inner Coast Range, acc. to Greene, Fl. Francis. 244.

<sup>3</sup> Garden and Forest, iv. 76, f. 16.

<sup>4</sup> Valley of Kaweah, acc. to Coville, Contrib. U. S. Nat. Herb. iv. 69.

**V. pubescens**, Arr. From soft-pubescent or villous to puberulent: stems erect, often robust: leaves crenate-dentate, mostly obtusely acuminate, round-cordate or uppermost broadly deltoid-ovate, the larger when accrescent often 3 or 4 inches wide: stipules usually ample, broadly ovate to oblong; upper ones membranaceo-herbaceous, commonly serrulate: capsule (often half inch long), varying from glabrous to tomentose, and on same stem from oblong to globular. — Kew. iii. 290; Pursh, Fl. i. 174; Reichenb. Ic. Pl. Crit. i. 45, 92, t. 53, f. 111; Le Conte, l. c. 150; Torr. & Gray, l. c. 142; Sweet, Brit. Fl. Gard. t. 223; Lodd. Bot. Cab. t. 1249; Maxim. l. c. (with *V. scabriuscula* & *eriocarpa*). *V. Pennsylvanica*, Michx. Fl. ii. 149. *V. pubescens* & *eriocarpa*, Schwein. Am. Jour. Sci. v. 74, 75. *V. uniflora*, var. *pubescens*, Regel, l. c. 255. — Rich woods, Upper Georgia to New Brunswick and Canada, Dakota, &c. Passes variously into

**Var. scabriuscula**, Torr. & Gray, l. c. A low form, from minutely or sparsely pubescent to glabrate, and with leaves in age rarely over 2 inches wide: capsule from globular to oblong. — Gray, Man. 78. — With the pubescent form, and more widely distributed, extending southwestward to middle parts of Texas and to Winnipeg. It were better named *glabriuscula* than by the name Schweinitz gave it as a species, as it is not at all scabrous.

+ + Petals white with violet or purple tinge, and yellow or yellowish at base within: stems more leafy toward the base, or more prolonged by successive leaf- and flower-bearing increments until midsummer: stipules small, narrow, entire and scarious or nearly so: capsule oval, glabrous.

**V. Canadensis**, L. Glabrous or slightly pubescent, at length a foot high from branching ascending rootstocks: leaves cordate and mostly acuminate, denticulate-serrate: petals usually pale violet outside and white within with yellowish claws and some purple stripes, sometimes more suffused with violet, or later ones nearly white throughout. — Spec. ii. 936; Michx. Fl. ii. 150; Reichenb. Ic. Pl. Crit. i. 45, t. 54, f. 113; Le Conte, l. c. 148; Sweet, Brit. Fl. Gard. ser. 2, t. 62; Torr. & Gray, Fl. i. 143. — Moist woods, Newfoundland to Saskatchewan and westward, south to the mountains of Carolina, along the Rocky Mountains to those of Utah, Arizona, and New Mexico where it passes into

**Var. scopulorum**, Gray. Small in all its parts, very low, depressed-spreading: leaves at flowering time only 3 to 8 lines long. — Bot. Gaz. xi. 291. — Rocky Mountains of Colorado, in Clear Creek Cañon, *Greene*.<sup>1</sup>

**V. ocelláta**, Torr. & Gray. Pubescent, slender, a span or two high from somewhat creeping rootstocks: leaves cordate or subcordate, seldom acuminate or over an inch or so in length: upper petals violet or with a deep violet spot on upper face; lower white or with some yellow, and purple veins. — Fl. i. 142; Brew. & Wats. Bot. Calif. i. 56.<sup>2</sup> — Woods, especially Redwoods, California, from Mendocino Co.<sup>3</sup> to Monterey; first coll. by *Douglas*.

**V. cuneáta**, Watson. Glabrous, with ascending slender stems a span or two high from rigid creeping rootstocks: leaves an inch or two long, irregularly crenulate or obtusely dentate, radical some cordate, more dilated rhomboid-ovate with cuneate base, cauline similar or more cuneate: flowers of the preceding or all the petals turning violet-purple and beardless. — Proc. Am. Acad. xiv. 290, & Bot. Calif. ii. 433. — Mountain woods, from Shasta and Humboldt Co. to S. W. Oregon, *Rattan*, *Lemmon*, *Howell*.

\* \* \* \* \* Caulescent from more or less creeping rootstocks, or at first flowering nearly acaulescent, erect or spreading: leaves cordate, merely crenate or serrate: stipules more or less herbaceous: corolla from blue to white, with projecting oblong to cylindrical spur: style only moderately thickened upward, naked or nearly so, no beard at summit.

+ Spur of corolla not very long: lateral petals usually bearded: stigma inflexed, bearing a short scarious beak. (*Caninae*.)

+ + Stipules from serrate to fimbriate-pinnatifid or pectinate: leaves apt to be brown-dotted in age.

**V. striáta**, Arr. Glabrous or nearly so: stems 3–4-angled, in age usually becoming a foot or more high and later leaves an inch or two long, flowering till after midsummer: corolla

<sup>1</sup> Var. *scariosa*, Porter, Trans. N. Y. Acad. Sci. viii. 63, appears to be a form of the same, with stipules (which are always thin) somewhat enlarged and more scarious about the base.

<sup>2</sup> Garden and Forest, iv. 51, f. 13.

<sup>3</sup> And northward to Cow Creek Mts., Oregon, *Henderson*.

yellowish white, lower petal with brown-purple lines; spur thick, rather shorter than the sepals: capsule ovoid. — Kew. iii. 290; Willd. Spec. i. 1166; Pursh, Fl. i. 174; Reichenb. Ic. Pl. Crit. i. 45, t. 54, f. 112; Torr. & Gray, Fl. i. 139; Torr. Fl. N. Y. i. 73, t. 8; Gray, Man. ed. 5, 79. *V. debilis*, Michx. Fl. ii. 150. *V. albiflora*, Link, Enum. i. 241. *V. striata*, *ochroleuca*, & *repens*, Schwein. Am. Jour. Sci. v. 76, 69, 70. *V. Lewisiana*, Ging. in DC. Prodr. i. 298. — Low and shady grounds, along streams, Upper Canada and New York to mountains of Georgia, west to Minnesota and Missouri.

**V. canina**, L. Mostly low and rather small-leaved, spring flowering and later cleistogamous: corolla blue or violet (rarely a white variety): petals inconspicuously lineate: spur cylindraceous, from a third to more than half the length of the petals: capsule ovoid-oblong. — Spec. ii. 935. — A collective species or assemblage (Eu. & N. Asia), of which the N. American forms may as well be ranked as special varieties.

**Var. Muhlenbergii**, TRAUTV. Glabrous or nearly so, ascending or erect from short root-stocks, a span or more high, often with some decumbent radical stems which may elongate into leafy runners in summer: lower leaves round-reniform and upper round-cordate, half inch to inch long, crenulate: petals a third to at most half inch long, light violet, occasionally white. — Act. Hort. Petrop. v. 28; Gray, Bot. Gaz. xi. 292. *V. Muhlenbergii*, Torr. Fl. N. & Midd. States, 256 (1824); Torr. & Gray, Fl. i. 140. *V. Muhlenbergiana*, Ging. in DC. Prodr. i. 297; Le Conte, l. c. 148; Hook. Fl. Bor.-Am. i. 78, with var. *minor*, a small form, of which the extreme is of same name by Lange, Fl. Dan. t. 2710, in Greenland. *V. asarifolia* (*uliginosa*), Muhl. Cat. 26, not Pursh. *V. debilis*, Pursh, Fl. i. 174; Bigel. Fl. Bost. ed. 2, 97, not Michx.; Lodd. Bot. Cab. t. 1378. *V. Labradorica*, Schrank, Regensb. Denskr. Bot. Gesell. i. pt. 2, 12; DC. l. c. 306. *V. punctata*, Schwein. Am. Jour. Sci. v. 67; DC. l. c. 305. *V. conspersa*, Reichenb. Ic. Pl. Crit. i. 44, t. 52, f. 108. *V. canina*, var. *sylvestris*, Regel, Bull. Soc. Nat. Mosc. xxxv. 245, partly; Gray, Man. ed. 5, 79; Wats. Bibl. Index, 82. — Low and shady or wet grounds, mountains of N. Carolina and in low country of Penn. to Minnesota, L. Superior (where a summer form in loose sand on the beach imitates the European *V. arenaria*, coll. Engelm.), northward, and northeastward to Labrador and Greenland. More like *V. sylvestris* than any other Old World form.

**Var.\* pubérula**, WATSON. Finely puberulent throughout: leaves ovate, shallowly or often not at all cordate, mostly small in size: flowers also small. — Wats. in Gray, Man. ed. 6, 81. *V. sylvestris*, var. *puberula*, Sheldon, Bull. Geol. Surv. Minn. ix. 17. — Dry ground, mostly rocky or sandy soil, Maine to Lake Superior, and adjacent Canada, and westward even to Washington and Oregon.

**Var. multicaulis**, GRAY. More depressed and stoloniferous, beginning to blossom from radical rosettes, soon producing prostrate leafy cleistogamous flowering branches: leaves mostly suborbicular, cordate or reniform, small: stipules commonly brownish-scarious and strongly pectinate-laciniate. — Bot. Gaz. xi. 292. *V. canina*, Walt. Car. 219. *V. radicans*, DC. Prodr. i. 297. *V. repens*, Schwein. l. c. 69. *V. Muhlenbergii*, var. *multicaulis*, Torr. & Gray, l. c. 140.<sup>1</sup> — Rocky or sandy ground, Kentucky to Florida, Louisiana, and Texas; fl. Feb. to April, and later cleistogamous on the runners.

**Var. adunca**, GRAY. Nearly glabrous, multicapital and mostly very short-stemmed from more indurated rootstocks: leaves from ovate-orbicular to oblong-ovate, barely subcordate, rarely lower ones more deeply cordate: petals from half down to quarter inch long; spur commonly almost as long as the petals, either a little curved or hooked or straight. — Proc. Am. Acad. viii. 377; Brew. & Wats. Bot. Calif. i. 55, with var. *longipes*. *V. Muhlenbergii*, var. *pubescens*, passing to *V. adunca*, Gray, Am. Jour. Sci. ser. 2, xxxiii. 404. *V. adunca*, Smith in Rees, Cycl. xxxviii.; Hook. Fl. Bor.-Am. i. 79; Torr. & Gray, l. c. 141. *V. longipes*, Nutt. in Torr. & Gray, l. c. 140; Benth. Pl. Hartw. 298, form with long peduncles, flowers nearly of *V. sylvestris*, and abbreviated stems, the large spur sometimes curved, oftener straight. *V. canina*, var. *rupestris*, Regel, l. c. 250, as to plant of N. W. Coast. — Rocky Mountains, from Colorado to Montana (where it passes into the preceding form) and northward, west to mountains of Arizona, the coast of California, and Alaska, northeast to the Ottawa, Canada.

**Var. oxýceras**, WATSON. Spur of the rather small corolla narrow, acute, about as long as the petals: peduncles not surpassing the leaves. — Bot. Calif. i. 56. — California in

<sup>1</sup> Add syn. *V. multicaulis*, Britton, Mem. Torr. Club, v. 227.

the Sierra Nevada from the Yosemite northward, *Brewer, Gray*, and near Donner Pass, *Torrey*.

++ ++ The few cauline stipules mainly entire, subradical ones laciniate-dentate (none squamaceous and imbricated at the innovations in the way of *V. mirabilis*): leaves dotless.

**V. Howéllii**, GRAY. Glabrous or nearly so: leaves membranaceous, reniform-cordate (larger ones an inch or two in diameter), slender-petioled: peduncles long and scapiform; some on short sarmentose leafy branches: flower rather large: corolla blue, about three fourths inch long including the very thick and short spur. — *Proc. Am. Acad.* xxii. 308. *V. mirabilis*, Gray, *Bot. Gaz.* xi. 293, not L. — Damp woods on or near Columbia River, near Portland, Oregon, *T. Howell*, and *Klikitat Co.*, Washington, *Suksdorf*.<sup>1</sup>

+ + Spur to corolla very long: petals beardless: style slender-fusiform, symmetrical, with erect and terminal small stigma: stipules laciniate.

**V. rostráta**, MUHL. Glabrous or nearly so, a span or two high from short and ascending rootstocks: leaves roundish-cordate, callous-serrate, seldom over inch long: stipules large, lanceolate, pectinate-laciniate: peduncles elongated: corolla light violet; slender spur 5 or 6 lines long, longer than the petals. — *Cat.* 26; *Pursh, Fl. i.* 174; *DC. Prodr. i.* 298; *Le Conte, l. c.* 148; *Reichenb. Ic. Bot. Exot. ii.* 13, t. 131; *Torr. & Gray, Fl. i.* 140. — Hillsides in rich woods, Canada to Michigan and through W. New York along the mountains to Georgia. In N. Penn. (*Dolph*) found with spur 2-3-corniculate at top.

§ 2. Annuals, becoming subperennial in cultivation: stipules very leaf-like and large: receptacle concave: lateral petals turned partly upward over the upper pair: stigma urceolate or globose-saccate with a thin anterior bordering lip; the large and deep cavity nectariferous.

**V. trícólor**, L. (PANSY, HEARTSEASE.) Glabrous: stems angled, leafy: leaves obtusely serrate or crenate; lowest roundish or cordate; upper oblong, at least their petiole equalled by the deeply lyrate-pinnatifid foliaceous stipules: corolla diversely colored or variegated, in cultivation large and widely spreading, at least the lower petal normally with some yellow and upper violet-purple: spur short. — *Spec. ii.* 935. — Eu., straying more or less from gardens, and becoming depauperate and small-flowered.

**Var. arvénsis**, DC. Slender, small-flowered: petals little or not much surpassing the calyx, white with tinges of blue and yellow, or the colors more decided. — *Prodr. i.* 303; *Reichenb. Ic. Fl. Germ. iii.* t. 21; *Torr. & Gray, l. c.* 143. *V. arvensis*, *Murr. Prodr. Stirp. Gætt.* 73; *Roth, Fl. Germ. ii.* 273. *V. tenella*, *Muhl. Cat.* 26; *Schwein. Am. Jour. Sci. v.* 29; *Le Conte, l. c.* 151. *V. bicolor*, *Pursh, Fl. i.* 175; *Nutt. Gen. i.* 151. — Barren fields, or rocks, Canada to Texas, thought to be indigenous. (Eu.)

2. **SÓLEA**, Spreng. partly, Ging. (*William Sole*, an English apothecary and botanist, monographer of *Mentha*.) — Spreng. *Pugill. i.* 22, as to first species (here genus actually founded, 1813, not in *Schrad. Jour.* 1800, where it is merely suggested on a different plant); Ging. in *DC. Prodr. i.* 306, & *Mem. Viol.* 10; *Gray, Gen. III. i.* 187, t. 81.

**S. cóncólor**, GING. Herbaceous perennial, loosely pubescent: stems simple, a foot or two high, very leafy to the top: stipules slender-subulate, deciduous: leaves alternate, membranaceous, 3 to 5 inches long, oblong or somewhat obovate, conspicuously acuminate at both ends, short-petioled, penniveined: flowers in numerous axils, small, nodding, greenish, solitary or geminate or two or three on the short peduncles: capsule oval, nearly an inch long: seeds large, globular, narrowly carunculate. — Ging. in *DC. Prodr. i.* 306; *Torr. & Gray, Fl. i.* 144; *Gray, l. c.* *S. stricta*, Spreng. *Pl. Min. Cog. i.* 22, as to plant and habitat, but not *Ionidium strictum*, Vent. *Viola concolor*, T. F. Forst. *Trans. Linn. Soc. vi.* 309, t. 28; *Pursh, Fl. i.* 175. *Ionidium Sprengelianum*, Roem. & Schult. *Syst. v.* 401. *I. concolor*, Wats. *Bibl. Index*, 81. *Noisetia acuminata*, DC. *Prodr. i.* 290. — Low woods of the Alleghany region, W. New York and adjacent Canada to North Carolina, west to Michigan and Missouri; fl. spring and early summer.

<sup>1</sup> Also Salem, Oregon, *Henderson*; Wimer, *Hammond*, and Vancouver Isl., *Streets*.

**3. IONÍDIUM**, Vent. (Ἰον, εἶδος, like a violet.) — Shrubs or herbs (chiefly tropical), with branching and leafy stems, alternate or opposite leaves, and flowers variously clustered or sometimes solitary and short-peduncled in the axils. — Hort. Malm. i. fol. & t. 27; Mart. Spec. Mat. Med. Bras. 13, t. 3, 4; Torr. & Gray, l. c. 144; Benth. & Hook. Gen. i. 117, excl. *Hybanthus* & *Solea*. *Calceolaria*, Lœfl. It. Hisp. 183 (1758), not Juss. *Hybanthus*, Baill. Hist. Pl. iv. 351, excl. sp. (not Jacq.).

**I. FRUTICULÓSUM**, Benth. Bot. Sulph. 7, t. 2, and a probable variety **DENTÁTUM**, Gray, Proc. Am. Acad. v. 154, are from the southern end of Lower California.

**I. polygalæfólium**, VENT. Low, many-stemmed from a woody caudex, erect or diffuse, leafy, puberulent or glabrous: leaves both alternate and opposite, from linear to oblanceolate or lower even obovate, entire, rarely subdentate: stipules sometimes like the leaves, sometimes small or wanting: flowers solitary in the axils, nodding on peduncles shorter than the leaves: corolla about 2 lines long, white or whitish; lower lip not stipitate nor prolonged: a pair of small scale-like glands at base of the lower stamens. — Hort. Malm, i. t. 27; HBK. Nov. Gen. & Spec. v. 376, t. 496, f. 1; DC. Prodr. i. 309; Wats. Proc. Am. Acad. xvii. 324. *I. lineare*, Torr. Ann. Lyc. N. Y. ii. 168; Gray, Gen. III. i. 190, t. 82, Pl. Lindh. pt. 2, 151, Pl. Wright. i. 12, & ii. 16. *I. gracile*, Moç. & Sessé in DC. l. c. 309, & Calques des Dess. t. 36. *I. lineare* & *I. stipulaceum* (Nutt.), Torr. & Gray, Fl. i. 145. *Viola verticillata*, Ort. Dec. iv. 50; Spreng. in Schrad. Jour. 1800, ii. 190, t. 6, where it is suggested as a genus, *Solea*.<sup>1</sup> Variable species, in Mexico commonly but not always with peduncle nearly equalling subtending leaf; in U. S. peduncles commonly but not always much shorter. — Plains and low grounds, Arkansas and Texas to Arizona. (Mex.)

**I. parietariæfólium**, DC. A foot or two high from an annual root, erect, loosely branched, from puberulent or above loosely pilose-pubescent to glabrous: leaves alternate or the lower opposite, membranaceous, ovate-oblong to lanceolate, acute or acuminate, narrowed at base mostly into a petiole, more or less serrate: stipules small and subulate: flowers axillary on peduncles shorter than the leaf: corolla white and purplish; lower petal fully twice the length of the others, 4 lines long, labelliform, the oval lamina slender-stipitate: a laterally compressed gland on base of each anterior stamen. — Prodr. i. 308; Eichl. Fl. Bras. xiii. pt. 1, 371; Wats. Proc. Am. Acad. xxi. 415. *I. riparium*, var., Gray, Pl. Wright. ii. 16, & *I. lineare*, var. *platyphyllum*, Gray, Pl. Wright. i. 12, both probably with some cleistogamous flowers. — W. Texas and S. Arizona, Wright. Only the var. *Berteroi*, DC. l. c. 308, with subserrate leaves; near 25 & 93, coll. Palmer, in Northern Mexico; the var. *Houstoni*, DC., from farther south, has broader leaves thickly serrate with fine sharp teeth. (Mex. to Brazil.)

## ORDER XV. CANELLACEÆ.

By A. GRAY.

Tropical trees, with pungent-aromatic bark, pellucid-punctate evergreen and entire penniveined leaves, no stipules, and regular hermaphrodite cymose flowers, the 10 or more hypogynous stamens wholly monadelphous, with the 2-celled anthers extrorsely adnate to the truncate tube, enclosing the one-celled and short-styled ovary, which bears few to several ovules on 2 to 4 parietal placenta; the fruit a berry; seeds campylotropous or anatropous, with a small embryo in copious albumen. — American order of two genera and very few species, one reaching Florida.

<sup>1</sup> Add syn. *Calceolaria verticillata*, Kuntze, Rev. Gen. 41.

1. **CANÉLLA**, P. Browne. (*Canela*, Spanish name for cinnamon, &c., probably from the quilled bark.) — Sepals 3, orbicular, imbricated, persistent. Petals 5, imbricated in the bud, obovate, deciduous: no interior scales. Stamens 10. Stigmas 2. Placentæ 2 or 3, each with a pair of ovules ascending from a pendulous funiculus. Seed-coat crustaceous. — Jam. 275, t. 27, f. 3; Swartz, Trans. Linn. Soc. i. 96, t. 8; Griseb. Fl. W. Ind. 109; Benth. & Hook. Gen. i. 121, where petals are taken for sepals and these for bracts. (Cf. Eichl. Fl. Bras. xiii. pt. 1, 521.)

**C. álba**, Murr. (WHITE CANELLA or WINTER'S BARK, WHITE-WOOD, WILD CINNAMON.) Tree 20 to 50 feet high, heavy-wooded: leaves spatulate or oblong-obovate, 2 to 4 inches long, shining above: flowers in small terminal cymes: flower 2 or 3 lines long, odorous, violet, with anthers yellow: berries black, globose; seeds few, black, shining. — Syst. Veg. ed. 14, 443; Swartz, l. c.; Chapm. Fl. 43; Sargent, U. S. Tenth Census, ix. 24.<sup>1</sup> *C. Winterana*, Gærtn. Fruct. i. 373, t. 77.<sup>2</sup> *Winterania Canella*, L. Spec. ed. 2, 636 (Catesb. Car. ii. t. 50). — Southern Keys of Florida. (W. Ind.) Furnishes the *White Winter's Bark* of commerce.

## ORDER XVI. BIXACEÆ.

BY A. GRAY.

A tropical and very varied order (including *Samydeæ*) of trees and shrubs, with 2- $\infty$ -carpellary pistil and as many parietal placentæ, the type *Bixa Orellana*, L., the Arnotto (which in the pulp investing its seeds furnishes the coloring matter of that name), to which as Tribe COCHLOSPERMEÆ have been somewhat doubtfully referred *Cochlospermum*, Kunth, and the following related genus of low herbs, with axile placentation, which reaches the United States.

1. **AMOREÚXIA**, Moç. & Sessé. (*P. J. Amoreux*, a botanist of Montpellier.) — Hypogynous, and no glandular torus. Sepals 5, lanceolate, tardily deciduous. Petals 5, ample, rounded-obovate, convolute in the bud, deciduous. Stamens indefinitely numerous: filaments filiform, on one side of the flower longer than the other and incurved: anthers linear, basifixed, 2-celled, opening introrsely at the tip. Ovary subglobose, 3-celled, with placentæ in the thickish axis: style and stigma entire. Ovules numerous in a double series, campylotropous or amphitropous. Capsule large, pendulous, smooth, 3-celled; epicarp 6- (or 3-) valved, thin coriaceous, separating from the membranaceous or chartaceous endocarp, which is either loculicidally 3-valved or bursts irregularly. Seeds large, with a crustaceous smooth seed-coat under a thin epispERM or pellicle: embryo more or less incurved in the copious firm-fleshy albumen; the roundish-oval or oblong thin cotyledons much longer than the caulicle. Low, simple-stemmed and mostly glabrous herbs, from a stout lignescent perennial stock or root: leaves alternate, long-petioled, orbicular in outline, deeply palmately 5-9-lobed, the obovate or spatulate lobes acutely dentate: stipules subulate-setaceous,

<sup>1</sup> Add Silva, i. 37, t. 20.

<sup>2</sup> Add syn. *Laurus Winterana*, L. Spec. i. 371. *Canella laurifolia*, Lodd. Cat. acc. to Sweet, Hort. Brit. 65.

deciduous: flowers in terminal raceme, large, mainly yellow. — Moç. & Sessé in DC. Prodr. ii. 638; Planchon in Hook. Lond. Jour. Bot. vi. 140; Gray, Pl. Wright. i. 29, ii. 26; Benth. & Hook. Gen. i. 124.

**A. palmatifida**, Moç. & Sessé. A foot or two high: leaves almost 7-9-parted into spatulate lobes: petals inch and a half or less long, orange with brown purple spot at base: capsule ovate-globose: seeds reniform-incurved, with the delicate outer coat close, minutely hirsute: embryo simple, arcuate-incurved; cotyledons oblong. — Moç. & Sessé in DC. Prodr. ii. 638, & Calques des Dess. t. 1171; Hemsl. Biol. Centr.-Am. Bot. i. 55; *A. palmatifida* & *A. Schiedeana*, Planchon, l. c. 141, t. 1; Gray, Pl. Wright. ii. 26, t. 12, A, fruit. *Euryanthe Schiedeana*, Cham. & Schlecht. Linnæa, v. 225. — Foothills of the mountains of S. Arizona, Wright, Rothrock, Pringle. (Mex., New Grenada.)

**A. Wrightii**, GRAY. Resembles the preceding: but leaves less deeply 5-7-cleft into obovate lobes: capsule oblong-ovoid and 2 inches long or smaller and shorter: seeds obovate, with short distinct raphe, not incurved; outer coat glabrous, loose and arilliform; cotyledons nearly orbicular, flexuous. — Pl. Wright. ii. 26; Wats. Proc. Am. Acad. xvii. 324. *A. Scheidiana*, Gray, Pl. Wright. i. 29 (excl. syn.), t. 3, B, fruit. — Hills and arid plains, S. Texas to Arizona, Wright, Thurber? Palmer, Reverchon. (Adj. Mex., Berlandier, &c., and farther south.)

**A. MALVÆFOLIA**, Gray, Pl. Wright. i. 29, from Chihuahua, if distinct from the last, needs more elucidation.

## ORDER XVII. FRANKENIACEÆ.

By A. GRAY.

Low perennial herbs or undershrubs, in saline soil; with opposite or 4-nate and sessile entire thickish leaves (and commonly axillary fascicles), a stipular membrane or line connecting their bases: regular and complete small hypogynous flowers; calyx and corolla 4-5-merous, the sepals united into a tube and persistent in the manner of *Sileneæ* and the petals in same way long-unguiculate and crowned at base of the blade; stamens as many as petals and alternate with them or more numerous; style 3-4-cleft with narrow lobes introrsely or in ours almost terminally stigmatose; ovary one-celled with 2 to 4 one-many-ovulate parietal placentæ; capsule included in the calyx, dehiscent through the placentæ; seeds straight and anatropous, slender-stalked, with crustaceous coat; and mostly cylindrical straight embryo in the axis of mealy albumen. — Single and widely dispersed genus.

**1. FRANKENIA**, L. (*J. Frankenius*, Professor of Medicine at Upsal in the 17th century.) — Gen. no. 362.

\* Nearly or quite herbaceous: style 3-cleft: ovules numerous and seeds several: leaves plane or nearly so when fresh.

**F. grandifolia**, CHAM. & SCHLECHT. Erect or ascending from a procumbent base, a foot high, more or less pubescent, divergently branched: leaves large for the genus (half inch or less long), from round-obovate to spatulate, the short petiole or connecting bases mostly hirsute-ciliate: petals mostly 5, purple: stamens 4 to 7, commonly 5. — Linnæa, i. 35; Torr. & Gray, Fl. i. 168; Torr. Bot. Mex. Bound. 36, t. 5; Brew. & Wats. Bot. Calif. i. 60. *F. grandifolia* & *F. latifolia*, Presl, Rel. Hænk. ii. 3. *Velezia latifolia*, Esch. Mém. Acad. Petrop. x. 286. — Coast of California from San Francisco Bay to San Diego; first coll. by Hænke.

**Var. campéstris**, GRAY, n. var. More tufted: leaves smaller (quarter to half inch long), from narrowly spatulate to nearly linear, mostly with revolute margins in drying: petals less conspicuous. — *F. grandifolia*, Wats. Proc. Am. Acad. xvii. 326. *F. Bertereaana*, C. Gay, Fl. Chil. i. 247, seems to be an intermediate form. — Plains near San Jacinto, S. W. California, *Parish*; S. Nevada, *Wheeler*, &c. (N. Mex., interior of Chili?)

\* \* Shrubby, thickly branched, a foot or more high: style 2-cleft: ovules only 2 or 3 nearly basilar: leaves small and heath-like, with margins much revolute, commonly much fascicled.

**F. Jamésii**, TORR. Erect: branchlets scabrous-puberulent: leaves nearly glabrous, linear or filiform, a quarter or third inch long: petals white, the cuneiform and erose-truncate blade 2 lines long: stamens mostly 6, with anther-cells elongated-oblong. — Torr. in Gray, Proc. Am. Acad. viii. 622; Coulter, Man. Rocky Mt. Reg. 31. — Eastern foot of the Rocky Mountains in Colorado, especially on the Arkansas; first coll. by *James*; Guadalupe Mountains, W. Texas, *Havard*.

**F. Pálmeri**, WATSON. More spreading, barely pulverulent-puberulent: leaves thicker and shorter, a line or two long: flowers much smaller: stamens 4, with oval anther-cells. — Proc. Am. Acad. xi. 124; Brew. & Wats. Bot. Calif. i. 61. — Border of salt marshes, San Diego Bay, California, *Cleveland*, *Parry*, *Pringle*. (Lower Calif., *Palmer*.)

**F. PULVERULÉNTA**, L., common European species, is an occasional ballast-weed in New York Harbor.

## FASCICLE II.

### ORDER XVIII. CARYOPHYLLACEÆ.

By B. L. ROBINSON.

Herbs (rarely lignescent at the base) with bland watery juice, opposite entire often slightly connate leaves and regular perfect or less frequently and through abortion unisexual flowers. Stems with enlarged nodes. Sepals 4 to 5, in the first tribe united into a cup or tube, in the others distinct. Petals as many (or none), often emarginate, toothed, or deeply bifid, in the first tribe unguiculate and borne together with the stamens and ovary upon a somewhat elongated or columnar torus, in the other tribes often somewhat perigynous. Stamens commonly twice as many as the petals, but often fewer and when of the same number alternating with them; filaments free or slightly cohering near the base; anthers introrse. Styles 2 to 5, free or in the last tribe united below; ovary free, unicellular or imperfectly 2-5-celled at the base; placentation axial; ovules amphitropous or campylotropous, usually numerous. Fruit a capsule (in one foreign genus baccate), opening by 2 to 5 entire or bifid valves; seeds many or by abortion few, albuminous; embryo straight or moderately curved.

**TRIBE I. SILENEÆ.** Sepals united into a 4-5-toothed or -lobed tube or cup. Petals unguiculate and often scale-bearing at the junction of the blade and claw, borne, together with the stamens and ovary, upon a columnar prolongation of the receptacle. Stipules none. Flowers usually showy, perfect, or not infrequently polygamous.



\* Seeds compressed or meniscoidal, attached by the flattened or concave face; embryo straight or nearly so.

+ Calyx ebracteolate: stamens mostly 5.

1. **VELEZIA**. Calyx slender, elongated, cylindrical, 5-ribbed or (more often) subequally 15-ribbed, sharply 5-toothed. Petals small, scarcely appendaged; blades 2(-4)-toothed or rarely entire. Torus not elongated. Styles 2; slender terete capsule 4-valved at the summit. Flowers sessile or very shortly peduncled.

+ + Calyx subtended by one or more pairs of bractlets: stamens 10.

2. **DIANTHUS**. Calyx tubular, 5-toothed, finely many-striate. Petals 5, with long claws; the blade entire, emarginate, or several-toothed. Styles 2. Capsule dehiscent by 4 valves. Leaves narrow, often connate by narrow scarious membranes. Flowers commonly showy.
3. **TUNICA**. Calyx turbinate or cylindrical, obtusely toothed, distinctly 5-ribbed, or sometimes 15-ribbed. Petals 5. Styles 2. Flowers considerably smaller and habit more slender than in *Dianthus*.

\* \* Seeds laterally attached; embryo curved: calycine bractlets none.

+ Styles 2; capsule 4-toothed or -valved: introduced plants.

4. **GYPSOPHILA**. Calyx turbinate, tubular or campanulate, 5-toothed, herbaceous only in the middle of the segments, the intermediate parts being scarious. Petals 5. Stamens 10. Flowers mostly small, paniculate or scattered, rarely aggregated. Capsule rather deeply 4-valved.

5. **SAPONARIA**. Calyx tubular or ovoid, 5-toothed, terete with numerous faint veins, or conspicuously 5-angled. Flowers showy. Petals 5. Stamens 10. Capsule dehiscent at apex by 4 short teeth.

+ + Styles normally 3 (sometimes 4 or 5); capsule opening by 3 or 6 teeth: calyx commonly 10-nerved, rarely  $\infty$ -nerved.

6. **SILENE**. Calyx 5-toothed, campanulate, subcylindric or turbinate, either inflated or becoming distended by the maturing capsule, 10- $\infty$ -nerved. Petals usually appendaged at the summit of the claw; the blade variously toothed or divided, rarely entire. Stamens 10. Styles 3 (rarely 4 or 5). Stipe of the ovary commonly developed. Capsule 1-celled or somewhat 3-celled at the base. Flowers solitary, racemose, or cymose-paniculate.

+ + + Styles 5, alternating with the petals when of the same number: calyx-teeth not foliaceous.

7. **LYCHNIS**. Calyx ovoid, obovate, or clavate, 5-toothed, 10-nerved, inflated or not. Petals with or without appendages; the blade entire, emarginate, bifid or variously cleft. Stamens 10. Ovary 1-celled or divided at the base into 5 partial cells. Capsule dehiscent by as many or twice as many teeth as there are styles.

+ + + + Styles 5, opposite the petals: calyx-teeth conspicuously prolonged into foliaceous appendages: introduced plants.

8. **AGROSTEMMA**. Calyx ovoid, with 10 strong ribs; the elongated teeth in our species an inch or more in length, exceeding the five large unappendaged petals. Stamens 10. Capsule 1-celled. Leaves linear.

**TRIBE II. ALSINÆÆ.** Sepals free or slightly united at the very base. Petals more or less contracted but not unguiculate below. Corona absent. Flowers mostly small. Styles distinct to the base.

\* Stipules none.

+ Capsule cylindric, more or less elongated, often curved, dehiscent by twice as many teeth as there are carpels.

9. **HOLOSTEUM**. Sepals 5. Petals 5, white, subentire or denticulate toward the apex. Stamens 3 to 5, very rarely 10. Styles 3 (occasionally 4 or 5), longitudinally stigmatic. Pod unicellular; seeds numerous, dorsally flattened, i. e. parallel with the incumbent cotyledons; the radicle prominent upon the ventral surface. Inflorescence umbelliform.

10. **CERASTIUM**. Sepals in our species 5. Petals as many, retuse or bifid, very rarely subentire, white. Stamens 10, or sometimes fewer. Styles 5 (4 or 3). Capsule usually exceeding the calyx, often curved; seeds numerous, more or less laterally compressed.

+ + Capsule ovoid or oblong, relatively short, dehiscent by as many or twice as many teeth as there are carpels.

+ + Styles usually fewer than the sepals, when of the same number opposite them.

11. **STELLARIA**. Sepals 5 (or 4). Petals 5 (or 4, rarely abortive or absent), always more or less deeply bifid, often divided almost to the base, white. Stamens 3 to 10. Styles 3 or 4, rarely 5.

12. **ARENARIA**. Sepals 5. Petals as many, white or nearly so, entire or emarginate (very rarely minute or wanting). Stamens 10, or often fewer by abortion. Styles 3 or 4; seeds many.

+ + Styles as many as the sepals and alternate with them.

13. **SAGINA**. Sepals 5 (rarely 4). Petals as many, entire or emarginate, white, not rarely absent. Stamens usually 5, less frequently 3 to 10. Valves of the capsule as many as the sepals and opposite them; seeds several to many.

\* \* Stipules present, scarious: petals undivided.

14. **SPERGULARIA**. Sepals 5. Petals 5 (rarely fewer or none), purplish or white. Stamens commonly 10. Styles 3 (very rarely 5); ovary 1-celled. Valves of the capsule as many as the styles, when 5 in number alternate with the sepals; seeds often margined. Leaves linear or filiform.

15. **SPERGULA**. Sepals 5. Petals 5, white. Stamens 10 (rarely 5). Styles 5; ovary 1-celled, many-ovuled. Valves of the capsule 5, opposite the sepals; seeds acutely margined or narrowly winged. Leaves narrow, linear, verticillate and fascicled in the axils.

TRIBE III. **POLYCARPÆ**. Sepals free or somewhat united at the base. Petals commonly small, not distinctly unguiculate, borne, together with the stamens, upon a hypogynous or slightly perigynous disk. Style simple below, 3- or more rarely 2-branched above; stigmas rarely sessile on the ovary.

\* Petals 2-5-parted.

16. **DRYMARIA**. Sepals 5, often scarious-margined. Petals 5. Stamens 3 to 5, slightly perigynous. Ovary 1-celled, several-many-ovuled. Capsule 3-valved. Flowers small, white or nearly so. Leaves flat, though often narrow, opposite or pseudoverticillate. Stipules small, free, scarious or bristle-formed, sometimes fugacious.

\* \* Petals entire, denticulate, or none.

+ Cauline leaves numerous, flat, not linear-setaceous.

17. **POLYCARPON**. Sepals 5, more or less carinate, entire, scarious-margined. Petals 5, small, shorter than the sepals, sometimes emarginate. Stamens 3 to 5. Ovary 1-celled. Capsule 3-valved, several-seeded; seeds ovoid with the embryo but little curved.

+ + Cauline leaves setaceous.

18. **LÆFLINGIA**. Sepals 5, carinate and produced to rather rigid setaceous tips; the three outer ones commonly bearing a setaceous tooth on each side. Petals 3 to 5, small, or none. Stamens 3 (to 5?). Ovary 1-celled, several-seeded, triangular. Capsule 3-valved; seeds oblong, attached laterally near the base; embryo somewhat curved; cotyledons accumbent.

+ + Leaves forming a radical rosette; the cauline minute or obsolete; basal stipules lacerate.

19. **STIPULICIDA**. Sepals 5, distinct, somewhat rigid, obtuse, often emarginate, scarious-margined. Petals 5, oblong, gradually contracted below, hypogynous. Stamens 5. Capsule ovate-globose, 3-valved, many-seeded.

1. **VELÉZIA**, Lœfl. (Named for *Cristóbal Velez*, friend of Lœfling and author of an unpublished flora of Madrid, and not, as is sometimes said, Francisco

Velez de Arciniega.) — Annuals with tough dichotomously branched stems, sparse subulate foliage, and slender sessile or short-peduncled flowers. — Lœfl. in L. Spec. i. 332; Sibthorp, Fl. Græc. t. 390, 391; Reichenb. Ic. Fl. Germ. vi. t. 246; Benth. & Hook. Gen. i. 144. — A small Mediterranean genus of characteristic habit. A single species, probably of recent introduction, has just been noted in Central California.

**V. rŔGIDA**, L. l. c. Leaves narrowly linear, attenuate, an inch or less in length: flowers subsolitary at the nodes, or in the forks of the stem, and more or less crowded toward the ends of the branches: calyx about equally 15-ribbed, glandular-puberulent, 6 to 8 lines long, scarcely more than half line in diameter; sharp teeth erect: petals small with minute bristle-formed appendages and small 2-toothed roseate blades: stamens 5 (to 10?). — Reichenb. l. c. — Dry sandy bluffs of the Tuolumne River, near La Grange, California, Jepson, 1896; fl. July. (Adv. from Eu.)

**2. DIÁNTHUS**, L. PINK, CARNATION. (*Διός* and *ἄνθος*, flower of Jove.) — Syst. Nat. ed. 1, & Gen. no. 364; DC. Prodr. i. 355; Reichenb. Ic. Fl. Germ. vi. t. 248–268; Benth. & Hook. Gen. i. 144. — Chiefly natives of S. Europe and N. Africa, deservedly popular in cultivation. Several species tend to escape, and have become more or less naturalized. One variety only is indigenous to this continent.

\* Indigenous in the extreme Northwest.

**D. alpinus**, L. Low caespitose perennial with numerous ascending 1-flowered stems: bracts 2 to 6, erect or somewhat spreading. — Spec. i. 412; Regel, Bull. Soc. Nat. Mosc. xxxiv. pt. 2, 529. — (Eu., Siberia.) Very variable and according to Regel passing into

**Var. répens**, REGEL, l. c. 531. Root single, vertical or descending: stems procumbent but not repent, much branched from near the base; branches simple, ascending, 3 to 6 inches in height, most often 1-flowered: leaves linear or linear-lanceolate, 8 to 16 lines long, glabrous, slightly fleshy: involucre scales a single pair, narrowly ovate, acuminate, nearly equalling the calyx, the attenuate tips slightly spreading: calyx somewhat inflated, 6 lines long: corolla purple, about 7 lines broad, glabrous; petals with obovate erose-dentate blades. — *D. repens*, Willd. Spec. ii. 681; Cham. & Schlecht. Linnæa, i. 37; Torr. & Gray, Fl. i. 195; Seem. Bot. Herald, 27, t. 4. — Coast of N. and W. Alaska. (Siberia.)

\* \* Species of the Old World, naturalized, or adventive and locally established.

+ Bractlet short, half the length of the calyx: flowers solitary.

**D. DELTOÏDES**, L. (MAIDEN PINK.) Perennial: stems decumbent, ascending, 6 inches to a foot in height, very leafy below: leaves short, narrowly oblong to lance-linear, a line wide, the lower obtusish, the uppermost acute: calyx long, tubular: petals narrow, red, pink, or white. — Spec. i. 411; Eng. Bot. t. 61; Wats. & Coulter in Gray, Man. ed. 6, 83. — Occasionally found escaped from gardens, New England, Martha's Vineyard, *Miss E. Watson*, and E. Windsor, Conn., from same collector, to Michigan (first reported in Bot. Gaz. vii. 109, as *D. furcatus*), *L. H. Bailey*. (Eu., Asia.)

+ + Bractlets narrow, attenuate, equalling or exceeding the calyx: flowers clustered.

**D. BARBÁTUS**, L. l. c. 409. (SWEET WILLIAM.) A smooth perennial, 1 to 2 feet in height: stems simple, bearing the flowers in dense cymose fascicles: leaves lanceolate, large for the genus, 1½ to 3 inches long, a fourth as wide, minutely roughened on the edges: bractlets filiform from a lanceolate base: blades of petals triangular-obovate, toothed, red, purple or white, often variegated in cultivation. — Reichenb. Ic. Fl. Germ. vi. t. 248. — Long cultivated, and occasionally spontaneous about old gardens. (Eu.)

**D. ARMÉRIA**, L. l. c. 410. (DEPTFORD PINK.) Annual, 1 to 2 feet high, covered with a fine grayish pubescence: stems branching and bearing several 2–4-flowered fascicles: bracts subulate, attenuate, densely pubescent: flowers scentless: calyx slender, tubular, 7 to 8 lines long, the teeth very sharp: petals roseate, spotted with white; blades elliptical, crenate-

dentate. — Pursh, Fl. i. 314; Bigel. Fl. Bost. 108; Torr. Fl. N. & Midd. States, 447; Torr. & Gray, Fl. i. 195. *D. armerioides*, Raf. in Desv. Jour. Bot. iii. 269 (1814), & Précis Découv. 36 (1814). *Atocion armerioides*, Raf. Autikon Bot. 29. — Fields and pine woods, Canada and Eastern States from Maine (Portland Catalogue) to Virginia and westward at least as far as Michigan and Iowa (acc. to Shimek); also naturalized and spreading upon rocky shores of Vancouver Isl. (acc. to J. M. Macoun); fl. June, July. Autumnal flowers in October noted by L. F. Ward, and by others. (Eu., Caucasus.)

+ + + Bractlets broad, scarious, concealing the calyx.

**D. PRÓLIFER**, L. l. c. Annual, a foot or two in height: stems wiry: leaves narrow, minutely scabrous, acute: heads terminal, 2-several-flowered, inclosed in thin dry ovate obtusish mucronate imbricated bractlets: flowers expanding one at a time, ephemeral: calyx tubular; the veins faint, collected into five groups: petals small, notched, pink or red. — Eng. Bot. t. 956. *Tunica prolifera*, Scop. Fl. Carn. ed. 2, i. 299. — New Jersey, *Durand*; Eastern Pennsylvania, *Smith, Porter*; Staten Island, *Britton*; Suffolk Co., Long Island, *Hollick*; Delaware, acc. to Commons; Cleveland, O., *Beardslee*; fl. all summer. This species, especially in its calyx, forms a transition to the next genus. (Eu., Caucasus.)

**3. TÚNICA**, Rupp. (*Tunica*, a tunic, probably in reference to the close involucre.) — Slender wiry-stemmed herbs with small mostly linear leaves. Flowers terminal, solitary or fascicled in small heads. — Fl. Jen. 105; Adans. Fam. ii. 255, in part; Scop. Fl. Carn. ed. 2, i. 298; Benth. & Hook. Gen. i. 145; Williams, Jour. Bot. xxviii. 193. — Old World plants represented in America by a single species recently introduced.

**T. SAXÍFRAGA**, Scop. l. c. 300. Smooth: stems numerous, slender, branching, curved-ascending: leaves small, linear, acute, less than half a line in width: the lower internodes very short: flowers small, numerous, terminal, solitary: bractlets 2 pairs, scarious except in the middle, acute, considerably shorter than the calyx: petals notched, pale purple; blades a line in length. — Reichenb. Ic. Fl. Germ. vi. t. 246. *Dianthus Saxifragus*, L. Spec. i. 413. — Flushing, L. I., *J. Schrenk*, and on roadsides near London, Ontario, *Burgess*. (Adv. from Eu.)

**4. GYPSÓPHILA**, L. (Γύψος, gypsum, and φιλεῖν, to love, from a supposed preference for soil rich in gypsum.) — Amœn. Acad. iii. 23 (Diss. Chen. 1751, 41), & Spec. i. 406; DC. Prodr. i. 251, in part; Reichenb. l. c. t. 239-242; Benth. & Hook. Gen. i. 146; Williams, l. c. xxvii. 321. — Old World herbs of graceful habit, mostly natives of Southern Europe and Western Asia. Several species are cultivated for ornament; the following are sparingly naturalized.

**G. MURÁLIS**, L. Low annual with the habit of *Arenaria*: leaves small, linear, acute: flowers scattered in the forks of the branches: pedicels filiform, two or three times as long as the calyx: petals pink with darker veins, emarginate, 2 to 3 lines in length. — Spec. i. 408; Fl. Dan. t. 1268. — Roadsides and sandy places from Maine, *Miss Blatchford*, to New Jersey, *Brown*, and westward to London, Canada, *Dearness*; becoming frequent. (Adv. from S. and Midd. Eu., Siberia.)

**G. PANICULÁTA**, L. l. c. 407. (BABY'S BREATH.) Perennial, glabrous and somewhat glaucous, 2 feet or more in height: leaves lanceolate, acute, 1 to 1½ inches in length: flowers very numerous in a compound panicle: segments of the calyx with conspicuous white scarious margins: petals scarcely exceeding the calyx: capsule nearly spherical. — Reichenb. l. c. t. 242. — Doubtfully established at Emerson, Manitoba, *Fowler*. (Adv. from Eu.)

**5. SAPONÁRIA**, L. SOAPWORT. (Latin *sapo*, soap; *S. officinalis* having been used as a substitute for soap, the juice being capable of forming a lather.) — Syst. Nat. ed. 1, & Gen. no. 365; DC. Prodr. i. 365; Benth. & Hook. Gen. i. 146. — A genus of the Old World including plants of diverse habit. Two

rather coarse species belonging to different sections of the genus are spontaneous in America.

§ 1. *VACCÁRIA*, Dodon. (as gen.). Annual: flowers in a broad loose flat-topped corymb: calyx ovate, 5-angled. — Pempt. 104; DC. l. c.

*S. VACCÁRIA*, L. Glabrous and somewhat glaucous: leaves ovate or oblong-lanceolate, sessile and somewhat connate: calyx with 5 sharp herbaceous angles, the intervening parts being white and scarious: corolla rose-colored, destitute of appendages. — Spec. i. 409; Sims. Bot. Mag. t. 2290; Torr. & Gray, Fl. i. 195; also variously referred by authors to *Gypsophila*, *Lychnis*, or more often regarded as an independent genus, *Vaccaria* (*V. vulgaris*, Host, Fl. Aust. i. 518). — Railway ballast and cultivated ground, frequent and sometimes troublesome in wheatfields westward, where it bears the name of "cockle"; fl. July, August. (Intro. from Eu.)

§ 2. *ΒΟΪΤΙΑ*, Neck. (as gen.). Perennials: flowers fasciculate-paniculate: calyx cylindrical, not angled. — Delic. Gallo-Belg. i. 193; DC. l. c.

*S. OFFICINÁLIS*, L. l. c. 408. (SOAPWORT, BOUNCING BET.) Perennial, smooth, 1½ to 2 feet high: leaves ovate-lanceolate, acute, 3-ribbed, 2 to 3 inches long, narrowed at the base; inflorescence terminal, somewhat pyramidal, the flowers clustered at the ends of short branches: calyx tubular, terete: petals appendaged at the junction of the claw and the obovate retuse blade, white or pink, often double. — Eng. Bot. t. 1060; Pursh, Fl. i. 314; Torr. & Gray, Fl. i. 195. — Roadsides and waste ground, common; fl. July to the end of October. (Nat. from Eu.) Tricarpellary flowers are not infrequent.

6. *SILÉNE*, L. CATCHFLY, CAMPION. (Name from *Σεληνός*, in reference to the viscid excretion of many species, the Greek god having been described as covered with foam; also derived directly from *σάλον*, saliva.) — Syst. Nat. ed. 1, & Gen. no. 372; Otth in DC. Prodr. i. 367; Torr. & Gray, Fl. i. 189; Fenzl in Ledeb. Fl. Ross. i. 303; Reichenb. Ic. Fl. Germ. vi. t. 269–301; Benth. & Hook. Gen. i. 147; Rohrb. Monogr. der Gatt. Silene; Wats. Proc. Am. Acad. x. 340, & Bibl. Index, 106; Robinson, Proc. Am. Acad. xxviii. 130. — A large genus of attractive plants inhabiting chiefly the northern temperate parts of the Old World, but also well represented in North America, especially in the Pacific region. Although the members of this genus present considerable diversity of habit and floral characters, yet the greater part of the species do not fall into well marked groups, and the elaborate subdivision of the genus suggested by Rohrbach cannot be satisfactorily carried out among our American plants. Many species, together with several nearly related members of *Lychnis*, have been by many foreign writers transferred to *Melandrium*, Röhl. (Deutsch. Fl. ed. 2, ii. 274; *Melandryum*, Reichenb. Fl. Germ. Ex. 824). While a natural group is thus formed, it is so poorly circumscribed by technical characters as to be almost useless in classification. The partial septation of the capsule, usually adduced as the strongest character for the division of *Silene* and *Melandrium*, is wholly untrustworthy in American species. Thus *S. Virginica*, generally referred by continental authors to *Melandrium*, often shows the partial septation of a *Silene*, while *S. multinervia*, a good *Silene* by habit and affinity to others of the § *Conoimorpha*, has often no trace of septation. The number of carpels, the sole technical distinction between this and the next genus, is in some cases unfortunately variable. Specimens with 4 or 5 carpels have been noted especially in

the following species of western range: *S. Hallii*, *S. Douglasii*, *S. pectinata*, and *S. Watsoni*.

§ 1. **CONOIMÓRPHA**, Otth, l. c. 371. Calyx conspicuously 18–60-costate; the ribs about equally prominent. — Boiss. Fl. Orient. i. 578. *Conosilene*, Fourr. Ann. Soc. Linn. Lyon, n. ser. xvi. 344. § *Conosilene*, Rohrb. l. c. 89; subg. Williams, Jour. Bot. xxxii. 13. — Annuals, all of the Mediterranean region but the following problematic Californian species.

**S. multinervia**, WATSON. Erect, a foot high, pubescent throughout and somewhat viscid-glandular above: leaves narrowly oblong or linear, acute: inflorescence cymose with unequal branches: calyx ovate in fruit, contracted above, 5 lines long, 18–23-ribbed: petals small, purplish, unappendaged, not exceeding the subulate spreading calyx-teeth: capsule narrowly ovate; partial septa at the base commonly obscure or wanting. — Proc. Am. Acad. xxv. 126; Brandegee, Zoe, i. 133, ii. 121. *S. Conoidea*, Brandegee, Proc. Calif. Acad. Sci. ser. 2, i. 202, & Zoe, i. 113; Davidson, Erythea, i. 58; not L. — Western California near the coast from Tamalpais near San Francisco, *K. Brandegee*, to Jamuel, San Diego Co., *Orcutt*. Also on the Island of Santa Cruz, *Brandegee*. This species has recently spread rapidly through Southern and Central California, as though an introduced plant, but cannot be identified as yet with any foreign member of this small and well marked section of the genus.

§ 2. **BEHENÁNTHA**, Otth, l. c. 367. Calyx ovoid to globular, vesicular-inflated and somewhat contracted at the orifice, obscurely 15–20-veined, the veins connected throughout their whole extent by anastomosing veinlets. — *Behen*, Mœnch, Meth. 709. Subg. *Behen*, Rohrb. l. c. 77. Subg. *Gastrosilene*, Williams, l. c. — Perennials of the Old World; the following extensively naturalized in America.

**S. cucubalus**, Wibel. (BLADDER CAMPION.) Glaucous: stems ascending, a foot or more in height, leafy below, smooth or somewhat rough-pubescent: leaves opposite, usually lanceolate, acute: bracts much smaller: flowers polygamo-dieocious, sometimes a little zygomorphous through the reflexing of the upper petals and declining of the stamens: calyx campanulate to subglobose, strongly inflated, glabrous, finely reticulated between the inconspicuous nerves: petals narrow, 2-cleft, scarcely crowned, white or pink. — Prim. Fl. Werth. 241; Rohrb. l. c. 84; Wats. & Coulter in Gray, Man. ed. 6, 84. *S. inflata*, Smith, Fl. Brit. ii. 467; Gray, Man. ed. 5, 89; Warming, Bot. Foren. Festschr. 1890, 258. *S. vulgaris*, Garcke, Fl. Deutsch. ed. 9, 64. *Cucubalus Behen*, L. Spec. i. 414. *Behen vulgaris*, Mœnch, l. c. — Fields and roadsides, New Brunswick to Brit. Columbia (acc. to J. M. Macoun), Washington State, *Piper*, and southward to Tennessee, *Scribner*; common, especially eastward. (Nat. from Eu.)

§ 3. **EUSILÉNE**, Godr. Calyx campanulate to cylindrical or clavate, definitely 10-nerved (obscurely so in *S. campanulata*); anastomosing veinlets often present. — Mém. Soc. Sci. Nancy, 1846, 414. *Silene* proper and *Melandryum* in part, of European authors.

\* Annuals or biennials, mostly introduced.

+- Inflorescence simply racemose, or subspicate; pedicels solitary.

**S. GÁLLICA**, L. Stem hirsute with white jointed hairs: leaves spatulate, obtuse, mucronate, hirsute-pubescent on both sides, 8 to 18 lines in length: racemes terminal, one-sided, 2 to 4 inches long: flowers more or less pedicellate: calyx villous-hirsute, slender and subcylindric in anthesis, becoming in fruit broadly ovoid, with contracted orifice and short narrow spreading teeth: petals usually little exceeding the calyx; blades obovate, somewhat bifid, toothed or entire. — Spec. i. 417; Cham. & Schlecht. Linnæa, i. 40; Rohrb. l. c. 96. *S. Anglica*, L. l. c. 416. — Apparently of European origin, but now cosmopolitan; locally common on the Pacific Slope from Brit. Columbia to Lower Calif.; not infrequent in cultivated fields in the Atlantic States; fl. April to July. The typical form has very short ascending

pedicels and white or pink flowers. *S. Lusitanica*, L. l. c., a form with the lower pedicels elongated (equalling or exceeding the calyx) and becoming horizontal in fruit, has been found at Jolon, Calif., *Brandegee*. (Nat. from Eu.)

**Var. QUINQUEVÚLNERA**, Koch. Petals more showy, subentire, deep crimson with a white or pink border. — Synop. Fl. Germ. & Helv. 100. *S. quinquevulnera*, L. l. c. — With the typical form. (Adv. from Eu.)

+ + Inflorescence dichotomously racemose.

**S. DICHÓTOMA**, Ehrh. Tall, more or less hirsute and viscid : root annual or biennial : leaves lanceolate or oblanceolate : flowers short-pedicelled or subsessile, larger than in the preceding, half inch in diameter, often nodding in anthesis, but becoming erect in fruit : petals white or roseate ; blades obovate, more or less deeply bifid : calyx cylindric in anthesis, becoming ovate in fruit, the prominent green nerves strictly simple, hirsute. — Beitr. vii. 143 ; Reichenb. l. c. vi. t. 280. — Recently and extensively introduced in New England, where it is becoming a noxious weed in clover and grain fields ; also locally established in other parts of the country ; Texas, *Nealley* ; Berkeley, Calif., *Greene* ; fl. June, July. (Intro. from S. Eu. and W. Asia.) **Var. RACEMÓSA**, Rohrb. l. c. 95 (*S. racemosa*, Otth, l. c. 384 ; Boiss. Fl. Orient. i. 589) is a form or variety, which has been vaguely separated upon various combinations of inconstant characters (chiefly the more spreading branches and deeply cleft petals), but it scarcely occurs in America except on ballast (Philadelphia, *Martindale*).

+ + + Inflorescence cymose or paniculate, not distinctly racemose.

++ Viscid-pubescent or hirsute.

**S. NOCTIFLÓRA**, L. A coarse species a foot or two in height : leaves lanceolate or ovate-lanceolate, 2 to 3 inches long : flowers usually few in loose cymes, fragrant : calyx large, in fruit ovoid, white with green nerves tending to anastomose ; the teeth attenuate : petals bifid. — Spec. i. 419 ; Eng. Bot. t. 291 ; Torr. & Gray, Fl. i. 192 ; Wats. & Coulter in Gray, Man. ed. 6, 85. — Roadsides and cultivated grounds ; fl. June to September. (Nat. from Eu.)

++ ++ Smooth or nearly so, a part of each of the upper internodes glutinous.

**S. antirrhína**, L. l. c. (SLEEPY OR SNAPPDRAGON CATCHFLY.) Stem 6 inches to 3 feet in height : leaves oblong-lanceolate or linear, commonly acute : flowers rather numerous, small, ephemeral, borne in a compound cyme ; pedicels long, filiform : calyx smooth, green, ovoid in fruit, about 4 lines long, contracted above ; the teeth short : ovary scarcely stiped : petals small, pink or white, more or less emarginate or bifid. — Otth, l. c. 376 ; Torr. & Gray, Fl. i. 191 ; Rohrb. l. c. 173 ; Mart. Fl. Bras. xiv. pt. 2, t. 66. *Saponaria dioica*, Cham. & Schlecht. Linnæa, i. 38. *Ebraxis virgata*, Raf. Antikon Bot. 29. — Waste places, common, widely distributed throughout the United States and Canada (also S. Am.) ; very variable in size and foliage.

**Var. linária**, Wood. "Very slender ; leaves all linear except the lowest, which are linear-spatulate ; calyx globular. Ga. and Fla." — Class-Book, ed. of 1861, 256, & Bot. & Fl. 53 ; Wats. Bibl. Index, 107.

**Var. divaricatá**, Robinson. Very slender : leaves linear or lance-linear : branches filiform, divaricate : calyx ovoid, 2 to 2½ lines long : petals wanting. — Proc. Am. Acad. xxviii. 132. — Waltham, Mass., *Boott* ; Rockford, Ill., *Bebb*, *Swezey*. A very similar apetalous form has been collected at Hartville, Wyoming, *Nelson*.

**S. ARMÉRÍA**, L. l. c. 420. Leaves elliptic or ovate-elliptic : flowers borne at the ends of the branches in small close cymes : pedicels short : calyx slender, clavate, 6 to 8 lines long : ovary long-stiped : petals pink, subentire or minutely toothed ; appendages lanceolate, acute. — Torr. & Gray, Fl. i. 194 ; Reichenb. l. c. t. 284. — Occasionally found on roadsides and in fields, having escaped from gardens. (Intro. from Eu.)

\* \* Perennial, subcaulescent, very low and densely matted.

**S. acaúlis**, L. (MOSS CAMPION.) Closely caespitose, an inch or two in height : leaves linear, crowded on the branching rootstocks : flowers small, 2 to 3 lines in diameter, subsessile or raised on naked curved peduncles (2 to 6 lines long) : calyx narrowly campanulate, 2 to 3 lines long, glabrous ; the teeth short, rounded : petals purplish, rarely white, entire, retuse

or bifid, minutely appendaged. — Spec. ed. 2, i. 603; Reichenb. l. c. t. 270. *Cucubalus acaulis*, L. Spec. i. 415. *Lychnis acaulis*, Scop. Fl. Carn. ed. 2, i. 306. — An arctic and high alpine species, widely distributed and somewhat variable; Arctic America to the White Mts.; extending along the Rocky Mts. from Alaska to Arizona; also found in the Cascade Mts. (Eu., Asia.) A somewhat caulescent form, with very slender elongated leaves 1 to 1½ inches in length, has been found in the Rocky Mts. of Colorado, *Hall & Harbour, Miss Eastwood*, and Arizona, *Rothrock*. It is connected, however, with the typical form by gradual transitions.

\* \* \* Caulescent perennials.

+ Species of the Atlantic and Gulf States and of the Mississippi Valley.

++ Calyx inflated, flowers white or pink, scattered or panicle.

**S. nivea**, MUHL. Stem smooth or minutely pubescent above, 1½ to 3 feet in height: leaves opposite, lanceolate, attenuate-acuminate, smooth or pulverulent-pubescent: flowers rather few, nodding, borne in the forks of the branches: bracts foliar: calyx oblong in anthesis, finely pubescent or smooth; nerves inconspicuous, anastomosing, the teeth short, triangular, obtuse: petals cuneate-obovate, bearing two short blunt appendages. — Muhl. acc. to Nutt. Gen. i. 287, where first descr. (Nutt. evidently miscopying the name *S. alba* of Muhl.); Otth, l. c. 377; Torr. & Gray, Fl. i. 190; Rohrb. l. c. 87. *S. alba*, Muhl. Cat. 45 (*nomen subnudum*). *Cucubalus niveus*, Nutt. Gen. i. 287. — Pennsylvania and Washington, D. C., and mountains of E. Tennessee (acc. to Chapman), to S. Illinois, Iowa, and Minnesota; rather local but not rare. Some specimens have been discovered also at Orono, Maine, by *Prof. F. L. Harvey*, who regards the species as indigenous at this extra-limital station.

**S. stellata**, AIT. f. (STARRY CAMPION.) Stems 2 to 3 feet high: leaves in whorls of 4 (the uppermost and lowest sometimes opposite), ovate-lanceolate, acuminate, 2 to 3 inches long, half as broad: flowers in an open panicle: calyx campanulate, 4 to 5 lines in length; the teeth broad, acuminate: petals laciniately cleft, unappendaged. — [Dryander? in] Ait. f. Kew. ed. 2, iii. 84; Torr. Fl. N. Y. i. 100, t. 16; Meehan, Native Flowers, ser. 1, ii. 45, t. 12. *Cucubalus stellatus*, L. Spec. i. 414; Sims, Bot. Mag. t. 1107. — Woodland, frequent, E. Massachusetts to Minnesota and Nebraska, *Hayden, Clements*, southward to Georgia, *Small*, and Texas.

++ ++ Calyx not inflated, distended only by the enlarging capsule.

== Flowers white or rose-colored.

**S. ovata**, PURSH. Pubescent or smooth: stems several from the same root, 2 to 4 feet in height: leaves ovate to ovate-lanceolate, attenuate-acuminate, 3-5-nerved from the rounded base, sessile, subconnate, 3 to 5 inches long: flowers borne in a narrow terminal leafless panicle: calyx tubular, 3 to 4 lines in length, 10-nerved: petals white, blades dichotomously cleft into linear segments. — Fl. i. 316; Torr. & Gray, Fl. i. 190; Chapm. Fl. 51. ? *Cucubalus polypetalus*, Walt. Car. 141. — Alluvial woods, uplands, North Carolina to Georgia and Alabama.

**S. Baldwinii**, NUTT. Villous: stems low, weak, decumbent, throwing out runners: lower leaves spatulate, obtuse, with attenuate bases; the upper oblanceolate or lanceolate, acute: flowers few, very large, 1½ inches or more in diameter, pedicellate, aggregated at the ends of the stems: calyx clavate, pubescent, 10 lines in length; the teeth ovate-lanceolate, acuminate: petals white or pink; the large obovate blades fringed, unappendaged: capsule aseptate. — Gen. i. 288; Torr. & Gray, Fl. i. 193; Chapm. Fl. 51. *S. fimbriata*, Baldw. in Ell. Sk. i. 515, not of Sims. *Melandryum Baldwinii*, Rohrb. l. c. 231; Wats. Bot. King Exp. 431. — Georgia and Florida; fl. March to May.

**S. NUTANS**, L., a slender European species with narrow leaves chiefly clustered near the base, and white or rose-colored flowers nodding in a narrow panicle, has been found more or less established on Mt. Desert Isl., Maine, *Miss Minot*, and has been collected at Arrochar, Richmond Co., N. Y., by *W. C. Kerr* (Bull. Torr. Club, xxii. 460).

**S. Pennsylvanica**, MICHX. (WILD PINK.) Viscid-pubescent: stems few or many, 6 to 9 inches high, from a strong tap-root: leaves mostly at the base, spatulate or oblanceolate, usually acutish at the apex, tapering below to long ciliated petioles; the two or three pairs



of cauline leaves much shorter, lanceolate or narrowly oblong, acute: cymes small, terminal, dense, rarely more open: calyx clavate, purplish; the teeth short: petals rose-colored or white, appendaged; blades obovate, erose, 4 to 6 lines in length: ovary long-stiped. — Fl. i. 272; Lindl. Bot. Reg. t. 247; Hook. Fl. Bor.-Am. i. 90; Gray, Gen. III. ii. 42, t. 115. *S. cheiranthoides*, Poir. Dict. vii. 176. *S. incarnata*, Lodd. Bot. Cab. t. 41. *S. platypetala*, Otth in DC. Prodr. i. 383. *Melandryum Pennsylvanicum*, Rohrb. l. c. 233, & Linnæa, xxxvi. 251. *S. Caroliniana*, Walt. Car. 142, with scarlet or crimson petals, and *S. rubicunda*, Dietr. Allg. Gartenzeit. iii. 196, with divided petals, are probable synonyms. Dr. Britton maintains (Bull. Torr. Club, xviii. 268) that the former species, which antedates that of Michaux, was founded upon a plant in herb. Walter labelled "*Silene an Virginica*." Walter's species, however, as the description shows, was based upon two somewhat differing plants, and there is no proof from the labelling that the plant in question represents either of them. — Open rocky woods, E. New England to S. Carolina and Kentucky; fl. April, May. Flowers with 5 carpels are occasionally found (acc. to J. Schrenk) as in some other species of the genus.

== = Flowers crimson or scarlet, large.

a. Petals 2-4-toothed.

**S. Virginica**, L. (FIRE PINK, CATCHFLY.) Viscid-pubescent: stem striate, single, simple, 1 to 2 feet high: leaves spatulate or oblanceolate; the lower ones narrowed to ciliate-fringed petioles; the upper lanceolate, sessile: flowers very large, an inch or more in diameter, loosely cymose, commonly nodding or reflexed after anthesis: calyx clavate or oblong, 8 lines in length, becoming obovate in fruit: petals crimson; blades broadly lanceolate, 2(rarely 4)-toothed at the apex. — Spec. i. 419, in part, not Willd.; Hook. Bot. Mag. t. 3342; Torr. & Gray, Fl. i. 192; Chapm. Fl. 51; Meehan, l. c. 17, t. 5. *S. Catesbeii*, Walt. Car. 142. *S. coccinea*, Mœnch, Meth. Suppl. 306. — Common in open woods, on rocky hills, W. New York, S. W. Ontario (acc. to Macoun) to Minnesota (acc. to Upham), southward to Georgia and Arkansas.

**S. rotundifolia**, NUTT. (ROUND-LEAVED CATCHFLY.) Viscid-pubescent: stems weak, decumbent, branched: leaves rather large, varying from broadly lanceolate to subrotund, rather abruptly pointed; the lower ones contracted at the base to winged petioles: flowers large, showy, scattered or in loose cymes: calyx tubular, 10 to 13 lines in length, abrupt at the base, becoming clavate but not obovate in fruit: petals bright scarlet; blades 8 lines in length, deeply bifid; lobes more or less toothed: seeds smaller, smoother, and darker colored than in the preceding. — Gen. i. 288; Otth, l. c. 383; Torr. & Gray, Fl. i. 192. *Melandryum rotundifolium*, Rohrb. Monogr. Sil. 234, & Linnæa, xxxvi. 257; Wats. Bot. King Exp. 431. — S. Ohio (abundant at Ash Cave, Hocking Co., acc. to Selby), Kentucky, Tennessee, and (acc. to Chapman) Alabama; rather local; fl. June to August.

b. Petals entire or nearly so.

**S. régia**, SIMS. (ROYAL CATCHFLY.) Viscid-glandular above, finely pulverulent-pubescent below: stems tall, erect, rather rigid, simple or sparingly branched, leafy: leaves ovate, acuminate, 3-7-nerved from the rounded sessile base; the lowest more or less contracted below: flowers showy, in a narrow oblong panicle: calyx cylindrical, 10 to 12 lines long, becoming somewhat spindle-shaped in fruit: petals spatulate-lanceolate, subentire, scarlet. — Bot. Mag. t. 1724; Sweet, Brit. Fl. Gard, n. ser. t. 313; Torr. & Gray, Fl. i. 193. *S. Virginica*, form, Michx. Fl. i. 272. "*S. Illinoensis* (Mx.)," Kellerman, Geol. Ohio, vii. pt. 2, 178, careless synonym, as Michaux employs the word *Illinoensis* merely in giving the distribution. *Melandryum regium*, A. Br. Flora, 1843, 372. *M. Illinoense*, Rohrb. Linnæa, xxxvi. 250. — Prairies, Ohio to Georgia (acc. to Chapman) and westward to Missouri, Arkansas, and N. W. Indian Terr., *Blankinship*; fl. June to August.

**S. subciliata**, ROBINSON. Stem strict, erect, glabrous: leaves narrowly linear-oblong, slightly fleshy, glabrous on the surfaces but sparingly ciliated on the margin, 1½ to 2 inches long, obtusely pointed with callous tips and narrowed below to short winged and ciliated petioles: inflorescence slender, elongated, racemiform; the lower flowers distant: calyx glabrous, cylindric, 10 lines in length: petals with elliptic entire obtuse blades and lanceolate entire appendages. — Proc. Am. Acad. xxix. 327. — "Texas and Louisiana," Wright. Δ distinct species, but never rediscovered and hence poorly known.

+ + Rocky Mountain and Pacific species.

+ + Flowers large, rather few, scattered: calyx cylindrical or clavate in anthesis, 8 to 12 lines long: corolla (except in *S. Parishii*) usually more than 10 lines in breadth; petals 4- $\infty$ -cleft, very rarely bifid: stems leafy.

= Corolla deep red.

**S. laciniáta**, CAV. Finely pubescent: root narrowly fusiform: stems erect or decumbent, somewhat rigid, knotty below; the branches ascending: leaves lanceolate to narrowly linear, scabrous, ciliolate, narrowed to a sessile base: flowers terminal on the branches: calyx subcylindric or clavate even in fruit, 10 lines in length: petals bright scarlet, 4-cleft or very rarely bifid: capsule essentially oblong, scarcely at all ovate, commonly exserted at maturity. — Ic. vi. 44, t. 564; Lindl. Bot. Reg. t. 1444; Gray, Pl. Wright. ii. 17; Wats. Proc. Am. Acad. x. 341. *S. pulchra*, Torr. & Gray, Fl. i. 675, in part. *S. speciosa*, Paxt. Mag. Bot. x. 219. *S. simulans*, Greene, Pittonia, i. 63. *Lychnis pulchra*, Cham. & Schlecht. Linnæa, v. 234. — Central California to New Mexico. (Mex., Lower Calif.)

**Var. Gréggii**, WATSON. Leaves oblong-lanceolate to ovate, otherwise not differing essentially from the type. — Proc. Am. Acad. x. 341, & Bibl. Index, 108. *S. Greggii*, Gray, Pl. Wright. ii. 17. *Melandyrium laciniatum*, var. *Greggii*, Rohrb. Monogr. Sil. 232. *M. Greggii*, Rohrb. Linnæa, xxxvi. 256. — W. Texas, *Nealley* (acc. to Coulter); New Mexico, *Wright*, *Thurber*, *Matthews*; Arizona, *Buckminster*, *Lemmon*. (Mex., *Gregg*.)

**S. Californica**, DURAND. Root simple, strong, penetrating vertically to a depth of 2 to 3 feet: stems several, procumbent or suberect, leafy: leaves lanceolate or ovate-elliptic, more or less narrowed to the base, acuminate, rarely obtusish: corolla more than an inch broad; petals variously cleft, most commonly with two broad lobes flanked by two narrower ones: capsule ovoid, concealed until dehiscence by the rather broad calyx. — Pl. Pratt. 83; Brew. & Wats. Bot. Calif. i. 64. *S. pulchra*, Torr. & Gray, Fl. i. 675, in part. *S. Virginica*, Benth. Pl. Hartw. 299. *S. laciniata*, var. *Californica*, Gray, Proc. Bost. Soc. Nat. Hist. vii. 146; Wats. Proc. Am. Acad. x. 341. *S. Tilingi*, Regel, Act. Hort. Petrop. i. 99. *Melandyrium Californicum*, Rohrb. Linnæa, xxxvi. 252. — Coast Mts. of Currie Co., Oregon, *Howell*, southward through N. and Central California to Ft. Tejon, *Xanthus*, and perhaps farther. Subject to much variation in foliage, the following being perhaps the best marked of the varieties.

**Var. subcordáta**, ROBINSON. Leaves ovate, suborbicular, shortly acuminate, closely sessile by subcordate bases. — Proc. Am. Acad. xxviii. 136. — Blue Cañon, Placer Co., Calif., *Kellogg*, *Brandegee*.

= = Corolla white or roseate, much exserted: seed-coat more or less roughened but firm.

**S. Wrightii**, GRAY. Very glutinous: rootstock thick, ligneous: stems several, ascending, a foot or more in length, branching, leafy: leaves lanceolate, acuminate, 1½ to 2 inches long, sessile; the lower attenuate below: calyx-teeth filiform-attenuate, nearly half as long as the tube: petals white, 4-cleft; the lobes somewhat toothed: capsule on a stipe of nearly its own length. — Pl. Wright. ii. 17; Wats. Bibl. Index, 110. *Melandyrium Wrightii*, Rohrb. Linnæa, xxxvi. 253; Wats. Bot. King Exp. 431. — Mountain sides near the copper mines, New Mexico, *Wright* (no. 862).

**S. Hoókeri**, NUTT. Covered above with a fine grayish pubescence: root single, stout: stems several, short, slender, decumbent: leaves oblanceolate, rather numerous and approximate, 2 to 3 inches in length, acute or obtusish: flowers very large: calyx-teeth acute, but not filiform: petals 4-cleft, white or pink. — Nutt. in Torr. & Gray, Fl. i. 193; Hook. f. Bot. Mag. t. 6051; Fl. Serres, t. 2093; Wats. Proc. Am. Acad. x. 341; Brew. & Wats. l. c. *S. Bolanderi*, Gray, Proc. Am. Acad. vii. 330, viii. 378; Bolander, Cat. 6. *Melandyrium Hookeri* & *M. Bolanderi*, Rohrb. l. c.; Wats. Bot. King Exp. 431. — Woodlands, W. Oregon and N. W. California; fl. June, July.

= = = Corolla white or nearly so, scarcely exserted: seed-coat vesicularly roughened or crested.

**S. Parishii**, WATSON. Somewhat grayish-pubescent or green: root simple, thick, with a branching rootstock: stems several, decumbent, a span long: leaves lanceolate, acuminate, sessile, 1 to 2 inches long; the lower oblanceolate: flowers aggregated at the ends of the

branches: calyx tubular, narrowed below, an inch long, with narrow subulate teeth (3 to 4 lines in length): petals narrow, scarcely exserted from the calyx, cleft into 4 or more filiform segments: seeds doubly crested with short vesicular hairs. — Proc. Am. Acad. xvii. 366. — San Bernardino Mts., Calif., *Parish Bros.*; also on dry summit of Tanwitz Ridge, San Jacinto Mts., *H. M. Hall*; fl. August.

++ ++ Flowers smaller, not ordinarily exceeding 6 or 8 lines in diameter.

= Flowers borne in the forks of the branches and forming a leafy inflorescence: calyx oblong or campanulate: leaves lanceolate to orbicular.

**S. campanuláta**, WATSON. Finely glandular-pubescent: root thick, simple: rootstock branching, somewhat woody: stems slender, erect, leafy: leaves sessile, lanceolate: flowers on short deflexed peduncles: calyx green, broadly campanulate, reticulate-veined, toothed nearly to the middle: petals narrow; the limb cleft into 4 or more flesh-colored segments: capsule globular, 3 to 4 lines in diameter. — Proc. Am. Acad. x. 341; Brew. & Wats. l. c. 63. — Mountainous districts of N. California and S. Oregon.

**Var. Greénei**, WATSON. More pubescent throughout: leaves ovate: petals greenish white. — Wats. in Robinson, Proc. Am. Acad. xxviii. 137. — California, Yreka, *Greene*, Trinity Co., *Blankinship*; Oregon, Cañonville and Wolf Creek, *Howell Bros.*, Ashland, *Henderson*. Apparently the commonest form.

**Var. orbiculáta**, ROBINSON, n. var. Tomentulose: leaves shorter, rotund in general outline, half inch in diameter, with a very short acuminate tip, broadly cordate and amplexicaul at the base. — Elevated ledges above Hetten Chow, Trinity Co., Calif., *Blankinship*, 23 June, 1893.

**S. Menziésii**, HOOK. Finely glandular-pubescent: stems weak, leafy, dichotomously branched above, 6 inches to a foot or more in height: leaves ovate-lanceolate, acuminate at each end, thin: flowers very small for the genus: calyx obconical, obovate, or oblong, only  $2\frac{1}{2}$  to 4 lines in length: petals white, 2-cleft, commonly but not always unappendaged: capsule  $1\frac{1}{2}$  to 2 lines in diameter. — Fl. Bor.-Am. i. 90, t. 30; Torr. & Gray, Fl. i. 193, 676; Rohrb. Monogr. Sil. 147. *S. stellarioides*, Nutt. in Torr. & Gray, l. c. 193. *S. Dorrii*, Kellogg, Proc. Calif. Acad. Sci. iii. 44, f. 12. — From S. Missouri, *Blankinship*, Nebraska, *Williams*, to Assiniboia, and westward and southwestward to Vancouver Isl., S. California, and New Mexico.

= = Flowers few, rather small, white or nearly so, nodding, borne in a lax naked panicle: petals cleft into four or more narrowly linear almost filiform segments: styles long-exserted: leaves small, lanceolate, chiefly clustered upon the more or less caespitose base.

**S. Lemmóni**, WATSON. Smoothish and green or more or less hoary-puberulent, finely glandular and viscid above: root single; rootstock considerably branched: stems slender, 6 to 14 inches high, bearing 3 to 6 loosely paniculate or subracemose flowers: leaves oblanceolate to linear-oblong, acute: calyx in fruit obovoid, more or less narrowed below; nerves green, those of the short ovate-lanceolate teeth rather broad: petals with spatulate pubescent claws; blades divided into 4 linear-filiform segments; appendages linear, entire: seeds reddish or ashy. — Proc. Am. Acad. x. 342; Brew. & Wats. Bot. Calif. i. 64. *S. Palmeri*, Wats. l. c. xi. 124; Brew. & Wats. l. c. 65, an indistinguishable form of *S. Calif. S. longistylis*, Engelm. in Wats. l. c. xxii. 469, merely a narrow-leaved and somewhat canescent form of the north. — Mountainous regions from Ashland Butte, S. Oregon, throughout California to Cuimacá Mts., San Diego Co., *Palmer*; fl. May to July. The three species here united are now known from fairly copious intergrading material which leaves no doubt that the supposed specific differences are of a trivial and inconstant nature.

= = = Inflorescence as in the preceding: petals 2-cleft into linear segments: styles very long, the exserted portion as long as the calyx.

**S. Bridgésii**, ROHRB. Pubescent and viscid: stems leafy, usually simple up to the inflorescence, a foot or more in height: leaves sessile, lanceolate, acute,  $1\frac{1}{2}$  to 2 inches long: flowers slender-pedicelled, verticillately racemose or somewhat paniculate, nodding: calyx narrowly oblong or clavate in anthesis, broadly obovate in fruit; the teeth acute; the principal nerves broad, green; the commissural much narrower, seldom anastomosing with the others: petals half to three fourths inch long, considerably exserted, white or purplish: seeds very

large, finely tuberculate, red. — App. Ind. Sem. Berol. 1867, 5, & Monogr. Sil. 204; Wats. Proc. Am. Acad. x. 342; Brew. & Wats. l. c. 66. *S. incompta*, Gray, Proc. Am. Acad. vii. 330 (*S. Engelmanni*, Rohrb. Linnæa, xxxvi. 264), is a form of the same species, differing from the type only in the somewhat broader lobes of the petals and in the obtuse appendages. — California, Yosemite Valley, *Bridges, Gray*; Mt. Bullion, *Bolander*; Danah, *Congdon*. A closely similar if not identical plant has been found by *Rattan* on the Klamath River.

== == == Flowers scattered, or variously paniculate (in *S. montana*, var. *rigidula*, and sometimes in *S. repens*, denser and subspicate or thyrsoid): styles included or somewhat exerted, but not so long as in the preceding.

a. Fruiting calyx ovate, not contracted below, filled and distended by the subsessile capsule.

**S. Thúrberi**, WATSON. Densely grayish-pubescent and glandular: stems erect, 2 feet high, somewhat rigid, with ascending branches: leaves lanceolate, acute, contracted below, sessile, 2 to 4 inches long: flowers small, rather numerous: calyx cylindric becoming narrowly ovate, green and white striped, densely pubescent; the teeth slender with fimbriate-laciniate margin: petals white, little exceeding the calyx; claws rather broad with upwardly produced auricles; blades bifid with short oblong lobes, each with a small lateral tooth; appendages oblong, obtuse: capsule narrowly ovoid, scarcely stiped; seeds tuberculate and distinctly crested. — Proc. Am. Acad. x. 343. *S. plicata*, Wats. l. c. xvii. 366. — Near Janos, S. W. New Mexico, *Thurber*; peak south of Rucker Valley, Arizona, *Lemmon*. (Chihuahua, *Pringle, Hartman*; Sonora, *Hartman*.)

**S. pectináta**, WATSON. Stems several, erect, 1½ to 2½ feet high: leaves lanceolate or oblanceolate, acute or acuminate; the lower long, tapering into winged petioles; the upper more or less reduced: flowers purplish rose-colored, 6 to 8 lines broad: calyx becoming ovate in fruit: the teeth lance-linear to filiform, elongated, usually exceeding the mature capsule: petals with narrow claws destitute of auricles; blades obovate, bifid; lobes rounded; appendages lanceolate, entire: capsule large, ovate. — Proc. Am. Acad. x. 344; Brew. & Wats. Bot. Calif. i. 65. — Plumas Co., Calif., *Mrs. Ames*, Sierra Co., *Lemmon*; Carson City, Nev., *Anderson*. The typical form is very viscid-glandular and somewhat branched.

**Var. subnúda**, ROBINSON. Scarcely viscid: stems subsimple: radical leaves almost smooth, the cauline much reduced. — Proc. Am. Acad. xxviii. 140. *Lychnis nuda*, Wats. Bot. King Exp. 37, & Proc. Am. Acad. xii. 248, is with scarcely a doubt merely a 5-carpelled form from the Humboldt Mts., *Watson*. — Near Empire City and at Franktown, Nev., *Jones*.

b. Capsule distinctly stiped: calyx relatively narrow, cylindric or in fruit clavate or obovate and usually rather distinctly contracted about the stipe of the capsule.

1. Petals 4(–∞)-fid.

**S. Oregána**, WATSON. Finely pubescent and very viscid, fetid: stems one or more, erect, simple up to the racemiform or rather densely cymose-paniculate inflorescence: the lower leaves oblanceolate, narrowed below to long petioles; the upper leaves lanceolate or lance-linear, sessile: petals white; claws spatulate, glabrous, distinctly auricled at the summit; blades 2 to 3 lines long, variously cleft into 4 to 6 or more linear segments: stipe of the ovoid capsule about 2 lines long. — Proc. Am. Acad. x. 343; Brew. & Wats. l. c. — Mountains of Oregon and Washington to Montana; fl. April to August.

**S. montána**, WATSON, l. c. Finely pubescent: stems erect from a more or less decumbent base, 4 to 14 inches high: leaves lance-linear or narrowly oblanceolate, acuminate, 1 to 2½ inches in length; the cauline 3 to 4 pairs: inflorescence varying from subspicate to paniculate; flowers rarely solitary: calyx 6 to 9 lines in length: petals greenish white to rose-colored, exerted 2 to 4 lines: ovary long-stiped: capsule acutish. — Near Carson City, Nev., *Anderson*; Sierra Co., Calif., *Lemmon*. *S. Shockleyi*, Wats. l. c. xxv. 127, from the White Mts., Mono Co., Calif., is apparently only a high-mountain form of the same species.

**Var. rigidula**, ROBINSON, l. c. Stems simple, a span high, slightly rigid: leaves short, less than an inch in length, thickish and stiff: flowers white, subspicate. — Franktown, Nev., *Jones*.

**S. occidentális**, WATSON. Viscid-glandular, 2 feet high: stems one or two from a single strong root, branched above: leaves lanceolate or oblanceolate, 2 to 3 inches long: flowers in a very loose open panicle: calyx elongated, cylindric, becoming clavate in fruit: petals purple, 4-cleft into lanceolate segments; blades narrowed gradually into cuneate claws, the latter devoid of auricles; appendages linear: capsule oblong, upon a stipe 2 lines in length.—Proc. Am. Acad. x. 343; Brew. & Wats. l. c. 64.—California, without special locality, *Bolander*; *Plumas Co.*, *Lemmon*, *Mrs. Austin*; *Butte Co.*, *Mrs. Bidwell*; *Alpine Co.*, *Hansen*; *Modoc Co.*, *Baker*.

2. Petals with a (sometimes small but) well marked bifid blade, each lobe sometimes bearing a very small lateral tooth.

○ Blades nearly or quite as long as the glabrous claws.

**S. répens**, PATRIN. Finely and densely puberulent: stems several from a branched and creeping rootstock, leafy: leaves thinish, lanceolate, attenuate both ways: inflorescence rather dense, often thyrsoid, but sometimes more loosely paniculate: calyx purplish, 5 or 6 lines in length: spreading limb of the rose-purple petals 2 or 3 lines in length, with retuse or entire segments; appendages oblong, entire: carpophore very long, often equalling or exceeding the fruit.—Patrin in Pers. Syn. i. 500; Ledeb. Ic. t. 425; K. Brandegee, *Zoe*, iv. 84. *S. purpurata*, Greene, *Pittonia*, ii. 229.—Porcupine River in the interior of N. Alaska, *Turner*, *S. Centr. Montana*, *Rydberg*, *Flodman*. (N. Asia and Caucasus Mts.)

○○ Blades much shorter than the claws; these pubescent below.

**S. verecúnda**, WATSON, l. c. 344. Low, 6 to 18 inches in height, finely pubescent below, glandular-viscid above: stems several, leafy especially near the base: leaves narrowly lanceolate, oblanceolate, or spatulate, to linear, acute: flowers terminal on the short branches of the inflorescence or borne in 3-flowered lateral cymes: calyx soon becoming clavate or obovate by the development of the broad ovoid capsule: calyx-teeth with membranous ciliated margins: petals rose-colored; claws glabrous, narrowly or more broadly auricled; blades 2-cleft into short entire or slightly toothed oblong segments; appendages oblong or lanceolate, blunt and often somewhat toothed at the apex.—Brew. & Wats. l. c. 65. *S. Engelmanni*, var. *Behrii*, Rohrb. *Linnæa*, xxxvi. 264. *S. platyota*, Wats. l. c. xvii. 366, merely a slender form of southern range. *S. Luisana*, Wats. l. c. xxiii. 261, narrow-leaved form not satisfactorily separable from the type.—Central California from Mt. Diablo (acc. to Greene) and near San Francisco (first coll. at Mission Dolores by *Bolander*) to San Luis Obispo, *J. G. & S. A. Lemmon*, and southward chiefly in the mountainous regions to the Cuimacá Mts., *Palmer*; fl. midsummer. (Lower Calif., *Orcutt*.) This species has long been regarded as local, yet patient search has failed to show satisfactory or constant characters to distinguish the type from the more southern forms here included, which greatly extend its range.

**S. Sargentii**, WATSON. Cespitose, minutely pubescent: stems numerous, slender, erect, 6 inches high: leaves linear or nearly so, inch or two long, a line or so in breadth; the radical crowded, covering the rootstock with their slightly enlarged and imbricated bases; the cauline 2 to 3 pairs: calyx cylindrical, 7 lines long; teeth short: petals white or pink; claws exerted, with broad laciniately cleft auricles; blades short, obovate, bifid; segments each bearing a small lateral tooth: capsule well stiped, cylindrical, very slender, at maturity scarcely more than a line in diameter: seeds tuberculate-crested, smooth on the faces.—Proc. Am. Acad. xiv. 290.—Table Mountain, Monitor Range, N. Nevada, *Sargent*. Known from a single specimen only.

3. Petals with large spatulate claws; the almost obsolete blades consisting merely of two very short entire blunt or triangular teeth; appendages 4, very small and entire: viscid-glandular species of Idaho and Washington.

**S. Spaldingii**, WATSON. Viscid-tomentose: stems several, knotty, a foot high, very leafy; branches appressed or ascending: leaves lanceolate, sessile,  $1\frac{1}{2}$  to 2 inches long: flowers subspicate or appressed cymose-paniculate: calyx in fruit obconical, more herbaceous than usual in the genus, net-veined nearly to the base; teeth rather large, triangular-lanceolate, acutish: petals greenish white, not exceeding the calyx; claws broadly auricled; blades bifid, very short indeed, scarcely surpassing the four small appendages: capsule ovate-

oblong, moderately stiped. — Proc. Am. Acad. x. 344. — On the Clear Water, Central Idaho, *Spalding*; on the Imnaha, Union Co., Oregon, *Cusick*; fl. September.

c. Calyx broader, oblong, campanulate or rarely obovate, rather loosely surrounding the ovary, sometimes narrowed downward but not distinctly contracted about the carpophore.

1. Petals divided into 4 nearly equal segments: appendages fringe-toothed.

**S. Bernardina**, WATSON. Covered with a fine grayish pubescence below, finely glandular above: caudex branching: stems several, slender, erect, 8 to 12 inches high, furrowed, 1-5-flowered: leaves grass-like, narrowly linear, half line to line in breadth, 1-nerved, acute: terminal flower developing first, the lower ones borne upon branches  $1\frac{1}{2}$  to 2 inches long: buds acute: calyx green-nerved; teeth lanceolate, acutish, with membranous ciliated margins: petals white with rather short blades; claws with broad lacinate auricles; appendages 4, long; the inner ones broad and toothed: capsule moderately stiped. — Proc. Am. Acad. xxiv. 82. — On shady slopes, Tulare Co., Calif., at Long Meadow, *Palmer*, near Whitney Meadows, *Coville* & *Funston*.

2. Petals bifid; each segment with or without a smaller lateral tooth.

○ Low, 3 to 8 inches in height.

**S. Gráyii**, WATSON, l. c. xiv. 291. Cespitose, minutely pubescent and glandular: rootstock elongated, much branched; stem simple, erect, 4 to 6 inches high, 1-5-flowered: leaves short, oblanceolate or spatulate, slightly fleshy, 4 to 8 lines in length, the radical numerous, crowded; the cauline about 3 pairs: calyx broadly cylindrical; teeth rounded: petals pink, with blades deeply bifid, the segments each bearing a lateral tooth; claws narrowly auricled; capsule short-ovoid, scarcely stiped. — Robinson, Bot. Gaz. xvi. 44, t. 6. — Mt. Shasta, above the timber line and near snow, *Brewer*, *Hooker* & *Gray*, *Engelmann*, *Packard*, *Pringle*; Scott Mts., *Engelmann*.

**S. Suksdorfii**, ROBINSON, l. c. Low, densely matted, alpine: stems 2 to 3 (rarely 4 to 5) inches high, simple, 1-3-flowered, minutely pubescent below, glandular above: cauline leaves about 2 pairs, linear-spatulate, 3 to 7 lines long, a line wide, obtusish; radical leaves numerous, crowded, similar or somewhat spatulate: calyx broadly cylindric or campanulate, seldom exceeding 5 lines in length; nerves conspicuous, simple below, anastomosing above: petals white, little exceeding the calyx, shallowly bifid; lobes entire; appendages oblong, retuse: stipe of capsule  $1\frac{1}{2}$  lines long. — California to Washington, Mt. Stanford, *Hooker* & *Gray*; Mt. Paddo, *Suksdorf*; Mt. Hood, *Howell*; Mt. Stewart, *Brandeggee*; Mt. Rainier, *Piper*.

**S. Watsóni**, ROBINSON. Finely glandular above, minutely pubescent or nearly smooth below: stems many, cespitose from a multicapital caudex, erect, very slender, simple, 4 to 10 inches in height, bearing 1 to 5 or more flowers: leaves narrowly linear or very narrowly oblanceolate, acute, dark green; the radical numerous, an inch in length, seldom exceeding a line in breadth; the slender petioles expanding at the base, closely imbricated and connate by scarious membranes: calyx ovate or somewhat obovate, 5 to 6 lines in length, with purple more or less anastomosing nerves; teeth with membranous margins: petals white or rose-colored; blades short, a line in length, bifid; each segment usually bearing a short lateral tooth; appendages obtuse: styles ordinarily 3, rarely 4. — Proc. Am. Acad. xxviii. 143. *Lychnis Californica*, Wats. Proc. Am. Acad. xii. 248; Coville, Contrib. U. S. Nat. Herb. iv. 70. *L. Parryi*, Wats. l. c., of W. Wyoming, is apparently this species, although the single specimen on which it was based is 4-5-carpelled. In the absence of other differences its separation on this (probably inconstant) character is highly artificial. — California, near Ebbett's Pass, *Brewer*; Mt. Dana, *Bolander*; Sierra and Plumas Cos., *Lemmon*, southward to Mineral King, acc. to Coville, l. c.; and northward to the Siskiyou and Cascade Mts., Oregon, *Howell*, and Washington, *Piper*. The anthers are often infested by *Ustilago antherarum*, and in consequence enlarge and turn purple.

○ ○ Taller.

**S. Douglásii**, HOOK. Finely pubescent, scarcely viscid: stems very slender, usually decumbent and geniculate at the base: leaves remote, long, linear to narrowly lance-linear,

attenuate to each end, spreading, 2 to 3 inches long, 1 to 2 lines wide: flowers borne mostly in 3-flowered long-peduncled cymes: calyx oblong or obovate, rather narrow at the base; the ends of the teeth surrounded by ovate obtuse inflexed membranes: petals white or pink, 2-lobed; segments obtuse; claws moderately auricled; appendages oblong, obtuse: capsule narrowly cylindrical, 5 lines long; teeth recurved; stipe  $1\frac{1}{2}$  lines long. — Fl. Bor.-Am. i. 88; Torr. & Gray, Fl. i. 190; Wats. Bot. King Exp. 36, 431, & Proc. Am. Acad. x. 341; Brew. & Wats. Bot. Calif. i. 66. ? *S. Lyallii*, Wats. Proc. Am. Acad. x. 342, in part (as to pl. *Lemmon*), a form with small flowers in a pathological state, the anthers being infested with *Ustilago antherarum*. *Lychnis elata*, Wats. l. c. xii. 249, in part (as to pl. *Bourgeau*), merely 5-carpedled individual. *Cucubalus Douglasii*, Eat. Man. ed. 7, 266. — Wasatch Mts., Utah, to Central California, northward to Montana and Brit. Columbia; fl. June to September. A common and polymorphous species, of which the following are the chief varieties; all of them tending to intergrade with the type, and separated from it and each other by no constant or important floral character.

**Var. multicaulis**, ROBINSON, l. c. 144. Grayish-tomentulose and less glandular: leaves more approximate, narrowly lanceolate or oblong, taper-pointed, erect: stems more rigid. — *S. multicaulis*, Nutt. in Torr. & Gray, Fl. i. 192. *S. Drummondii*, var., Torr. & Gray, Fl. i. 675. — "Oregon," Nuttall; Washington, Yakima Co., *Brandegee* (no. 655 in part); Klikitat, *Howell*; Spokane Co., *Suksdorf*, *Ramm*; N. Idaho, *Spalding*, *Sandberg*; Montana, *Scribner*, *Canby*.

**Var. Macounii**, ROBINSON, l. c. Minutely pubescent, somewhat glandular above: leaves distant, long and narrow, short-pointed, tapering very gradually from near the apex to the base: calyx oblong, rather short, 4 to 5 lines in length, narrow; teeth purple-tipped: styles in specimens studied 3 to 4, very rarely 5. — *S. Lyallii*, Wats. Proc. Am. Acad. x. 342, as to pl. *Lyall* (pathological form with anthers infested by *Ustilago antherarum*). *S. multicaulis*, Macoun, Cat. Canad. Pl. i. 494. *S. Macounii*, Wats. l. c. xxvi. 124; Macoun, Bot. Gaz. xvi. 286. — Washington, *Lyall*, *Brandegee* (no. 655 in part); Brit. Columbia, summits of Rocky and Selkirk Mts., *Macoun*, *Dawson*.

**Var. macrocalyx**, ROBINSON, l. c. 145. Tall, puberulent or nearly smooth: leaves narrowly lanceolate or linear, attenuate both ways: calyx long, cylindrical, 7 to 8 lines in length. — Humboldt Mts., W. Nevada, *Watson*; Mt. Paddo, Washington, *Suksdorf*, *Howell*.

**Var. viscida**, ROBINSON, l. c. Glandular-viscid, especially above: stems erect, rigid, mostly simple from a branched slightly woody base: calyx broadly oblong or almost campanulate, relatively short: leaves narrowly lanceolate to linear-oblong, thickish. — Brit. Columbia, at Kicking Horse Pass, *Macoun*; Washington, Olympic Mts., *Piper*, Mt. Stewart, *Sandberg* & *Leiberg*, Yakima region, *Brandegee*.

**Var. brachycalyx**, ROBINSON, l. c. Puberulent, not viscid; leaves distant, spreading, narrowly oblanceolate, attenuate: calyx short and broad, campanulate. — Oregon, Multnomah Co., and on Sauvie's Island, *Howell*; Washington, Skamania Co., *Suksdorf*.

**Var. monantha**, ROBINSON, l. c. Nearly or quite smooth: stems very slender and weak, rising from a spreading much branched base: leaves thin, lanceolate or linear-oblong and grass-like, narrowed both ways: flowers solitary, terminal, or 3 to 5 and loosely cymose: calyx oblong-campanulate, inflated. — *S. monantha*, Wats. l. c. x. 340; Brew. & Wats. l. c. 63. — Cascade Mts., Washington, *Harford* & *Dunn*; Webber Lake, Calif., *Lemmon*; N. Utah (?), *Parry*.

**S. scapósa**, ROBINSON, l. c. Finely puberulent, somewhat viscid above: stem erect, subsimple, almost naked, 1 to  $1\frac{1}{2}$  feet high, rather rigid: radical leaves thickish, oblanceolate, acute, 3-nerved, somewhat glaucous, 2 to 3 inches in length, 3 to 5 lines broad; cauline leaves reduced to 1 or 2 pairs of distant bracts: inflorescence a narrow rigid panicle: flowers small, erect: calyx oblong or elliptic in outline, with simple green nerves: petals white, scarcely exceeding the calyx; blades short, retuse; claws with somewhat saccate auricles; appendages short, obtuse: ovary shortly stiped. — Oregon, Blue Mts., *Nevius*; Cold Camp (no. 355) and Currant Creek, *Th. Howell*; fl. May.

===== Inflorescence denser, subsapicately paniculate or forming an elongated thyrs: styles included or moderately exserted.

**S. Hállii**, WATSON, l. c. xxi. 446. Stems several, from a stout root, simple, densely glandular-pubescent, 6 inches to  $1\frac{1}{2}$  feet high: leaves oblanceolate, acute, tapering to the base, the

midrib prominent below: flowers verticillately spicate, nodding: calyx even in anthesis broad, oblong or campanulate becoming obovate, strongly marked with purple or green nerves; those at the commissures irregularly anastomosing with the others and frequently double; teeth triangular, acute, with membranous incurved margins: petals purple, not greatly exceeding the calyx; claws very broad, laterally ciliate; blades short, bifid; segments somewhat oblique, often toothed: capsule ovate on a short stipe. — *S. Scouleri* of various authors, not Hook.; thus Gray, Am. Jour. Sci. ser. 2, xxxiii. 405, & Proc. Acad. Philad. 1863, 58; Porter & Coulter, Fl. Col. 12; Wats. l. c. x. 342, in part; Coulter, Man. Rocky Mt. Reg. 32, in part. *Lychnis elata*, Robinson, Proc. Am. Acad. xxviii. 148, as to plants of Colorado, not Wats., 5-carpeted form. — Alpine regions of Colorado, *Hall & Harbour*, *Greene*, *French*, *Brandegee*, *Patterson*; a doubtful specimen from Arizona, *Knowlton*; fl. August, September.

**S. Scouleri**, Hook. Pubescent, glandular-viscid above: root stout: stems simple,  $1\frac{1}{2}$  to 2 $\frac{1}{2}$  feet high: leaves narrowly oblanceolate or lance-linear, acuminate, not at all warty: inflorescence 6 to 8 inches long, verticillately spicate, or the lower flowers borne in short appressed cymes: calyx clavate; nerves definite, but anastomosing above; teeth short with broad membranous margins, ciliate: petals white or purplish; claws with rather narrow slightly lacinate auricles; blades bifid; segments emarginate or toothed; appendages blunt: carpophore 2 lines long. — Fl. Bor.-Am. i. 88; Torr. & Gray, Fl. i. 191; Rohrb. Monogr. Sil. 213. *S. Drummondii*, Gray, Proc. Am. Acad. viii. 377. *Elisanthe Scouleri*, Ruprecht, Fl. Cauc. i. 200. — Frequent in mountainous districts of Oregon and Idaho to Vancouver Isl. and "Northwest Coast," *Menzies*; Colorado, *Brandegee*; fl. July, August.

**S. Pringlei**, WATSON. Habit, inflorescence, and calyx of the last: leaves very long, usually narrow and attenuate, both surfaces roughened (especially in the older leaves) with fine warts: petals purplish, bifid; segments each bearing a lateral tooth; auricles rather broad; appendages saccate: capsule ovate-oblong, well stiped. — Proc. Am. Acad. xxiii. 269. — Mt. Graham, Arizona, *Rothrock*; New Mexico, *Fendler*, *Greene*. (Chihuahua, *Pringle*, *Hartman*.)

**7. LÝCHNIS**, Tourn. COCKLE. (Name ancient, from λύχνος, a lamp, in reference to the bright color of certain European species.) — Inst. 333, t. 175; L. Gen. no. 381; DC. Prodr. i. 385; Torr. & Gray, Fl. i. 194; Endl. Gen. 972-974; A. Br. Flora, 1843, 369; Reichenb. Ic. Fl. Germ. vi. t. 303-308; Benth. & Hook. Gen. i. 147; Wats. Proc. Am. Acad. xii. 246; Baill. Hist. Pl. ix. 108; Robinson, Proc. Am. Acad. xxviii. 147. *Lychnis*, *Melandryum* (in part), & *Viscaria*, Pax in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 1b, 70, 73. *Lychnis*, *Coronaria*, *Viscaria*, *Eudianthe*, & *Melandryum* (in part), Williams, Jour. Bot. xxxi. 170, 171. — A considerable and as here taken rather composite genus, chiefly of Europe and Asia, and too closely allied to *Silene*. The number of carpels is far from being satisfactory as a crucial character in separating the genera, and if applied consistently (as by Dr. Watson, l. c.) leads in our western species of *Silene* to artificial results. Yet it is deemed best for practical reasons to keep the genera separate, even if the division is based (as between *Arenaria* and *Stellaria*) upon a single and not wholly trustworthy character. Examination of a number of specimens seems to show that in American species the characters of partial septation of the capsule, division of the valves, inflation of the calyx, are very variable, and do not lead either individually or in combination to more definite or satisfactory results. The indigenous species are western or arctic (*L. alpina* extends eastward and southward to Lower Canada), but several introduced European species have become more or less common in the Atlantic and Middle States, and in Canada.



§ 1. *EULÝCHNIS*, Fenzl (extended). Teeth of the usually more or less inflated calyx not twisted: ovary unicellular at the base: capsule with its five valves normally bifid, but sometimes indistinctly so or entire. — Fenzl in Endl. l. c. 974. *Melandrium*, Röhl. Deutsch. Fl. ed. 2, ii. 37, 274. *Melandrium* of authors in great part.

\* Native species, western or arctic: leaves narrowly lanceolate, spatulate or linear; the radical usually numerous and the cauline few.

+ Tall: stems erect, usually a foot or more in height, several-many-flowered: species ranging from Winnipeg to the Sierras, but chiefly of the Rocky Mountains, though not truly alpine.

**L. Drummóndii**, WATSON. Finely grayish-pubescent throughout, often purple-glandular above: root stout, vertical: stems erect, simple, somewhat rigid: leaves narrow; the lower oblanceolate; the upper lance-linear: flowers on long usually appressed pedicels: calyx in the typical form oblong-cylindric or scarcely ovate, with green nerves: petals small, included or scarcely exerted, white or purplish, with the short bifid minutely appendaged blades narrower than the claws: capsule sessile; seeds uniformly tubercled, not distinctly crested. — Bot. King Exp. 37, 432, & Proc. Am. Acad. xii. 248. *L. apetala*, Gray, Am. Jour. Sci. ser. 2, xxxiii. 405, in part. *L. apetala*, var. *pauciflora*, Porter in Hayden, Rep. 1870, 473. *Silene Drummondii*, Hook. Fl. Bor.-Am. i. 89; Torr. & Gray, Fl. i. 191, in part; Rohrb. Monogr. Sil. i. 83. *S. Scouleri*, Webber, App. to Cat. Fl. Neb. 30; Britton, Bull. Torr. Club, xx. 344. *Elisanthe Drummondii*, Ruprecht, Fl. Cauc. i. 200. — E. Minnesota, *Sheldon*, and Winnipeg, *Bourgeau*, Assiniboia, *Macoun*, to the Pacific Slope at Ft. Vancouver and southward especially in mountainous regions to New Mexico and Arizona; fl. summer; very variable, especially in pubescence. A lanate form has been found in the Winnipeg Valley, *Bourgeau*; another form with broad thinnish leaves, purple glandular pubescence, and more ovate calyx, in the Uintas, *Watson*, and at Gray's Peak, *Hooker & Gray, Patterson*.

+ + Alpine, boreal, and arctic species.

++ Calyx ovate, not strongly inflated: flowers on each stem 3 or 5, densely aggregated, rarely solitary: petals exerted: seeds tuberculate.

**L. triflóra**, R. BR. Viscid-tomentose: stems 3 to 8 inches high: leaves thickish, linear-oblong, often conspicuously ciliate: flowers short-pedicelled: calyx with 10 broad indistinct purple or green nerves: petals white or roseate; blades obcordate; claws scarcely auricled. — R. Br. in Ross, Voy. App. cxlii, name only; Sommerfelt, Mag. Naturv. ii. 151, 152 (1824); Wats. l. c. 247. *L. apetala*, var. *pauciflora*, Dur. Pl. Kane. 189. *L. pauciflora*, Dur. Proc. Acad. Philad. 1863, 94. *Agrostemma triflora*, Don, Syst. i. 417. *Melandrium triflorum*, Liebm. Fl. Dan. t. 2356; Rohrb. Linnæa, xxxvi. 231. *Wahlbergella triflora*, Fries, Summa Scand. 155. — Greenland, from Polaris Bay, *Bessel*, southward; Grinnell Land, *Greely*.

**Var. Dawsoni**, ROBINSON. Calyx with principal nerves double or triple, joined by interlacing veinlets; the intermediate nerves beneath the sinuses inconspicuous or wanting: petals very narrow; blades oblong, bifid, hardly to be distinguished from the narrow claws. — Proc. Am. Acad. xxviii. 149. — Gravel banks, N. Brit. Columbia, 100 miles northeast of Dease Lake, *Dr. G. M. Dawson*.

++ ++ Calyx ovate, scarcely inflated: flowers erect or slightly nodding in anthesis: stems usually 1-flowered, occasionally loosely several-flowered.

= Arctic or sub-arctic species.

**L. Taylóra**, ROBINSON, l. c. 150. Very slender, 1 to 1½ feet high, puberulent, nearly smooth below, glandular above: stem erect, bearing 3 to 4 pairs of leaves and two or three long slender almost filiform 1-3-flowered branches: leaves thin, lance-linear, acute or attenuate both ways, finely ciliate, and pubescent upon the single nerve beneath, otherwise glabrate, 2 to 2½ inches in length: flowers terminal or subterminal on the branches: calyx ovate, not much inflated, about 4 lines long, in anthesis only 2 lines in diameter, with green nerves interlacing above; teeth obtuse, with broad green membranous ciliate margins: petals one and a half times as long as the calyx; blades obcordate, 1¼ lines long, considerably broader

than the slender narrowly auricled claws; appendages lance-oblong. — Peel's Riv., at the delta of the Mackenzie, *Miss E. Taylor*, July, 1892. A fragmentary specimen from the Kowak Riv., N. Alaska, *McLenegan*, may be doubtfully referred to this species.

- L. affinis**, VAHL. Glandular-pubescent, 3 to 6 inches high: leaves oblanceolate-linear, 9 lines to 3 inches in length: calyx ovate-elliptic, usually contracted at the mouth: petals white or pink; blades narrow, entire or retuse, narrowed from near the end to the summit of the more or less distinctly auricled claws; appendages oblong. — Vahl in Fries, *Mant.* iii. 36. *L. triflora*, Hornem. *Fl. Dan.* t. 2173. *L. apetalá*, Hook. f. *Arct. Pl.* 321, in part. *Melandrium affine*, Vahl in Liebm. *Fl. Dan.* xiv. 5, obs. *Wahlbergella affinis*, Fries, *Summa Scand.* 155. *Melandrium involucratum*, var. *affine*, Rohrb. *Linnaea*, xxxvi. 217. — Greenland to Labrador, at Rama, *Sornborger*. (N. Eu., Siberia.) Warming (*Vidensk. Selsk. Forhand.* 1886, 129) states that in Norway the flowers are of two kinds, perfect and pistillate, and that the petals in the latter are devoid of appendages and auricles.

= = Rocky Mountain and western alpine species.

- L. montána**, WATSON. Glandular-pubescent: root thickish, subsimple: stems erect, 2 to 4 inches high: leaves linear, 1 to 1½ inches in length: calyx green or rarely purple-nerved, 5 to 6 lines long; teeth short, scarcely acute: petals narrow, about equalling or a line or two exceeding the calyx; blades small, bifid; claws narrow, one half to three fourths line in breadth; appendages small or absent: filaments naked: capsule sessile or nearly so. — *Proc. Am. Acad.* xii. 247, excl. specimens from the Uintas. *L. apetalá*, Gray, *Am. Jour. Sci.* ser. 2, xxxviii. 405, & *Proc. Acad. Philad.* 1863, 58, in part. *L. Kingii*, var. with naked filaments, Wats. l. c. 247. — Mountains of Colorado, *Parry*, *Hall & Harbour*, *Scovill*, *Wolf*; N. W. Wyoming, *Parry*.

- L. Kingii**, WATSON. Densely covered with a very short pubescence, somewhat glandular above: stems slender, erect, 4 to 6 inches high, 1-2-flowered: leaves narrowly linear: blades of the petals rather short and broad, emarginate; claws with broad ciliated auricles; appendages oblong; filaments pubescent. — *Proc. Am. Acad.* xii. 247, excl. Wyoming plant. *L. Ajanensis*? Wats. *Bot. King Exp.* 37. — Peaks of the Uintas, N. Utah, *Watson*. Dr. Watson (l. c.) states that this species can be readily distinguished from *L. apetalá*, with which it grows. Aside, however, from the position of the flower in anthesis and the longer slightly exerted petals, the material at hand fails to show any definite distinctions. In view of the considerable variation of *L. apetalá* in Asia these differences are not very satisfactory.

++ ++ ++ Calyx large, much inflated, almost globose: flowers commonly pendulous in anthesis: seeds margined: stems 1-flowered except in var. *elatiór*.

- L. apétala**, L. More or less viscid-pubescent: stems 2 to 6 inches high: flowers perfect or pistillate, at first pendulous, but becoming erect in fruit: petals in the typical form included; blades short, bifid; segments rather irregular, sometimes with a small lateral lobe; claws auricled. — *Spec.* i. 437; *Fl. Dan.* t. 806. *L. frigida*, Schrank, *Pflanz. Lab.* 25. *L. montana*, Wats. *Proc. Am. Acad.* xii. 247 (so far as the Utah specimens are concerned). *Agrostemma apetalá*, Don, l. c. i. 416. *Melandrium apetalum*, Fenzl in Ledeb. *Fl. Ross.* i. 326; Warming, *Bot. Foren. Festschr.* 1890, 251, f. 25, 26. *Wahlbergella apetalá*, Fries, l. c. — N. Greenland and Grinnell Land to Labrador (acc. to Macoun) and Alaska, also southward along the Rocky Mts. to Montana, *Canby*, and Uintas, N. Utah, *Watson*. A polymorphous species, the forms of which have been elaborated by Regel, *Bull. Soc. Nat. Mosc.* xxxiv. pt. 2, 570-574.

**Var. glábra**, REGEL. Glabrous throughout, otherwise as in the type. — Regel, l. c. 570, 572. — Rocky Mts. of Brit. America, *Bourgeau*; St. Paul's Isl., Alaska, *Elliot*; Schmagin Isl., *Harrington*. The Alaskan form differs from Bourgeau's plant, upon which the variety was founded, in having much larger thinner leaves.

**Var. elatiór**, REGEL (extended). Pubescent, taller, 6 to 12 inches in height: stems commonly several-flowered: petals sometimes considerably exerted. — Regel, l. c. 573, including var. *macropetalá*, so far as the American specimens are concerned. — Kodiak Isl. and northward in Alaska to Kotzebue Sound, acc. to Regel.

\* \* Species of the Old World adventive in the Eastern and Middle States and in Canada: corolla much exerted.

+ Leaves usually large; the cauline lanceolate or ovate-lanceolate: flowers mostly dioecious: valves of the capsule distinctly 2-toothed.

**L. dioica**, L. (RED LYCHNIS, RED CAMPION.) Flowers inodorous, expanding in the morning: calyx oblong, rather short, 4 to 6 lines long, reddish; teeth triangular-lanceolate, acute: corolla red or pink (rarely white): capsule large, globose, with a wide mouth; teeth recurved. — Spec. i. 437, in part; Wats. Bibl. Index, 104; Macoun, Cat. Canad. Pl. i. 69; Britton, Mem. Torr. Club, v. 149; Hook. & Jackson, Ind. Kew. ii. 129 (excl. syn. in part). *L. diurna*, Sibth. Fl. Oxon. 145; Reichenb. l. c. t. 304. *Melandrium silvestre*, Röhl. Deutschl. Fl. ed. 2, ii. 274. *M. rubrum*, Garcke, Fl. Deutschl. ed. 4, 55. — Waste ground, common, especially in Canada and the Atlantic States. (Adv. from Eu., Asia; also in Greenland.)

**L. alba**, Mill. (EVENING LYCHNIS, WHITE CAMPION.) Flowers fragrant, opening in the evening: calyx green, longer than in the preceding; teeth lance-linear, attenuate: corolla more commonly white: capsule ovate-conical; teeth erect or slightly spreading. — Dict. ed. 8, n. 4. *L. dioica*, var.  $\beta$ , L. Spec. i. 437. *L. vespertina*, Sibth. Fl. Oxon. 146. *Melandrium album*, Garcke, l. c. 55. — Ballast and waste lands, sometimes by roadsides and in cultivated fields, chiefly eastward. This and the last preceding species are not always clearly distinguishable, notwithstanding the rather conspicuous differences exhibited by the extreme forms. In Europe frequent natural hybrids between them have been noticed. (Adv. from the Old World.)

+ + Flowers perfect: valves of the capsule 5, entire.

**L. flos-cuculi**, L. (RAGGED ROBIN.) A slender smoothish perennial, with furrowed sometimes minutely roughened stem,  $1\frac{1}{2}$  to 2 feet high: lower leaves oblanceolate; the upper lance-linear: calyx oblong-ovate, equally 10-ribbed: flowers cymose-paniculate: petals pink or red, cleft to below the middle into 4 linear acute segments. — Spec. i. 436; Fl. Dan. t. 590; Eng. Bot. t. 573; Reichenb. l. c. t. 306. *Coronaria flos-cuculi*, A. Br. Flora, 1843, 368. — Moist fields, New Brunswick, New England, and New York. (Adv. from Eu., N. Asia.)

**L. chalcédonica**, L. l. c., the Scarlet Lychnis or "Scarlet Lightning," a tall Japanese species with ovate leaves and globular clusters of scarlet flowers, has been known to persist in a wild state in thickets, etc., Centr. and S. Maine, *Fernald, Deane*, and doubtless in other regions, where commonly cultivated. (Introd. from Japan.)

§ 2. **VISCÁRIA**, DC. (extended). Calyx not inflated; teeth not twisted: ovary septate at the base; teeth of the capsule as many as the styles. — Fl. Fr. iv. 761; Endl. Gen. 973. *Viscaria*, Röhl. Deutschl. Fl. ed. 2, ii. 37, 275.

**L. alpina**, L. l. c. Smooth, biennial or perennial, erect, 2 inches to a foot in height: leaves numerous, clustered at the base, linear or oblong, thickish; the cauline 2 to 4 pairs, erect or ascending: flowers small, the densely clustered cymes forming a terminal head: bracts conspicuous, membranaceous, tipped with red: calyx short-campanulate or turbinate, membranaceous, scarcely nerved; teeth bright red: petals pink, bifid; segments linear. — Torr. & Gray, Fl. i. 194; Reichenb. l. c. Fl. Germ. vi. t. 307; Wats. l. c. 246. *Lychnis Suecica*, Lodd. Bot. Cab. t. 881. — Greenland to Labrador, W. Newfoundland, acc. to Macoun, and Mt. Albert, Quebec, *Allen, Macoun*; also Little Whale Riv., Hudson Bay, acc. to Macoun. (Eu., Siberia.)

§ 3. **AGROSTÉMA**, Fenzl. Calyx-teeth filiform, twisted: flowers few, large: petals with conspicuous awl-shaped appendages: teeth of the capsule as many as the styles: plant woolly. — Fenzl in Endl. Gen. 974. *Coronaria* § *Pseudagrostemma*, A. Br. Flora, 1843, 368.

**L. coronária**, Desr. (MULLEIN PINK.) Covered with dense white wool throughout: stem  $1\frac{1}{2}$  to 3 feet high: leaves oval or oblong: calyx ovoid; the alternating ribs more prominent; teeth small, much shorter than the tube: petals large, crimson. — Desr. in Lam. Dict. iii. 643. *Agrostemma Coronariá*, L. l. c.; Curtis, Bot. Mag. t. 24; Sibth. Fl. Gr. t. 452; Reichenb. l. c. t. 308. *Coronaria tomentosa*, A. Br. l. c. — A handsome plant, which, having escaped from cultivation, is established and becoming locally abundant in several places in New England and the Middle States. (Introd. from S. Eu., W. Asia.)

**8. AGROSTÉMMA, L. CORN COCKLE.** (Name from ἀγρός, field, and στέμμα, crown.) — Gen. no. 379; Pax, l. c. 70. *Githago*, Desf. Cat. Hort. Par. 266; Baill. Hist. Pl. ix. 108. *Lychnis* § *Githago*, DC. Prodr. i. 387; Benth. & Hook. Gen. i. 148. — A genus of two species, both natives of the Mediterranean region; one of them growing in cultivated fields, now cosmopolitan, having been widely disseminated in grain seed. Although often united with *Lychnis*, these species through the different relative position of the carpels and petals seem to deserve rank as a separate genus, especially if *Sagina* is to be kept distinct from *Arenaria* upon the same ground.

**A. GITHÁGO, L.** Annual or biennial, covered with a long silky appressed or spreading pubescence: stem  $1\frac{1}{2}$  to 3 feet high, somewhat branched: flowers few, long-peduncled: leaves linear, acute, 2 to 4 inches in length: corolla 1 to  $1\frac{1}{2}$  inches in diameter; petals obovate, dark purplish red, somewhat lighter toward the claw, and with small black spots: calyx-teeth usually an inch or more in length. — Spec. i. 435; Fl. Dan. t. 576; Eng. Bot. t. 741; Reichenb. l. c. *Lychnis Githago*, Scop. Fl. Carn. ed. 2, i. 310. *Githago segetum*, Desf. l. c. 266. — An attractive but troublesome weed, common in grain fields; fl. summer. (Intro. from Eu.) The fresh seeds have been found to contain an active poisonous principle, which is expelled, it is said, by roasting.

**9. HOLÓSTEUM, Dill.** (ὅλος, whole, and ὀστέον, bone; Ὀλόστειον is used by Dioscorides for some unknown plant, possibly, as Prof. Ascherson suggests, in allusion to supposed healing properties in cases of bone fracture.) — Nov. Gen. 130, t. 6; L. Gen. no. 928; Reichenb. l. c. v. t. 221; Gay, Ann. Sci. Nat. ser. 3, iv. 23; Benth. & Hook. Gen. i. 148. — A small genus of Old World annuals and biennials much resembling *Cerastium* except in inflorescence and seeds. The commonest species is adventive in America.

**H. UMBELLÁTUM, L.** Finely glandular-pubescent, somewhat glaucous: stems 3 to 18 inches high: leaves sessile, ovate-oblong: umbels 3–12-flowered, terminal upon long naked peduncles; pedicels 8 to 12 lines long, some of them reflexed: filaments shorter than the calyx. — Spec. i. 88; Eng. Bot. t. 27. — Locally established in Pennsylvania, New Jersey, and Delaware, *Porter, Austin, Cunby, Small, Heller & Halbach*; fl. April, May. (Adv. from Eu.)

**10. CERÁSTIUM, L. MOUSE-EAR CHICKWEED.** (Κέρας, a horn, from the elongated curved capsules.) — Annuals or perennials, mostly pubescent and often viscid. Leaves usually flat. Flowers white, borne in more or less expanded leafy or naked cymes. — Gen. no. 376 (name ascribed to Dill. by Linn. Syst. ed. 1); Seringe in DC. Prodr. i. 414; Grenier, Flora, 1840, pt. 1, 266; Reichenb. l. c. Fl. Germ. v–vi. t. 228–236; Gray, Gen. Ill. ii. 39, t. 114; Benth. & Hook. Gen. i. 148; Pax in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 1b, 80; Robinson, Proc. Am. Acad. xxix. 275. — A genus distinguished from *Stellaria* and *Arenaria* somewhat by habit, but chiefly, although not always satisfactorily, by the form and dehiscence of the capsule.

§ 1. **STRÉPHODON**, Seringe, l. c. Styles 3 to 5; teeth of the capsule finally circinate-revolute from the tip. — Our species have pubescent leaves.

**C. Texánum, Britton.** Annual, viscid: stems several, slender, almost erect, leafy below, nearly naked and dichotomous above: leaves oblanceolate or spatulate, 6 lines to 2 inches in length, very pubescent or subcinereous on both surfaces: flowers rather small: petals bifid: styles 3 to 4 (to 5?): capsule  $1\frac{1}{2}$  to 2 times the length of the calyx. — Bull. Torr. Club, xv. 97; Coulter, Contrib. U. S. Nat. Herb. ii. 29. *Stellaria montana*, Rose, Contrib.

U. S. Nat. Herb. i. 93, t. 2. — Hills, Texas, Blanco, *Wright*, to Arizona, on the Mogollons, *Greene*, Santa Catalina Mts., *Lemmon*. (Mex., *Palmer*; Lower Calif., *Brandegge*.)

**C. maximum**, L. Stoloniferous perennial with stems simple or nearly so, erect or decumbent, becoming a foot or more in height: leaves linear or lanceolate, attenuate: flowers very large for the genus, an inch in diameter, borne on erect pedicels in simple or compound cymes: sepals oblong or narrowly ovate, obtuse, 3 to 4 lines long: petals obovate, much exceeding the calyx, deeply notched at the apex: capsule symmetrical, much exserted at maturity. — Spec. i. 439; Ledeb. Ic. t. 242; Fenzl in Ledeb. Fl. Ross. i. 399; Seem. Bot. Herald, 51. *C. grande*, *Greene*, Pittonia, ii. 229. — Alaska. (Siberia.) Asiatic specimens of this species, identified at the St. Petersburg Gardens, show that the capsule becomes cylindric and much longer than figured by Ledebour.

§ 2. **ORTHODON**, Seringe. Styles normally 5; teeth of capsule erect or spreading; the edges sometimes slightly reflexed. — Seringe, l. c. 415. — Our species have pubescent leaves.

\* Flowers comparatively small: petals 1 to  $1\frac{1}{2}$  times as long as the sepals.

— Pods 1 to  $1\frac{1}{2}$  times as long as the calyx: introduced or doubtfully indigenous weeds.

**C. vulgatum**, L. (COMMON MOUSE-EAR CHICKWEED.) Perennial, viscid-pubescent, leaves oblong, obtusely pointed: lower pedicels in fruit considerably exceeding the calyx: bracts herbaceous: sepals 2 to 3 lines long, obtuse, often purple-tipped, appearing acute through the infolding of the scarious margins: petals as long as the calyx. — Spec. ed. 2, 627; Regel, Bull. Soc. Nat. Mosc. xxxv. 313; Wats. Bibl. Index, 101; Wats. & Coulter in Gray, Man. ed. 6, 88. *C. viscosum*, L. in herb.; Torr. & Gray, Fl. i. 187; Gray, Man. eds. 1-5, etc. *C. fulvum*, Raf. Préc. Découv. 36. *C. triviale*, Link, Enum. Hort. Berol. i. 433. — Very common on roadsides, in fields, etc., but also often remote from habitations and cultivated ground, thus perhaps native; fl. through the summer. (Probably nat. from the Old World.)

**C. viscosum**, L. (MOUSE-EAR CHICKWEED.) Annual, lower and less spreading than the last, viscid-pubescent, 3 inches to a span high: leaves oval or elliptic-oblong, very obtuse; the lowest narrowed below to short margined petioles: flowers small, at first densely clustered at the ends of the branches, becoming laxer in fruit, but even the longest pedicels not exceeding the acute sepals, which are  $1\frac{1}{2}$  to 2 lines in length: bracts herbaceous: petals scarcely equalling the calyx: stamens frequently 5. — Spec. i. 437; Hook. f. Arc. Pl. 288; Wats. Bibl. Index, 101; Wats. & Coulter in Gray, Man. ed. 6, 88. *C. vulgatum*, L. in herb.; Torr. & Gray, Fl. i. 187; Gray, Man. eds. 1-5; and others. *C. hirsutum*, Muhl. Cat. 46. *C. glomeratum*, Thuill. as used by Hook. f. and others. *C. connatum*, Beck, Bot. 55. Depauperate forms with few flowers and short capsule have been regarded as indigenous, being the *C. viscosum*, var. *tenellum*, Grenier, l. c. 266, and the *C. semidecandrum*, of authors, not of L. — Roadsides, lawns, etc., widely distributed in the United States and Canada, but in most regions much less common than the preceding. (Probably nat. from the Old World.) Delicate specimens apparently to be referred to this species, but with minute apetalous flowers, have been collected at San Diego, Calif., *Orcutt*.

**C. semidecandrum**, L. Near the two preceding, but smaller and with shorter leaves: bracts, at least the upper ones, conspicuously scarious-margined: pedicels in fruit longer than the calyx. — Spec. i. 438; *C. vulgatum*, var. ? *semidecandrum*, Gray, Man. ed. 5, 94. — New Jersey, *Britton*, *Peters*, to Norfolk, Va., *Britton*, *Small*. (Adv. from Eu., W. Asia.)

— — Pods 2 to 3 times as long as the calyx: indigenous species.

**C. brachypodium**, ROBINSON. Pale green annual, finely pubescent and sometimes very viscid: leaves linear-oblong to oblanceolate, obtusish, seldom more than an inch in length: flowers in more or less open dichotomous cymes; pedicels, even the lower ones, only equalling or little exceeding the capsules, erect or deflexed, straight or gently curved, not hooked. — Robinson in Britton, Mem. Torr. Club, v. 150, & Proc. Am. Acad. xxix. 277. *C. nutans*, var. *brachypodium*, Engelm. in herb. — St. Louis, Mo., *Engelmann*, to the Black Hills, S. Dakota, *Rydberg*, westward and southward to Nevada, *Anderson*, *Watson*, Arizona, *Palmer*, New Mexico, *Fendler*, and Louisiana. (Mex., *Schaffner*, *Palmer*, *Hartman*.) *C. tenellum*,

Fenzl, mentioned in Watson's Index (but never published?), represented by Drummond's no. 30 of his 3d Texan Coll., appears to be only a more slender form of the above. Exactly the same thing, however, has been found at Milledgeville, Ga., by Dr. Boykin (Short Herbarium), thus considerably extending the range of the species. A very leafy and velvety-tomentose form from Willow Spring, Arizona, Palmer, is worthy of mention.

**Var. compáctum**, ROBINSON. Inflorescence capitate-umbellate: pods very slender. — Proc. Am. Acad. xxix. 278. *C. nutans*, var. *compactum*, Engelm. in herb. — A marked variety or form from the Bad Lands of Nebraska, Hayden; Belknap, N. Texas, Hayes; False Washita, Ind. Terr., Palmer.

**C. nútans**, RAF. A pubescent and viscid annual, 8 to 18 inches high: stems branched: leaves oblong-lanceolate, acute; the lowest narrowed toward the base: flowers numerous in an open dichotomous cyme: calyx about 2 lines in length: petals somewhat exserted, oblanceolate, bifid: pedicels elongated, ascending or spreading, tending to be hooked or nodding at the summit: capsule 4 to 6 lines long, nodding but curved upward. — Préc. Découv. 36, & Desv. Jour. Bot. iv. 269 (1814); Gray, Gen. III. ii. t. 114. *C. longe pedunculatum*, Muhl. Cat. 46, the earliest name, but used without satisfactory characterization. *C. glutinosum*, Nutt. Gen. i. 291. *C. apricum*, Schlecht. Linnæa, xii. 208. *C. oblongifolium*, Anderson, Cat. 118. — Common and widely distributed from Nova Scotia to the Pacific and from Hudson Bay and Little Slave Lake (acc. to Macoun) to New Mexico. (Mex.) Like the last, paler green than the other common species. Cleistogamy in this species has been noted by Mr. Thos. Meehan, and apetalous specimens have been found at Wawa, Penn., Brinton. Arizona forms of this species also differ slightly in habit, but lack technical characters for satisfactory distinction.

**C. sericeum**, WATSON. Annual: stems one or many, 1 to 2 feet high, stout for the genus, sericeous, very leafy below: leaves oblong-lanceolate, sessile, 1 to 2 inches long, 3 to 6 lines broad; the lower cinereous with dense flocculent wool; the upper green: flowers numerous in spreading cymes: calyx  $2\frac{1}{2}$  lines long, scarcely exceeded by the corolla: seeds larger and rougher than in the preceding. — Proc. Am. Acad. xx. 354. — S. Arizona in the Huachuca Mts., Lemmon; Santa Rita Mts., Pringle.

\* \* Flowers larger; petals usually twice as long as the calyx (except in *C. alpinum*, var. *Beerianum*): indigenous species.

**C. arvénse**, L. Perennial: stems several, weak, usually almost naked above: leaves linear to narrowly lance-oblong: petals obovate: pod in the typical form scarcely longer than the calyx. — Spec. i. 438; Hook. Fl. Bor.-Am. i. 104; Torr. & Gray, Fl. i. 188; Hollick & Britton, Bull. Torr. Club, xiv. 45-51, t. 63-65. ? *C. hybridum*, Muhl. Trans. Am. Phil. Soc. iii. 169. *C. Pennsylvanicum*, Hornem. Hort. Hafn. 435. — Rocky soil, common; fl. May to July. (Eu., Asia, S. Amer.) Very variable in size, pubescence, relative length of its capsules, etc. Var. **ANGUSTIFOLIUM**, Fenzl, l. c. i. 413 (var. *Andrewsii*, Bailey, Bot. Gaz. vii. 109), with cauline leaves narrowly oblong to linear, strongly 1-nerved, attenuate at the base, much fascicled, 9 to 15 lines in length, and var. **LATIFOLIUM**, Fenzl, l. c. 412, with shorter oblong leaves (6 to 8 lines long, broad at the base), are forms strikingly different in their extremes, but rather freely intergrading and often difficult to distinguish. The latter is perhaps a little more common in the Rocky Mts., but extends eastward to Labrador. Better marked are the following.

**Var. oblongifolium**, HOLLICK & BRITTON. Leaves oblong or lance-oblong, obtuse or obtusish: capsule longer,  $1\frac{1}{2}$  to  $2\frac{1}{2}$  times as long as the calyx. — Bull. Torr. Club, xiv. 47, t. 63. *C. oblongifolium*, Torr. Fl. N. & Midd. States, 460; Torr. & Gray, Fl. i. 188. ? *C. dichotomum*, Muhl. Cat. 46. *C. arvense*, var. *bracteatum*, MacMillan, Metasp. Minn. Val. 223. ? *C. bracteatum*, Raf. Préc. Découv. 36. — Nova Scotia to Virginia and westward to Montana, Scribner, and New Mexico, Vasey. This variety has been widely drawn by its authors to include narrow-leaved forms as well as the original rather broad-leaved *C. oblongifolium*, extended series of specimens showing complete transitions.

**Var. máximum**, HOLLICK & BRITTON, l. c. 47. Taller, 1 to 2 feet high: leaves elongated, lanceolate, acutish, 2 to 3 lines broad: inflorescence very spreading: capsule equalling or half exceeding the calyx or nearly twice its length. — *C. oblongifolium*, Torr. Pacif. R. Rep. iv. 70. *C. pilosum*, Brew. & Wats. Bot. Calif. i. 67, not Ledeb. — California,

Point Reyes, where first collected by *Bigelow*, and elsewhere; a rank growing form, serving to connect the next species through var. *Fischerianum*, from which in some cases it can scarcely be distinguished except by the narrow lower leaves. Similar robust forms of *C. arvense* have been found on the St. Clair Riv., Wis., *Houghton*, and in N. Illinois, at Joliet, *Boott*, and Dixon, *Vasey*.

**Var. villósum**, **HOLLICK & BRITTON**, l. c. 49. Densely villous: leaves narrowly lance-oblong to ovate-lanceolate. — *C. velutinum*, Raf. Med. Rep. hex. 2, v. 359. *C. villosum*, Muhl. Cat. 46; Darlington. Fl. Cest. ed. 2, 279. ? *C. hirsutum*, Darlington. Florula Cest. 54. *C. oblongifolium*, Torr. & Gray, Fl. i. 188, in part; Wats. Bibl. Index, 101. *C. arvense*, var. *velutinum*, Britton, Mem. Torr. Club, v. 150. — Pennsylvania, Lancaster Co., *Porter*, *Small*, Chester Co., *Canby*.

**Var. Fuegiánium**, **Hook. f.** Depauperate, 2 to 3 inches high, with short thickish imbricated leaves and sub-solitary terminal flowers. — Hook. f. in Gray, Bot. U. S. Expl. Exped. 119. — Specimens collected by *Coulter* in the Yellowstone Park have been confidently referred to this variety by *Hollick & Britton*, l. c., and no. 41 of *Parry* from Northwestern Wyoming is doubtless the same. (*Fuegia*.)

**C. alpinum**, **L.** Silky-villous perennial: stems weak, matted: leaves elliptic-ovate, 4 to 5 lines long: petals notched at the apex,  $1\frac{1}{2}$  to 2 times the length of the sepals. — Spec. i. 438; Torr. & Gray, Fl. i. 188; Regel, Bull. Soc. Nat. Mosc. xxxv. 314, 315. *C. lanatum*, Lam. Dict. i. 680. *C. latifolium*, Greville, Mem. Soc. Wern. iii. 429. *C. vulgatum*, Hook. f. Arc. Pl. 288, in part. ? *C. latifolium*, Hart, Jour. Bot. xviii. 205. — Arctic America from Greenland to Alaska, also in Labrador, the Hudson Bay region, and upon the Rocky Mts. of Brit. America. (Eu., Asia.) The following varieties extend farther southward.

**Var. Beeringiánium**, **REGEL**, l. c. 316. Tomentulose and less silky-villous, somewhat glandular-viscid above: leaves smaller, oblong: petals shorter, often scarcely exceeding the calyx. — *C. Beeringianum*, Cham. & Schlecht. Linnæa, i. 62. *C. vulgatum*, var. *Beeringianum*, Fenzl in Ledeb. Fl. Ross. i. 409. *C. alpinum*, var. *Behringianum*, Wats. Bibl. Index, 100; Coulter, Man. Rocky Mt. Reg. 33. — Alaska to the Rocky Mts. of Colorado and Arizona. This variety is sometimes difficult to distinguish from stunted short-leaved forms of *C. arvense*, but its flowers are less densely aggregated and have the slightly larger firmer and more herbaceous sepals characteristic of *C. alpinum*.

**Var. Fischeriánium**, **TORR. & GRAY**. Tomentose or hirsutulose, taller, 8 to 10 inches or even more than a foot in height: leaves rather thick, elliptic-lanceolate or oval-lanceolate, acute or acutish, an inch or more in length: capsule  $1\frac{1}{2}$  to 2 (or rarely 3) times the length of the calyx. — Fl. i. 188; Regel, l. c. 319. *C. rigidum*, Ledeb. Mém. Acad. Petrop. v. 538. *C. Fischerianum*, Seringe in DC. Prodr. i. 419. *C. vulgatum*, vars. *grandiflorum* & *macrocarpum*, Fenzl in Ledeb. Fl. Ross. i. 409, 410. To judge from the figure in the *Calques des Dessins*, *C. stellarioides*, Moc., should be referred here also, having been placed by *Seringe* probably through an error in § *Strephodon*. — A stout variety passing to *C. arvense*, var. *maximum*, but with broader more elliptic-ovate leaves and longer capsules. Alaska to Humboldt Co., Calif., *Rattan*. (Siberia, Japan.) The leaves are thicker and the sepals more pubescent and acute than in *C. pilosum*, Ledeb., to which it is also nearly related.

**Var. glabrátum**, **Hook.** Leaves and calyx nearly smooth. — Hook. in *Parry*, 2d Voy. App. 390, & Fl. Bor.-Am. i. 104. — Arctic America with the pubescent forms but much rarer. (N. Eu.)

§ 3. **DICHODON**, **Bartl.** Styles normally 3: teeth of the capsule erect or slightly spreading, not circinate-revolute. — Bartl. in Endl. Gen. 970. — Our species with symmetrical capsule and short glabrous leaves.

**C. trigynum**, **VILL.** Perennial, with stems weak, spreading, somewhat matted, smooth or glandular-pubescent, loosely 2-3-flowered: leaves oblong, 3 to 5 (to 8) lines in length; the uppermost ovate: sepals lance-ovate or oblong, obtuse, 2 to 3 lines long: petals  $1\frac{1}{2}$  to 2 times the length of the calyx, obcordate, bifid nearly half way to the base: capsule oblong-conic, twice the length of the calyx; teeth finally spreading. — Prosp. 48, & Dauph. iii. 645, t. 46; Fenzl in Ledeb. Fl. Ross. i. 396. *C. cerastioides*, Britton, Mem. Torr. Club, v. 150. *Stellaria cerastioides*, L. Spec. i. 422; Torr. & Gray, Fl. i. 184; Hook. f. Arc. Pl. 288. — Table-topped mountain, Gaspé, Lower Canada, *Allen*; Cape Chudleigh, Hudson Strait, *Bell*;

Labrador. (Greenland, *Holm*; Eu., Siberia.) A species now generally appended to *Cerastium*, but forming a transition to *Stellaria*.

**11. STELLÁRIA, L. CHICKWEED, STARWORT.** (*Stella*, a star, in reference to the form of the flower.) — Low spreading herbs, sometimes a little succulent, mostly preferring a moist shaded habitat. Leaves flat, never acerose. — Spec. i. 421, & Gen. ed. 5, no. 504; Seringe in DC. Prodr. i. 396; Fenzl in Endl. Gen. 969; Reichenb. Ic. Fl. Germ. vi. t. 222–226; Benth. & Hook. Gen. i. 149; Gray, Gen. Ill. ii. t. 113; Pax in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 1b, 79; Robinson, Proc. Am. Acad. xxix. 281. *Alsine*, L. Spec. i. 272, in part. *Stellularia*, L. Syst. Nat. ed. 6, 106. *Spergulastrum*, Michx. Fl. i. 275. *Micropetalon*, Pers. Syn. i. 509. *Larbrea*, St. Hil. Mém. Mus. Par. ii. 287. — A genus somewhat artificially separated from *Arenaria* by the more or less deeply cleft petals. Although convenient and generally useful this distinction breaks down in

*S. MACROPÉTALA*, Torr. & Gray (Fl. i. 184), and *S. KINGII*, Wats. (Bot. King Exp. 39, t. 6, f. 1–3), which, notwithstanding their emarginate cleft or divided petals, are doubtless mere forms of *Arenaria patula* and *A. capillaris* respectively.

§ 1. **MYOSÓTON**, Mœnch (as genus). Styles 5, alternate with the sepals: leaves ovate, acute. — Meth. 225. *Malachia*, Fries, Fl. Hall. 77.

**S. AQUÁTICA**, Scop. Perennial, stem strongly angled and somewhat pubescent: leaves large, ovate or ovate-lanceolate, acute; the upper sessile, cordate; the lower petiolate: pedicels glandular-viscid, deflexed in fruit: petals  $1\frac{1}{2}$  to 2 times as long as the campanulate glandular-pubescent calyx: seeds numerous, dark-colored, tuberculately roughened. — Fl. Carn. ed. 2, i. 319. *Malachia aquatica*, Fries, Fl. Hall. 77. *Malachium aquaticum*, Reichenb. l. c. t. 237. *Larbrea aquatica*, Seringe in DC. Prodr. i. 395 (excl. syn.). *Alsine aquatica*, Britton, Mem. Torr. Club, v. 356. — Becoming frequent upon waste land and public grounds in the Eastern States, and more or less established along roadsides in Brit. America, Stratford, Ont., *Burgess*; Nanaimo, Brit. Columbia, *Macoun*. (Adv. from Eu.)

§ 2. **EUSTELLÁRIA**, Fenzl, l. c. 969. Styles 3 to 4.

\* Petals, except in some flowers of *S. pubera*, very deeply 2-parted (sometimes minute or wanting): segments narrow.

— Lower leaves ovate, rather abruptly contracted into slender petioles.

**S. MÉDIA**, Cyrill. (COMMON CHICKWEED.) A low annual: stems pubescent in lines: leaves acute; the upper narrower, sessile; the lower on pubescent narrowly margined petioles: calyx glandular-pubescent, equalled or slightly exceeded by the capsule: petals shorter than the sepals: stamens 3, 5, or 10. — Char. Comm. 36; Eng. Bot. t. 537; Jackson, Jour. Bot. xxv. 69. *Alsine media*, L. Spec. i. 272; Walt. Car. 117. *Holosteum succulentum*, L. Amœn. Acad. iii. 21; Nutt. Gen. i. 89; Torr. Fl. N. & Midd. States, 159. — One of the commonest weeds in dooryards and cultivated grounds, especially in moist soil; fl. earliest spring to late autumn. (Temperate and boreal parts of the Old World, Greenland.)

**S. prostráta**, Baldw. Annual: stems weak, elongated, prostrate, pubescent: leaves ovate, acute or shortly acuminate; the lower subcordate on slender ciliated petioles; the upper cauline short-petioled or subsessile; the floral reduced and bract-like: pedicels filiform: flowers smaller than in the preceding: sepals in anthesis but a line long: petals nearly twice as long: mature capsule much exceeding the calyx; valves distinctly circinate-revolute. — Baldw. in Ell. Sk. i. 518; Torr. & Gray, Fl. i. 183; Gray, Pl. Lindh. pt. 2, 152, & Pl. Wright. ii. 17; Chapm. Fl. 50. — Moist and shaded places, rocky woods; Georgia and Florida to Texas. (Adj. Mex.) Leaves very variable in size, from 2 lines to an inch in length. The flowers in this species are distinctly smaller than in the nearly related Mexican *S. cuspidata*, & *ovata*, Willd.



**S. nitens**, NUTT. Annual, slender, erect, shining: stems filiform, forked several times, leafy and slightly pubescent near the base, almost naked and quite glabrous above: leaves of two forms, the lowest (1 to 3 pairs) ovate, acute, only 2 lines long, on slender petioles of somewhat greater length, not always persisting; the other leaves lance-linear, acute, 3 to 5 lines long: sepals very acute, scarious-margined, 1-3-nerved: petals half as long as the sepals, sometimes absent: capsule oblong, about equalling the calyx. — Nutt. in Torr. & Gray, Fl. i. 185; Torr. Pacif. R. Rep. iv. 69, & Bot. Mex. Bound. 37; Gray, Proc. Am. Acad. viii. 378. *S. manchioides*, Fenzl acc. to Torr. & Gray, Fl. i. 675. *S. stricta*, Hook. Fl. Bor.-Am. i. 96, in part. *Alsine nitens*, Greene, Man. Bay-Reg. 33. — S. California to Brit. Columbia, *Macoun*; eastward to Utah, *Jones*; fl. April, May. (Lower Calif.)

**S. GRAMÍNEA**, L., with seldom persistent but sometimes slightly petiolate lower leaves, may possibly be sought here.

+ + Leaves all sessile or subsessile.

+ + Bracts small, scarious.

= Flowers small: petals minute or none.

**S. umbelláta**, TURCZ. Smooth: stems weak, ascending from a decumbent rooting base: leaves varying from lanceolate and acute to elliptic-oblong, 3 to 8 lines in length: pedicels filiform, sub-umbellately grouped at the ends of the branches, often deflexed: sepals small, 1 to 1½ lines in length, glabrous, scarious-margined: capsule twice as long; valves deeply 2-toothed; teeth obtuse. — Bull. Soc. Nat. Mosc. 1838, 89, xv (1842), 173, Cat. Baic. 5, & Fl. Baic.-Dahur. i. 236; Fenzl in Ledeb. Fl. Ross. i. 394; Regel, Bull. Soc. Nat. Mosc. xxxv. 264, 280; Wats. Bot. King Exp. 38; Porter & Coulter, Fl. Col. 13; Brew. & Wats. Bot. Calif. i. 67. *S. borealis*, var., Hook. Fl. Bor.-Am. i. 94. *Alsine Baicalensis*, Coville, Contrib. U. S. Nat. Herb. iv. 70. — Mountains of Colorado and Arizona, also Sierras of S. Central California, *Coville*, to Union Co., Oregon, *Cusick*; fl. July, August. (Asia.)

= = Flowers of medium size: petals equalling or exceeding the calyx (except sometimes in *S. uliginosa*).

a. Seeds essentially smooth.

**S. longifólia**, MUHL. Stems sharply 4-angled, commonly 8 inches or more in height: leaves linear or linear-oblong, somewhat narrowed at each end, thickish, often ciliate toward the base; the larger ones 1½ to 1¾ inches long: flowers rather numerous in a lateral long-peduncled open cyme; pedicels spreading, horizontal or deflexed: petals and capsule exceeding the sepals: seeds smooth. — Cat. 45; Willd. Enum. 479; Fenzl, l. c. 392; Gray, Gen. III. ii. 38, t. 113, f. 1-5. *S. graminea*, Bigel. Fl. Bost. 110. *Spergulastrum gramineum*, Michx. Fl. i. 276. *Micropetalon gramineum*, Pers. Syn. i. 509. *M. longifolia*, Eat. & Wright, N. A. Bot. 319. *Alsine longifolia*, Britton, Mem. Torr. Club, v. 150. — Newfoundland to Maryland, westward to the Rocky Mts. and northward to Alaska; fl. June, July. (Eu., Asia.)

**S. longipes**, GOLDIE. Smooth and shining or more or less glaucous, spreading at the base: branches erect, 3 to 12 inches high: leaves linear or lance-linear, gradually narrowed from the base to the acute apex, 1-nerved, 8 to 12 lines in length, spreading: flowers irregularly cymose: peduncles terminal or rarely and tardily somewhat lateral; pedicels elongated, unequal, erect; the lowest often more or less distinctly axillary: sepals oblong-lanceolate: capsule exceeding the calyx, acutish, dark and shining; seeds very smooth. — Edinb. Phil. Jour. vi. 327; Hook. Fl. Bor.-Am. i. 95; Torr. & Gray, Fl. i. 184 (vars.  $\alpha$ ,  $\beta$ ,  $\gamma$ ); Fenzl, l. c. 386. *S. palustris*, Richards. in Frankl. 1st Journ. ed. 1, App. 738 (reprint, p. 10). *S. stricta*, Richards. l. c. ed. 2, App. 743 (reprint, p. 15). *S. lata*, Torr. Ann. Lyc. N. Y. ii. 169. *S. glauca*, Meyer, Pl. Lab. 93. *S. crassifolia*, Wats. Bot. King Exp. 38. *S. longifolia*, Rothr. Enum. Pl. Cent. Col. 35. ? *Micropetalon gramineum*, James, Cat. 181. *Alsine longipes*, Coville, Contrib. U. S. Nat. Herb. iv. 70. — A very variable species marked by its long dark-colored acutish capsules and very smooth seeds. It is widely distributed from Maine to Arctic America, and from Alaska (also Siberia) southward along the Rocky Mts. to Colorado, and on the Pacific Slope to San Bernardino, *Parish*. The commoner form has acute sepals and leaves varying imperceptibly from flaccid and spreading to erect and somewhat pungent (var.  $\beta$  MfNOR, Hook. l. c.; *S. stricta*, Richards. l. c., etc.). The typical form,

with spreading leaves and "very obtuse" sepals, is comparatively rare. The following, although the best marked varieties, are connected by innumerable puzzling intermediate forms.

**Var. læta**, WATSON. Low, smooth or somewhat pubescent, 1 to 4 inches in height, usually very glaucous, densely leafy at the base: leaves carinate, lanceolate-subulate to linear, rather rigid, erect, 2 to 6 lines long, shorter than in the type, narrower than in the following. — Bibl. Index, 112. *S. læta*, Richards. l. c. ed. 1, App. 738 (reprint, p. 10); Hook. in Parry, 2d Voy. App. 390, & Fl. Bor.-Am. i. 96. *S. stricta*, var.  $\gamma$ , Hook. Fl. Bor.-Am. i. 96. *S. longipes*, var.  $\delta$ , Torr. & Gray, Fl. i. 185. — Arctic America to the Rocky Mts. of Montana and Wyoming; also at Gaspé, Lower Canada, Allen. (Siberia.) A very similar form has been found on the coast of New Brunswick, Fowler. The variety PEDUNCULARIS of Fenzl is a boreal form somewhat intermediate between this variety and the next, and indefinitely characterized by still more elongated peduncles.

**Var. Edwardsii**, WATSON, l. c. 113. Low, smooth or pubescent: leaves lanceolate to ovate-lanceolate or even ovate, shorter than in the type: stems usually but 2-3-flowered; the lower peduncles axillary, much longer than the others. — *S. Edwardsii*, R. Br. in Parry, 1st Voy. App. 271; Cham. & Schlecht. Linnæa, i. 48; Hook. l. c. t. 31; Fl. Dan. t. 2290. *S. nitida*, Hook. in Scoresb. Greenl. 411; Cham. & Schlecht. l. c. 47. *Alsine longipes*, var. *Edwardsii*, Britton, l. c. — Brit. America from Labrador to Brit. Columbia, northward to the arctic regions; Alaska. (Siberia.)

b. Seeds distinctly roughened under a lens.

**S. GRAMÍNEA**, L. Stems ascending, smooth and shining, 1 to 2½ feet high, sharply 4-angled (rhombic in cross-section); internodes usually elongated: leaves lance-linear, thickish, attenuate, furrowed above and with midrib prominent beneath: inflorescence a broad terminal pedunculate cyme (larger and looser than in *S. longifolia*), often accompanied by one or two smaller cymes springing at its base; pedicels elongated, spreading or deflexed: capsule exceeding the calyx. — Spec. i. 422; Eng. Bot. t. 803; Fenzl in Ledeb. Fl. Ross. i. 391; Wats. & Coulter in Gray, Man. ed. 6, 87. *Alsine graminea*, Britton, l. c. — Introduced in moist grassy places, Newfoundland to Maryland, and in Northern States across the continent; common. (Eu., Asia.) A shade form, var. *LANCEOLATA*, Fenzl, l. c. 392, is not infrequent, in which the leaves are lanceolate and more narrowed at the base or the lowest even subpetiolate. The inflorescence rarely becomes seemingly lateral through the development of a sterile branch from its base as in *S. longifolia*. Fenzl has noted that the flowers of *S. graminea* are of different sizes, the smaller being the more fertile.

**S. uliginósa**, MURR. Low, weak, diffuse: stems numerous, leafy: leaves lanceolate or elliptic-lanceolate, 6 to 8 lines long, acute at each end: inflorescences few-flowered, pedunculate or sub-sessile, much smaller than in the last, becoming decidedly lateral, 1½ inches or less in length: flowers smaller and petals relatively shorter than in the related species: sepals very acute, 1½ lines in length. — Prod. Stirp. Gött. 55; Fenzl, l. c. 393; Eaton & Wright, N. A. Bot. 442; Warming, Bot. Foren. Festschr. 1890, 216, f. 10. *S. alsine*, Hoffm. Deutschl. Fl. i. 153; Muhl. Cat. 45. *S. borealis*, Darl. in Fl. Cest. 274. *Larvæa uliginosa*, Hook. Fl. Bor.-Am. i. 93, as to syn. in part, but not as to pl. of Chamisso. *Alsine uliginosa*, Britton, l. c. — On wet rocks, in brooks, etc., usually in deep shade, Atlantic Slope, Placentia, Newfoundland, Robinson & Schrenk; Halifax, N. S., Macoun, to Delaware, Tatnall, and Maryland; not common; fl. May to November. (Eu., Asia.)

++ ++ Bracts foliaceous (except the uppermost in *S. borealis*, var. *corollina*).

= Leaves narrowly elliptical to lanceolate or linear.

**S. longipes**, GOLDIE, may be sought here, as weak specimens with solitary terminal long-peduncled flowers do not always show the scarious bracts which are developed in more vigorous plants.

**S. boreális**, BIGEL. Suberect, 6 to 10 inches in height, smooth or nearly so: leaves lanceolate, attenuate, 6 to 18 lines long, with one prominent nerve: pedicels scattered, 8 to 14 lines in length, often deflexed: sepals ovate-lanceolate, scarious-margined, acute or often narrowed to an obtusish apex: petals much shorter than the calyx or none: capsule narrowly ovoid, acutish, 1½ to 2 times as long as the sepals; seeds smooth. — Fl. Bost. ed. 2, 182; Torr. & Gray, Fl. i. 185; Fenzl, l. c. 381; Fl. Dan. t. 2355. *S. aquatica*, Cham. & Schlecht. Lin-

næa, i. 50; Torr. & Gray, Fl. i. 186; but probably not of Poll. *Larbreæ uliginosa*, Hook. Fl. Bor.-Am. i. 93, as to pl. of Chamisso and perhaps of Drummond. *S. crassifolia*, Boland. Cat. 6. *Spergulastrum lanceolatum*, Michx. Fl. i. 275. *Micropetalon lanceolatum*, Pers. Syn. i. 509. *Arenaria lateriflora*, Darlingt. Florula Cest. 54. *Alsine borealis*, Britton, l. c. 149. — New England to New Jersey; Mendocino Co., Calif., and northward; fl. midsummer; frequent.

**Var. corollina**, FENZL, l. c. 382. Taller: inflorescence spreading and more definitely terminal: bracts reduced, the uppermost more or less scarious: petals usually present: seeds slightly roughened. — *S. brachypetala*, Bong. Veg. Sitch. 126; Torr. & Gray, Fl. i. 186. *S. alpestris*, Fries, Mant. i. 10, excl. var. *S. Fenzlii*, Regel, Bull. Soc. Nat. Mosc. xxxv. 280. *S. borealis*, var. *alpestris*, Gray, Man. ed. 5, 93. *Alsine borealis*, var. *alpestris*, Britton, l. c. — Lake Superior, Robbins, to Oregon, Howell, and northward. (Eu., Asia.)

**S. crassifolia**, EHRL. Low, smooth: stems many, weak, ascending or suberect; internodes short: leaves small, numerous, thickish, oblong-lanceolate, acutish, 3 to 6 lines in length: sepals ovate-lanceolate, acuminate, about equalled or somewhat exceeded by the petals and capsule: seeds distinctly roughened under a lens, somewhat larger than in the last preceding species. — Hannov. Mag. pt. 8, 116, & Beitr. iii. 60; Fenzl, l. c. 383; Wats. & Coulter in Gray, Man. ed. 6, 87, excl. Kentucky plant. *S. gracilis*, Richards. l. c. ed. 1, App. 738 (reprint, p. 10), gemmiferous form? Hook. Fl. Bor.-Am. i. 97; Torr. & Gray, Fl. i. 184. *S. borealis*, var.  $\beta$ , Hook. l. c. 95. *Alsine crassifolia*, Britton, l. c. 150. — Wet ground and marshy places, Labrador, Martin, Allen, to the Lower St. Lawrence, Pringle, and N. Illinois, Vasey, Hill; Colorado, Hall & Harbour, Crandall; Montana, Canby, and northward; fl. July to September. (N. Eu., Asia.)

**S. fontinalis**, ROBINSON. Glabrous: stems regularly and dichotomously branched, 6 to 12 inches long: branches spreading: leaves spatulate-linear, obtusish, spreading, 5 to 10 lines long: internodes elongated, 1 to 2 inches in length: peduncles solitary in the forks of the branches, 1 to 1½ inches long, ascending: sepals 4 to 5, oblong, obtuse, 3-nerved: petals none: stamens 4 to 8; filaments abruptly dilated at the base: styles 3 to 4, very short; capsule obtuse, not exceeding the calyx. — Proc. Am. Acad. xxix. 286. *S. crassifolia*, Wats. Bibl. Index, 111, in part; Chapm. Fl. ed. 2, 608; Wats. & Coulter in Gray, Man. ed. 6, 87, in part. *Sagina fontinalis*, Short & Peter, Transylv. Jour. Med. vii. 600; Torr. & Gray, Fl. i. 177. *Spergula fontinalis*, Dietr. Syn. Pl. ii. 1597. *Alsine fontinalis*, Britton, l. c. 356. — Cliffs of Kentucky River and Elkhorn Creek, Kentucky, Short & Peter; Nashville, Tenn., Gattinger; fl. April, May. Certainly distinct from *S. crassifolia*, Ehrh.

= = Leaves broader, ovate or broadly oblong, seldom an inch in length.

**S. humifusa**, ROTTE. Low, densely matted, smooth: stems prostrate or ascending, angulate, shining: leaves elliptic-ovate or oblong, acutish, 2 to 5 lines long, marcescent: peduncles axillary, 4 to 7 lines in length: sepals ovate-oblong, acute, narrowly margined: petals somewhat exceeding the calyx: seeds smooth. — Skrivt. Natur. Vidensk. Selsk. Kjøb. x. 447, t. 4, f. 14; Torr. & Gray, Fl. i. 184; Fenzl in Ledeb. Fl. Ross. i. 384. *S. marginata*, Cham. & Schlecht. Linnæa, i. 50. *Arenaria thymifolia*, Pursh, Fl. i. 317; Eaton & Wright, N. A. Bot. 132. *A. Purshiana*, Seringe in DC. Prodr. i. 414; Hook. Fl. Bor.-Am. i. 102. *Alsine humifusa*, Britton, l. c. — Salt marshes and boggy slopes, Maine, Little Cranberry Island, Redfield, Upper St. John River, Goodale; Anticosti, Macoun, and coast of Oregon, Howell Bros., northward to Alaska and Arctic America; fl. July to September. (Greenland, N. Eu., Siberia.) The commoner form, var. **ovalifolia**, Fenzl, l. c., has leaves ovate or suborbicular, crowded, only 1 to 3 lines in length. Var. **oblongifolia**, Fenzl, l. c., has internodes more elongated and leaves oblong, 4 to 5 lines in length.

**S. obtusa**, ENGELM. Smooth: stems prostrate, 2 to 3 inches long: leaves thin, ovate, acute, about 4 lines long, half as broad: flowers solitary, appearing axillary: peduncles 3 to 4 lines long: sepals ovate, obtuse, hardly at all scarious on the margins: petals none: capsule 1½ to 1½ times as long as the calyx, obtuse; seeds brown, under a compound microscope covered with lighter-colored oblong tubercles with fringed edges. — Bot. Gaz. vii. 5; Macoun, Cat. Canad. Pl. i. 76. *S. humifusa*, Macoun, Phænog. & Crypt. Pl. of Canad. 9. — Anthracite Creek, Colorado, 9,000 to 10,000 feet, Brandegee, to Blue Mts., Washington, Piper, and Brit. Columbia, near Macleod's Lake, Macoun; Kootanie Pass, Dawson; fl. June, July.

**S. crispa**, CHAM. & SCHLECHT. Usually glabrous: stems numerous, weak, decumbent: leaves thin, ovate, commonly crisped on the edges; the broad base rounded, subpetiolate; the apex short-acuminate: pedicels solitary, axillary, 3 to 12 lines long: sepals lanceolate, acute, margined, 3-nerved, considerably exceeded by the acutish capsule: petals minute or none. — *Linnaea*, i. 51; Hook. Fl. Bor.-Am. i. 97; Torr. & Gray, Fl. i. 186, 675; Gray, Proc. Am. Acad. viii. 378. *S. borealis*, var. *crispa*, Fenzl in Torr. & Gray, l. c. 675; Torr. Bot. Wilkes Exped. 245. *S. borealis*, var. *apetala*, Regel, Bull. Soc. Nat. Mosc. xxxv. 277, in part. — Mountainous regions of N. California to Alaska. A pubescent but mostly sterile and possibly distinct form from Lake Cushman, Washington, *Piper*.

**S. calycántha**, BONG. Perennial, more or less finely pubescent: stems numerous, decumbent, branching: leaves ovate-lanceolate, somewhat narrowed toward the more closely sessile base, slightly fleshy or almost as thin as in the last, ciliate at least near the base: flowers small, nearly or quite apetalous, forming at length a more or less regular dichotomous cymose inflorescence: capsule broadly ovate and very obtuse or even subglobose. — Veg. Sitch. 127; Torr. & Gray, Fl. i. 186; Macoun, Cat. Canad. Pl. i. 74. *Arenaria calycantha*, Ledeb. Mém. Acad. St. Pétersb. v. 534. — Mt. Shasta, California, Hook. & Gray, to Washington, Howell Bros., Suksdorf, Brandegee, Allen; Brit. Columbia, Macoun, and S. Alaska, Mertens, acc. to Bongard. (Siberia.) A species referred by Fenzl, l. c. 382, and by various American writers to *S. borealis*, but, as it seems, rightly restored to specific rank by Prof. Macoun. A glabrous form, however, from Mt. Paddo, coll. Suksdorf, scarcely differs from *S. borealis* except in its broader leaves and blunter pods, while a pubescent form from Skamania Co., Washington, no. 2194 of the same collector, shows in its more racemiform inflorescence a transition to *S. crispa*.

**S. ruscifolia**, WILLD. Glabrous: leaves coriaceous, ovate, subcordate, acuminate, somewhat rigid with pungent tip: flowers rather large, terminal, pedunculate: sepals acute. — Willd. acc. to Schlecht. Berl. Gesell. Nat. Fr. Mag. vii. (1816), 194; Cham. & Schlecht. l. c. 50; Regel, l. c. 300. (Siberia.)

Var. *áretica*, REGEL, l. c. 301. "Low stems, scarcely an inch in length, sepals obtuse. — On the Melville Islands."

== = Leaves broad, an inch or more in length.

**S. littoralis**, TORR. Pubescent: stems decumbent, dichotomously branched, 8 inches in height: leaves ovate, rounded at the base, acute or acuminate, about an inch in length, with definite intramarginal veins: flowers rather numerous in the forks of the branches; peduncles becoming horizontal or deflexed: sepals  $2\frac{1}{2}$  lines long, acute: petals of nearly equal length, cleft almost to the base: capsule somewhat shorter. — Pacif. R. Rep. iv. 69; Brew. & Wats. Bot. Calif. i. 68. *Alsine littoralis*, Greene, Man. Bay-Reg. 34. — California, coast of Marin Co.; Point Reyes, Bigelow, Blankinship; Dillon's Beach, Congdon; bluffs near Point Lobos, acc. to Mrs. Brandegee. In habit much resembling the Old World *S. dichotoma*, L., of which it may well prove a form. It differs, however, in its much more deeply cleft petals.

**S. púbera**, MICHX. (GREAT CHICKWEED.) Perennial, decumbent, stout for the genus: stems pubescent in lines: leaves elliptic-oblong, finely ciliate, acute or obtusish, 6 lines to  $1\frac{1}{2}$  inches long, or on the late tall shoots 3 inches in length: calyx nearly or quite smooth; sepals 3 to  $4\frac{1}{2}$  lines in length: stamens 10: capsule globose, not exceeding the calyx; teeth sometimes but not always circinate-revolute as in *Cerastium* § *Strepodon*. — Fl. i. 273; Darl. Fl. Cest. 274; Torr. & Gray, Fl. i. 183. *Alsine púbera*, Britton, Mem. Torr. Club, iv. 107. — Rocky woods, Pennsylvania to Georgia, westward to Tennessee, Kentucky, and Indiana; fl. April, May. According to Mr. Thomas Meehan the flowers are protogynous. Prof. L. F. Ward notes that the large-leaved usually sterile shoots of late spring sometimes bear a few flowers which are smaller in size and shorter-peduncled than the earlier ones. Miss E. F. Andrews states that the petals are sometimes cleft half their length, in other cases nearly to the base, which is confirmed by specimens.

\* \* Petals retuse or shortly bifid, divided only one fourth to one half the way to the base, commonly much exceeding the calyx: species approaching *Arenaria*.

+ Tall or spreading species, adventive on the Atlantic Slope: leaves long, lanceolate to lance-linear, attenuate.

**S. HOLÓSTEA**, L. Stem 6 to 18 inches high: leaves narrowly lanceolate, spreading, long-attenuate from near the rounded sessile base, scabrous-ciliate on the margins and midrib,  $1\frac{1}{4}$  to 3 inches in length, 1-nerved: sepals lance-oblong, thin, nerveless, 4 lines in length, exceeded by the large white petals: styles 3: valves of the capsule sometimes tardily circinate-revolute. — Spec. i. 422; Reichenb. Ic. Fl. Germ. v. t. 223. *Alsine Holostea*, Britton, Mem. Torr. Club, v. 150. — Found more or less established in the outskirts of Brooklyn, Long Island, *Ruger*; Poland, Maine, *Miss Furbish*. (Adv. from Eu.)

+ + Indigenous species of the Southern States: leaves narrowly oblong, linear, or spatulate.

**S. uniflora**, WALT. Weak and slender: stems decumbent or suberect, a foot in length: leaves linear, acute, or the lower lanceolate, gradually narrowed below, mucronate, 8 to 12 lines in length; the floral much reduced: flowers few, solitary, on elongated slender peduncles: calyx soft in texture, sepals scarcely veined. — Car. 141; Torr. & Gray, Fl. i. 184; Chapm. Fl. 50. *Arenaria glabra*, Ell. Sk. i. 520, not Michx.; Wood, Bot. & Fl. 56. *Alsine Walteri*, Gray, Gen. III. ii. 34. — Moist meadows, North Carolina to Florida and Alabama, *Winchell*; fl. March to May.

**S. Nuttallii**, TORR. & GRAY. Annual, a span high: leaves linear-oblong, obtusish; the upper much reduced but not scarious: flowers in dichotomous racemes; pedicels horizontally spreading, 9 lines in length: corolla 6 to 8 lines broad. — Fl. i. 183; Fielding, Sert. Pl. t. 18. *Alsine Drummondii*, Fenzl in Torr. & Gray, l. c. 675. *Alsine Nuttallii*, Gray, Gen. III. ii. 34. — Arkansas, *Nuttall*; Indian Terr., *Carleton* (acc. to Holzinger); Louisiana, *Hale*; Central Texas, *Drummond*, *Lindheimer*, *Wright*, *Hall*.

+ + + Indigenous glandular-pubescent species of the Rocky Mts. and Pacific Slope.

**S. dichótoma**, L. Stems terete, profusely and dichotomously branched: leaves ovate to ovate-lanceolate, acute or acutish, cordate, spreading, 6 to 12 lines in length: peduncles 1-flowered, springing from the forks of the branches, considerably exceeding the leaves, commonly deflexed in fruit: sepals lanceolate, acute, usually about equalling the petals. — Spec. i. 421; Fenzl in Ledeb. Fl. Ross. i. 378. — An Asiatic species of great variability.

**Var. Americana**, PORTER. Leaves oval, obtusish: sepals oblong, obtuse, only  $1\frac{1}{2}$  lines long, considerably exceeded by the rather narrow white petals. — Porter in Robinson, Proc. Am. Acad. xxix. 289. — Collected near Virginia City, Montana, *W. B. Platt*.

**S. Jamésii**, TORR. Viscid above: stem strongly angled: leaves elongated, lanceolate, attenuate, smooth, 2 to 4 inches in length, 1 to 8 lines broad near the closely sessile base: flowers in a leafy terminal panicle: sepals oblong, herbaceous, 2 lines in length. — Ann. Lyc. N. Y. ii. 169 (as *S. Jamesiana*), & Pacif. R. Rep. iv. 69; Torr. & Gray, Fl. i. 183; Wats. Bot. King Exp. 38. ? *S. graminea*, James, Cat. 181. — Woodlands and "creek bottoms," Rocky Mts. of Colorado, New Mexico, and Arizona to Central California and Washington, *Brandegee*, *Henderson*; Idaho, *Miss Mulford*; fl. June to October. Leaves varying greatly in breadth even on the same individual.

+ + + + Glabrous Alaskan densely cespitose species: leaves very small.

**S. dicranoides**, FENZL. Dwarf and tufted perennial: stems numerous, covered with the small oblong cuneate closely imbricated leaves: flowers small, solitary, terminal, short-peduncled: petals shorter than the oblong-lanceolate sepals. — Fenzl in Ledeb. Fl. Ross. i. 395; Seem. Bot. Herald, 26, t. 3. *Cherleria dicranoides*, Cham. & Schlecht. Linnæa, i. 63. — Cape Lisburne, N. W. Alaska, *Seemann*. (Adj. Siberia, *Chamisso*, *Eschscholtz*.) A very distinct species, but not recently collected nor very well known.

**12. ARENÁRIA**, L. SANDWORT. (*Arena*, sand, a sandy place, from the habitat of several species.) — Leaves sessile or nearly so, either flat and with well-developed blades or more frequently awl-shaped or acerose. Flowers of *Stellaria*, but with petals entire or barely retuse (sometimes more deeply cleft in *A. patula* and *A. capillaris*). — Syst. Nat. ed. 1, & Gen. no. 374, in part (name used by Ruppis for various *Alsineæ*); Benth. & Hook. Gen. i. 150; Wats. Bibl. Index, 94; Hook. f. & Jackson, Index Kew. i. 178; Robinson, Proc. Am. Acad. xxix.

289. *Alsine*, Wahlenb. Fl. Lapp. 127, not L. *Arenaria*, *Merkia*, & *Honkenya*, Torr. & Gray, Fl. i. 176, 178. *Arenaria*, *Sabulina*, *Minuartia*, *Tryphane*, *Alsinanthe*, etc., Reichenb. Ic. Fl. Germ. v. t. 204–219. *Alsine*, *Arenaria*, *Mæhringia*, *Merckia*, & *Dolophragma*, Pax in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 1b, 82–84. — A composite genus, and, when taken as here in its more comprehensive sense, the largest of the *Alsineæ*. Plants of wide distribution both as regards latitude and altitude, and possessing in consequence much variability in aspect; being rather slender annuals or herbaceous perennials of the habit of *Stellaria*, or often more densely tufted and occasionally distinctly woody at the base.

§ 1. *MÆHRINGIA*, Benth. & Hook. Seeds, at least when young, provided at the hilum with a light-colored spongy appendage (strophiole). Habit of *Stellaria*. — Gen. i. 150. *Mæhringia*, L. Phil. Bot. 32; Fenzl in Endl. Gen. 968; DC. Prodr. i. 390; Gray, Gen. III. ii. 36, t. 112.

*A. lateriflora*, L. Stems terete, weak, often decumbent, puberulent: leaves elliptic-oblong or oval, obtuse or rounded at the apex, thin, puberulent or at least (under lens) papillose-roughened, 5 to 10 lines long; the veins and edges beneath covered with a fine spreading pubescence: cymes pedunculate and somewhat umbellately few (1–6)-flowered: sepals ovate, obtuse or scarcely acute,  $1\frac{1}{4}$  lines long, only one third to one half the length of the obovate petals: filaments pubescent. — Spec. i. 423; Hook. Fl. Bor.-Am. i. 102, t. 36; Torr. & Gray, Fl. i. 182, 675. *A. Pennsylvanica*, Muhl. Trans. Am. Phil. Soc. iii. 169. *A. buxifolia*, Poir. Dict. vi. 362; Torr. & Gray, l. c. 182. *A. Haenkeana*, Bartl. in Presl, Rel. Haenk. ii. 15. *Stellaria biflora*, Pursh, Fl. i. 317. *Mæhringia lateriflora*, Fenzl, Verbreit. Alsin. 18, 38, & in Ledeb. Fl. Ross. i. 371; Gray, l. c. — New England to New Jersey, Colorado, Oregon, and northward to the Arctic Ocean; fl. May to August. (Siberia.) Var. *GLABRÆSCENS*, Robinson, n. comb. (*Mæhringia lateriflora*, var. *glabrescens*, Regel, Bull. Soc. Nat. Mosc. xxxv. 259), with glabrate or even glabrous leaves, has been collected in Delta Co., Colorado, *J. H. Cowen*, and on Peel's River near the mouth of the Mackenzie, *Miss Taylor*. (Siberia.)

*A. macrophylla*, Hook. Stems decumbent, angled, pulverulent-pubescent: leaves lanceolate, acutish to acuminate at both ends (less commonly elliptic, obtusish), 1 to 3 inches in length, glabrous, more or less punctate: peduncles slender, terminal or becoming axillary, 1–5-flowered: sepals ovate-lanceolate, very acuminate, exceeding the petals. — Fl. Bor.-Am. i. 102, t. 37; Torr. & Gray, Fl. i. 182; Torr. Pacif. R. Rep. iv. 69; Gray, Proc. Am. Acad. viii. 378; Greene, Fl. Francis. 125. *Mæhringia macrophylla*, Torr. Bot. Wilkes Exp. 246. — Extending from San Diego, *Orcutt*, northward through California, Oregon, and Washington, into Brit. America, and eastward to Isle St. Ignace, Lake Superior, *Wheeler*; fl. April to August. While the essential floral characters remain the same, there is considerable variation in the size, texture, and shape of the leaves.

§ 2. *AMMODENIA*, Benth. & Hook. l. c. 151. Styles 3 to 5: disk conspicuous, 10-lobed and glanduliferous: capsule globose, somewhat baccate; seeds not strophiolate. — *Ammodenia*, Patrin in Gmelin, Fl. Sib. iv. 160. *Honkenya*, Ehrh. Beitr. ii. 180. *Halianthus*, Fries, Fl. Hall. 75. *Adenarium*, Raf. Am. Monthly Mag. ii. 266, & Jour. Phys. lxxxix. 259. — A single stout fleshy species of maritime habitat and with axillary flowers.

*A. peploides*, L. Perennial, glabrous: stems a span in height, stout, angled: leaves thick, ovate or obovate, 1-nerved, shortly pointed, clasping at the broad base: sepals ovate-lanceolate, acuminate,  $3\frac{1}{2}$  lines in length, about equalling the petals. — Spec. i. 423; Pursh, Fl. i. 317. *Alsine peploides*, Crantz, Inst. ii. 406. *Honkenya peploides*, Ehrh. l. c. 181; Fenzl in Ledeb. Fl. Ross. i. 358; Gray, Gen. III. ii. 32, t. 110. *Adenarium peploides*, Raf. ll. cc. — Seashores, from New Jersey and Washington State, *Henderson*, northward; fl. July to September. (Greenland, N. Eu., Asia.) On the Northwest Coast the commoner form is

**Var. *májor***, Hook. Taller: leaves longer, often 15 lines in length, oblong or oblanceolate, more pointed and decidedly narrowed to the base. — Fl. Bor.-Am. i. 102. *A. Stichen-sis*, Dietr. Syn. Pl. ii. 1565. *Honkenya oblongifolia*, Torr. & Gray, Fl. i. 176. *Honkenya peploides*, var. *oblongifolia*, Fenzl, l. c. — Washington to Alaska. Imperfect specimens (perhaps of the type rather than the variety) from Yellowstone Lake, Wyoming, collected by Adams on the Hayden Surv., and kindly communicated by Professor Porter, show a noteworthy inland occurrence of this usually maritime species. (Siberia, Japan.)

§ 3. **MÉRCKIA**, Benth. & Hook. l. c. 151. Styles 3 to 5; ovary 3-5-celled: capsule large, depressed-globose, somewhat inflated, many-seeded; seeds not strophiolate. — *Merckia*, Fisch. in Cham. & Schlecht. Linnæa, i. 59; Fenzl, l. c. 359; Pax in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 1b, 84. *Merkia*, Torr. & Gray, Fl. i. 176. — A single glandular and slightly fleshy species of the Northwest.

**A. physódes**, Fisch. Perennial, caespitose: stems weak, decumbent, 3 to 6 inches in length: leaves ovate, cuspidately pointed, 4 to 6 lines long: flowers solitary at the summit of the stem or becoming lateral: sepals lance-oblong, acute, 3 lines in length, equalling or slightly exceeding the petals: capsule 4 lines (said to become half an inch) in diameter. — Fisch. in DC. Prodr. i. 413; Wats. Bibl. Index, 97. *Merckia physodes*, Fisch. l. c. 59; Hook. l. c. 103; Torr. & Gray, l. c. *Stellaria ovalifolia*, Hook. l. c. 97; Hook. & Arn. Bot. Beech. 122. — Brit. Columbia to N. Alaska; fl. July, August. (E. Siberia.)

§ 4. **ARENÁRIA** proper. Styles normally 3: capsule ovoid, dehiscent by 2-toothed or -cleft valves; seeds not strophiolate. — *Arenaria* of many authors, as Fenzl in Ledeb. Fl. Ross. i. 360; Regel, l. c. 215; Pax, l. c.; Williams, Bull. Herb. Boiss. iii. 593, etc.

\* Leaves ovate, elliptic or linear, not acerose.

+ Annuals.

**A. SERPYLLIFÓLIA**, L. (THYME-LEAVED SANDWORT.) Annual, finely pubescent, much branched: leaves very short, 2 to  $3\frac{1}{2}$  lines in length, ovate, acute or acuminate, rather distinctly 3-5-nerved, rounded at the base; only the lowest being narrowed to short petioles: flowers numerous in open leafy cymes; pedicels 1 to 3 times the length of the ovate-lanceolate acuminate hispidulous sepals: petals small, about two thirds the length of the sepals: capsule flask-shaped. — Spec. i. 423; Michx. Fl. i. 274; Ell. Sk. i. 518; Torr. & Gray, Fl. i. 182. — Sandy soil, Lower Canada and New England to Florida, westward to Oregon, Washington, and Brit. Columbia; fl. April to June. (Nat. from Eu.)

**Var. TENÚIOR**, Koch. More delicate: leaves reduced, lanceolate: flowers smaller in a nearly naked racemose panicle: capsule more oblong. — Synop. 117. *A. leptoclados*, Guss. Fl. Sic. Syn. iii. 824. — Dry situations, less frequent than the type; Maine, *Fernald*; Vermont, *Boott*; Oregon, *Brandegee*; Washington, *Suksdorf*; fl. May to August. (Adv. from Eu.)

**A. Benthámii**, FENZL. A slender annual, branched from the base; branches finely pubescent in lines: leaves short, 3 to 4 lines in length, elliptic-lanceolate, acute and apiculate, often punctate, narrowed to sessile bases, or the lowest to short ciliated petioles; floral leaves much reduced: pedicels filiform, many times exceeding the ovate acuminate glabrous often punctate sepals: seeds dark brown, minutely tuberculate. — Fenzl in Torr. & Gray, Fl. i. 675; Gray, Pl. Wright. ii. 18; Torr. Bot. Mex. Bound. 36. *A. monticola*, Buckley, Proc. Acad. Philad. 1861, 449. — Rocky ground, Texas, where first coll. by *Drummond*; New Mexico, *Thurber*.

+ + Perennials.

**A. ciliáta**, L. Minutely glandular-puberulent: stems numerous, slender, terete, leafy, densely matted, or in less exposed situations spreading and ascending, 1 to 5 inches long, terminally 1-3-flowered: leaves small, ovate-oblong or lance-oblong, scarcely acute, 1 to 3 lines in length, distinctly ciliate near the cuneate base: peduncles erect, 2 to 5 lines long:

sepals ovate-oblong, obtuse, nerved,  $1\frac{1}{4}$  to  $1\frac{1}{2}$  lines long: petals of similar shape and equal length: stamens 8 to 10: valves of the capsule rather deeply bifid, exceeding the calyx. — Spec. i. 425; DC. Prodr. i. 411; Fenzl in Ledeb. Fl. Ross. i. 370. (High mountains and arctic regions of Europe.)

**Var. (?) humifusa**, HORNEM. Leaves without ciliation: sepals nerveless. — Hornem. in Lange, Pl. Græn. 132. *A. Norvegica*, Gunn. Fl. Norv. ii. 145, t. 9, f. 7-9. *A. humifusa*, Wahlenb. Fl. Lapp. 129. — Rich soil, Brit. America, Mt. Albert, Gaspé, Allen, Porter; Lake Mistassini, J. M. Macoun, and what is with scarcely a doubt the same thing at Kicking Horse Lake in the Rocky Mts., J. Macoun. (Greenland, N. Eu.)

- A. alsinoides**, WILLD. Minutely pubescent with slightly hooked hairs or smoothish: stems long, procumbent, moderately branched: leaves narrowly elliptic, acute, narrowed below, commonly pseudovercillate, 8 to 10 lines long, punctate: flowers axillary, solitary at the nodes: pedicels filiform, elongated, spreading or horizontal, nearly or quite an inch in length: sepals ovate, acute, tuberculate-punctate,  $1\frac{3}{4}$  lines long: petals commonly smaller or wanting: seeds smooth and shining. — Willd. in Schlecht. Berl. Gesell. Nat. Fr. Mag. vii (1816), 201; Wats. Proc. Am. Acad. xvii. 327. *A. diffusa*, Ell. Sk. i. 519. *A. nemorosa*, HBK. Nov. Gen. & Spec. vi. 35. *A. lanuginosa*, Rohrb. in Mart. Fl. Bras. xiv. pt. 2, 274, t. 63. *Spergulastrum lanuginosum*, Michx. Fl. i. 275. ?*Polycarpon uniflorum*, Walt. Car. 83. *Micro-petalon lanuginosum*, Pers. Syn. i. 509. *Stellaria elongata*, Nutt. Gen. i. 289. *S. lanuginosa*, Torr. & Gray, Fl. i. 187, 675. — Moist shaded ground, North Carolina to Florida and Texas, Drummond, Hall. (Mex., S. Amer.) A more western form, represented from New Mexico by Fendler's 58 and 62 and Wright's 864, has slightly firmer stems, more numerous subpaniculate flowers, and leaves less narrowed at the base. In all these respects it shows a transition to the following.

- A. saxosa**, GRAY. Finely puberulent, green or glaucescent: stems many, spreading from a rather stout root, decumbent or creeping at the base, 2 inches to a foot long: leaves numerous, opposite, not fasciated or pseudovercillate (sometimes crowded), slightly fleshy, lance-oblong, acute, mucronate, 2 to 9 lines long, sessile by a scarcely narrowed base: flowers terminal and subsolitary on short simple peduncles or in stouter individuals numerous and more or less paniculate: petals almost or quite equalling the ovate-lanceolate sharply acuminate slightly fleshy sepals. — Pl. Wright. ii. 18; Walp. Ann. iv. 258. *Mehringia umbrosa*, Gray, Pl. Fendl. 13, & Pl. Wright. ii. 18, not Fenzl. — Colorado, Brandegee, Hooker & Gray; Guadalupe Mts., Texas, Havard; New Mexico, Fendler, Wright, Wooton; Arizona, Rothrock, Lemmon, Jones, Rusby. (Lower Calif., Orcutt.) A species of wide range, occurring alike in rocky subalpine regions and much lower upon sandy banks, accordingly varying much in height and diffuseness of branching. The type is a condensed few-flowered form.

**Var. cinerascens**, ROBINSON. Somewhat more rigid, grayish throughout with a fine pubescence: leaves pungent. — Proc. Am. Acad. xxix. 293. — Huachuca Mts., Arizona, Lemmon.

\* \* Leaves very narrowly linear, commonly acerose, often rigid and pungent: western species.

† Sepals broadly ovate, mostly very obtuse or at least obtusish: flowers not densely aggregated.

- A. capillaris**, POIR. Leaves chiefly grouped at the base in fascicles upon a multicapital caudex, 6 lines to  $2\frac{1}{2}$  inches long, somewhat pungent, little spreading; the cauline few pairs, much reduced: stems 4 to 8 inches in height: petals obovate, considerably exceeding the short obtuse sepals. — Dict. vi. 380; Regel, l. c. 247. *Alsine nardifolia*, Anderson, Cat. 118. The typical glabrous form with straight leaves is comparatively rare in America, but occasionally occurs with var. *NARDIFOLIA*, Regel, l. c. 253, which is glabrous with curved leaves (*A. nardifolia*, Ledeb. Fl. Alt. ii. 166, & l. c. t. 6; Hook. Fl. Bor.-Am. i. 98, t. 32), and the more common form, var. *FORMOSA*, Regel, l. c. 252, which has the stem and inflorescence glandular (*A. formosa*, Fischer in DC. Prodr. i. 402; Hook. f. Arc. Pl. 287, 322; Torr. Bot. Wilkes Exp. 243). — Central California to Utah, Montana, and Brit. Columbia. (Asia.)

**Var. ursina**, ROBINSON, n. comb. Caudex more densely multicapital and bearing closer fascicles or rosettes of very short filiform-linear thickish glaucous glandular-ciliate white punctate apiculate leaves (only 2 to 3 lines in length): sepals nerveless, little exceeded



by the white oblong slightly emarginate petals. — *A. ursina*, Robinson, Proc. Am. Acad. xxix. 294. — Dry hills, Bear Valley, San Bernardino Mts., *Parish Bros.*, August, 1882. Further material of this variety, secured from the same locality in June, 1895, by *S. B. Parish*, leaves little doubt that it is best regarded as a condensed stunted form of *A. capillaris*, with shorter petals.

+ + Sepals ovate or ovate-lanceolate, acute or acuminate, shorter than the petals (except in *A. congesta*, var. *Parishiorum*).

**A. compácta**, COVILLE. Root thick, ligneous: caudex much branched and bearing very closely tufted rosulately spreading subulate glaucous leaves; these not exceeding 2 lines in length, minutely glandular, ciliate: stems slender, an inch or more in height, simple or sparingly branched, almost naked, the cauline leaves being few and much reduced: flowers terminal on the branches: sepals  $1\frac{1}{2}$  lines long, scarious-margined, thickened in the middle, attenuate. — Proc. Biol. Soc. Wash. vii. 67, & Contrib. U. S. Nat. Herb. iv. 70, t. 5. — California, mountains of Tulare Co., *Coville*; Bloody Cañon, Mono Co., *Congdon*.

**A. congesta**, NUTT. Smooth or rarely with slight traces of a minute glandular puberulence: stems slender, simple, 5 to 14 inches high, numerous, springing from a matted non-ligneous caudex: basal leaves erect, gramineous-setaceous, 6 lines to 3 inches long, ciliate-serrate near the base: cauline leaves rather distant, gradually reduced: flowers sessile in 1 to 3 dense heads (subtended by 1—several pairs of scarious-margined bracts): sepals carinate, obscurely 3-nerved, scarious except in the middle, 2 lines long, considerably exceeded by the narrowly oblong petals: stigmas not strictly capitate. — Nutt. in Torr. & Gray, Fl. i. 178; Torr. in Frém. Rep. 87; Wats. Bot. King Exp. 39; Porter & Coulter, Fl. Col. 13; Brew. & Wats. Bot. Calif. i. 69; Greene, Fl. Francis. 123 (excl. syn.); K. Brandegee, Zoe, ii. 161. — Rocky Mts. of Colorado and Wyoming to the Yosemite, acc. to Mrs. Brandegee, and northward to Washington, *Suksdorf*.

**Var. suffrutescens**, ROBINSON. Caudex sometimes, perhaps always, very ligneous: its branches becoming 2 to 3 lines in diameter, bearing fascicled sub-equal leaves (an inch or less in length): flowers somewhat smaller (sepals  $1\frac{1}{2}$  lines long) in capitate umbels: pedicels slender, 2 to 3 times as long as the calyx: stigmas capitate. — Proc. Am. Acad. xxix. 295; *Brewerina suffrutescens*, Gray, Proc. Am. Acad. viii. 620, under *A. congesta*; Brew. & Wats. Bot. Calif. i. 69; Wats. Bibl. Index, 95; Greene, Fl. Francis. 123. — California, Cisco, *Bolander & Kellogg*; Emigrant Gap, *Jones*; Tulare Co., *Coville & Funston*. A form too well marked in its foliage, ligneous caudex, and *allium*-like inflorescence to be united with the typical *A. congesta*, yet appearing to intergrade with it. One of the transitional forms has been collected in Sierra Valley by *Lemmon*.

**Var. subcongesta**, WATSON. Caudex more or less ligneous, stems smooth, glandular or pulverulent-pubescent, often knotted with enlarged nodes: flowers as in the type, but borne in more or less expanded dichotomous cymes: leaves varying greatly in length and texture. — Bot. Calif. i. 69, & Bibl. Index, 454. *A. Fendleri*, var. *subcongesta*, Wats. Bot. King Exp. 40, & Pl. Wheeler, 6; Porter & Coulter, Fl. Col. 13; Rothr. Enum. Pl. Col. 35. *A. Fendleri*, var. *glabrescens*, Wats. Bot. King Exp. 40, & Bibl. Index, 95, differs only in its still looser inflorescence, and should doubtless be referred hither. — Rocky Mts. of Colorado and Arizona, *Newberry*, northward to Brit. America, Cypress Hills, *Macoun*, and Lewis River, *Dawson* (acc. to J. M. Macoun), and westward to Oregon, *Howell*, and California, Sierra Co., *Lemmon*, Donner Pass, *Torrey*.

**Var. Kingii**, ROBINSON, n. comb. Habit and glandular pubescence as in loose-flowered forms of the preceding variety: petals emarginate to deeply bifid. — *A. Kingii*, Jones, Proc. Calif. Acad. Sci. ser. 2, v. 627. *Stellaria Kingii*, Wats. Bot. King Exp. 39, t. 6. — Mountains of N. Nevada, *Watson*, to Utah, *Parry*, *Palmer*, *Jones*, and *Ward* (form with petals merely emarginate); fl. July, August.

**Var. macradénia**, JONES, l. c. 626. Glabrous or nearly so: rootstock more or less ligneous, extensively and irregularly branched: stems stout for the genus, 6 to 15 inches high, knotted with the enlarged nodes: leaves chiefly cauline, glaucous, rigid, pungent, 6 lines to  $2\frac{1}{2}$  inches long: flowers large, in an open cyme: sepals fleshy, subcarinate,  $2\frac{1}{2}$  to  $2\frac{3}{4}$  lines long, with membranous margins: petals considerably exserted, obovate or oblong with obtusish sometimes auricled bases: staminal glands moderately developed: stigmas subcapitate. — *A. macradenia*, Wats. Proc. Am. Acad. xvii. 367, in part. — S. E. California,

*Parish Bros., Oliver, Coville & Funston, Davidson; S. Utah, Parry, Palmer; Arizona, Palmer, Lemmon.*

**Var. Parishiorum**, ROBINSON, n. comb. Smooth or minutely glandular-pubescent: caudex scarcely ligneous, densely multicapital: stems slender; nodes not conspicuously enlarged: leaves chiefly basal: petals narrowed at their bases, shorter than or barely equalling the sepals, these fully 3 lines in length: staminal glands very large. — *A. macradenia*, var. *Parishiorum*, Robinson, Proc. Am. Acad. xxix. 296. *A. macradenia*, Wats. l. c., in part. — Common on mountains bordering the Mojave Desert, *Parish Bros.*

- A. aculeata**, WATSON. Leaves grouped chiefly in fascicles at the summits of a multicapital caudex, decidedly glaucous, rigid and pungent and with age strongly spreading, often purple, 6 to 12 lines in length; cauline leaves few, shorter: stems simple up to the few-flowered cymes, 4 to 6 inches high: sepals oblong-lanceolate, acute or acutish: petals rather narrow, elliptic-oblancheolate, obtuse,  $1\frac{1}{2}$  to 2 times as long as the sepals. — Bot. King Exp. 40, & Bibl. Index, 94. *A. congesta*, var. *aculeata*, Jones, l. c. — Chiefly in mountainous districts from Oregon, *Nevius, Cusick, Howell*, to N. Nevada, *Watson*, S. Utah and (?) Arizona, *Palmer, Toumey*.

+ + + Sepals lanceolate to lance-linear, attenuate, equalling or exceeding the petals.

+ + Flowers cymose, not densely aggregated.

- A. Fendleri**, GRAY. Rather pale and glaucous, finely glandular-pubescent above: stems numerous, erect, leafy, 4 to 15 inches high, closely aggregated upon the summit of a thick root: basal leaves setaceous, gramineous, ciliolate or quite smooth, 2 to 4 inches in length, somewhat pungent; the cauline gradually shorter, connate and sheathing at the base: internodes an inch or two long: inflorescence dichotomous, few-many-flowered: sepals attenuate, glandular, nearly equalling the obovate white or pale yellow petals ( $2\frac{1}{2}$  to 3 lines in length): capsule commonly a fourth shorter. — Pl. Fendl. 13; Torr. Pacif. R. Rep. iv. 69; Wats. Bot. King Exp. 40, exclusive of var. *glabrescens*; Porter & Coulter, Fl. Col. 13. — Chiefly in the Rocky Mts., but sometimes among the sage-brush of the plains, Nebraska, *Engelmann*; Wyoming, *Nelson*; and Colorado to New Mexico, *G. R. Vasey*; San Francisco Mts., Arizona, *Lemmon*; Los Angeles, Calif., *Nevin*. The var. *diffusa*, Porter & Coulter (Fl. Col. 13), is a greener form from the Rocky Mts. of Colorado and Wyoming, with a more lax and spreading inflorescence and often although not always larger flowers. It intergrades with the type so that in the herbarium specimens at least its separation is often unsatisfactory. Another form, collected by *Prof. Porter* in the Garden of the Gods, has very small flowers (sepals  $1\frac{1}{4}$  to  $1\frac{1}{2}$  lines in length) upon curved and spreading branches.

+ + + Flowers densely fascicled at the summit of the stem.

- A. Franklinii**, DOUGL. Caudex of numerous procumbent more or less elongated branches, covered with somewhat persistent dried leaves: stems quite smooth, erect, simple, 3 to 5 inches high, somewhat rigid but fragile, bearing 3 to 6 pairs of narrowly subulate pungent spreading smooth or ciliolate and minutely scabrous leaves (5 to 9 lines long): cymes dense, sub-involucrate: sepals elongated, attenuate, pungent with slightly spreading tips, 1-nerved, 4 to 6 lines long, distinctly exceeding the petals. — Dougl. in Hook. Fl. Bor.-Am. i. 101, t. 35; Torr. & Gray, Fl. i. 178; Torr. Bot. Wilkes Exped. 244. — Sandy soil, Oregon, *Douglas, Lyall, Howell, Nevius, Cusick*; Washington, *Suksdorf*; Idaho, *Miss Mulford*. Specimens collected by *Douglas* at source of the Missouri may well have been the next species.

- A. Hookeri**, NUTT. Caudex densely multicapital: stems 1 to 4 inches high, pubescent: leaves shorter than in the last: flowers smaller and petals about equalling or slightly exceeding the sepals. — Nutt. in Torr. & Gray, Fl. i. 178. *A. Franklinii*, var. *minor*, Hook. & Arn. Bot. Beech. 326; Wats. Bibl. Index, 95; Coulter, Man. Rocky Mt. Reg. 35. *A. Franklinii*, Engelm. Trans. Am. Phil. Soc. n. ser. xii. 186; Coulter, l. c., in great part; Hook. f. & Jackson, Index Kew. i. 179, in part. *A. pungens*, Webber, Cat. Fl. Neb. 114. — Nebraska, *Rydberg, Webber*; Rocky Mts., lat. 40°, *Nuttall*; Colorado, *Vasey, Crandall*; Wyoming, *Hayden, Parry, Porter, Greene, Sheldon, Nelson*; plains of Green River, *Gray*; Montana, *Tweedy*. This species with the habit of the preceding differs in its much denser caudex and constantly pubescent stem, as well as in the distinctions indicated. The stem is terete even in a dried state, while the stems of *A. Franklinii* in drying become furrowed and angulate, as though slightly fleshy.

§ 5. *ALSINE*, Benth. & Hook. Capsule ovoid, 3-valved; valves entire; seeds not strophiolate: matted perennials or delicate annuals, usually with narrow linear subulate or acerose leaves. — Gen. i. 150. *Alsine*, Wahlenb. Fl. Lapp. 127; Fenzl in Ledeb. Fl. Ross. i. 341; Pax in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 1b, 82.

\* Palustrine perennial with weak elongated stems, narrow linear or lance-linear leaves and axillary long-peduncled flowers.

**A. paludicola**, ROBINSON. Glabrous, flaccid: stems several, subsimple, procumbent, rooting at the lower joints, sulcate, shining, leafy throughout: leaves uniform, flat, 1-nerved, acute, spreading, 9 lines to  $1\frac{1}{2}$  inches long, 1 to 3 lines in breadth, often punctate, somewhat connate, slightly scabrous upon the margins: peduncles solitary in the axils, 1 to 2 inches long, spreading or somewhat deflexed: sepals nerveless, not at all indurated, acutish, about half the length of the obovate petals. — Proc. Am. Acad. xxix. 298. *A. palustris*, Wats. Bot. Calif. i. 70, & Bibl. Index, 97; Greene, Fl. Francis. 124; K. Brandegee, Zoe, ii. 341; not Gay. *Alsine palustris*, Kellogg, Proc. Calif. Acad. Sci. iii. 61. — Abundant in swamps, California, about Fort Point near San Francisco, *Bolander, Kellogg & Harford*; San Bernardino, *Parish Bros.*; Washington, near Tacoma, *Flett*, according to Piper; fl. May to August.

\* \* Terrestrial annuals of the Atlantic Slope and Alleghany Mts., rarely extending to the interior in the Southern States, essentially glabrous: sepals obtuse, soft in texture, scarcely or not at all nerved.

**A. Grœnlândica**, SPRENG. Somewhat fleshy: root at first simple, later of many delicate fibres: stems few to many, decumbent or erect, subsimple, 2 to 8 inches long, bearing 1 to 5 flowers: leaves linear, obtuse,  $1\frac{1}{2}$  to 7 lines long, at first in a dense more or less rosulate cluster at the base; the cauline 2 to 4 pairs: sepals broadly ovate,  $1\frac{1}{2}$  to 2 lines in length: petals obovate, about twice as long, entire or notched: capsule subglobose to oblong, more or less contracted to a point. — Syst. ii. 402; Torr. & Gray, Fl. i. 180; Torr. Fl. N. Y. i. 95, t. 15; Robinson, Proc. Am. Acad. xxix. 298, 328. *A. glabra*, Torr. Fl. N. & Midd. States, 455; Bigel. Fl. Bost. ed. 2, 180; not Michx. *Alsine Grœnlândica*, Gray, Man. ed. 2, 58. *Stellaria Grœnlândica*, Retz. Fl. Scand. ed. 2, 107; Fl. Dan. t. 1210. ? *S. Labradorica*, Schrank, Pfl. Lab. 24; Meyer, Pl. Lab. 93. — Rocky soil, chiefly but not always at higher altitudes, Greenland to the mountains of Maine, and even reaching the coast at Bath, *Gambel*, and Bar Harbor, *Rand*; also found at Middletown, Conn., *Osborn, Wright*; locally abundant in the White, Green, Adirondack, Catskill, and Shawangunk Mts.; also found on the Kittatinny Mts. of N. W. New Jersey, *Britton*; in the mountains of Pennsylvania (acc. to Porter); of S. Virginia, *Small & Heller*; and in N. Carolina, *Small*, where it had passed as a form of *A. glabra*, Michx., having been previously collected on Roan Mt. by *Gray & Carey, Smith, and Scribner*; fl. June to September. The autumnal flowers are usually smaller than the earlier ones.

**A. glabra**, MICHX. Glabrous, loosely matted, many-stemmed: stems weak, slender, suberect, very leafy, 6 to 12 inches high: leaves narrowly linear, spreading, thin, nerveless, equaling or exceeding the internodes: peduncles filiform, elongated, spreading, 1-flowered: corolla rather broad, considerably exceeding the calyx: sepals ovate-oblong, obtuse, nerveless,  $1\frac{1}{2}$  lines in length, somewhat exceeded by the ovoid capsule. — Fl. i. 274; Torr. & Gray, Fl. i. 180, in part. *Alsine glabra*, Gray, Man. ed. 2, 58; Chapm. Fl. 49. — On rocks in mountains of N. Carolina, *Michaux*, Table Mountain, *Gray*; S. Carolina, Table Rock, *Vasey*; Georgia, Stone Mt., *Gray*, De Kalb Co., *Small*; also apparently the same in the Arroyo of Lamben, near the Mexican boundary, *Parry*.

**A. brevifolia**, NUTT. Glabrous: stems erect, filiform, 2 to 5 inches high, with spreading branches: leaves linear or lance-linear, obtuse, nerveless, slightly fleshy, 1 to 4 lines long, commonly much shorter than the internodes: sepals ovate-oblong, obtuse, only a line in length, with a distinct thin white margin: petals rather conspicuous, obovate,  $2\frac{1}{2}$  to  $3\frac{1}{2}$  lines in length, widely spreading: capsule ovoid, acuminate, a third longer than the calyx; valves ovate, acuminately narrowed almost to the tip. — Nutt. in Torr. & Gray, Fl. i. 180. *Alsine*

*brevifolia*, Chapm. Fl. 49. — On rocks, Georgia, Tatnall Co., *Nuttall*, Stone Mountain, *Canby*, *Gray*, *Small*; fl. April, May. Apparently the most rare and local eastern species.

\* \* \* Terrestrial annuals of the Pacific Slope: sepals neither indurated nor very strongly nerved.

+ Seeds much flattened and margined.

**A. Douglásii**, FENZL. Thinly glandular-pubescent and somewhat viscid, or nearly glabrous: stems much branched, 2 to 15 inches high: leaves attenuate to filiform points: peduncles filiform: flowers numerous, larger than in the related species, 4 to 5 lines in diameter: sepals ovate, thin-margined, obscurely or more or less distinctly ribbed: petals obovate, conspicuous: capsule subglobose; valves rounded at the apex; seeds large, smooth, or with fine radiating striation, reniform, broadly margined. — Fenzl acc. to Torr. & Gray, Fl. i. 674; Durand, Pl. Pratt. 83; Brew. & Wats. Bot. Calif. i. 69; Greene, Fl. Francis. 124. *A. verna*,  $\beta$ , Hook. & Arn. Bot. Beech. 325. *Greniera Douglasii*, Gay, Ann. Sci. Nat. ser. 3, iv. 27. *Alsine tenella*, Torr. Bot. Mex. Bound. 36 (from char. and hab.). — Barren hillsides and grassy slopes, S. Arizona, *Palmer*, and S. California to Oregon, *Howell*, *Henderson*; fl. May, June. Some smaller flowered specimens with seeds of *A. Douglasii* have been collected by *Thurber* near San Diego, Calif.

+ + Seeds not flattened nor thin-margined.

**A. Howéllii**, WATSON. Finely glandular-pubescent: stem terete, purple, profusely branched, more than a foot high: leaves rather thick, obtuse, 4 to 7 lines in length; the floral much reduced: flowers  $2\frac{1}{2}$  to 3 lines in diameter: petals oblong, little exceeding the ovate glandular nerveless sepals: capsule ovoid, pointed; valves narrowed to an acutish apex; seeds dark, slightly tuberculate-crested. — Proc. Am. Acad. xx. 354. — Oregon, in the Coast Mts., near Waldo, *Th. Howell*, June 5, 1884.

**A. Californica**, BREWER. Smooth, with delicate filiform stems branching from the base, erect, 2 to 4 inches in height: leaves very short, slightly fleshy, 1 to 2 lines in length, obtuse: flowers 4 lines in diameter: petals oblong, about twice the length of the ovate-oblong nerveless or inconspicuously ribbed sepals: seeds small, finely roughened. — Brewer in Boland. Cat. 6; Brew. & Wats. Bot. Calif. i. 69; Greene, Fl. Francis. 124. *A. brevifolia*, var. (?) *Californica*, Gray, Proc. Calif. Acad. Sci. iii. 101. — Dry hills, sandy soil, Central California to Grant's Pass, Oregon, *Howell*; fl. March to May.

**A. pusilla**, WATSON. Smooth, very diminutive,  $1\frac{1}{2}$  to 2 inches high: stems purplish, filiform, branched from the base: leaves obtusish, only 1 to 2 lines in length: sepals not so strongly nerved as in the preceding, 1 to  $1\frac{1}{2}$  lines in length: petals minute or wanting: seeds minute, smooth. — Proc. Am. Acad. xvii. 367. *A. Californica*, Wats. Bot. Calif. ii. 435, not Brew. — Plains, N. California, about Yreka, *Greene*, to the Dalles of the Columbia, *Howell Bros.*; Washington, at White Salmon, *Suksdorf*, and Pullman, *Piper*, where said to be common along fences, etc.; fl. April, May. This species bears the closest habitual resemblance to *A. capillipes*, Boiss., of Spain, but lacks the minute pulverulence of that species.

\* \* \* \* Annuals or slender-stemmed loosely matted perennials, 5 to 15 inches in height: sepals lanceolate, acuminate or attenuate, strongly 3-5-nerved.

+ Puberulent, at least on the pedicels.

**A. tenella**, NUTT. Finely glandular-pubescent: stems very slender, dichotomously branched almost from the base, 3 to 8 inches in height: leaves attenuate from a connate prominently ribbed base to a filiform often curved apex, 3 to 5 lines long; the uppermost considerably reduced: pedicels filiform, several times as long as the strongly 3-ribbed sepals; the latter equalled or more or less exceeded by the oblong petals: valves of ovoid capsule exceeding the sepals; seeds small, margined with a fine muriculate crest (under a strong lens). — Nutt. in Torr. & Gray, Fl. i. 179; Eaton & Wright, N. A. Bot. 133 (excl. Arkansas spec.); Macoun, Bot. Gaz. xvi. 286; not Kit., which is wholly obscure. *A. tenuifolia*, var. *Americana*, Fenzl in Torr. & Gray, Fl. i. 674. *Greniera tenella*, Gay, Ann. Sci. Nat. ser. 3, iv. 27. *Alsine tenella*, Torr. Bot. Wilkes Exped. 243. — Rocky places, Oregon, *Nuttall*, *Tolmie*, *Hall*, *Howell*, to Brit. Columbia, at Kamloops, acc. to J. M. Macoun, and Nanaimo, *Miss Cooley*; fl. May to July. Like *A. Grænländica* of the Eastern States, this species seems to occur either in mats or in a segregated state. In the former condition it considerably resembles

*A. stricta*, Michx., but is to be distinguished by its small flowers and puberulent inflorescence. The habitually identical *A. tenuifolia*, L., of the Old World, has shorter petals and more slender capsules, distinctions which are none too strong.

**A. patula**, MICHX. Stems diffusely branched, 2 inches to a foot in height, often almost filiform: leaves spreading, slightly fleshy: inflorescence dichotomous; pedicels filiform, spreading: sepals lanceolate, attenuate, with 3 to 5 prominent converging nerves, slightly indurated, a little over 2 lines in length, usually minutely glandular: petals twice as long, entire or retuse, obcordate: the obtuse valves of the capsule about equalling the calyx; seeds black, minutely roughened. — Fl. i. 273; Torr. & Gray, Fl. i. 180; Gray, Man. ed. 5, 91; Hill, Bull. Torr. Club, xvii. 172; MacMillan, Bot. Gaz. xv. 332. *A. Pitcheri*, Nutt., and ? *A. tenella*, Nutt. l. c. 180, so far as Arkansas plants are concerned. *Alsine microsperma*, Fenzl, l. c. *A. patula*, Gray, Man. ed. 2, 58; Chapm. Fl. 49. *A. Pitcheri*, Wood, Class-Book, ed. of 1861, 260; Chapm. Fl. ed. 2, 608. *Stellaria macropetala*, Torr. & Gray, Fl. i. 184 (*Alsine macropetala*, Gray, Gen. Ill. ii. 34), differing only in the slightly more deeply divided petals, which are themselves more or less variable, must be referred here, where its identity of habit and calyx clearly indicates its affinity to be. — Kentucky to Florida (acc. to Chapman); Alabama, *Peters, Mohr*; Texas, *Drummond, Meyer, Buckley*; and Indian Terr., *Carleton* (acc. to Holzinger), northward to Chicago, *Babcock, Hill*, and Cass Co., Minnesota (acc. to MacMillan); fl. April to July. The leaves of this species are variable, more often narrowly linear or filiform, 4 to 7 lines in length, but occasionally  $1\frac{1}{2}$  inches long and a line wide.

+ + Glabrous.

**A. stricta**, MICHX. Smooth, loosely matted: stems numerous, slender, ascending, 3 to 15 inches high, leafy nearly to the middle: leaves subulate-setaceous, conspicuously fascicled in the axils: inflorescence a loosely forked cymose panicle: petals narrowly obovate, nearly twice the length of the somewhat rigid acuminate prominently 3-ribbed sepals: capsule about equalling or exceeding the calyx. — Fl. i. 274; Ell. Sk. i. 521; Hook. Fl. Bor.-Am. i. 99, t. 33 (including both var.  $\alpha$ , a weak boreal few-flowered form with erect leaves, and var.  $\beta$ , the common form with spreading leaves); Torr. & Gray, Fl. i. 179 (at least var.  $\beta$ ); Britton, Mem. Torr. Club, ii. 37. ? *A. setacea*, Muhl. Trans. Am. Phil. Soc. iii. 169. *A. Michauxii*, Hook. f. Arc. Pl. 287, 322. *Alsine Michauxii*, Fenzl, Verbreit. Alsin. 18; Regel, Bull. Soc. Nat. Mosc. xxxv. 232, t. 8, f. 1-5. — Rocky and gravelly soil, Vermont to S. Carolina, westward to the Black Hills, *Rydberg* (lax form), and (acc. to J. M. Macoun) to the Rocky Mts. of Brit. America; fl. May to July.

**Var. Texana**, ROBINSON. More rigid: stems fewer, 3 to 7 inches high, strongly enlarged at the nodes: leaves very short, conspicuously connate; the fascicled ones only 1 to 2 lines long: flowers in a small rather dense cyme: sepals almost cartilaginous, very strongly 3-nerved, appearing attenuate through the infolding of their margins. — Proc. Am. Acad. xxix. 302. ? *A. stricta*, var.  $\alpha$ , Torr. & Gray, Fl. i. 179. — Rocky Hills, Texas, *Gordon, Bigelow, Hall, Reverchon*; Arkansas, *Leavenworth*; Indian Terr., *Palmer*; Kansas, *Smythe*; and S. W. Missouri, *Blankinship*. A specimen from Potosi, Mo., coll. by *F. Peck*, exactly connects this variety with the type.

\* \* \* \* \* Perennials, closely matted or tufted, 1 to 6 inches in height: sepals acuminate, but not strongly nerved except in *A. verna*.

**A. verna**, L. Rather closely tufted: stems numerous, slender, ascending or erect, smooth, 1 to 5 inches high, 1-3 (or more)-flowered; the upper internodes commonly much exceeding the leaves: leaves linear-subulate, flat, rather strongly 3-nerved, usually erect and never squarrose: peduncles filiform: sepals ovate-oblong, acutish to acuminate, strongly 3-nerved,  $1\frac{1}{2}$  to  $1\frac{1}{4}$  lines long, exceeding the obovate or oblanceolate obtusish petals: capsule somewhat surpassing the calyx. — Mant. i. 72; Seringe in DC. Prodr. i. 405; Hook. Fl. Bor.-Am. i. 99; Torr. & Gray, Fl. i. 181. *A. juniperina*, Pursh, Fl. i. 318; Hook. Fl. Bor.-Am. i. 98; Torr. & Gray, Fl. i. 179, 674. *Alsine verna*, Bartl. Beitr. ii. 63. — A widely distributed æstival rather than vernal species (fl. June to August) with numerous but ill-defined varieties. The smooth typical form appears to be common in the Rocky Mts. of Brit. America, *Macoun*, and extends even as far southward as Colorado, *Wolf & Rothrock*. It has been found on Mt. Albert, Lower Canada, *Allen*. A far more frequent form is

**Var. hirta**, WATSON. Finely glandular-puberulent upon the stems, peduncles, and calyx: leaves nearly or quite smooth. — Bot. King Exp. 41; Porter & Coulter, Fl. Col. 14; Rothr. Enum. Pl. Col. 35. *A. hirta*, Wormsk. Fl. Dan. t. 1646. *A. propinqua*, Richards. in Frankl. 1st Journ. ed. i. 738 (reprint, p. 10). *Alsine verna*, var. *hirta*, Fenzl in Ledeb. Fl. Ross. i. 349. *A. rubella*, var. *hirta*, Lange, Pl. Græn. 132. *A. propinqua*, Lange, Fl. Dan. t. 2903. *A. hirta*, Warming, Bot. Foren. Festskr. 1890, 229. — From Greenland to Alaska, southward to Smugglers' Notch, Vt., Pringle, Eggleston, and along the Rocky Mts. to Arizona, Lemmon; also in the San Bernardino Mts., W. G. Wright.

**Var. rubella**, Hook. f. Depauperate, minutely glandular-puberulent or very rarely smooth: peduncles and sepals purplish tinged, the latter less strongly nerved. — Jour. Linn. Soc. v. 82. *A. Giesekii*, Hornem. Fl. Dan. t. 1518. *A. hirta*, var. *glabrata*, Cham. & Schlecht. Linnæa, i. 56. *Alsine rubella*, Schrenk in Fenzl, l. c. *A. verna*, var. *glacialis*, Fenzl fide Wats. Bibl. Index, 99. — Occurring with and often scarcely to be distinguished from the preceding.

**A. Róssii**, RICHARDSON, l. c. Dwarf and closely tufted, glabrous: leaves crowded, narrowly linear, 3-edged, obtusish, slightly fleshy: stems many, 6 lines to  $1\frac{1}{2}$  inches long, filiform, usually ending in a solitary peduncle, more rarely branched and several-flowered: sepals less attenuate than in the last, slightly fleshy, not at all rigid and scarcely or not at all ribbed, 1 to  $1\frac{1}{2}$  lines long: petals oblong, nearly equalling the calyx, often minute or none: capsule shorter than the calyx. — R. Br. in Parry, 1st Voy. App. 272; Hook. Fl. Bor.-Am. i. 100; Torr. & Gray, Fl. i. 181; Porter & Coulter, Fl. Col. 14. *A. elegans*, Cham. & Schlecht. Linnæa, i. 57. *A. stricta*, Wats. Bibl. Index, 98, in part, not of Michaux, nor Wahlenberg's *Alsine stricta* of the Old World, which is surely distinct. *Alsine Rossii*, Fenzl, Verbreit. Alsin. 18. — Mountains of Colorado, Hall & Harbour, Coulter, Wolf; Wyoming, Parry; ? S. Brit. America, Bourgeau, to Arctic America. A doubtful species not very satisfactorily separable from forms of the preceding.

**A. Nuttalli**, PAX. Glandular-puberulent or tomentulose throughout: root single, vertical, rather stout: stems many, loosely matted and much branched near the base; branches ascending or erect, leafy: leaves subulate-acerose, rigid, pungent, tending to be squarrosely spreading, connate, 3 to 4 lines long: flowers usually numerous in spreading cymes, rarely subsolitary: sepals attenuate, acuminate, often purplish, not strongly nerved, 2 to  $2\frac{1}{2}$  lines long, exceeding the more or less pointed petals and ovoid capsule. — Pax in Engl. Jahrb. xviii. 30. *A. pungens*, Nutt. in Torr. & Gray, Fl. i. 179; Wats. Bot. King Exp. 40; not Clem. *A. Nuttallii*, var. *gracilipes*, Jones, Proc. Calif. Acad. Sci. ser. 2, v. 626, from specimens cited, does not appear to differ materially from Nuttall's type. — Mountainous regions, S. Brit. Columbia to S. California, and eastward to Utah and Wyoming; fl. June to August.

**Var. gracilis**, ROBINSON. Sepals narrow, elongated and still more attenuate,  $2\frac{1}{2}$  to 3 lines long: leaves less rigid, scarcely spreading or pungent. — Proc. Am. Acad. xxix. 304. *A. pungens*, var. *gracilis*, Gray in herb.; Vasey & Rose, Contrib. U. S. Nat. Herb. i. 6. — California, mountains above Big Tree Grove, Bolander, Long Meadow, Tulare Co., Palmer, Coville & Funston. Intergrading with the typical form.

\* \* \* \* \* Densely caespitose perennials with acicular or awl-shaped leaves: sepals oblong or linear-oblong, very obtuse.

+ Alpine, boreal, or arctic species.

+ Petals oblong or narrowly obovate.

**A. Sajanénsis**, WILLD. Cespitose: stems finely but rather densely glandular-hirsute, decumbent, very leafy below and with age sheathed at the base with the dried persistent leaves; the upper more or less erect portion of the stems 6 lines to  $2\frac{1}{2}$  inches in length, bearing two or three pairs of short and rather distant more or less puberulent leaves, and terminating in 1 to 3 flowers; lower leaves linear, obtusish, rather rigid, erect, 2 to  $3\frac{1}{2}$  lines long, quite glabrous or ciliolate, less commonly glandular-pubescent, straight: segments of the calyx linear oblong, 1-3-ribbed, glandular-pubescent, 2 lines in length: petals spatulate, equalling or half exceeding the sepals, rarely almost twice as long (but narrower than in *A. arctica*): valves of the capsule linear-oblong, obtuse, often considerably exceeding the calyx. — Willd. in Schlecht. Berl. Gesell. Nat. Fr. Mag. vii (1816), 200; DC. Prodr. i. 408.

*A. thymifolia*, James, Cat. 181. *A. obtusa*, Torr. Ann. N. Y. Lyc. ii. 170. *A. biflora*, Wats. Bibl. Index, 94, not L. *A. arctica*, and vars. of various authors, not Stev. *Stellaria biflora*, L. Spec. i. 422. *Alsine biflora*, Wahlenb. Fl. Lapp. 128; Fenzl in Ledeb. Fl. Ross. i. 355.—Mt. Albert, Lower Canada, Allen, Macoun, to Labrador and Bering Strait, southward to Oregon, Cusick, and along the Rocky Mts. to New Mexico, Parry, and Arizona, Lemmon. (Greenland, Siberia.) A common species widely distributed in alpine and arctic regions of the Old and New World; fl. July, August. Of its numerous and confluent forms, seemingly due to individual environment, the following only need be mentioned: var. *RIGIDULA*, Robinson (Proc. Am. Acad. xxix. 305; *Alsine biflora*, var. *rigidula*, Fenzl, l. c.), with leaves erect, firm in texture and rather closely imbricated; and var. *CARNOSULA*, Robinson, l. c. (*Alsine biflora*, var. *carnosula*, Fenzl, l. c.), more flaccid, with leaves spreading and slightly fleshy.

**A. laricifolia**, L.? Slightly woody and much branched at the base: stems clothed with linear acicular secund ciliolate-denticulate leaves: fertile branches erect, simple, 4 to 7 inches in height, 2-5-flowered: sepals  $3\frac{1}{2}$  lines in length, linear-oblong, 3-nerved: petals oblong or narrowly obovate, entire, twice as long as the calyx. — Spec. i. 424. — An alpine European species at various times reported from Alaska, but still somewhat doubtful. Plants collected upon the Porcupine River by J. H. Turner certainly possess much resemblance to the European plant, but differ in their shorter sepals and less leafy stems. It is not unlikely that they may prove merely a tall and long-petalled form of the preceding polymorphous species.

++ ++ Petals broadly obovate, much exceeding the calyx: Alaskan.

**A. ártica**, STEV. Stems 1 to 3 inches long, glandular-pubescent: lower leaves narrow, linear, obtuse, slightly fleshy, crowded upon the bases of the stems, nearly or quite glabrous, sometimes slightly ciliated near the base, half a line in breadth; upper leaves a little broader; pairs rather distant: flowers solitary, terminal upon slender glandular-pubescent peduncles, 5 to 7 lines in diameter: capsule  $3\frac{1}{2}$  to 4 lines long, considerably exceeding the sepals: seeds minutely roughened and slightly crested. — Stev. in DC. Prodr. i. 404; Cham. & Schlecht. Linnæa, i. 54; Hook. Fl. Bor.-Am. i. 100 (excl. vars.); Torr. & Gray, Fl. i. 181, in part. *Alsine arctica*, Fenzl, Verbreit. Alsin. 18, & in Ledeb. Fl. Ross. i. 355; Regel, Bull. Soc. Nat. Mosc. xxxv. 219, 227 (excl. var. *breviscapa*). — W. and N. Alaska and adjacent islands.

**A. macrocarpa**, PURSH. Stems 2 to 4 inches long, covered except near the ends with the densely imbricated lance-linear obtuse conspicuously ciliated leaves; these three fourths line broad: flowers solitary, terminal, often exceeding half inch in diameter: valves of the mature capsule fully 6 lines in length; seeds slightly margined. — Fl. i. 318; Cham. & Schlecht. l. c. 55; Hook. l. c. 101; Torr. & Gray, l. c. 182, 675. *A. arctica*, var.  $\beta$  *grandiflora*, Hook. l. c. 100, t. 34, f. B. *Alsine macrocarpa*, Fenzl, Verbreit. Alsin. 18; Regel, l. c. 235, t. 8, f. 6-9; *A. arctica*, var. *breviscapa*, Regel, l. c. 228. — W. Alaska near the coast. (Siberia.) Regel's elaborate subdivision of the Siberian forms of this species is not warranted in America in the absence of abundant fruiting material.

+ + Species of the Atlantic and Gulf States, neither arctic nor alpine.

**A. Caroliniána**, WALT. Stems several to many, glandular-pubescent and viscid above, 3 to 8 inches in height, densely leafy near the base: leaves linear-subulate, rigidulous, pungent, triangular in section, channelled above; the lower imbricated and more or less squarrosely spreading; the upper reduced, distant: cymes few-flowered; pedicels slender, ascending: sepals oval,  $1\frac{1}{2}$  lines in length: petals broad, rounded at the apex. — Car. 141; Wats. & Coulter in Gray, Man. ed. 6, 85. *A. squarrosa*, Michx. Fl. i. 273; Ell. Sk. i. 520; Torr. Fl. N. Y. i. 95. *A. imbricata*, Raf. Med. Rep. hex. 2, v. 361, & in Desv. Jour. Bot. i. 229 (1808). *A. Rafinesquiana*, Seringe in DC. Prodr. i. 409. *Alsine squarrosa*, Fenzl in Gray, Man. ed. 2, 57; Gray, Gen. Ill. ii. 34, t. 111; Chapm. Fl. 49. — Pine barrens, S. New York to Florida; fl. June, July.

**13. SAGÍNA**, L. PEARLWORT. (Name from the Latin *saginare*, to fatten; the plants though small and delicate sometimes grow abundantly in otherwise barren regions and are grazed by sheep.) — Low slender herbs commonly cespitose

with filiform stems and subulate or filiform leaves. — Syst. Nat. ed. 1, & Gen. no. 336; DC. Prodr. i. 389; Reichenb. Ic. Fl. Germ. v. t. 200, 201; Gray, Gen. Ill. ii. 29, t. 109. — About a dozen species (chiefly of the temperate and frigid parts of the northern hemisphere) in much need of a general revision, the identity and distinctness of several Old World species being so doubtful that it is impossible to correlate with them the common forms of America.

\* Very slender, 2 to 5 inches high: the almost capillary stems several to many, subsimple from near the base, usually several-flowered; the lowest flowers distinctly axillary: leaves nearly filiform but flattened above, not proliferous in the upper axils nor forming sterile rosettes; the basal rosette seldom persisting: flowers small, 4-5-parted.

**S. apétala**, ARD. Commonly glandular-pubescent: stems not numerous, ascending or nearly erect; leaves  $1\frac{1}{2}$  to 3 or 4 lines in length, scarcely flat: pedicels straight: flowers normally 4-parted: petals minute and obovate or more often altogether wanting. — Animad. Alt. 22, t. 8; L. Mant. ii. 559; Fenzl in Ledeb. Fl. Ross. i. 338; Torr. & Gray, Fl. i. 177; Reichenb. l. c. t. 200. *S. procumbens*, var., Benth. Brit. Fl. 120. — Middle Atlantic States near the coast and doubtfully indigenous; Amherst, Mass., *Jesup*, to E. Pennsylvania, *Porter*, New Jersey, *C. E. Smith*, and formerly near Washington, D.C. (acc. to Ward). A form with elongated capillary stems is abundant in grassy situations near Hewitt's, Bergen Co., N. J., *Britton*; also at Berkeley, Calif., *Blankinship*. Specimens from Labrador, coll. *Allen*, referred to *S. apétala*, are probably only a stunted form of *S. procumbens*. Var. **BARBATA**, Fenzl (in Ledeb. Fl. Ross. i. 338), with leaves distinctly ciliated at the base, has been found (probably introduced) at Auburn, California, *Mrs. Ames*. *Alsinella ciliata*, Greene, from near Ione, Calif., which is ambiguously characterized in the Fl. Francis. 126, as a very slender and diffuse plant of compact habit, does not differ in its described characters from this. (Eu., Asia, &c.)

**S. decumbens**, TORR. & GRAY. Annual, quite smooth or with the younger parts slightly glandular: stems several, decumbent or sub-erect, 2 to 5 inches high, subsimple: the filiform straight peduncles exceeding the narrowly linear very acute leaves: flowers normally 5-parted: calyx appressed even in fruit, obtusish but not rounded at the base, two thirds the length of the valves of the capsule: petals (sometimes only 1 to 3 and rudimentary) scarcely equalling the sepals: stamens 3 to 10. — Fl. i. 177. *S. procumbens*, Pursh, Fl. i. 119. *S. Elliottii*, Fenzl in Gray, Man. ed. 2, 61. *S. subulata*, Torr. & Gray, l. c. 178, not Wimm. ? *Spergula nodosa*, Walt. Car. 142. *S. saginoides*, Michx. Fl. i. 276, not L. *S. decumbens*, Eil. Sk. i. 523. *S. subulata*, Hook. Fl. Bor.-Am. i. 93. — Dry sandy ground, New England to Great Plains of Brit. America, *Macoun*, southward to Florida and Texas; fl. March to June. Var. **SMITHII**, Watson (Bibl. Index, 105; Wats. & Coulter in Gray, Man. ed. 6, 89; *S. subulata*, var. *Smithii*, Gray, Man. ed. 5, 95), is a more slender nearly or quite apetalous form, found in the neighborhood of Philadelphia, *C. E. Smith*, Camden, *Parker*, Richmond Co., N. Y. (acc. to Hollick & Britton), S. E. Kentucky (acc. to Kearney), and probably elsewhere with and poorly distinguished from the type.

**S. occidentális**, WATSON. Annual, glabrous, with habit and foliage of the preceding species, but with longer pedicels (usually 7 to 10 or 12 lines in length) and larger also 5-parted flowers: capsule  $1\frac{1}{2}$  lines in length: calyx rounded at the base. — Proc. Am. Acad. x. 344. *S. procumbens*, Boland. Cat. 6; and perhaps Torr. Bot. Wilkes Exped. 242. *S. Linnei*, Gray, Proc. Am. Acad. viii. 378. *Alsinella occidentalis*, Greene, Fl. Francis. 125. — Low grounds and salt marshes of the coast, Vancouver Isl. to S. California; common; fl. spring. The western equivalent of *S. decumbens* and possibly intergrading with that species.

\* \* Flowering stems of lateral origin, spreading, 1 to 6 inches in length, procumbent; the unprolonged terminal axis bearing, close to the ground, a more or less persistent tuft or rosette of leaves: flowers normally 4-parted.

**S. procumbens**, L. Matted: the numerous procumbent leafy stems  $1\frac{1}{2}$  to 4 inches in length: leaves smooth or ciliate, narrowly linear, obtusish and mucronate: pedicels filiform, elongated, nodding at the summit during anthesis: petals considerably shorter than the sepals; the latter spreading in fruit. — Spec. i. 128; Torr. & Gray, Fl. i. 177. — Moist rocks,



also in paths, etc., Newfoundland to Pennsylvania, and (acc. to Chapman) N. Carolina; also rarely inland as far as Michigan, *Hill*; fl. through the summer. (Eu., Asia, S. Amer.) Specimens with petals obsolete or wanting do not seem to be rare. Dwarfed specimens from Labrador, coll. *Allen*, may also be of this species.

\* \* \* Stems very short, 4 lines to 2 inches long: flowers rather small, 5-parted, terminal: leaves thickish, narrowly linear to subulate, not proliferous in the upper axils but commonly forming sterile rosettes about the base.

**S. Linnæi**, PRESL. Matted, 1 to 3 inches high: stems slender, decumbent, rooting and often producing lateral rosettes: radical leaves narrowly linear, mucronate, 3 to 7 lines long, forming dense and mostly persistent rosettes; cauline leaves short, few: pedicels long, filiform, commonly recurved at the summit; flowers moderately large for the genus: petals not quite equalling the calyx: capsule ovate, conic, even before dehiscence considerably exceeding the sepals; the dry valves fully twice their length: stamens 5 to 10. — *Rel. Haenk.* ii. 14 (*Linnei*); *Fenzl in Ledeb. Fl. Ross.* i. 339; *Wats. Bot. King Exp.* 41. *S. saxatilis*, *Wimm. in Lange, Pl. Grœn.* 133. *S. saginoides*, *Britton, Mem. Torr. Club*, v. 151. *Spergula saginoides*, *L. Spec.* i. 441. *Alsinella saginoides*, *Greene, Fl. Francis.* 125. — Labrador (?) to Greenland, Alaska, and southward in mountainous regions to New Mexico and S. California, *Palmer, Parish.* (Widely distributed in the Old World.)

**S. nivâlis**, FRIES. Very condensed, one half to one inch high: leaves subulate, or linear-subulate, 2 to 3 (rarely 5) lines long, forming one or more dense rosettes; cauline leaves few and short: pedicels spreading, 5 lines in length, straight or curved but scarcely ever hooked at the summit: petals equalling the purple-edged sepals, about a line in length. — *Mant.* iii. 31; *Hook. f. Arc. Pl.* 287, 322; *Babington, Jour. Bot.* ii. 340; *Wats. Bot. King Exp.* 42. *S. intermedia*, *Fenzl, l. c.* *Arenaria caespitosa*, *Vahl, Fl. Dan.* t. 2289. — A rare plant, first collected in America by *Dr. Watson* in the Uinta Mts. in 1869 (*U. S. Nat. Herb.*); since found in Alaska, without the exact locality, *Dall*; *Kyska Harbor, Harrington*; and also in the Rocky Mts. of Colorado near *Gray's Peak, Patterson.* (Greenland, N. Eu.) The species has been regarded by some authors, and perhaps rightly, as a boreal or high alpine form of the preceding.

\* \* \* \* Distinctly fleshy: stems not filiform, more or less branched, several-flowered: flowers 5-parted: species of the Pacific Coast.

**S. crassicaulis**, WATSON. Smooth: stems several or many, branching, 1½ to 5 inches long: leaves linear, pungent, thickish, 2½ to 7 (rarely 12) lines long; the basal forming a rosette which may persist or not; the cauline connate by broad scarious membranes: pedicels numerous, straight: petals and sepals subequal, 1½ lines in length: capsule one third to one half longer. — *Proc. Am. Acad.* xviii. 191. *S. occidentalis* (?), *Henderson* (on authority of *Dr. Watson*), *Zoe*, ii. 260. *Alsinella crassicaulis*, *Greene, Fl. Francis.* 125. — *Beaches, California, Marin Co., Congdon, Monterey Co., Michener & Bioletti, Tomales Bay, Blankinship, to Washington, Ilwaco, Henderson, and Vancouver Isl., acc. to J. M. Macoun.* Distinguished from the Japanese *S. maxima*, *Gray*, by its glabrous peduncles and calyx.

\* \* \* \* Stems simple, 2 to 6 inches in length: upper leaves short, proliferous, i. e. bearing fascicles of minute leaves in their axils: flowers 5-parted: petals exceeding the calyx: species of the Atlantic Slope, Great Lakes, and Hudson Bay region.

**S. nodosa**, FENZL. Perennial: stems several to many, decumbent, rooting at the base, often 5 to 6 inches in length: lower leaves filiform; the upper subulate, only a line in length, bearing a tuft of undeveloped leaves in the axils, thus giving a nodose appearance to the slender stems: flowers terminal, large for the genus, 4 lines in diameter when expanded. — *Verbreit. Alsin.* 18, & in *Ledeb. Fl. Ross.* i. 340. *Spergula nodosa*, *L. Spec.* i. 440; *Fl. Dan.* t. 96. — Moist sandy soil, along the Atlantic Coast from Labrador (acc. to *Macoun*), to Cape Ann, *J. Robinson*; *Anticosti, Pursh*; also on both shores of Lake Superior and northward to Hudson Bay, *Burke*; fl. July, August. The most conspicuous and attractive species of the genus.

14. SPERGULARIA, J. & C. Presl. (Name a derivative of *Spergula*.)

— Annuals, biennials, or perennials, usually of maritime or saline habitat, with

narrowly linear often fleshy leaves. — Fl. Čech. 94; Gray, Gen. Ill. ii. 27, t. 108; Benth. & Hook. Gen. i. 152. *Arenaria*, L. Gen. no. 374, in part. *Arenaria* § *Spergularia*, Pers. Syn. i. 504. *Corion*, Mitchell, Act. Phys. Med. Acad. Nat. Cur. viii. App. 208; N. E. Brown, Eng. Bot. ed. 3, Suppl. 47. *Tissa*, Adans. Fam. ii. 507; Baillon, Hist. Pl. ix. 116; Britton, Bull. Torr. Club, xvi. 125; Greene, Fl. Francis. 126, & Man. Bay-Reg. 35. *Buda*, Adans. l. c.; Dumort. Fl. Belg. 110; Wats. & Coulter in Gray, Man. ed. 6, 89. *Lepigonum*, Fries, Fl. Hall. 76; Kindberg, Monogr.; Leffler, Öst. Bot. Zeitschr. xix. 101–106; Wats. Bibl. Index, 103. — A genus of moderate size but difficult, through the natural variability of the commoner species, the inconstancy of characters (such as the form of the seeds) which elsewhere are most trustworthy, and finally through an unfortunate complication in the synonymy, arising both from the most diverse views as to the number and proper limitation of the species and from the differences in the choice of the generic name. The designation here adopted is the one which has been most widely used, is now employed by most English and Continental authors (except the Scandinavians), and has had the recent indorsement of the botanists of the Royal and Imperial Gardens of Kew and Berlin. In limiting the species, the usually practical criterion of non-confluence would lead, if rigidly enforced in this group, to a general reduction of the commoner forms to one polymorphous species of widely diverse varieties. Greater clearness can certainly be attained by retaining as species a moderate number of oft-recurring and usually distinguishable types, notwithstanding the frequent occurrence of intermediates or local intergradation.

*S. MIQUELONÉNSIS*, Lebel (Bull. Soc. Bot. France, xv. 58; *Arenaria Miquelonensis*, La Pylaie, *ibid.*), never properly described, is obscure. It may well be *S. salina* or perhaps *S. borealis*.

\* Procumbent or decumbent, slender, scarcely or not at all fleshy: flowers of medium size: petals rose-lilac: stipules lanceolate, elongated, conspicuous and silvery.

**S. rúbra**, J. & C. PRESL, l. c. Smoothish below but finely and often copiously glandular-pubescent above: stems spreading, wiry: leaves flat or slightly grooved on both surfaces, narrowly linear, cuspidate, 4 to 6 lines long, a third line broad: stipules attenuate, 2 to 3 lines long: inflorescence racemiform; pedicels truly filiform, exceeding the foliaceous bracts and about twice as long as the oblong-lanceolate scarious-margined acutish glandular-pubescent sepals: corolla  $1\frac{1}{2}$  lines in diameter, scarcely equalling the calyx: capsule of the same length as the sepals; seeds pear-shaped, and minutely crested but not winged. — Gray, Gen. Ill. ii. 28, t. 108, & Man. ed. 1, 64, excl. var. *S. rubra*, var. *campestris*, Gray, Man. ed. 5, 95. *S. campestris*, Aschers. Fl. Prov. Brandenb. 94. *Arenaria rubra*, L. Spec. i. 423, excl. var.  $\beta$ ; Bigel. Fl. Bost. 108; Hook. Fl. Bor.-Am. i. 98. *Lepigonum rubrum*, Wahlb. Fl. Gothob. 45 (excl. var. *perennans*). *Buda rubra*, Dumort. Fl. Belg. 110. *Spergula rubra*, Torr. & Gray, Fl. i. 175, excl. vars. *Tissa rubra*, Britton, Bull. Torr. Club, xvi. 127, as to eastern plant. — An attractive species, growing about paths and in dry sandy soil, occasionally on sea-beaches, Newfoundland to Virginia and Ohio, common on or near the coast, but less frequent in the interior. (Eu.) Perhaps not indigenous.

**Var. perennans**, ROBINSON, n. comb. More fleshy and forming large mats: root stout, biennial or perennial: internodes shorter: leaves shorter and broader, 3 to 4 lines in length, half line in breadth: inflorescence denser. — *Tissa rubra*, var. *perennans*, Greene, Pittonia, ii. 229. ? *Lepigonum rubrum*, var. *perennans*, Kindb. l. c. 40. — Common on the Pacific Slope from Washington, *Suksdorf*, and Idaho, *Miss Mulford*, to Central California. (N. Eu.?) There appear to be no technical differences of flower or fruit between this variety and the Atlantic form, yet the two can in general be readily distinguished by their foliage. The

eastern form also when growing on the sea-shore sometimes has a stoutish, perhaps perennial root.

**S. Clevelandi**, ROBINSON. Perennial, viscid-glandular: leaves ascending, conspicuously fascicled in the axils, almost terete and filiform, very acute and attenuate, 5 to 10 lines in length: flowers much as in the last, but often somewhat larger: seeds winged. — Proc. Am. Acad. xxix. 310. *Tissa villosa*, Britton, l. c. 129. *T. Clevelandi*, Greene, Fl. Francis. 127. *T. rubra*, K. Brandegee, Zoe, iv. 84. — Sandy soil, California, San Diego, *Cleveland*, Mrs. Brandegee; San José, Mrs. Bush; and at the Presidio, San Francisco, *Jepson*. Differing from the S. American *S. villosa*, Cambess., in its lower growth, distinctly smaller flowers, shorter pedicels, and somewhat firmer and less flaccid leaves.

\* \* Slender spreading or erect annuals of the West and Southwest, scarcely fleshy, and with short deltoid stipules.

— Corolla roseate (or white?), more than half as long as the sepals.

**S. salsuginea**, FENZL. Viscid-pubescent to nearly glabrous: leaves not fascicled, linear-filiform: pedicels slender, about 2 lines long, spreading or deflexed: sepals in fruit  $1\frac{1}{2}$  lines long, but little exceeded by the capsules: upper leaves much reduced, those in the higher parts of the almost naked inflorescence not exceeding their scarious stipules: stamens usually only 2 to 3. — Fenzl in Ledeb. Fl. Ross. ii. 166. *S. diandra*, Boiss. Fl. Orient. i. 733. *Arenaria diandra*, Guss. Prodr. Sic. i. 515. *A. salsuginea*, Bunge in Ledeb. Fl. Alt. ii. 163; Ledeb. Ic. t. 409. (Siberia.)

**Var. bracteata**, ROBINSON, n. var. Closely simulating the Asiatic type in habit, pubescence, flowers, fruit, and seeds: inflorescence leafy; even the uppermost bracts considerably exceeding their stipules. — *S. diandra*, Robinson, Proc. Am. Acad. xxix. 310. *Tissa diandra*, Britton, Bull. Torr. Club, xvi. 128. — Sandy banks, Texas, *Drummond*, *Lindheimer*; Oregon, *Henderson*; Washington, *Suksdorf*. Decidedly less fleshy in stems and leaves than *S. salina*. Doubtful specimens from Central California, coll. Mrs. Brandegee, are transitional to *S. tenuis*.

— — Flowers very small: corolla much reduced, consisting of 1 to 3 minute petals, or wanting.

**S. Platensis**, FENZL. Low, glabrous, 2 to 6 inches in height, diffusely branched: leaves a third to one inch in length: stipules deltoid: flowers small, subglobose, 1 to  $1\frac{1}{4}$  lines in diameter, not closely aggregated; pedicels 2 to 3 lines long: sepals elliptic-ovate, a line or less in length, thick in the middle but scarious-margined: valves of the capsule a third to half longer than the sepals; seeds angled, somewhat triangular in outline, finely but distinctly roughened. — Ann. Wien. Mus. ii. 272. *S. gracilis*, Robinson, l. c. 311. *Balardia Platensis*, Cambess. in St. Hil. Fl. Bras. Merid. ii. 180, t. 111. *Lepigonum gracile*, Wats. Proc. Am. Acad. xvii. 367. *Tissa gracilis*, Britton, Bull. Torr. Club, xvi. 128. — Sandy ground, dried ponds, etc., Dallas, Texas, *Reverchon*, to S. California, *Parry*, *Nevin*, *Orcutt*. (S. Brazil, whence perhaps introd.)

**S. tenuis**, ROBINSON, l. c. Dichotomously much-branched, becoming 8 to 10 inches in height, somewhat glandular-puberulent or pubescent above: leaves 6 to 10 lines long: the very numerous flowers short-pedicelled, the uppermost sessile in close groups: bracts inconspicuous: stamens 2 to 5: capsule twice the length of the ovate-oblong sepals. — *Lepigonum tenue*, Greene, Pittonia, i. 63. *Tissa tenuis*, Greene in Britton, l. c. *T. diandra*? K. Brandegee, Zoe, iv. 84. — California near Alameda, *Greene*, *Williams*, Colusa Co., Pt. Costa, and Tulare, Mrs. Brandegee. A species characterized by its copious branching, small closely aggregated flowers, and reduced corolla, yet doubtless intergrading with *S. salina*, of which it may be merely a soil variation. **Var. involucreta**, Robinson, n. var. Heads of closely aggregated flowers, even at full maturity subtended and exceeded by 2 to several foliaceous bracts. — Mt. Eden, Calif., Mrs. Brandegee, growing with and passing into the typical form.

\* \* \* Annuals or biennials, more decidedly fleshy, usually of maritime or saline habitat: flowers of medium size: corolla more or less conspicuous, white or pink, less frequently pink-purple: stipules ovate or deltoid, scarious but not conspicuous or silvery.

**S. salina**, J. & C. PRESL. Commonly although not always pubescent: leaves often fascicled in the axils: sepals ovate to oblong-lanceolate, narrowed upward although obtuse at the

summit, 2 to 2½ lines long: flowers axillary in dichotomous racemes: petals pink: capsule equalling or a third to half longer than the calyx: seeds minute, turgid, obovate, usually roughened, less frequently almost or quite smooth (*Buda marina*, var. *leiosperma*, N. E. Brown, acc. to Wats. & Coulter in Gray, Man. ed. 6, 90; *Corion marinum*, var. *leiosperma*, N. E. Brown, Eng. Bot. ed. 3, Suppl. 48). — Fl. Čech. 95; Gray, Man. ed. 5, 95; Warming, Bot. Foren. Festschr. 1890, 238, f. 20. *S. Canadensis*, Don, Syst. i. 426. *S. rubra*, var. *marina*, Gray, Man. ed. 1, 64. ? *S. Miquelonensis*, Lebel, Bull. Soc. Bot. France, xv. 58. *S. media*, and var. *macrocarpa*, Gray, Man. ed. 5, 95. *Arenaria marina*, Bigel. Fl. Bost. 109; ? *A. Miquelonensis*, La Pylaie in Lebel, l. c. *Lepigonum salinum*, Fries, Mant. iii. 34. *L. medium*, Wats. Bibl. Index, 103, in great part. *Tissa marina*, Britton, l. c. 126. *T. salina*, Greene (not Britton), Fl. Francis. 128, incl. var. *sordida*, a form with copious glandular pubescence and dense secund racemes, and var. *Sanfordi*, scarcely viscid and looser flowered. *T. sparsiflora*, Greene, Erythea, iii. 47, a form with more elongated leafy-bracted inflorescence, yet freely passing to the usual form. — Common on both the Atlantic and Pacific coasts, also occurring upon the Gulf coast, and not infrequent about salt lakes and in alkaline regions of the interior, especially westward.

**Var. (?) minor**, ROBINSON, l. c. Smaller, 2 to 3 inches high: flowers smaller and very numerous, on short pedicels (¾ to 2 lines in length) and consequently rather densely aggregated. — *Buda marina*, var. ? *minor*, Wats. & Coulter in Gray, Man. ed. 6, 90. — Coast of New Hampshire and Massachusetts. An ambiguous form suggesting the western *S. tenuis*, but smaller and with a better developed corolla.

- S. borealis**, ROBINSON, l. c. More slender and in well developed specimens more diffusely branched than the last preceding species, 2 to 5 inches high, usually glabrous: leaves seldom fascicled; stipules ovate, broader than long, obtuse or obtusish: sepals ovate, 1 to 1½ lines long, very obtuse: petals white or roseate: capsule ovate-oblong, usually almost or quite twice as long as the calyx; seeds generally wingless and nearly or quite smooth, a half line in diameter, about twice as large as in *S. salina*. — *Arenaria rubra*, β, Michx. Fl. i. 274. (Dr. Britton, who has examined the type of Michaux's variety, pronounces it identical with this species.) *A. Canadensis*, Pers. Syn. i. 504, the oldest specific name, but not to be selected for use under *Spergularia*, since *S. Canadensis* has been employed by Don, Syst. i. 426, for a "pilose" and "rather hispid" plant, extending from "Canada to Carolina" and being doubtless *S. salina*, Presl. *Lepigonum medium*, Wats. Bibl. Index, 103, in part. *Tissa salina*, Britton, l. c. 127. *T. Canadensis*, Britton, Mem. Torr. Club, v. 152. *Buda borealis*, Wats. & Coulter in Gray, Man. ed. 6, 90. — Beaches and tidal marshes, Labrador to Wells, Maine, Deane; also on Cape Cod at Dennis, Rev. C. N. Brainerd.

\* \* \* Stout and fleshy perennials: flowers large.

- S. média**, PRESL. Root stout, perpendicular, giving off numerous accessory fibres: stems fleshy, decumbent, ascending: pedicels commonly exceeding the flowers, deflexed; racemes short-bracted, secund: petals rose-lilac: sepals rather broadly ovate-oblong, obtusish, about two thirds the length of the capsules; the latter ovoid, becoming 3½ lines long; seeds often broadly winged. — Fl. Sic. p. xvii. & in Griseb. Spicil. Fl. Rumel. i. 213. *S. marginata*, Kitt. Taschenb. ed. 2, 1003; Garcke, Fl. Deutschl. ed. 17, 96. *S. marina*, Griseb. l. c. *Arenaria rubra*, var. *marina*, L. Spec. i. 423, in great part, *fide* Leffler. *Lepigonum marinum*, Wahlb. Fl. Gothob. 45, "et Auctores Scand. omnes!" *fide* Leffler. — Near Salina, New York, Fry (herb. N. Y. Bot. Garden), and Saucelito, Marin Co., Calif., Mrs. Brandegee (herb. Calif. Acad. Sci.). A species now generally recognized under some name by European authors. Although difficult of technical limitation on the side of *S. salina*, it can in general be readily distinguished by its stouter root and much larger flowers and seeds. From the following it differs in its relatively broader sepals and well exerted capsule.
- S. macrotheca**, HEYNH. Smooth to densely glandular-tomentose: root large: stems spreading, ascending, 8 to 15 inches in height: leaves linear, acute, mucronate, 8 lines to 2 inches in length, about a line in breadth; internodes more or less developed, usually 6 lines to 1 inch long: floral bracts resembling the leaves: inflorescence inclined to be racemiform; pedicels 4 to 12 lines in length, spreading or more or less deflexed: sepals lanceolate, acutish or subacuminate to an obtuse point, thick in the middle, nearly smooth or viscid-glandular, conspicuously membranous-margined: petals roseate, shorter than the sepals: capsule oblong-ovoid, acutish, about equalling the calyx. — Nomencl. ii. 689, *fide* Hook. f. & Jackson,

Index Kew. ii. 956; Robinson, l. c. 312. *Arenaria macrotheca*, Hornem. in Cham. & Schlecht. Linnæa, i. 53. *Lepigonum macrothecum*, Fisch. & Mey. Ind. Sem. Hort. Petrop. iii. 14; Kindberg, Monogr. 16, t. 1, f. 1; Wats. Bibl. Index, 103. *L. Chilense*, Fisch. & Mey. l. c. *Spergularia rubra*, Torr. Pacif. R. Rep. iv. 70. — California, chiefly on or near the coast. A polymorphous species, the varieties of which, although diverse in aspect, appear in a large series of specimens to be thoroughly connected by intermediates.

**Var. leucántha**, ROBINSON, l. c. Erect or nearly so, more slender, with long internodes: leaves somewhat narrower and more erect than in the type: floral bracts reduced and inflorescence more distinctly cymose; pedicels elongated, slender, rather rigidly spreading or deflexed: corolla white or rose-lilac, nearly 6 lines in diameter. — *Tissa leucantha*, Greene, Fl. Francis. 127. — A variety of alkaline regions of the interior of California, from Mendocino Co., Brandegee, and Solano Co., Mrs. Brandegee, Miss Eastwood, to San Bernardino Co., Parish.

**Var. scariósa**, ROBINSON, l. c. Low, pale, smoothish near the base, and often very glandular-viscid above, densely leafy; the internodes scarcely or not at all developed: leaves 4 to 6 lines long, acute; stipules conspicuous, ovate-lanceolate, acuminate, 3 to 5 lines long: inflorescence racemiform; pedicels not greatly exceeding the calyx: flowers inclining to be smaller and more numerous than in the type. — *Tissa macrotheca*, var. *scariosa*, Britton, Bull. Torr. Club, xvi. 129. *T. pallida*, Greene in Britton, l. c., & Fl. Francis. i. 127. — Coast of California at Monterey, Torrey, Hooker & Gray, Tidestrom, Fort Point, Brandegee, and at Lime Point, Marin Co., Miss Eastwood. *T. valida*, Greene (Erythea, i. 107), from the Island of Sta. Cruz, appears to be a firmer and more erect form of the same thing, also pale and very viscid, but with more elongated internodes and distinctly dichotomous cymose inflorescence.

**15. SPÉRGULA**, L. SPURRY. (Name from the Latin *spargere*, to strew, in reference to the scattering of the numerous seeds.) — Annuals with narrowly linear slightly fleshy apparently whorled leaves; one species common in America, having probably been introduced with grain from the Old World. — Syst. Nat. ed. 1, & Gen. no. 375; Reichenb. Ic. Pl. Crit. vi. t. 511–513.

**S. ARVÉNSIS**, L. A foot or two high: leaves numerous in rather remote whorls: inflorescence a terminal naked spreading cymose panicle; pedicels often deflexed in fruit: petals white, equalling or slightly exceeding the sepals, 2 to 2½ lines long: capsule ovate-globose; seeds black, minutely roughened with light-colored papillæ, acutely edged but scarcely winged. — Spec. i. 440; Walt. Car. 142; Eng. Bot. t. 1535; Pursh, Fl. i. 320; Hook. Fl. Bor.-Am. i. 92; Torr. & Gray, Fl. i. 174; Rothr. Pl. Alask. 444. *S. ramosissima*, Dougl. in Torr. & Gray, l. c. — Grain fields and cultivated ground, common, United States and Canada, northward to Alaska. (Introd. from the Old World.)

**16. DRYMÁRIA**, Willd. (Name from *δρυμός*, an oak copse; some species having been supposed to prefer that habitat.) — Willd. in Rœm. & Sch. Syst. v. p. xxxi.; HBK. Nov. Gen. & Spec. vi. 21, t. 515, 516; DC. Prodr. i. 395; Wats. Bibl. Index, 102, & Proc. Am. Acad. xvii. 327–329. — A group of low diffusely branched plants, chiefly of the New World, and attaining its maximum development in Mexico. Our species are weak annuals.

\* Cauline leaves rather broadly ovate.

**D. FÉNDLERI**, WATSON. An erect annual, 2 to 10 inches high: stems, peduncles, and petioles finely glandular-pubescent: leaves membranaceous, reniform-ovate, subcordate, abruptly acuminate, nearly smooth, 4 to 5 lines long, on slender petioles half their length: flowers aggregated in terminal fascicles or solitary in the forks: sepals herbaceous, lanceolate, acuminate, 1–3-nerved. — Proc. Am. Acad. xvii. 328. *D. cordata*, Gray, Pl. Fendl. 13; not Willd. *D. glandulosa*, Gray, Pl. Wright. ii. 18; Torr. Pacif. R. Rep. iv. 70, & Bot. Mex. Bound. 37. — New Mexico and Arizona; fl. August, September.

**D. holosteoides**, BENTH. Prostrate, smooth or puberulent, somewhat glaucous: stems numerous, each bearing 2 to 3 remote fascicles of leaves and flowers: leaves appearing qua-

ternate, ovate, obtuse, thickish, 3-5-nerved, 3 to 6 lines long, rather abruptly contracted into slender petioles 2 to 3 lines in length: pedicels equalling or slightly exceeding the petioles, 1-flowered: sepals obtusish,  $1\frac{3}{4}$  lines long, with conspicuous membranous margins: seeds black, of rather irregular form, with broad thin cotyledons incumbent upon the curved radicle. — Bot. Sulph. 16; Wats. Bibl. Index, 103; Brandegee, Zoe, ii. 68, 69 (where properly distinguished from *D. crassifolia*). *D. crassifolia*, Vasey & Rose, Contrib. U. S. Nat. Herb. i. 66; Brandegee, Proc. Calif. Acad. Sci. ser. 2, ii. 131, not of later publications. *D. Veatchii*, Curran, Proc. Calif. Acad. Sci. ser. 2, i. 227. *Mollugo verticillata*, var., Coulter, Contrib. U. S. Nat. Herb. i. 39. *M. Cambessedesii*, Coulter, l. c. ii. 138. — W. Texas, in dry bed of Tarlinga Creek, *Havard*, Limpia Cañon, *Nealley*. (Lower Calif., *Brandegee*, *Palmer*.)

*D. CRASSIFOLIA*, Benth. l. c. (Brandegee, Zoe, ii. 68, 69), is a nearly related probably perennial species of Lower California (coll. *Hinds*, *Xanthus*, *Brandegee*), differing in its more condensed habit, thicker and more glaucous broadly rhombic-ovate or suborbicular leaves and more regular seeds with narrower cotyledons.

*D. POLYCARPOIDES*, Gray (Pl. Fendl. 12), of Northern Mexico, may attain our southwestern borders. It resembles *D. holosteoides* and *D. crassifolia*, but has scarcely petioled ovate-lanceolate leaves. (Mex., *Gregg*, *Palmer*.)

\* \* \* Cauline leaves linear, pseudoverticillate.

*D. sperguloïdes*, GRAY. Covered with a fine grayish pubescence or quite glabrous: radical leaves spatulate, fugacious: stem erect, with spreading branches and pseudoverticels of 4 to 8 sessile narrow obtuse slightly fleshy leaves: inflorescence diffuse; flowers slender-pedicelled. — Pl. Fendl. 11, & Pl. Wright. ii. 19; Torr. Bot. Mex. Bound. 37. — Cornfields, etc., Texas, near Presidio del Norte, *Parry*; New Mexico, *Fendler*, *Wright*; Arizona, *Palmer*, *Lemmon*.

*D. viscosa*, Watson (Proc. Am. Acad. xxii. 469), of N. Lower Calif., if it reaches S. California, may be distinguished from the preceding by its prostrate habit and smaller nearly sessile and very viscid flowers. (Lower Calif., *Orcutt*, *Palmer*.)

\* \* \* Cauline leaves linear, opposite: stems erect, delicate, much branched: flowers short-pedicelled in the forks of a diffuse inflorescence.

*D. effusa*, GRAY. Viscid, especially upon the upper part of each internode: radical leaves obovate, seldom persisting; cauline very narrowly linear, obtuse: sepals elliptic, obtuse or scarcely acute, not distinctly ribbed, considerably exceeded by the petals. — Pl. Wright. ii. 19; Torr. Bot. Mex. Bound. 37. — Mountainous districts, New Mexico, *Wright*; Arizona, *Rothrock*, *Lemmon*. (Adj. Mex., *Thurber*.)

*D. tenella*, GRAY. In size and habit closely resembling the preceding, but glabrous and not viscid: sepals acutish, rather strongly ribbed, a line in length, about equalling the petals. — Pl. Fendl. 12, & Pl. Wright. ii. 19. — Shady places, woodland, New Mexico, *Fendler*, *Wright*, *Greene*. (Adj. Mex., *Pringle*.)

*D. nodosa*, Engelm. in Gray, Pl. Fendl. 12, of Mexico, is a third closely related species, but has glandular stems, and somewhat larger flowers with attenuate rather rigid sepals ( $1\frac{1}{2}$  to 2 lines long).

17. POLYCARPON, [Læfl.] L. (Πολύς, much, many, and καρπός, fruit, from the innumerable capsules.) — Flowers numerous, cymose, very small. — Syst. Nat. ed. 10, 881, later ascribed by Linnæus (Gen. ed. 6, no. 105) to Læfling; DC. Prodr. iii. 376; Torr. & Gray, Fl. i. 173. *Polycarpa*, Læfl. It. 7, the earliest name but not characterized. — A small genus of low much-branched annuals.

*P. UNIFLÓRUM*, Walt. (Car. 83), is obscure. It may well have been *Arenaria alsinoides*. Described as pentapetalous, it certainly cannot have been *Sesuvium Portulacastrum*, to which it has been of late referred.

*P. TETRAPHÝLLUM*, L. Nearly or quite smooth: stems 2 to 6 inches long, prostrate or ascending: leaves quaternate or opposite, oblong or obovate, obtuse,  $2\frac{1}{2}$  to 6 lines long, abruptly narrowed to short petioles: stipules and bracts scarious, acuminate, the latter equalling the rather sharply carinate sepals: petals white. — Syst. Nat. ed. 10, 881, & Spec. ed. 2, i. 131;

Eng. Bot. t. 1031; Ell. Sk. i. 182. — Introduced in S. Carolina near Charleston and at Camden, *Curtis*; also naturalized in California, Napa Co., *Jepson*, and Solano Co., *Bioletti*; and occasionally found on ballast in the Middle Atlantic States. (Introd. from the Old World, where widely distributed.)

**P. depréssum**, NUTT. Smaller: stems numerous, 1 to 2 inches long: leaves opposite, spatulate, obtuse, attenuate to slender petioles: bracts much shorter than the scarcely carinate sepals: petals very narrow or subfiliform: capsule spherical. — Nutt. in Torr. & Gray, l. c. 174; Brew. & Wats. Bot. Calif. i. 71. — Sandhills, S. California, near San Diego, *Nuttall*, *Cleveland*, near San Bernardino, *Lemmon*, *Parish*, also on Sta. Barbara and Sta. Catalina Ids., *Brandegee*. (Lower Calif., *Orcutt*, *Palmer*.)

**18. LÖEFLÍNGIA**, L. (Dedicated to *Peter Læfving*, a Swedish traveller and naturalist, born 1729.) — Small spreading glandular somewhat rigid annuals, with subulate inconspicuous leaves and sessile solitary or more commonly fasciculate greenish flowers. — Spec. i. 35; Lœfl. It. 162; DC. Prodr. iii. 380.

\* Outer sepals provided with lateral teeth.

**L. Texána**, HOOK. Branching from near the base: branches 4 to 6 inches long: flowers chiefly borne upon short secund and somewhat recurved branchlets: sepals straight or slightly curved: stamens in the flowers examined 3 (5 acc. to Hooker and Gray): seeds rather broadly obovate. — Ic. t. 285 (text with t. 275); *Brandegee*, *Zoe*, i. 219. *L. squarrosa*, Torr. & Gray, Fl. i. 674; Gray, Gen. III. ii. 23, t. 106 (figs. 7 and 8 representing the seed too narrow and with cotyledons incumbent instead of accumbent as is the case); Coulter, Contrib. U. S. Nat. Herb. ii. 31. — Central and Eastern Texas, *Drummond*, *Wright*, *Hall*; northward to Nebraska, *Webber* (acc. to Britton). Differing slightly, but as it appears constantly, from the following.

**L. squarrósa**, NUTT. Smaller, 2 to 4 inches high: branchlets scarcely or not at all secund: sepals pretty strongly recurved and squarrose: stamens 3 (to 5?): seeds oblong or elliptical in outline. — Torr. & Gray, Fl. i. 174; Brew. & Wats. Bot. Calif. i. 72; Wats. Bibl. Index, 104 (excl. syn.); *Brandegee*, l. c. — Sandy soil, California, from San Diego northward to the Sacramento Valley and Sierra Co., *Lemmon*. (Lower Calif., *Brandegee*.)

\* \* Sepals all entire.

**L. pusílla**, CURRAN. Low and condensed, 2 to 3 inches in height: branches closely flowered, not distinctly secund: sepals lanceolate, acute and bristle-tipped: stamens (in flowers examined) 3. — Bull. Calif. Acad. Sci. i. 152; *Brandegee*, *Zoe*, i. 220. — Tehachapi, California, 4,000 ft., *Mrs. Curran*. This very interesting species has the calyx of a *Cerdia*, but is distinguished from that genus by the number of stamens, the absence of a style, and the accumbent position of the cotyledons, which in *Cerdia* appear to be constantly incumbent.

**19. STIPULICÍDA**, MICHX. (Name from the Latin *stipula*, stalk, blade, stipule, and *cædere*, to cut, from its deeply divided stipules.) — Fl. i. 26, t. 6; Gray, Gen. III. ii. 25, t. 107. — A very small or perhaps monotypic genus, scarcely differing in its technical characters from the Old World *Polycarpæa*, but with a distinct habit, somewhat that of an *Eriogonum*.

**S. setácea**, MICHX. l. c. A span high: root simple: stems dichotomously forked: radical leaves spatulate, 2 to 4 lines long, narrowed to a slender petiole: flowers small, fascicled (usually 3 to 6 together) at the ends of the naked branches: bracts awn-like from a lanceolate more or less fimbriate-margined base, and nearly equalling the flowers. — Chapm. Fl. 47. *Polycarpon stipulicidum*, Pers. Syn. i. 111; Pursh, Fl. i. 90. — Sandy soil, North Carolina to Florida.

**S. filifórmis**, NASH. More slender and with more numerous branches: fascicles fewer (1-3)-flowered: bracts shorter. — Bull. Torr. Club, xxii. 148. — Dry sandy soil, in "scrub" and pine woods, near Eustis, Florida, *Nash*. An apparently identical form was collected on the Manatee River by *Rugel*, no. 61. It is doubted whether the differences between this and the preceding will be found constant.

## ORDER XIX. FICOIDEÆ.

BY B. L. ROBINSON.

Herbs of annual or perennial duration, often succulent, rarely lignescent, with watery juice and simple entire or serrulate mostly opposite or pseudoverticillate leaves. Flowers regular, perfect, polygamous, or unisexual. Calyx 4-5-cleft or 4-5-sepalous, free or more or less adnate to the ovary. Petals in N. American genera wanting except in *Mesembryanthemum* (where narrow, numerous, and inserted upon the calyx). Stamens as many as the divisions of the calyx, or fewer, or indefinitely numerous and then inclining to be grouped in phalanges, hypogynous or distinctly perigynous; bilocular anthers short-oblong. Ovary free, half adnate to the calyx, or wholly inferior, 1- $\infty$ -locular; styles or free stigmas as many as the cells of the ovary, stigmatose along the inner surface. Fruit a loculicidal or circumscissile capsule, or rarely indehiscent and baccate or nutlike. Seeds 1 to  $\infty$ , with sparing or copious albumen and curved peripheral embryo.

With the exception of the large and chiefly S. African genus *Mesembryanthemum* (including about 300 species, many of which are known in horticulture), this loosely bound and poorly defined order is composed of small and unimportant genera. Its members, however, possess much classificatory interest, since they exhibit affinities with the *Caryophyllaceæ* and *Paronychiaceæ* on the one hand, and the *Portulacaceæ* and *Cactaceæ* on the other, thus serving to connect these important orders.

TRIBE I. MOLLUGINEÆ. Calyx free, divided nearly or quite to the base.

Petals (in ours) none. Stamens mostly hypogynous. Fruit (in ours) a loculicidal capsule.

1. **MOLLUGO.** Sepals 5, elliptic, concave, obtuse, 1-3-nerved, with thin margins. Stamens 3 to 5 (rarely in foreign species more numerous), hypogynous, when 5 alternate with the sepals, and when 3 alternate with the carpels. Ovary 3-celled, many-seeded; styles filiform, short, distinct to the base. Capsule ovoid, thin-walled, rounded at the summit; seeds estrophiolate, borne on short straight funiculi; these remaining fixed to the placenta.
2. **GLINUS.** Flowers mostly short-peduncled and aggregated in rather dense verticillasters about the upper nodes. Stamens 5 to 10 (rarely more numerous). Seeds with distinct strophiole at the hilum; funiculi very long and slender, coiled about the seeds and in great part deciduous with them. Other characters as in the preceding.

TRIBE II. AIZOIDEÆ. Calyx free, with a distinct turbinate, campanulate, or subcylindric tube, and 4-5-cleft limb. Petals none. Fruit (in ours) a circumscissile capsule. Leaves (in ours) opposite, mostly unequal.

\* Ovary 1-2-celled; stipules present.

3. **CYPSELEA.** Calyx-tube short, campanulate; segments 4 to 5, unequal, ovate, obtuse, erect, green, unappendaged. Stamens 1 to 3, alternate with the calyx-lobes. Ovary ovoid or subglobose, 1-celled, many-ovuled; short erect style 2-cleft. Seeds minute, smoothish, estrophiolate; slender straight funiculi remaining attached to the free central placenta. Leaves opposite; stipules scarious, lacinate.
4. **TRIANTHEMA.** Calyx-lobes 5, concave, colored within, with dorsal horn-like appendage from beneath the apex. Stamens varying from 5 or 6 to 10, alternate with the lobes of the calyx when of the same number. Ovary truncate, 1-2-celled; styles or stigmas



normally 2, centrally situated, but (in N. American species) by abortion single and at length excentric. Capsule short-cylindric or turbinate, few(1-5)-seeded, tardily circumscissile, the upper portion thickened, coreaceous or suberose, with mostly 2 rounded marginal crests partly or almost completely surrounding the concave very oblique summit.

\* \* Ovary 3-5-celled: stipules none.

5. **SESUVIUM.** Calyx 5-cleft to below the middle; oblong segments obtuse or obtusish, but commonly cornute dorsally beneath the apex, colored within. Stamens 5 and alternate with the calyx-lobes or numerous and indefinite, perigynous, sometimes slightly united into phalanges. Ovary free from the calyx, many-ovuled; styles 3 (to 5), filiform, free to the base. Capsule membranaceous, 3(-5)-celled; seeds several to many in each cell.

TRIBE III. MESEMBRYANTHÆ. Calyx-tube partially or wholly adnate to the ovary.

\* Petals 0: fruit indehiscent.

6. **TETRAGONIA.** Calyx-tube at length enveloping and adnate to the ovary, mostly 4-lobed or -toothed, fleshy; lobes short, obtuse, erect and connivent after anthesis. Stamens 1 to  $\infty$ , sometimes more or less united at the base into phalanges, perigynous: ovary half inferior, at length wholly so, with 3 to 9 cells and as many short distinct styles; cells uni-ovulate. Fruit a somewhat 4(-6)-horned nut; seeds solitary, pendent in the indehiscent cells, pyriform, estrophiolate; embryo horse-shoe shaped.

\* \* Petals numerous: fruit a capsule, loculicidally dehiscent at the summit.

7. **MESEMBRYANTHEMUM.** Calyx normally 5-parted or 5-toothed, unequal. Petals  $\infty$ , linear, sometimes in several series, inserted together with the numerous and indefinite stamens upon the tube of the calyx. Ovary 5(- $\infty$ )-celled; styles as many as the cells of the ovary, free or nearly so. Fruit stellate, with distinct epicarp and endocarp, dehiscing under the influence of moisture; seeds numerous, minute.

1. **MÓLLUGO, L.** INDIAN CHICKWEED. (Name derived from *mollis*, soft, used by Pliny for some unidentified plant, and by the herbalists for *Galium Mollugo*, from which it was by Linnæus transferred to the present genus, on account, perhaps, of the superficial similarity of leaf-arrangement.) — Gen. no. 839; Gray, Gen. III. ii. 13, t. 101; Benth. & Hook. Gen. i. 857 (excl. syn. *Glinus*); Pax in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 1b, 39. *Mollugo*, subg. *Mollugo*, Fenzl, Ann. Wien. Mus. i. 375-384. *Lampetia* & *Nemallosis*, Raf. Fl. Tellur. iii. 34. — Glabrous profusely branched annuals with rosulate or pseudo-verticillate leaves and small apetalous slender-pedicelled flowers.

\* Seeds 3-5-ribbed parallel to the median dorsal line, and often minutely and transversely rugose between the ribs: cauline leaves spatulate to lance-oblong or rarely linear: prostrate or ascending.

**M. verticillata, L.** (CARPET-WEED.) Slender terete stems radiating, dichotomously branched: leaves 3 to 6 at each node, unequal, half inch to inch in length, the larger ones 2 to 4 lines in breadth, obtuse or acutish at the apex, gradually narrowed at the base: flowers 2 to 5 from each node, slender-pedicelled, subtended by foliaceous bracts: sepals elliptic-oblong, obtuse, 3-nerved, not reticulated: stamens 3 (to 4): capsule short-oblong. — Spec. i. 89; Fenzl, l. c. 376; Gray, l. c. 14; Rohrb. in Mart. Fl. Bras. xiv. pt. 2, 240-243 (incl. var. *scrobiculata*), t. 55, f. 2; Meehan, Bull. Torr. Club, xiv. 218. *M. arenaria*, HBK. Nov. Gen. & Spec. vi. 20. — Lower Canada to Florida and across the continent, common especially upon bare ground of paths, &c. (Mex., W. Ind., Trop. Amer., "Trop. Afr.")

\* \* Seeds finely reticulated: cauline leaves very narrow, linear: habit ascending or sub-erect: southwestern.

**M. Cerviána, SERINGE.** Very slender: 2 to 8 inches high, much branched: stems and branches filiform, terete: leaves glaucous; the basal spatulate, forming a more or less persistent rosette; the uppermost reduced to minute bracts: flowers small, the lower verticil-

late about the nodes, the upper disposed in a filiform-branched panicle: sepals 1-nerved and reticulated with green veins: capsule globose. — Seringe in DC. Prodr. i. 392; Fenzl Ann. Wien. Mus. i. 379; Wats. Proc. Am. Acad. xvii. 360; Coulter, Contrib. U. S. Nat. Herb. ii. 138. *Pharnaceum Cerviana*, L. Spec. i. 272 (excl. syn. Buxb.). — River banks, also in sterile granitic sand and on mesas, S. W. Texas, at Bluffton, *Palmer*, and on Pecan Creek, acc. to Plank; New Mexico, *Greene*; Arizona, *Lemmon*, *Pringle*, *Jones*. (Mex., *Palmer*; Lower Calif., *Brandegee*; Mediterranean Region; S. Afr.; E. Ind.)

2. **GLÍNUS**, L. (Γλίνος or γλεῖνος, a name used by Theophrastus for a maple; the reason for its application to the present genus is wholly obscure.) — Spec. i. 463 (but later in Gen. ed. 5, no. 537, & Spec. ed. 2, i. 663, Linnæus ascribes the genus to Læffling, who, in 1758, in his It. Hispan. 145, republished *G. lotoides*); Fenzl, Ann. Wien. Mus. i. 355; Pax in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 1b, 40. *Physa*, Du Petit-Thouars, Gen. Nov. Madag. 20. Under *Mollugo*, Benth. & Hook. Gen. i. 857. — Small genus of homely plants, nearly related to *Mollugo*, but with sharp and apparently constant technical distinctions in the peculiar elongated funiculi and strophiolate seeds. Our species annuals, pubescent with soft branching hairs.

**G. lotoides**, L. l. c. Diffusely branched from the base, densely clothed in cinereous tomentum; stems procumbent or ascending: pseudoverticillate leaves obovate, rounded at the apex, cuneately narrowed at the base to slender petioles: flowers pedicellate or subsessile in glomerules: sepals 2 to 3½ lines long, rather broadly oblong, scarcely mucronate: stamens mostly 10 or more: seeds nearly black, granulated. — Læffl. l. c.; Lam. Dict. ii. 729; Sibth. Fl. Græc. v. t. 472. *G. lotoides*, var. *a candida*, Fenzl, l. c. i. 357. *G. dictamnoides*, Lam. l. c. (Mediterranean Reg., E. Ind.) Represented in N. Amer. chiefly if not wholly by

**Var. virens**, FENZL, l. c. 358. Less densely pubescent: leaves glabrate at least above; the broad blade sometimes half inch in diameter: flowers mostly smaller, about 2 lines long: sepals more narrowly oblong than in the type and more or less distinctly mucronate: stamens 5 to 10: seeds inclining to be red, granulated as in the type. — *G. dictamnoides*, L. Mant. ii. 243; DC. Prodr. iii. 455. — Abundant at Verdigris, Ind. Terr., and in Arkansas, *Bush*; also earlier collected in California (where perhaps introduced), at Chico, *Parry*, *Lathrop*, *Mrs. Brandegee*, a more pubescent form possibly referable to the type. There can be no doubt that the California plant is of this species rather than of the following, where first placed by Dr. Watson.

**G. Cambessidésii**, FENZL, l. c. Habit of the preceding species but less robust, cinereous-tomentose or greener: flowers 1½ to 2 lines in length: stamens 3 to 5: seeds red, very smooth and shining. — *G. radiatus*, Rohrb. in Mart. Fl. Bras. xiv. pt. 2, 238. *G. lotoides*, Rose, Contrib. U. S. Nat. Herb. i. 331, not L. *Mollugo radiata*, Ruiz & Pav. Fl. Peruv. i. 48. *M. glinoides*, Cambess. in St. Hil. Fl. Bras. Merid. ii. 171, t. 109. — A single specimen from our limits labelled Texas (without locality) from herb. Durand is now in herb. Gray. The species, however, is not uncommon in Mexico, extending from the Yaqui River, *Palmer*, southward. (Lower Calif., *Brandegee*; Cuba; S. Am.)

3. **CYPSELÉA**, Turp. (Κυνέλη, a bee-hive, which in form the capsules resemble.) — Ann. Mus. Paris, vii (1806), 219, t. 12; Fenzl, Ann. Wien. Mus. i. 351, ii. 293; Benth. & Hook. l. c. 856. *Radiana*, Raf. Speech. i. 88. — Inconspicuous prostrate W. Indian monotype, small in all parts.

**C. humifúsa**, TURP. l. c. Prostrate matted much branched stems from a long perpendicular annual or perhaps more enduring root: leaves opposite, those of each pair very unequal, the axil of the smaller one bearing a fascicle of crowded leaves and a pedicellate flower; leaf-blade elliptical, obtuse or rounded, 1½ to 3 lines in length; petiole slender, nearly as long, with a membranous bicaudate or somewhat fimbriate stipular expansion at the base: calyx-lobes 5: stamens (1 to) 3, inserted opposite the sinuses. — DC. Prodr. iii. 353; Griseb. Fl. W. Ind. 56. — Sandy pine barrens near the coast of S. & W. Florida, *Blodgett*, *Rugel*,

perhaps not indigenous; also Central California (where certainly introduced), on and near the coast, Sta. Cruz, *Parry*; banks and marshes of San Joaquin River, *Congdon*, *Michener* & *Bioletti*. (W. Ind. on Cuba, St. Domingo, Virgin Ids., &c.)

4. **TRIANTHEMA**, Sauv. (*Τρεῖς*, three, and *ἄνθεμον*, flower, from the often ternate nature of the inflorescence.)—de Sauvages, *Meth.* Fol. 127; *L. Spec.* i. 223; Benth. & Hook. *Gen.* i. 855.—A small genus of prostrate herbs or undershrubs, tropical and subtropical, chiefly of Asia, Africa, and Australia, the only American species being

**T. Portulacastrum**, L. Diffusely and dichotomously branched herb, somewhat succulent; procumbent or prostrate branches terete, smooth or papillose-puberulent, 6 inches to 3 feet in length: leaves opposite, obovate to suborbicular, entire or nearly so, half inch to inch long, obtuse, rounded, mucronate, or retuse at the apex, usually cuneate at the base; the leaves of each pair unequal; petioles dilated near the base into bidentate stipular expansions, connate about the stem, the sheath, thus formed, bearing an intermediate tooth on each side: flowers small, closely sessile in the forks of the branches, purplish within: sepals ovate-lanceolate, acuminate, withering to a sort of rostrum upon the broad oblique summit of the circumscissile few-seeded capsule; style single; ovary at length partially divided into two superposed cells.—*Spec.* i. 223 (*Portulaca Curassavica procumbens*, Herm. *Parad. Bat.* 213, t. 213); Hook. f. & Jackson, *Index Kew.* ii. 1101. *T. monogyna*, L. *Mant.* 69; *Lam.* III. ii. 496, t. 375, f. 1; Gray, *Pl. Wright.* i. 15, ii. 20; Payer, *Ann. Sci. Nat.* ser. 3, xviii. 241, t. 12; Chapm. *Fl.* ed. 2, 607.—Forming mats on shores, in saline places, or in rich garden soil; Keys of Florida to Arizona, and not infrequent on ballast in the Middle Atlantic States. (Mex., Lower Calif., W. Ind., and widely distributed in the warmer parts of the Old World.)

5. **SESUVIUM**, L. SEA PURSLANE. (Etymology unknown.)—*Syst. Nat.* ed. 10, 1058, & *Spec. ed.* 2, i. 684; Jacq. *Stirp. Am.* t. 95; Gray, *Gen.* III. i. 229, t. 100; Benth. & Hook. *Gen.* i. 855. *Sesuvium* & *Pycipoma*, Fenzl, *Ann. Wien. Mus.* ii. 292, 293.—A small but widely distributed genus of fleshy prostrate or sub-erect mostly maritime herbs or undershrubs with axillary purplish apetalous flowers.

\* Stamens many, indefinite.

**S. Portulacastrum**, L. ll. cc. Stems numerous, long, spreading, decumbent, often rooting at the lower nodes, quite smooth or slightly verrucose: leaves linear-oblong to spatulate, mostly acutish, 1 to 2 inches in length: flowers 4 or 5 lines long, usually on peduncles of nearly or quite their own length: sepals narrowly oblong, horned on the back near the apex.—DC. *Prodr.* iii. 453; Chapm. *Fl.* 44. *S. pedunculatum*, Pers. *Syn.* ii. 39. *Portulaca Portulacastrum*, L. *Spec.* i. 446 (Herm. *Parad. Bat.* t. 112; Pluk. *Alm.* t. 216, f. 1).—Sea-beaches and sandy banks near the coast, N. Carolina, *M. A. Curtis*; Florida. (W. Ind., Bermuda, most tropics, China.)

**S. sessile**, PERS. More erect and bushy, never rooting from the nodes, copiously and dichotomously branched: stems smooth or very often finely verrucose with crystalline globules as in *Mesembryanthemum*: leaves shorter and mostly broader and more obtuse than in the preceding species, oblanceolate or obovate-oblong: flowers subsessile, 2 to 3 lines in length: sepals rather broadly ovate-oblong, dorsally cornute near the apex.—*Syn.* ii. 39. *S. Portulacastrum*, DC. *Pl. Grass.* t. 9; Torr. in Emory, *Rep.* 137, & *Bot. Mex. Bound.* 38; Coulter, *Man. Rocky Mt. Reg.* 112; Greene, *Fl. Francis.* 239; not L. *S. Portulacastrum*, var. *subsessile*, Gray (*Pl. Wright.* i. 13, ii. 19) in Wats. *Bibl. Index*, 411, probably not of Cambess. in St. Hil. *Fl. Bras. Merid.* ii. 200, which, being the much smaller-flowered *S. parviflorum*, DC., of S. Am., is presumably a distinct species.—Beaches, river banks, and sterile saline plains, coast of Texas, to S. Kansas, *Carleton*, and Colorado, *Crandall*; N. W. Nevada, *Lemmon*, and California from the valley of the San Joaquin near Stockton, *Jepson*, southward. (Lower Calif., *Orcutt*; Northern Mex.; S. Brazil.) A plant of too distinct habit and range, at least

as to its N. American occurrence, to be satisfactorily classed as a variety of the preceding, especially in the absence of more evident intergradation. An extreme form with stem, leaves, and sepals densely vesicular-verrucose in the manner of *Mesembryanthemum* has been collected in the sink of the Mojave by *Parish Bros.* A tendency toward this character is, however, manifested by specimens from other regions.

\* \* Stamens 5, alternate with the sepals.

**S. pentándrum**, ELL. Procumbent or ascending, much branched: leaves obovate to elliptic-spatulate, rounded at the apex, entire, cuneate at the base: flowers rather small, closely sessile: calyx  $2\frac{1}{2}$  to  $3\frac{1}{2}$  lines long, 5-parted to below the middle; segments ovate-oblong, obtuse but rather sharply cornute dorsally just below the apex. — Sk. i. 556; Fenzl, Ann. Wien. Mus. i. 347 (later and independent publication of same species and, by curious coincidence, under same name); Gray, Gen. III. i. 230; Chapm. Fl. 44. *S. Portulacastrum*, Muhl. Cat. 49; Gray, Man. eds. 2-5; not L. *S. sessile*, Nutt. Gen. i. 306; Torr. Fl. N. & Midd. States, 478; not Pers. *S. maritimum*, Britt. Sterns & Poggenb. Prel. Cat. N. Y. 20. *Pharnaceum maritimum*, Walt. Car. 117. *Mollugo maritima*, Seringe in DC. Prodr. i. 393. — Sea-beaches and low sandy banks near coast, Long Island to Florida and Louisiana, common; fl. midsummer to late autumn. (Cuba.)

**6. TETRAGÓNIA**, L. (*Τετράγωνος*, four-cornered, in allusion to the form of the calyx-covered fruit; the name *Τετραγωνία* was used by Theophrastus for *Euonymus Europæus*, L.) — Syst. Nat. ed. 1, & Gen. no. 406; Fenzl, Ann. Wien. Mus. ii. 287; Benth. & Hook. Gen. i. 854. *Tetragonocarpus*, Commelyn, Amstel. ii. t. 102, 103. *Demidovia*, Pall. Demid. t. 1. *Tetragonella*, Miq. in Lehm. Pl. Preiss. i. 245. — Fleshy herbs and undershrubs, chiefly S. African and of littoral habitat. A single species, with alternate leaves, tends to escape from cultivation in N. America.

**T. EXPÁNSA**, Murr. (NEW ZEALAND SPINACH.) Succulent annual with numerous spreading or procumbent branches, more or less thickly covered with crystalline papulæ: leaves ovate, entire or merely undulate, obtuse or acutish, 1 to  $2\frac{1}{2}$  inches long, abruptly contracted at the base to a broad cuneately winged petiole: subsessile flowers solitary in the axils, small, yellowish green: limb of the gamophyllous 4-lobed calyx widely spreading: styles 5 to 9; cells of the ovary as many, 1-ovuled: fruit a cartilaginous somewhat compressed 4(-6)-horned nut, closely invested by the calyx and becoming 4 to 6 lines in diameter. — Comm. Götting. vi. 13; DC. Pl. Grass. t. 114; Sims, Bot. Mag. t. 2362; Greene, Fl. Francis. 240. — In old fields about Manatee, Florida, *Garber*, and on the beaches of the Central Californian coast; doubtless escaped from gardens where sometimes cultivated as a salad plant. (Introd. from China, Japan, New Zealand.) For historical note on garden use, see Sturtevant, Am. Nat. xxiv. 32.

**7. MESEMBRYÁNTHEMUM**, Dill. (Arbitrarily altered from the earlier *Mesembrianthemum*, a name first used by Jakob Breyne and clearly derived from *μεσημβρία*, mid-day, and *ἄνθεμον*, flower. In its later form the first part of the word is derived by Linnæus, in his Philos. Bot. 177, from *μέσος*, middle, and *ἐμβρύον*, embryo, without very obvious application.) — Nov. Gen. 148, & Elth. t. 179-215; L. Gen. no. 453; Haworth, Obs. Mesemb.; Salm-Dyck, Monog. Gen. Aloes et Mesembryanthemi; Sonder, Fl. Cap. ii. 387. — A large genus of low and mostly very succulent herbs and shrubs, chiefly African, much cultivated both for their showy many-petalled flowers and their grotesque *Aloe*-like foliage. Three species of wide distribution and probably introduced without the agency of man have become established in the mild and equable climate of Central and Southern California. It seems best to adopt the Linnæan orthography in the generic name notwithstanding its strained etymology.

§ 1. PAPULÓSA, Sonder, l. c. Surface of stem and leaves covered with colorless shining papulæ: our species spreading annuals, branched from the base, and with leaves alternate or scattered.

\* Leaves linear, semiterete.

**M. nodiflorum**, L. Suberect or procumbent, matted, covered with fine papulæ: leaves half inch to inch in length, a line in breadth, obtuse: flowers scattered, small, subsessile or shortly pedunculate: 4-5-cleft calyx considerably exceeding the minute white petals: valves of the capsule 5, acute, not uncinatè, stellately spreading when moist. — Spec. i. 480; DC. Pl. Grass. t. 88; Parish, Zoe, i. 263. *M. copticum*, L. l. c. ed. 2, i. 688; Jacq. Hort. Vindob. iii. t. 6. *M. apetalum*, L. f. Suppl. 258. — Sandy hills on S. Californian coast, San Diego Co., Cleveland, Orcutt; San Clemente Isl., Lyon & Nevin, and Sta. Catalina Isl., Brandegee; locally abundant although, as Mr. Parish states, our most restricted species. (S. Afr. and Mediterranean Region.)

\* \* Leaves flat, with more or less expanded lamina.

**M. crystallinum**, L. (ICE PLANT.) Very succulent, prostrate, forming mats: papulæ large and conspicuous: leaves ovate to obovate or broadly spatulate, amplexicaul, the lowest with a cordate or subcordate petiolate base: flowers axillary, subsessile or borne on short thick erect peduncles: campanulate calyx 4 to 6 lines in length and about as broad: petals pink or purplish red, varying to white: carpels 5; valves of the retuse capsule as many, dorsally concave, uncinately incurved, hygroscopic, being opened by moisture and closed in drought; nigrescent epicarp separating from the stramineous more cartilaginous endocarp. — Spec. i. 480 (Dill. Elth. t. 180, f. 221); DC. Pl. Grass. t. 128; Sibth. Fl. Græc. v. t. 481; Parish, l. c. 262. — In sandy soil, coast of California and adjacent islands (where especially abundant and luxuriant), from Sta. Barbara southward, also in Mojave Desert, Mrs. Brandegee, *vide* Parish; first collected in California by Frémont. (Lower Calif. and adj. islands, Greece, N. Afr., Canary Ids., S. Afr.) First recognized as indigenous on the Californian islands by Prof. Greene.

**M. cordifolium**, L. f. (Suppl. 260), a related red-flowered species with even the upper leaves petiolate and cordate, is reported by K. Brandegee (Zoe ii. 352), as an escape about San Francisco. (S. Afr.)

§ 2. EPAPULÓSA, Sonder, l. c. 389. Stem and foliage smooth: our species perennial with opposite thick dorsally carinate leaves.

**M. æquilaterale**, Haworth. Very fleshy: stems elongating and forming large mats: leaves 2 inches or more in length, oblong, acute, triquetrous-prismatic, thicker than broad: flowers large, terminal, shortly pedunculate, fragrant,  $1\frac{1}{4}$  to 2 inches in diameter: spreading lobes of the calyx very unequal: petals roseate: styles 6 (or more): fruit edible. — Misc. Nat. 77, & Syn. Pl. Suc. 237; Salm-Dyck, l. c. fasc. 1, § 19, f. 1; Brew. & Wats. Bot. Calif. i. 251; Parish, l. c. 261. *M. dimidiatum*, Torr. Pacif. R. Rep. iv. 75; Newberry, *ibid.* vi. 67; not Haw. — Sand dunes and sterile cliffs, California, on and near the coast from Point Reyes, Bigelow, southward. (Lower Calif., Chili, Australia, Tasmania.)

A slender erect-branched purplish-flowered species, probably the S. African *M. sténium*, Haw. (not the scarlet-flowered *M. coccineum*, Haw., as at first determined), was in 1878 collected at Point Conception, near Sta. Barbara, Calif., by Miss Plummer, where, as a garden-escape, it had become temporarily established. However, acc. to Parish, l. c., it has already disappeared from this its only known N. American locality.

## ORDER XX. PORTULACACEÆ.

By A. GRAY; the genera *Lewisia*, *Calandrinia*, *Claytonia*, and *Montia* revised by  
B. L. ROBINSON.<sup>1</sup>

More or less succulent herbs, rarely frutescent, with entire leaves, hermaphrodite and regular but mostly anisomerous flowers, calyx and corolla imbricated in the bud; distinguished, with one or two exceptions, by hypogynous insertion, disepalous calyx not isomerous with corolla, one-celled 2-8-merous ovary with free central or basilar placentæ, 2 to 8 introrse stigmas or style-branches, few or many amphitropous ovules, and seeds with a cylindrical embryo curved or coiled in or around mealy albumen, the narrow cotyledons usually incumbent (but not rarely accumbent or oblique in the same genus). Stamens various in number, opposite the petals when of the same number, commonly adnate to their base. No hypogynous disk. No proper stipules. The main exceptions are the half superior calyx of *Portulaca*, the larger number of sepals in *Lewisia*, and the reduced number of petals in *Calyptridium*, &c. Corolla often slightly gamopetalous. Anthesis commonly ephemeral, the withering or colliquescent remains of corolla borne for some time on the ovary or capsule.

\* Lower half or more of ovary and capsule adnate to calyx-tube; upper part in fruit with the two calyx-lobes circumscissile; embryo peripheric.

1. **PORTULACA.** Petals 4 to 6 and with the more numerous (8 to 30) stamens inserted just where the calyx becomes free, ephemeral. Style-branches 3 to 8, filiform, introrsely stigmatose their whole length. Ovules and seeds numerous, slender-stalked, round-reniform.

\* \* Calyx, corolla, and ovary free (hypogynous).

+ Shrubby: seeds obovate-oblong, somewhat hook-shaped; embryo moderately curved in scanty albumen.

2. **TALINOPSIS.** Sepals 2, ovate, when dried chartaceo-scarious and nervose, persistent. Petals 5, oval, soon colliquescent. Stamens about 20, five at base of each petal; anthers oval. Introrse stigmas or style-branches 3, oblong, shorter than the style; ovules and marginless seeds numerous; capsule fusiform-oblong, acuminate; the coriaceous epicarp 3-valved from apex; chartaceous endocarp 6-valved and filiform sutures often separable from the valves. No bracts. Leaves opposite.

+ + Herbaceous: seeds reniform, hippocrepiform, or lenticular; embryo peripheric around the central albumen.

++ Calyx 2-sepalous, herbaceous, deciduous, sometimes tardily so.

3. **TALINUM.** Petals 5, or sometimes 6 to 10, ephemeral. Stamens 5 to 30. Stigmas or short lobes of columnar style 3. Capsule globose or ovoid, 3-valved from top to bottom, many-seeded; seeds smooth and shining.

++ ++ Calyx herbaceous (at least in part) and persistent.

= Style-branches 3 to 8: capsule circumscissile near the base, thence splitting upwards into short irregular lobes.

<sup>1</sup> In 1887 Dr. Gray (Proc. Am. Acad. xxii. 272-285) published a preliminary revision of the N. Am. *Portulacaceæ*. His manuscript notes, however, indicate that he was not satisfied with the treatment of *Calandrinia* and its allies, and that he contemplated a further revision before publication. On this account the editor has felt somewhat greater liberty in recasting this portion of the order. Although the limits of the four genera above mentioned have been considerably modified in the light of recent publications and some new material, Dr. Gray's specific descriptions have been kept wherever possible.

4. **LEWISIA.** Sepals 2 to 8, often glandular-denticulate. Petals 3 to 16. Anthers oblong to linear. Style-branches 3 to 8, slender. Capsule globose-ovate, thin-chartaceous; seeds several to many, lenticular, mostly smooth and shining.

= = Style-branches 3: capsule 3-valved from the apex: sepals 2.

5. **CALANDRINIA.** Petals 3 to 7. Stamens (rarely 3) 5 to 12, seldom of the same number as the petals. Seeds usually numerous, small, black, finely granulated. Fleshly spreading annuals with alternate leaves.

6. **CLAYTONIA.** Petals definitely 5, free, equal, conspicuous. Stamens as many. Ovules few, about 6. Seeds dark and shining. Perennials from thick roots or corms. Cauline leaves opposite.

7. **MONTIA.** Petals 5 or fewer, usually somewhat unequal, and sometimes more or less coherent or connate at the base. Stamens 3 to 5. Ovules very few, mostly 3. Seeds 2 or 3.

= = = Gynœcium dimerous, i. e. stigmas and valves only 2: sepals orbiculate, wholly or partly scarious and accrescent, mostly plane and as it were bivalvular in fruit: leaves all alternate: capsule membranaceous; seeds reniform-lenticular, not strophiolate: anthesis ephemeral: inflorescence usually secund.

8. **SPRAGUEA.** Sepals wholly scarious (or with mere greenish centre), emarginate at apex and base, equal. Petals 4, obovate. Stamens 3, twice the length of the petals; filaments filiform; anthers linear-oblong. Style very long, filiform; stigma 2-lobed. Capsule globose-ovate, few-seeded.

9. **CALYPTRIDUM.** Sepals scarious-margined or largely scarious, usually unequal. Petals 2 to 4, small (distinct), obovate. Stamens 1, 2, or 3, shorter than the petals; filaments subulate; anthers oval or oblong. Style short or hardly any; stigmas 2. Capsule linear to oval, 6-24-seeded.

1. **PORTULÁCA**, Tourn. **PURLANE.** (Latin name of Purslane, of uncertain derivation.) — Low herbs, fleshy, with leaves alternate or partly opposite, and stipules scarious or none, or reduced to hairy tufts; the flowers terminal and sessile, expanding in direct sunshine before mid-day, soon closing, and the petals by evening colliquescent. Pyxis membranaceous to coriaceous. — Inst. 236, t. 118; L. Gen. no. 341; Gray, Gen. III. i. t. 99.<sup>1</sup>

\* Leaves flat, naked in the axils or very nearly so: very glabrous annuals.

+ Stems terete: calyx-lobes dorsally carinate: no calycine border around the mouth of the persistent part of the dehiscent capsule; lid high-conical and with acute tip: petals yellow, emarginate.

- P. olerácea**, L. (COMMON PURSLANE.) Mostly prostrate: leaves cuneate- or spatulate-obovate, with very obtuse or nearly truncate apex: calyx-lobes ovate, in bud somewhat pointed by the projecting keel: stamens 7 to 12: style-lobes 5 or 6: seeds black, obtusely granulate. — Spec. i. 445; Engelm. in Gray, Pl. Lindh. pt. 2, 154; Gray, l. c. — Common in cult. grounds around dwellings, and, as is thought, indigenous on the plains of Arkansas, Texas, and westward. (Cosmopolite.)

- P. retúsa**, ENGELM. Ascending, greener: leaves somewhat more cuneate, often retuse: calyx-lobes in bud obtuse, strongly carinate: petals small or minute: stamens 7 to 19: style-lobes 3 or 4 and shorter: seeds larger and echinate-tuberculate. — Engelm. in Gray, Pl. Lindh. pt. 2, 154, & Pl. Wright. i. 13; Brew. & Wats. Bot. Calif. i. 74. — Plains of Texas and Arkansas to Arizona<sup>2</sup> and to the Colorado.

+ Stem angled: petals acutish or pointed: calyx-lobes obscurely carinate: a wing-like border around orifice of dehiscent capsule; lid depressed-conical.

- P. lanceoláta**, ENGELM. l. c. Erect or ascending: lower leaves spatulate and obtuse; upper oblanceolate or narrower, sometimes acute: petals spatulate or obovate, yellow or

<sup>1</sup> Add Gray, Proc. Am. Acad. xxii. 274.

<sup>2</sup> S. W. Colorado, acc. to Coulter, Man. Rocky Mt. Reg. 37; also reported from Kansas, Iowa, and Minnesota, but perhaps confused with the preceding nearly related species.

orange and partly red : stamens 7 to 27 : style-lobes 3 to 6 : capsule turbinate, winged with a circular rim left by circumscission of the calyx above the adnate portion ; seeds rough-tuberculate, cinereous. — Granitic region of W. Texas,<sup>1</sup> *Lindheimer*, &c., to New Mexico and Arizona,<sup>2</sup> *Wright, Greene, Rothrock*. "Said not to be eaten by swine," *Reverchon*. (The Cuban plant, coll. *Wright*, referred to this on account of the capsule, has bearded axils, and is distinct, being probably *P. oleracea*, var. *minor*, Griseb.)

\* \* Leaves terete or nearly so, subulate-lanceolate to linear, hairy in their axils, otherwise glabrous : calyx-lobes not carinate.

**P. stellifórmis**, MOCIÑO & SÉSSÉ. Perennial by creeping tuberous-thickened and sometimes moniliform rootstocks : stems erect or ascending, a span to a foot high : leaves quite terete, slender, mostly inch long, those involucreting the flowers in a radiating cluster much surpassing them : axillary clusters of hairs short and soft : petals copper- or buff-colored, obcordate or emarginate, quarter inch or more long : seeds blackish, granulate-tuberculate, with metallic lustre. — Moc. & Sessé acc. to DC. Prodr. iii. 353, under *P. foliosa*, and represented in Calques des Dess. t. 389. "*P. foliosa*, Lindl. *Mexicana*," A. DC. Calques des Dess. 3 & 6. *P. pilosa*, Engelm. in Gray, Pl. Wright. i. 13, in part ; Gray, Pl. Wright. ii. 20 (var. *erecta*) ; Wats. Proc. Am. Acad. xxi. 417, with doubt, the tuberous roots indicated. *P. suffrutescens*, Engelm. Bot. Gaz. vi. 236, but is not suffrutescent. — Plains of W. Texas to Arizona, *Wright*, &c. (Mex., Lower Calif.)

**P. halimoides**, L. Mostly perennial, fleshy-rooted, erect or diffuse, corymbosely branched : leaves short, moderately flattened, half inch or less long, uppermost well involucreting the flower-clusters : hair copious : petals yellow : capsule-lid depressed, much shorter than the basal portion ; seeds granulose, reddish, at least when young. — Spec. ed. 2, i. 639 (Sloane, Jam. t. 129, f. 3) ; DC. Prodr. iii. 354 ; Griseb. Fl. W. Ind. 57. — Keys of Florida, *Blodgett, Garber, Curtiss*. (W. Ind.)

**P. pilósa**, L. Annual, sometimes indurating in age,<sup>3</sup> ascending or spreading : leaves nearly terete, linear-subulate, half or quarter inch long, either much or little surpassing the copious axillary hair : petals from carmine to crimson or purple, a line or two long, retuse : capsule-lid hemispherical ; seeds blackish and with metallic lustre, muriculate-granulose. — Spec. i. 445 (Comm. Hort. t. 5 ; Pluk. Alm. t. 247, f. 7, &c.) ; Bot. Reg. t. 792 ; Griseb. l. c. — Sandy open ground, Florida and Texas to Arizona,<sup>4</sup> and a few places in California, where probably introduced. (All Trop. Am., &c.)

**P. párvula**, GRAY. Annual, or becoming fleshy-rooted, depressed and diffuse : leaves nearly terete, oblong-linear, obtuse, 2 to 5 lines long, with copiously hairy axils : petals yellow and copper-colored, barely a line long : lid high-hemispherical, fully as long as basal part of capsule ; seeds pale red, minutely granulate. — Proc. Am. Acad. xxii. 274. *P. pilosa*, Gray, Pl. Fendl. 14, & Pl. Wright. i. 13, in part ; Wats. Proc. Am. Acad. xvii. 329, in part, &c. — Plains of W. Texas and New Mexico, *Fendler, Wright*. (Mex.,<sup>5</sup> *Schaffner*, 772, *Pringle*, 543, &c.)

**P. GRANDIFLÓRA**, Hook., of Extra-tropical S. America, related to *P. pilosa*, is the showy *Portulaca* of ornamental cultivation. It tends to become spontaneous in the S. Atlantic States.

**2. TALINÓPSIS**, Gray. (Likeness to *Talinum*, which is not close.) — Pl. Wright. i. 14, t. 3 ; Benth. & Hook. Gen. i. 157, where "sepal 3" is a misprint. — Single species.

<sup>1</sup> *P. coronata*, Small (Bull. Torr. Club, xxiii. 126), from Stone Mt., Georgia, if distinct, is a very closely related species. Although Dr. Small has kindly furnished excellent alcoholic material of the Georgia plant, it has been impossible as yet to find satisfactory distinctions between it and the Texan species. Perhaps these may appear when better material of the latter can be obtained.

<sup>2</sup> Also Lower Calif., *Brandegge*.

<sup>3</sup> Specimens with distinctly perennial roots have been collected at Eustis, Fla., *Nash*, which, while resembling *P. halimoides* in habit, have the capsule of *P. pilosa*.

<sup>4</sup> Northward to Greene Co., Missouri, *Blankinship*, S. Kansas, *Carleton*, and the cañon of the Arkansas in Colorado, acc. to Miss Eastwood, *Zoe*, ii. 228.

<sup>5</sup> Also reported by *Brandegge*, from Lower Calif.



**T. frutescens**, GRAY, l. c. 15. A foot or so high, woody to the repeatedly dichotomous cymes: flowers sessile in the forks: leaves very fleshy, short-linear, terete, the pairs approximate, also fascicled in axils: corolla purple, ephemeral: capsule half inch or more long, twice the length of the calyx. — Mountain valleys, near El Paso and adjacent New Mexico, Wright. (Adj. Mex., Pringle, to San Luis Potosi, Parry & Palmer, Schaffner.)

**3. TALINUM**, Adans. (Etymology obscure.) — Chiefly tropical and American herbs, the only species of temperate regions North American, usually tuberous-rooted. — Fam. ii. 245, excl. spec.; DC. Prodr. iii. 356; Fenzl, Ann. Wien. Mus. ii. 296; Gray, Gen. III. i. 225, t. 98; Benth. & Hook. l. c.<sup>1</sup>

\* Leaves plane, moderately fleshy: flowers in loose cymes forming long and naked panicles.

**T. patens**, WILLD. Herbaceous or fleshy-suffrutescent at base from a tuberous root, usually tall and erect or ascending: leaves obovate or spatulate, varying to oblanceolate, somewhat petiolate, 2 to 4 inches long: pedicels filiform: sepals early deciduous: petals either rose-color or yellow, a line or two long: stamens numerous: seeds brown or black. — Spec. ii. 863; DC. l. c. 357; Rohrb. in Mart. Fl. Bras. xiv. pt. 2, 296, t. 67. The form with rose-colored corolla is *Portulaca paniculata*, Jacq. Enum. Pl. Carib. 22, Stirp. Amer. 148, & Hort. Vind. ii. t. 151 (not L.), & *T. paniculatum*, Gærtn. Fruct. ii. 219, t. 128. The yellow-flowered form is *T. reflexum*, Cav. Ic. i. 1, t. 1; Sims, Bot. Mag. t. 1543; DC. l. c.; Gray, Pl. Wright. ii. 20; & *T. spathulatum*, Engelm. in Gray, Pl. Wright. i. 14; the latter passing into Var. *SARMENTOSUM*, Gray, Proc. Am. Acad. xxii. 275 (*T. sarmentosum*, Engelm. in Gray, Pl. Lindh. pt. 2, 153; Gray, Pl. Wright. i. 14), which sends off procumbent stems. — Plains of Texas to Arizona.<sup>2</sup> (Mex., W. Ind., S. Am.)

\* \* Leaves flattish or nearly terete, fleshy, lanceolate to linear: flowers axillary: stamens numerous.

**T. lineare**, HBK. A span to a foot or more high, many-stemmed from an oblong or napiform tuberous root (said to be esculent), ascending, loosely branching, leafy throughout: leaves from lanceolate and 3 inches long by 3 lines wide to narrowly linear and subterete and some only half inch long: peduncle longer than the flower, articulated and 2-bracteolate below the middle, 1 (occasionally 2-3)-flowered, recurved in fruit: sepals ovate, acuminate, 3-nerved, tardily deciduous from the capsule: petals from light yellow to orange and flame-color, about half inch long: seeds conspicuously strophiolate, saliently pluricostate. — Nov. Gen. & Spec. vi. 77, the most narrow-leaved form. *T. aurantiacum*, Engelm. l. c.; Gray, Pl. Wright. i. 14, & ii. 20, with var. *angustissimum*, which passes into the broader-leaved form. *Calanaria tuberosa*, Benth. Pl. Hartw. 9, early state. — Rocky ground, W. Texas to Arizona; fl. summer. (Mex.)

**T. brevifolium**, TORR. Depressed, an inch to a span high from a large and deep branching perennial root: leaves crowded, short and thick, quarter to over half inch long, narrow-spatulate or clavate, apparently subterete: flowers solitary in upper axils, on very short erect pedicels articulated at base: sepals and globose-ovoid capsule barely 2 lines long, about half the length of the pink-red petals: stamens about 20: style as long as the ovary, 3-cleft at summit: seeds nearly smooth and even, with grayish pellicle. — Torr. in Sitgreaves, Zúñi Rep. 156. *T. brachypodum*, Wats. Proc. Am. Acad. xx. 355. — New Mexico, on the Little Colorado, Sitgreaves; near Indian Village of Laguna or Komack, Lemmon.

\* \* \* Leaves terete, linear, wholly fleshy: flowers in terminal pedunculate and commonly scapose naked cymes.

+ Surpassed by the leaves.

**T. humile**, GREENE. Acaulescent, a short and slender caudex from a napiform orange-colored tuber, bearing at the ground a dense cluster of terete leaves (2 or 3 inches long and a line or two thick) "lying flat on the ground": scape barely inch long, rather shorter than the twice or thrice dichotomous 5-10-flowered cyme: "petals light yellow, changing to

<sup>1</sup> Add Gray, Proc. Am. Acad. xxii. 275.

<sup>2</sup> Also S. and Centr. Florida, *Simpson*, Nash, and Louisiana, *Goodell*, where called "pink star-flowers."

orange": calyx promptly deciduous from the capsule: seeds lineate-costate in the way of *T. lineare*. — Bot. Gaz. vi. 183. — Rocky table-land of Pinos Altos Mountains, New Mexico, Greene.

+ + Scapiform slender peduncle much surpassing the leaves: styles united to the top; stigmas short and broad: valves of the capsule in dehiscence tending to separate from and leave behind three setaceous sutures in the way of *Capparidaceæ*; fl. summer. — *Phemeranthus*, Raf. Specch. i. 86.

+ + Stamens 20 to 30: petals rose-color: capsule ovoid-globose.

**T. spinescens**, TORR. Fleishy caudex short and multicapital, beset with short subulate spines, which are the indurated persistent midribs of the older (half inch long) very obtuse leaves; these all densely clustered: scape a span or two high, inclusive of the very spreading several times forking cyme: petals deep rose-red, 3 or 4 lines long: seeds large (a line wide), dull and coarsely rugulose. — Bot. Wilkes Exped. 250. — Plains and rocks, State of Washington,<sup>1</sup> *Pickering & Brackenridge*, *Brandegee*, *Suksdorf*, *Nevius*.

**T. teretifolium**, PURSH. Leafy stems short and rather thick, branching, ascending from fleshy rootstock: leaves an inch or two long, cylindrical, a line or more thick: scapiform peduncles a span or two high: cyme minutely bracteate at the forkings: petals 5, quarter inch long: stamens 15 to 20, equalling the short straight style: sepals promptly deciduous from the capsule (2 or 3 lines long); seeds nearly smooth and with a very thin gray pellicle, only half a line wide. — Fl. ii. 365; Lodd. Bot. Cab. t. 819; Darlingt. Fl. Cest. ed. 1, 56, t. 3; Torr. & Gray, Fl. i. 196; Bot. Reg. xxix. t. 1; Gray, Gen. III. i. 226, t. 98; Meehan, Native Flowers, ser. 1, ii. 53, t. 14. *Phemeranthus teretifolius*, Raf. l. c. — Rocks, especially of serpentine, W. North Carolina<sup>2</sup> and Tennessee to E. Texas, north to Pennsylvania and Minnesota.

**T. calycinum**, ENGELM. Rootstock thicker: bracts of cyme more conspicuous: flowers and capsule one half larger: petals commonly 8 or 10: stamens 30 or more: sepals tardily deciduous from the fruit: style exserted, declinate. — Engelm. in Wislitz. Tour in Northern Mex., 88, & in Gray, Pl. Fendl. 14, Pl. Lindh. pt. 2, 154. — Sandy soil, Upper Arkansas and Cimarron Rivers,<sup>3</sup> *Wislizenus*, *Woodhouse*.

+ + Stamens 5: petals pale rose or whitish: capsule mostly oval. (Here *T. napiforme*, DC., & *T. Mexicanum*, Hemsl.)

**T. parviflorum**, NUTT. Short-stemmed or subcaulescent from thick and more or less fleshy branching roots: leaves and inflorescence of the preceding, but small or more slender, and pedicels shorter: sepals and petals hardly over a line long, the latter tardily deciduous: seeds of *T. teretifolium* but smaller. — Nutt. in Torr. & Gray, Fl. i. 197; Engelm. in Gray, Pl. Lindh. pt. 2, 154; Gray, Pl. Fendl. 14, & Pl. Wright. ii. 20. *T. confertiflorum*, Greene, Bull. Torr. Club, viii. 121, a form with smaller and denser cymes. — Rocks and plains, W. Arkansas<sup>4</sup> and Texas to Colorado and Arizona; first coll. by *Nuttall*. (Mex., *Pringle*.)

4. **LEWISIA**, Pursh. BITTER-ROOT. (*Capt. Meriwether Lewis*, leader of the first U. S. expedition across the continent, first to make the principal species known.) — Perennial acaulescent or nearly acaulescent herbs, with a thick and perpendicular fleshy and farinaceous caudex and root, the crown bearing in spring a rosulate cluster of fleshy leaves and either short 1-flowered scapes or scapose-stalked panicles: flowers conspicuous and handsome, white to roseate or deep red. — Fl. ii. 368; Nutt. Gen. ii. 13, & Jour. Acad. Philad. vii. 24, t. 2; Hook.

<sup>1</sup> Also at Stump Lake, Brit. Columbia, *McEvoy*.

<sup>2</sup> Southward to Central Georgia, *Small*, westward to the mountains of Colorado, acc. to Coulter. (Rocky Mountain specimens so labelled, and seen by the editor, appear to be *T. parviflorum*.)

<sup>3</sup> Also in Greene Co., Missouri, *Blankinship*, in Arkansas, on Middle Fork of Red River, *Marcy Exp.* (*T. teretifolium*, Torr. in Marcy, Red. Riv. Rep. 281), and on "hills of the Blancos," Texas, *Wright*.

<sup>4</sup> Northward to Pipestone City, Minn., *Sheldon*.

Bot. Misc. i. 345, t. 70, & Fl. Bor.-Am. i. 223; Hook. & Arn. Bot. Beech. 344, t. 86; Wats. Bot. King Exp. 44; Brew. & Wats. Bot. Calif. i. 78. The genus is here considerably extended to include the thick-rooted perennial section of *Calandrinia* (§ *Pachyrrhizea*, Gray, Proc. Am. Acad. xxii. 276), rightly separated from *Calandrinia* by Th. Howell on the very different dehiscence of the capsules. Mr. Howell's genus *Oreobroma* (*Erythea*, i. 31), however, cannot be distinguished from *Lewisia* by a single constant or satisfactory generic character as well indicated by K. Brandegee, Proc. Calif. Acad. Sci. ser. 2, iv. 86. [Revised and extended by B. L. ROBINSON.]

§ 1. Sepals or sepaloid bracts 4 to 8 (in *L. rediviva*, var. (?) *Yosemitana*, reduced to 2).

\* Scapæ jointed above the middle and bearing an involucre of 2 or more scarious subulate bracts: cotyledons accumbent. — *Lewisia* proper.

**L. rediviva**, PURSH, l. c. (BITTER-ROOT, RACINE D'AMÈRE.) Leaves in a dense tuft, usually shorter than the scapes, inch or two long, subclavate: involucre of 5 to 7 subulate scarious bracts: sepals 6 to 8, strongly imbricated, broad-oval, somewhat petaloid: corolla bright rose-color varying to white, of 12 to 16 oval or at length spatulate (an inch or more long) petals, rotately spreading in sunshine: stamens 40 or more: style-branches about 8. — Hook. f. Bot. Mag. t. 5395.<sup>1</sup> *L. alba*, Kellogg, Proc. Calif. Acad. Sci. ii. 115, f. 36. — Rocky Mountains from north of British boundary to Wyoming and Utah, west to the Cascade Mountains and Sierra Nevada down to San Bernardino Co., and Arizona, and even on Monte Diablo of the Contra Costa range, California.

**Var.\* (?) Yosemitana**, K. BRANDEGEE, l. c. 89. Closely similar to the type in habit, but very depauperate and with the number of parts in the flowers much reduced: sepals 2, broad, concave, and emarginate: petals 5. — Yosemite Valley, Calif., Mrs. W. F. Dodd.

\* \* Scapæ not jointed near the middle but just beneath the calyx proper, the bracts from the joint 2, decussate with 2 sepals, which they usually closely subtend and much resemble: cotyledons incumbent or oblique.

**L.\* Kellöggii**, K. BRANDEGEE. Dwarf: leaves spatulate, obtuse or retuse; blades 6 lines to an inch in length; the petioles thick, very broad below; outer leaves bractlike being broad oblong-lanceolate scarious phyllodia: peduncles 4 to 7 lines in length, jointed at the base: involucre none: sepals 4, oblong-lanceolate, acute, finely glandular-toothed, 3 to 4 lines in length: petals 5, white, at least twice as long: stamens 12 to 15: style-branches 5; cotyledons oblique (acc. to Mrs. Brandegee). — Proc. Calif. Acad. Sci. ser. 2, iv. 88. *L. brachycalyx*, Greene, Fl. Francis. 176, not Engelm. — Granitic sand on the Sierra Nevada Mts., Central California, at Cisco, Kellogg (1870); Sierra Nevada, without exact locality, Muir (1872); and in Plumas Co., Mrs. Austin (1877). Clearly distinguished from the following species by its glandular-denticulate sepals.

**L.\* brachycalyx**, ENGELM. Leaves spreading in an open rosulate cluster, spatulate and oblanceolate, moderately fleshy, 1 to 4 inches long (including the margined petiole), surpassing the scapes: sepals 4, decussate, oval to oblong, much shorter than the corolla, outer pair narrower: petals 5 to 9, cuneate-obovate, white, sometimes purple-veiny, half inch to almost inch long: stamens 10 to 15: style-branches 5 to 7. — Engelm. in Gray, Proc. Am. Acad. vii. 400; Wats. l. c. 45; Brew. & Wats. Bot. Calif. i. 79. — In wet ground, mountains of Arizona, Newberry, Palmer; S. Utah, Parry, &c.; San Bernardino Co., Calif., Parish.

§ 2. **OREOBROMA**, Howell, l. c., as genus. Calyx of 2 sepals, without closely subtending bracts.

\* Root stout, more or less elongated, at least oblong-conical, bearing at its summit one or more short thick erect caudices.

<sup>1</sup> Add Garden, xxxi. 124, t. 582; Paillieux & Bois, Bull. Soc. Nat. Acclimat. xxxvi. 443-448 (1889), with wood-cut.

+ Seeds granulate, conspicuously strophiolate or arillate at the hilum.

**L.\* Tweedyi**, ROBINSON, n. comb. Caudex and root very thick: leaves obovate, fleshy (2 to 4 inches long, including the winged petiole, and inch or two wide), rather shorter than the 1-3-flowered fructiferous scapes: fructiferous sepals orbicular, or broadly ovate, obtuse, somewhat scarious and colored (5 lines long) and with the alternate narrower bracts of the scape entire and glandless: petals apparently inch long: stamens 10 or 11: capsule 20-30-seeded, 3-valved from below upward; seeds with a large loose scalelike round-reniform arillus rather than strophiole. — *Calandrinia Tweedyi*, Gray, Proc. Am. Acad. xxii. 277. *Oreobroma Tweedyi*, Howell, l. c. 32. — Alpine region, on the sides of Wenatchee Mountains, Yakima region, Washington, at 6,000-7,000 feet alt., *Tweedy*, *Brandegee*.

+ + Seeds obscurely or not at all strophiolate, mostly very smooth and shining.

++ Plant rarely a span high, from an oblong-conical root: scapes 1-3-flowered, mostly with a pair of bracteal small leaves, not surpassing the linear or spatulate-lanceolate moderately fleshy radical leaves.

**L.\* Nevadensis**, ROBINSON, n. comb. Sepals ample, in fruit 4 or 5 lines long, entire: petals 6 to 8, white, half inch long, unequal: stamens 6 to 9: ovules 30 to 40. — *Calandrinia Nevadensis*, Gray, Proc. Am. Acad. viii. 623, xxii. 276; Brew. & Wats. Bot. Calif. i. 75. *Talinum pygmaeum*, Wats. Bot. King Exp. 42, in part. *Oreobroma Nevadensis*, Howell, l. c. 33. — Sierra Nevada, California, from San Bernardino Co., northward, east to the Wasatch Mts. in Utah, and north to Washington; first coll. by *Watson*.

**L.\* pygmæa**, ROBINSON, n. comb. Smaller: scapes less stout: sepals erose-dentate at the quasi-truncate summit, the teeth gland-tipped: petals 6 to 8, rose-red: stamens about as many: ovules 15 to 20: otherwise as in the preceding. — *Talinum pygmaeum*, Gray, Am. Jour. Sci. ser. 2, xxxiii. 407; Wats. l. c., in part. *Calandrinia pygmæa*, Gray, Proc. Am. Acad. viii. 623, xxii. 276, not Muell. *C. Grayi*, Britton, Bull. Torr. Club, xvii. 312. *Oreobroma pygmæa*, Howell, l. c. — Alpine region of the Rocky Mountains, Montana and Wyoming to Colorado (first coll. by *Parry*), west to the Cascade Range, northward to the British boundary, and southward to the Sierra Nevada of California.

++ ++ Scapes or scapiform stems a span or two high from a thick multicapital caudex on a long and thick root, paniculately several-many-flowered: sepals (as in the last preceding species) rounded or subtruncate and erose-dentate or fimbriate, much shorter than the obovate rose-red petals.

= Cauliscent: a pair or two of opposite or subopposite foliar oblanceolate leaves on the stem not far from the base: calyx-teeth and floral bracts glandless.

**L.\* oppositifolia**, ROBINSON, n. comb. Leaves narrowly oblanceolate, the radical and lower cauline similar, 18 lines to 3 inches long, acutish: flowers few, large, long-pedicelled, shortly racemose or subumbellately clustered: bracts of the inflorescence ovate-oblong, somewhat scarious, subentire or erose-denticulate, but with teeth glandless. — *Calandrinia oppositifolia*, Wats. Proc. Am. Acad. xx. 355; Gard. Chron. ser. 3, iv. 601, f. 83; Garden, xl. 485, with fig.; Hook. f. Bot. Mag. t. 7051. *Oreobroma oppositifolia*, Howell, l. c. 32. — Bare moist hillsides, near Waldo, Oregon, and on the Coast Mts. of Del Norte Co., Calif., *Howell*.

= = Foliar leaves essentially basal; those of the stem much reduced and bractlike; floral bracts and calyx with fine glandular-tipped teeth.

a. Leaves fleshy but flattened, obovate to spatulate, rather large, 2 or 3 inches long, usually half inch or more in breadth.

**L.\* Cotylédon**, ROBINSON, n. comb. Leaves obovate-spatulate; those of the cymosely several-flowered scape very few and reduced to small oblong alternate or subopposite bracts: petals about 10, large and red: stamens 7 or 8; their filaments dilated and more or less coherent at the base: ovules 15 to 20. — *Calandrinia Cotyledon*, Wats. Proc. Am. Acad. xx. 355. *Oreobroma Cotyledon*, Howell, l. c. — Siskiyou Mountains of N. California, *Howell*.

**L.\* Howéllii**, ROBINSON, n. comb. Leaves narrower, spatulate, with margins scarious and crisped: flowers large, "red, streaked with orange": stamens nearly or quite free to the base. — *Calandrinia Howéllii*, Wats. l. c. xxiii. 262. *Oreobroma Howéllii*, Howell, l. c. — Moony Mountains, Josephine Co., Oregon. Perhaps only a form of the last.

b. Leaves smaller, flat, narrowly oblanceolate or spatulate, inch or two long, a quarter to a third inch broad.

- L.\* **Columbiána**, ROBINSON, n. comb. "Not glaucous," 4 to 12 inches high: stem bearing few or rather numerous short-oblong glandular-toothed bracts: inflorescence loosely paniculate, several-many-flowered; flowers considerably smaller than in the preceding species, red: petals about 4 or 5 lines long. — *Calandrinia Columbiana*, Howell, in Gray, Proc. Am. Acad. xxii. 277. *Oreobroma Columbiana*, Howell, l. c. — From the Columbia River, Oregon, Howell, to the Olympic Mts., Henderson, and Vancouver Isl., J. M. Macoun; first coll. by Lyall; fl. June, July.

c. Leaves small, as in the last, but "terete."

- L.\* **Leána**, ROBINSON, n. comb. Much like the last, but said to be glaucous, 4 to 8 inches high: inflorescence a much-branched many-flowered panicle; stems disarticulating at the base shortly after anthesis (a trait erroneously attributed to the preceding species by Dr. Gray, l. c.): petals about 7, "white streaked with red": stamens 5 to 8: ovules 5 to 8 (some abortive and seeds fewer?): bracts as in the preceding species fimbriate and with reddish beautifully glandular-tipped teeth. — *Calandrinia Leana*, Porter, Bot. Gaz. i. 49; Gray, l. c. 277. *Oreobroma Leana*, Howell, l. c. 31. — Siskiyou Mts. of California and Oregon, Lee, Howell.

\* \* Stems slender, 1 to several, arising from a small globular corm: single anomalous species, with habit of *Claytonia*, but with circumscissile dehiscence of the capsule.

- L.\* **triphylla**, ROBINSON, n. comb. Corm barely quarter inch thick: plant 1 to 4 inches high: radical leaves unknown; cauline a pair or sometimes a whorl of three, narrowly linear, sessile (half inch to 2 inches long): paniculate cyme 2-20-flowered; pedicels slender and erect in fruit: petals oblong, 3 to 10, 2 lines long: capsule oblong-conical. — *Claytonia triphylla*, Wats. Proc. Am. Acad. x. 345; Gray, l. c. xxii. 278. *Oreobroma triphylla*, Howell, l. c. 33. — Subalpine, Sierra Nevada, California, from above the Yosemite northward to Washington, first coll. by the late Prof. Holton, next by Watson, in the triphyllous state; structure of the capsule noticed by Henderson.

5. **CALANDRÍNIA**, HBK. (*J. L. Calandrini*, a Genevan botanist of the 18th century.) — Pacific-American and Andean (with some outlying Australian) low herbs, mostly alternate-leaved, and with ephemeral red or rose-colored flowers. — Nov. Gen. & Spec. vi. 77, t. 526, as to *C. caulescens*, the first descr. spec.; Howell, Erythea, i. 33. *Calandrinia* § *Eucalandrinia*, Gray, l. c. 277. — The genus is here limited as by Mr. Howell to those species having the capsules dehiscent from the apex. Ours are all annuals. [Revised and restricted by B. L. ROBINSON.]

\* Herbage green: capsule oblong-obovate, acute; seeds rather numerous, lenticular, punctulate, minutely strophiolate.

- C. **caulescens**, HBK. Glabrous or slightly pubescent, or leaves and sepals ciliate, somewhat succulent: stems ascending, a span to a foot high: leaves spatulate-oblanceolate to linear: flowers racemously extra-axillary, short-pedicelled: petals 3 to 5, rose-red to whitish, 2 to 4 lines long: stamens 3 to 6 or more: fructiferous sepals ovate, short-acuminate or apiculate, enveloping the ovate capsule and of about its length; the midrib slightly prominent. — Nov. Gen. & Spec. vi. 78, t. 526; DC. Prodr. iii. 359; Gray, Proc. Am. Acad. xxii. 277. *C. micrantha*, Schlecht. Hort. Hal. 9, t. 5, small-flowered form. — Low ground, Arizona and S. E. California, Pringle, Parish, to islands of Lower California, Palmer, and on Columbia River,<sup>1</sup> Suksdorf, Henderson. (Mex. to Bolivia.) Passes to

**Var. Menziesii**, GRAY, l. c. Flowers larger and longer-peduncled: petals quarter to half inch long, rose-red or purple: stamens 4 to 11. — *Talinum* (*Calandrinia*) *Menziesii*, Hook. Fl. Bor.-Am. i. 223, t. 70, small form, in fruit, probably from California. *C. Menziesii*, Torr. & Gray, Fl. i. 197; Brew. & Wats. Bot. Calif. i. 74. *C. speciosa*, Lindl. Bot. Reg.

<sup>1</sup> Also vicinity of Victoria, Brit. Columbia, Macoun (specimen distrib. as *C. Menziesii*).

t. 1598. *C. elegans*, Spach, Hist. Veg. v. 232. *C. pulchella*, Lilja, Linnæa, xvii. 108. — Low grounds throughout W. California and northward to Brit. Columbia; variable.

**C. Breweri**, WATSON.<sup>1</sup> Stems lax, ascending or trailing, commonly a foot long: leaves spatulate: flowers sparse: pedicels longer, often declined or refracted in fruit: capsule narrower and longer, 5 lines long, becoming nearly twice the length of the calyx. — Proc. Am. Acad. xi. 124; Brew. & Wats. Bot. Calif. i. 74. *C. Menziesii*, var. *macrocarpa*, Gray, Proc. Cal. Acad. Sci. iii. 102. — Santa Inez Mountains, near Santa Barbara, California, Brewer.<sup>2</sup> (La Grulla, Lower Calif., Orcutt.)

\* \* Glaucous: capsule ovoid, obtuse; seeds more turgid, dull and grayish, roughish, conspicuously strophiolate.

**C. maritima**, NUTT. Depressed and small: leaves mostly rosulate at the root, obovate or spatulate: flowers in a loose naked cyme: petals red: fructiferous sepals ovate, 2 lines long, a little shorter than the capsule. — Nutt. in Torr. & Gray, Fl. i. 197; Brew. & Wats. Bot. Calif. i. 75. — Coast of S. California, near San Diego, Nuttall, Thurber, and Santa Monica, Parry.<sup>3</sup>

\* \* \* Very succulent annual: capsule ovoid, obtuse; seeds rather numerous, obovate and lenticular, naked at hilum.

**C. sesuvioïdes**, GRAY. Depressed and spreading from a stout tap-root: stems a span or more long, leafy: leaves linear-spatulate, flattish and strongly edged, very obtuse, inch or more long, some of them opposite: flowers in terminal and lateral somewhat umbellate clusters; pedicels rather longer than the calyx, not jointed: sepals broadly ovate, obtuse, nearly equalling the chartaceous capsule, equalling or exceeding the 5 obovate white petals: stamens 5, sometimes 6 or 8: style very short; stigma subcapitate, undivided: seeds shining, minutely punctulate. — Proc. Am. Acad. xxii. 278. *Claytonia ambigua*, Wats. *ibid.* xvii. 365.<sup>4</sup> — Colorado Desert, at Indio and El Rio, on the Californian side of the river, Lemmon, Parish.

**6. CLAYTÓNIA**, GRONOV. SPRING BEAUTY. (Dedicated by Gronovius to John Clayton, of Virginia, from whose collections and observations he edited the Flora Virginica.) — Low and very glabrous moderately succulent perennials from a corm or thickened caudex, sending up radical leaves and scapes or flowering stems bearing a single pair of opposite leaves (in one species the 1 to 3 cauline leaves commonly alternate). Flowers usually opening for two or three days. Stamens always 5. Capsule 3-valved from the top, about 6-seeded; seeds smooth and shining, mostly with an evident conical or depressed white strophiole at the hilum (as noticed by Humb. & Bonpl. Pl. Æquin. i. 91). — Gronov. acc. to L. Gen. no. 849, & Fl. Virg. 25; Torr. & Gray, Fl. i. 198; Gray, Gen. Ill. i. 223, t. 97, & Proc. Am. Acad. xxii. 278, in part; Howell, Erythea, i. 35; K. Brandegee, Proc. Calif. Acad. Sci. ser. 2, iv. 89. — A genus essentially confluent with *Montia*, but scarcely to be united with it, owing to the diverse habit of the more typical species of the two. The most practicable, although none too definite, division is that suggested by Th. Howell and by K. Brandegee, whereby *Claytonia* is

<sup>1</sup> It has been suggested (Proc. Calif. Acad. Sci. ser. 2, iv. 90) that this species is the Chilean *C. compressa*, Schrad., — a possible identity, which, with the scanty and not very authoritatively named material at hand of the Chilean plant, can neither be confirmed nor wholly disproved. The number of stamens in the Californian plant is about 6, in the Chilean said to be 3 or 4.

<sup>2</sup> Also on the Island of Sta. Cruz, Brandegee, and apparently the same on Mt. Tamalpais, Blankinship.

<sup>3</sup> Also on the Island of Sta. Cruz, Brandegee, and Lower Calif., Palmer.

<sup>4</sup> Add syn. *Calandrinia ambigua*, Howell, Erythea, i. 34. It is much to be regretted that Dr. Gray in transferring this species to *Calandrinia* did not retain the original specific name.

limited, as here, to the cormatose and caudicose members of *Euclaytonia*, Gray (Proc. Am. Acad. xxii. 278). [Revised and restricted by B. L. ROBINSON.]

\* Typical *Claytonia*. (SPRING BEAUTY.) Cormose; the slender 2-leaved stems and sparse and few radical leaves (rarely cœtaneous) from a deep globular corm: leaves linear to oblong: petals light rose, usually with deeper-colored veins: few-seeded capsule 3-valved from top; the valves chartaceous and more or less conduplicate in age, persistent: racemiform inflorescence mainly bractless: flowers (produced in early spring) lasting for a few days: pedicels recurved or drooping in fruit: seeds lenticular, rather narrow-edged, very shining. Species almost confluent in a series.

**C. Virginica**, L. A span or two high from a deep and rather large globular compressed corm: leaves linear-lanceolate or linear, 2 to 6 inches long including the gradually tapering base or margined petiole, 1 to 4 lines broad: raceme rather long-peduncled, at length rather many-flowered: petals often half inch long. — Spec. i. 204; Lam. Ill. t. 144, f. 1; Schk. Handb. t. 50; Michx. Fl. i. 160; Sims, Bot. Mag. t. 941; Lodd. Bot. Cab. t. 643; Sweet, Brit. Fl. Gard. ser. 2, t. 163; Gray, Gen. Ill. i. t. 97; Meehan, Native Flowers, ser. 1, i. 157, t. 40. *C. grandiflora* (& *C. Simsii*), Sweet, Brit. Fl. Gard. t. 216. *C. acutiflora*, Sweet, Hort. Brit. ed. 2, 220. — Woods, in light soil or leaf mould, Nova Scotia to Minnesota,<sup>1</sup> south to Upper Georgia, Louisiana, and Texas, west to the Rocky Mountains in Colorado. Flowers sometimes heterogone-dimorphous, as shown by E. L. Hankenson.<sup>2</sup>

**C. Caroliniána**, MICHX. Lower and fewer-flowered: leaves oblong, oblong-lanceolate, or somewhat spatulate, with blade an inch or two long, abruptly contracted into a margined petiole of same or scarcely half the length: flowers rather smaller. — Fl. i. 160; Ell. Sk. i. 307; ? Sweet, Brit. Fl. Gard. t. 208. *C. Virginica*, var.  $\beta$ , Ait. Kew. i. 284. *C. Virginica*, var. *latifolia*, Torr. Fl. N. & Midd. States, 259. *C. spatulæfolia*, Salisb. Parad. Lond. t. 71. *C. spathulæfolia*, Pursh, Fl. i. 175. *C. Virginica*, var. *spathulæfolia*, DC. Prodr. iii. 361; Hook. Fl. Bor.-Am. i. 224. *C. spatulata*, Eaton, Man. ed. 4, 263. *C. spathulata*, Bigel. Fl. Bost. ed. 2, 98.<sup>3</sup> — Cool woods, Nova Scotia to Saskatchewan, Minnesota, the higher mountains of N. Carolina, and, apparently, those of New Mexico, *Newberry*.<sup>4</sup>

**C. lanceolata**, PURSH. A span high from a globose corm: leaves oblong or lanceolate, half to inch and a half long; radical (rare) long-petioled; cauline sessile either by broad or narrowed base: inflorescence few-several-flowered, subsessile between the leaves or short-peduncled: petals emarginate or almost obcordate. — Fl. i. 175, t. 3 (a large form); Hook. Fl. Bor.-Am. i. 224; Torr. & Gray, Fl. i. 199; Fenzl in Ledeb. Fl. Ross. ii. 147 (excl. pl. Kotzeb. & Siber. which should relate to *C. arctica*); Gray, Am. Jour. Sci. ser. 2, xxxiii. 407. *C. Caroliniana*, var. *sessilifolia*, Torr. Pacif. R. Rep. iv. 70; Brew. & Wats. Bot. Calif. i. 76. *C. Caroliniana*, var. *lanceolata*, Wats. Bot. King Exp. 42. — Rocky Mountains of Brit. Columbia, south to the Wasatch in Utah<sup>5</sup> and Sierra Nevada, California. *C. Caroliniana*, Sweet, Brit. Fl. Gard. t. 208, seems rather to represent the present species.

**C. umbellata**, WATSON. An inch or two high from a subglobular or obversely napiform corm: radical leaves unknown; cauline fleshy, obovate, half inch or more long and contracted into a petiole of equal or greater length: inflorescence subsessile and umbelliform, few-several-flowered: petals obovate, entire: seeds comparatively large. — Bot. King Exp. 43, t. 6, f. 4, 5; Brew. & Wats. Bot. Calif. i. 77. — W. borders of Nevada, near Virginia City, *Watson, Mann*; on Steins Mountain, E. Oregon, *Howell*.

\* \* Caudicose; a rosulate cluster of radical leaves surrounding scapiform flowering stems, directly from the very thick crown or perpendicular caudex surmounting the thick and fleshy tap-root: wing-margined petioles of the radical leaves scarious-dilated and mostly as if sheathing at base: no sarmentose shoots or offsets: inflorescence racemiform or subcymose, with or without some small scarious bracts: petals white or pale rose-color, 3 to 5 lines long, apparently not ephemeral.

<sup>1</sup> Northwest to the Saskatchewan, *Drummond*, *vide* Macoun.

<sup>2</sup> A form with double flowers has been noted by Prof. L. F. Ward.

<sup>3</sup> Add syn. *C. latifolia*, Sheldon, Bull. Geol. & Nat. Hist. Surv. Minn. ix. 15.

<sup>4</sup> Also at Mancos, Colorado, *Miss Eastwood*, and eastward as far as W. Newfoundland, *Waghorne*.

<sup>5</sup> Also Wyoming, *Nelson*.

- C. megarrhiza**, **PARRY**. Root very large (inch or two thick, often a foot long), conical or fusiform : radical leaves spatulate to dilated-cuneate, 2 to 6 inches long including the long wing-petioled base, equalling or surpassing the cymosely few-several-flowered scapes ; these bearing mostly two or rarely more alternate spatulate to linear leaves tapering below as if petioled, or occasionally opposite, or reduced to scarious bracts. — Parry in Wats. Bibl. Index, 118. *C. arctica*, var. *megarrhiza*, Gray, Am. Jour. Sci. ser. 2, xxxiii. 406, & Proc. Acad. Philad. 1863, 59 ; Wats. Bot. King Exp. 43. — Alpine region of the Rocky Mountains from S. Colorado (where first coll. by Parry) to Brit. America and on the mountains of Oregon, &c., where it approaches the next.
- C. ártica**, **M. F. ADAMS**. Radical leaves spatulate-obovate, about half the length of the scapes or flowering stems ; cauline ovate or broadly oblong, closely sessile by broad base (half inch to inch long), obtuse : cyme naked, short-racemiform, rather loosely several-flowered. — Mém. Soc. Nat. Mosc. v. 94 (1817) ; DC. Prodr. iii. 361 ; Cham. Linnæa, vi. 559 ; Gray, Am. Jour. Sci. l. c. 407. *C. Joanniana*, Rœm. & Schult. Syst. v. 434 (1819). *C. Sibirica*, Pall. in herb. Willd., not L. *C. acutifolia*, Ledeb. Fl. Alt. i. 253, & Ic. t. 272, not Pall. *C. Joanneana* & *C. arctica*, Fenzl in Ledeb. Fl. Ross. ii. 148. ? *C. sarmentosa*, Seem. Bot. Herald, t. 5. — Alaskan Islands, Unalaska, Harrington, Kyska, M. Baker. (Adj. Asia to Altai.)
- C. tuberósa**, **PALL**. Radical leaves lanceolate-obovate and acute to linear-lanceolate, shorter than the flowering stems ; cauline lanceolate, acute, broad at sessile base : inflorescence and flowers nearly of the preceding. — Pallas acc. to Willd. in Rœm. & Schult. Syst. v. 436, narrow-leaved form ; Gray, l. c. *C. acutifolia*, Pall. l. c. ; Cham. Linnæa, vi. 560 ; Fenzl in Ledeb. Fl. Ross. ii. 147, larger and broader-leaved form. *C. Eschscholtzii*, Cham. l. c. 561, the most narrow-leaved form. — Arctic Alaska, Muir, but specimen wants root and radical leaves. Also coll. by Rothrock at Plover Bay and by Wright on Arakamtchetchene Island on the Asiatic side. (E. Siberia.)
- \* \* \* Subterranean stems (whether cormatose or caudicose) unknown : cauline leaves subopposite, narrow : pedicels elongated, the lowest subtended by a short relatively broad ovate-lanceolate bract : sepals unequal, narrow and attenuate.
- C.\* Bódini**, **HOLZINGER**. Slender stems 4 to 6 inches high, mostly 2-leaved below the middle : leaves narrowly linear, unequal, about 2 to 3 inches in length, a line or less in breadth : lower pedicels  $1\frac{1}{2}$  to 2 inches long : calyx spathaceous ; the lanceolate attenuate sepals 4 to 5 lines in length, about equalling the ovate-oblong obtusish petals. — Contrib. U. S. Nat. Herb. i. 286. — Sandy soil, Hempstead, Texas, J. E. Bodin, 1890 ; fl. March. A species well marked by habit and characters but as yet poorly known and of uncertain affinities.
- 7. MÓNTIA**, **Micheli**. (*Jos. Monti*, professor of botany at Bologna.) — Nov. Gen. t. 13 ; L. Gen. no. 58 ; Benth. & Hook. Gen. i. 159, excl. syn. *Leptrina*, Raf., which is wholly obscure ; Greene, Fl. Francis. 180 ; Howell, Erythea, i. 36. *Montia* and *Claytonia* § *Limnia* (as well as the rhizomatose species of *Euclaytonia*) Gray, Proc. Am. Acad. xxii. 280, 284. [Revised and extended by B. L. ROBINSON.]

§ 1. Rhizomatose ; the flowering stems, bearing a pair of broad sessile leaves below the racemiform mostly bractless inflorescence, and the long-petioled radical leaves from creeping little-thickened rootstocks : petals obovate and emarginate or obcordate, rose-color or white : pedicels in fruit erect or ascending. \*

**M.\* sarmentósa**, **ROBINSON**, n. comb. About a span high from creeping filiform rootstocks or stolons moderately thickened at the crown : radical leaves obovate-spatulate, mostly obtuse, half inch or more long, abruptly contracted into a longer petiole with no scarious dilated base ; cauline ovate or orbicular, closely sessile : flowers few : petals broadly obovate, emarginate, a third to half inch long, 3 or 4 times the length of the sepals. — *Claytonia sarmentosa*, C. A. Meyer, Mém. Soc. Nat. Mosc. vii. 137, t. 3 (1829) ; Fenzl in Ledeb. Fl. Ross. ii. 149 ; Seem. Bot. Herald, 27, but the figures, t. 5, seem rather to be of *C. arctica*. *C. Chamissoi*, DC. Prodr. iii. 361, *fide* Fenzl, not Ledeb. in Spreng. *C. arctica*, vars., Cham.



Linnaea, l. c. 559. *C. Virginica*, Hook. & Arn. Bot. Beech. 123, in part. — St. Lawrence, St. Paul and St. George Islands, Alaska, first coll. by Chamisso & Eschscholtz, and Kotzebue Sound. (Adj. Asia.)

**M.\* asarifolia**, HOWELL. A foot or less high from a slender or slightly fleshy creeping rootstock: leaves succulent; radical from orbicular-subcordate or slightly reniform to rhombic-ovate; the larger 2 inches (or even 4 inches, acc. to Bongard) in diameter, long-petioled; cauline pair of similar form, closely sessile: inflorescence slender-pedunculate, loosely several-flowered, with occasionally a small bract: petals a quarter or third inch long: fructiferous sepals rather shorter than the capsule. — *Erythra*, i. 39; *Claytonia asarifolia*, Bong. Veg. Sitch. 137; Fenzl in Ledeb. Fl. Ross. ii. 150. *C. Nevadaensis*, Brew. & Wats. Bot. Calif. i. 77, a dwarfed form. *C. cordifolia*, Wats. Proc. Am. Acad. xvii. 365. — Wet or springy ground, Rocky Mountains of Brit. America, *Macoun*; Montana and Idaho, *Lyll*, *Nevius*, *Watson*; and Cascade Mountains, *Henderson*, *Suksdorf*, to Sitka, *Mertens*. Also in a reduced form in Sierra Nevada, California, *Lemmon*, &c. (Bering Island.)

§ 2. **LÍMNIA**. Fibrous-rooted annuals or perennials, destitute of rootstocks, corms, &c., but some stoloniferous or rooting from the nodes or bulbiferous: one sepal commonly a little larger than the other, and the two petals alternating with these commonly larger than the others. Flowers in most species opening more than one day. — *Limnia*, L. Act. Holm. 1746, 130, t. 5; Haworth, Syn. Pl. Succ. 11.

\* Cauline leaves a single sessile pair below the racemiform inflorescence; radical numerous and petioled: petals emarginate or obcordate: stamens always 5.

+ Bracts accompanying most of the pedicels of the simply and loosely racemiform inflorescence: leaves thinnish. Connects strictly with the preceding species.

**M.\* Sibíríca**, HOWELL, l. c. Annual or more enduring and with thickened crown producing offsets upon stout stolons, but no rootstock: flowering stems a span or two or a foot or two high: radical leaves rhombic-ovate (and varying from broadly ovate or obovate to ovate-lanceolate), contracted into long margined petioles, these fleshy-thickened at base; cauline broadly ovate and closely sessile but distinct, sometimes obovate and with contracted base, inch or two long: bracts oblong to linear: pedicels usually solitary and alternate, slender, in fruit often inch or more long and widely spreading or refracted: sepals very broadly ovate, mostly accrescent: petals rose-color or white, quarter inch long: seeds at maturity distinctly granulate. — *Claytonia Sibíríca*, L. Hort. Ups. 52, & Spec. i. 204 (*Limnia*, Act. Holm. l. c.); Gmel. Fl. Sibír. iv. 89; Sims, Bot. Mag. t. 2243; Sweet, Brit. Fl. Gard. t. 16; Torr. & Gray, Fl. i. 676, excl. syn.; Fenzl in Ledeb. Fl. Ross. ii. 149; Gray, Am. Jour. Sci. ser. 2, xxxiii. 407; Brew. & Wats. Bot. Calif. i. 76. *C. alsinoides*, Sims, Bot. Mag. t. 1309, white-fl. form; Pursh, Fl. i. 175; Cham. Linnaea. vi. 559; Bong. l. c. 136; Torr. & Gray, Fl. i. 199. *C. Unalaschkensis*, Fisch. Hort. Gorenk. ed. 2, 62, & in Roem. & Schult. Syst. v. 434; DC. Prodr. iii. 361. *Limnia Sibíríca* & *L. alsinoides*, Haworth, Syn. Pl. Succ. 11. — Moist banks, &c., Alaskan Islands and Brit. Columbia (first coll. by *Steller* & *Pallas*?) and south to San Francisco Bay and Plumas Co. in Sierra Nevada, California. (Bering Island, and probably on the adjacent mainland; but not otherwise known to be Siberian.)

**Var.\* heterophýlla**, ROBINSON, n. comb. A form with leaves, especially radical ones, varying from ovate-lanceolate to linear-lanceolate or even linear! — *Claytonia Sibíríca*, var. *heterophylla*, Gray, Proc. Am. Acad. xxii. 281. *C. Unalaschkensis*, var. *heterophylla*, Nutt. in Torr. & Gray, Fl. i. 199, & *C. alsinoides*, var. *heterophylla*, Torr. & Gray, l. c. — On the Columbia River and elsewhere, in moist and shady ground.

**Var.\* bulbífera**, ROBINSON, n. comb. Thickened bases of radical leaves more fleshy and persistent on the crown as bulblet-scales. — *Claytonia bulbífera*, Gray, Proc. Am. Acad. xii. 54; Wats. Bot. Calif. ii. 435. *C. Sibíríca*, var. *bulbillífera*, Gray, l. c. xxii. 281. *Montia bulbífera*, Howell, l. c. — N. California, on the Scott Mountains, *Greene*, and Wolf Creek, in adjacent Oregon, *Howell*. Other less marked specimens pass to the ordinary form of the species.

**M.\* arenicola**, A. A. HELLER. Much more slender yet approaching in habit var. *heterophylla* of the preceding species: stems numerous, 2 to 6 inches high: radical leaves lance-oblong to spatulate-linear, the cauline similar: raceme loose, elongated; pedicels slender, widely spreading or reflexed: flowers roseate, rather showy: calyx often with reddish tinge: seeds black, half line in length, very smooth and shining, scarcely more than half as large as in the preceding species. — [List of] Idaho Plants, 1896, on the second [unnumbered] page. (The thoughtless publication of new combinations in such irregular and obscure documents merits severe censure.) *Claytonia arenicola*, Henderson, Bull. Torr. Club, xxii. 49; Holzinger, Contrib. U. S. Nat. Herb. iii. 217. *C. spatulata*, var. *tennifolia*, Gray, Proc. Am. Acad. xxii. 282, in part. — Along creek-bottoms and on stony land, Washington, near Spokane, Lyall, Henderson, Bingen, Suksdorf; Idaho, Spalding, Sandberg, Henderson; fl. April to June. Nearest *M. gypsophiloides*, but of different range and readily distinguished by its much more decidedly bracteate racemes, and much more slender elongated cauline leaves.

+ + Bracts few and minute or none: leaves succulent; the cauline pair usually connate: flowers apparently opening for 2 or more days: species or forms (except the first) confluent in a series.

**M.\* saxósa**, BRANDEGEE, in litt. Small and dense, succulent: root annual, subsimple, slender, perpendicular: radical leaves broadly spatulate or obovate, 3 to 6 lines long, 2 to 3 lines broad, rounded at the apex, and somewhat narrowed at the subsessile base; cauline leaves a single pair, ovate, obtuse, quarter inch or less in length, not connate: flowers subumbellate; pedicels equalling or exceeding the short scape-like stem: sepals suborbicular, 2 lines in diameter: roseate petals twice as long: valves of the capsule  $1\frac{1}{2}$  to 2 lines in length: seeds large, black, foveolate-striate. — *Claytonia saxosa*, Brandegee, Zoe, iv. 150. — Shaly slopes of Snow Mountain, Lake Co., and on Yolo Bolo, California, Brandegee. Forming "dense succulent balls, 1 to 3 inches in diameter" and rather well marked among the related forms by its short and broad scarcely petiolate radical leaves.

**M.\* perfoliáta**, HOWELL, l. c. 38. Rather large and coarse, green and often reddening in age, a span to a foot high: radical leaves from subreniform or rhomboidal to spatulate-obovate (commonly 1 to 3 inches broad), petiolate; cauline connate into an entire or often angulately 2-lobed rounded disk: pedicels short, seldom longer than the fruiting calyx, commonly in 3 or 4 pairs or fascicles in a short interrupted and second raceme, sometimes all or a part closely clustered close to the disk: sepals orbicular, in fruit commonly 2 lines long and broader than the capsule: petals white, little surpassing the calyx: seeds turgid-lenticular, very shining, but at maturity minutely granulate, the larger a line long or more. — *Claytonia perfoliata*, Donn, Ind. Hort. Cantab. ed. 1, 25 (1796); Willd. Spec. i. 1186; Sims, Bot. Mag. t. 1336; Hook. Fl. Bor.-Am. i. 225; Torr. & Gray, Fl. i. 200. *C. Cubensis*, Bonpl. Ann. Mus. Par. vii. 82, t. 6, & Pl. Æquin. t. 26, but not native to Cuba. *Limnia perfoliata*, Haworth, Syn. Pl. Succ. 12. — Banks of streams, &c., California to Arizona (and adj. Mex.), northward to Brit. Columbia, common near the coast; first collected by Menzies, now a weed of cultivation in many parts of the world.

**M.\* parviflóra**, HOWELL, l. c. More slender, green or glaucescent, a span or two high: radical leaves spatulate to filiform-linear, when narrow usually an elongated blade and shorter petiole; cauline a rounded disk as of the preceding, or rarely the rounded leaves almost disjointed: pedicels slender, in fruit 2 to 6 lines long and much longer than the (about line long) calyx, less fascicled, more commonly scattered in a looser raceme, but sometimes inflorescence all glomerate on the disk: petals white or pale rose-color, hardly double the length of the calyx: seeds half as large as in the foregoing, very obscurely if at all granulate. — *Claytonia parviflora*, Dougl. in Hook. Fl. Bor.-Am. i. 225, t. 73; Torr. & Gray, Fl. i. 200. *C. perfoliata*, var. *parviflora*, Torr. Pacif. R. Rep. iv. 71, & Bot. Mex. Bound. 38; Brew. & Wats. Bot. Calif. i. 75. — California to Brit. Columbia, and east to S. Utah and Idaho; first coll. by Douglas. (Lower Calif., Palmer.)

**Var.\* depréssa**, ROBINSON, n. comb. Mostly small, depressed: radical leaves broadly ovate or rhomboidal and petiolate, as in *C. perfoliata*; blades sometimes broader than long; cauline usually small and partly disjointed, subtending sessile and glomerate or subumbellate inflorescence of small flowers: calyx only a line long. — *Claytonia parviflora*, var. *depressa*, Gray, Proc. Am. Acad. xxii. 281. — River banks, &c., Brit. Columbia to Oregon and adjacent

Idaho. Ambiguous form.<sup>1</sup> *Montia rubra*, Howell, l. c., is merely a larger often erubescens state of the same thing.

**M.\* gypsophiloides**, HOWELL, l. c. Rather slender, 3 to 8 or 10 inches high, erect or nearly so: radical leaves linear or filiform, much exceeded by the flowering stems: cauline leaves usually short, ovate, acutish, to oblong-linear, partially connate on one side (rarely on both) to a small acutely biauriculate disk: inflorescence slender, elongated; flowers conspicuous: petals retuse, roseate, about 3 times the length of the sepals. — *Claytonia gypsophiloides*, Fisch. & Mey. Ind. Sem. Hort. Petrop. ii. (1835), 8, & Sert. Petrop. t. 35; Don in Sweet, Brit. Fl. Gard. ser. 2, t. 375. *C. spathulata*, Gray, Proc. Am. Acad. xxii. 282, in part, not Dougl. — Mountains of W. Centr. California. *C. nubigena*, Greene, Pittonia, ii. 294, with flowers of this species, has cauline leaves connate into a roundish disk, as in *C. parvifolia*.

**M.\* spathulata**, HOWELL, l. c. Lower and more condensed, 1 to 4 inches high: radical leaves linear or spatulate-linear, not greatly exceeded by the flowering stems; cauline leaves from lanceolate-ovate to lanceolate, almost distinct or connate upon one side into an obcordate or 2-lobed body or rarely united all around to a peltate disk: inflorescences short, half inch to barely inch in length: flowers small: petals white, 1 to 2 lines in length: seeds at maturity black, shining, conspicuously granulated (under lens). — *Claytonia spathulata*, Dougl. in Hook. Fl. Bor.-Am. i. 226, t. 74; Torr. & Gray, Fl. i. 200; Greene, Fl. Francis. 179. *C. perfoliata*, var. *spathulata*, Torr. acc. to Brew. & Wats. Bot. Calif. i. 75. *C. exigua*, Wats. Bot. Calif. ii. 435, in great part. — Open and subsaline ground, Brit. Columbia to S. Utah and S. California; first coll. by Douglas.

**Var.\* exigua**, ROBINSON, n. comb. Even the cauline leaves narrowly oblong, linear or when fresh terete (half inch to 2 inches long), little or not at all dilated or connate at base, sometimes connate on one side: petals usually rose-color: passes variously into the other form. — *M. tenuifolia*, Howell, l. c. *Claytonia exigua*, Torr. & Gray, Fl. i. 200; Gray, Pl. Fendl. 14 (a lax and dubious seemingly thinner-leaved form). *C. tenuifolia*, Torr. & Gray, l. c. 201; Hook. & Arn. Bot. Beech. 344. *C. spathulata*, var. *tenuifolia*, Gray, Proc. Am. Acad. xxii. 282. — Brit. Columbia to borders of Idaho and Lower Calif., first coll. by Douglas.

\* \* Stems bearing few or several pairs of opposite spatulate leaves, fibrous-rooting from lower nodes, often flagelliferous: seeds round-reniform, muriculate! Stamens 5. — *Claytonia* § *Alsinastrum*, Torr. & Gray, Fl. i. 201; Gray, Proc. Am. Acad. xxii. 282.

**M.\* Chamissonis**, GREENE. Procumbent, decumbent, or ascending, rooting from lower nodes, producing lateral and terminal filiform runners, which become subterranean and bear at apex a globose bulblet or cormlet, thus perennial: leaves several pairs, oblong-spatulate, inch or two long including the tapering petiole-like base: inflorescence racemously 1-9-flowered, bractless except below: pedicels slender, recurved or refracted in fruit: petals pale rose-color, 3 lines long, thrice the length of the calyx: capsule small, 1-3-seeded; seeds half line long, densely granulate-muriculate. — Fl. Francis. 180. *Claytonia Chamissoi*, Ledeb. acc. to Spreng. Syst. i. 790. *C. Chamissonis*, Eschs. in litt. fide Cham. Linnæa, vi. 562 (excl. note on tubers), probably the original form of the name, but not published until six years after Sprengel's Syst.; Torr. & Gray, Fl. i. 676; Fenzl in Ledeb. Fl. Ross. l. c. 151; Brew. & Wats. l. c. 76. *C. stolonifera*, C. A. Meyer, Mém. Soc. Nat. Mosc. vii. 139, t. 3 (1829). *C. aquatica*, Nutt. in Torr. & Gray, Fl. i. 201. — Wet or mossy banks, Alaskan Islands and Brit. Columbia, to mountains of California as far south as those of San Bernardino, Arizona, and S. Colorado.

\* \* \* Stems slender, bearing numerous small alternate leaves, often sarmentose, spreading or decumbent, and producing axillary bulblet-like propagula, apparently also perennial by fibrous-rooting persisting creeping base of stem: leaves very fleshy. — *Claytonia* § *Naiocrene*, Torr. & Gray, Fl. i. 201, in part; Gray, Proc. Am. Acad. xxii. 283.

**M.\* parvifolia**, GREENE, l. c. 181. Stems a span to a foot long, diffuse, ascending or some reclined or procumbent and more or less flagelliform, sometimes reduced to filiform naked

<sup>1</sup> Eastward to the Black Hills, S. Dakota, Rydberg. A number of interesting, but apparently formal and confluent varieties of this and the next species have been distributed by Mr. W. N. Suksdorf of White Salmon, Washington.

runners: radical and lower cauline leaves rhombic-obovate, acutish, about half inch long, contracted at base into slender petiole; upper narrower and small (3 to 2 lines long), when fresh subclavate: flowers few and racemose: petals obovate or somewhat obcordate, 4 or 5 lines long, very much surpassing the rounded sepals, rose-color, varying to white. — *Claytonia parvifolia*, Moc. Ic. Pl. Nootk. ined. acc. to DC. Prod. iii. 361, & Calques des Dess. t. 383; Torr. & Gray, Fl. i. 201; Brew. & Wats. Bot. Calif. i. 76. *C. filicaulis*, Hook. Fl. Bor.-Am. i. 224, t. 72. — Moist rocks, Brit. Columbia to Rocky Mountains in Montana northward to Juneau, Alaska, *Miss Cooley*, and south in the Sierra Nevada and Coast Range, California, to the Yosemite. The bulblet-like propagula or offshoots, borne in the axils of the cauline leaves, are not commonly seen in the dried specimens. A variety from Washington, *Suksdorf*, with obovate obtuse chiefly radical leaves and filiform branches, differs from the next only in its smaller flowers and less leafy stem.

**M.\* flagelláris**, ROBINSON, n. comb. Apparently less fleshy, and with broadly ovate or obovate leaves, the weak stems a foot long, sparingly branched, the branches apparently attenuate into a kind of stolon or stoloniform peduncle: petals over half inch long. — *Claytonia flagellaris*, Bong. Veg. Stch. 137. "*C. sarmentosa*, Bong." in Gray, Proc. Am. Acad. xxii. 283 (by evident clerical error). — Sitka, *Mertens*. Perhaps a form of the preceding growing in deep shade. Prof. Macoun (Cat. Canad. Pl. ii. 311, 312) reports the collection of an identical or closely similar plant in the bed of Eagle Riv., Brit. Columbia (also called "*C. sarmentosa*, Bong.").

\* \* \* \* Leafy-stemmed and alternate-leaved annuals: leaves not very fleshy. — *Claytonia* § *Montiastrum*, Gray, l. c.

+ Leaves broad and long-petioled, in the way of *Stellaria media*: stamens 5: seeds closely lineate and the elevated lines closely and transversely lineolate!

**M.\* diffúsa**, GREENE, l. c. A span or two high, diffusely dichotomous, leafy, the weak stems at first erect: leaves broadly deltoid-ovate or uppermost oblong-ovate, inch or less long, abruptly contracted into a petiole of about equal length (lower occasionally opposite): inflorescence subcymose, several-flowered; pedicels slender, spreading: calyx a line or two long, surpassed by the white or pale rose-colored petals: style long. — *Claytonia diffusa*, Nutt. in Torr. & Gray, Fl. i. 202; Brew. & Wats. Bot. Calif. i. 76; Gray, l. c. — Low coniferous woods, Washington to Humboldt Bay, California,<sup>1</sup> *Nuttall*, *Kellogg* & *Harford*, *Suksdorf*, *Howell*, *Rattan*.

+ + Narrow-leaved annuals (lower nodes of the stem sometimes rooting) with racemose inflorescences: second and pedicels recurved after flowering: leaves partly scarious and clasping at insertion: stamens 3: seeds lenticular, thin-edged, very smooth: petals (white or tinged with rose) obviously unequal, but narrowed or unguiculate to distinct or more or less connate bases.

**M.\* lineáris**, GREENE, l. c. A span or two high, erect or soon diffuse: leaves linear-filiform and fleshy, inch or two long, about a line wide throughout, or obscurely widened upward: sepals in fruit 2 lines long or nearly so, rounded: seeds large (a line in diameter), very black and shining. — *Claytonia linearis*, Dougl. in Hook. Fl. Bor.-Am. i. 224, t. 71; Torr. & Gray, l. c.; Brew. & Wats. l. c. (excl. syn. *C. dichotoma*); Gray, l. c. — Moist ground, Brit. Columbia to middle parts of California, and east to Montana and the Yellowstone; first coll. by *Douglas*.

**M.\* dichótoma**, HOWELL, l. c. 36. An inch or two high, more diffuse or depressed but not repent, smaller in all parts: leaves similar but smaller, linear or nearly so: racemes terminal, rather dense, and numerous flowered: sepals in fruit only a line long: seeds half or third of a line in diameter, somewhat shining or rather dull at maturity. — *Claytonia dichotoma*, Nutt. in Torr. & Gray, Fl. i. 202. *C. spatulata*, Hook. Jour. Bot. vi. 230, not Dougl. — Low grounds on the Oregon River and its lower tributaries, and borders of California; first coll. by *Nuttall*.

**M.\* Howéllii**, WATSON. Similar in habit, but still more dwarf, rooting at the lower nodes: leaves spatulate: inflorescences several, few-flowered, axillary, subtended by ovate scale-like

<sup>1</sup> Abundant at Mill Valley, Tamalpais, Calif., *vide* T. S. & K. Brandegee.

bracts (or short leaves with broad scarious bases) opposite the foliar leaves: petals very variable, sometimes apparently absent: seeds very smooth and shining. — Proc. Am. Acad. xviii. 191; Howell, l. c. *Claytonia dichotoma*, Gray, l. c. 284, in part; Macoun, Cat. Canad. Pl. i. 83. — Oregon, Willamette Valley, *Howell*, Columbia Co., *Suksdorf*; vicinity of Victoria, Brit. Columbia, *Macoun*, no. 34.

\* \* \* \* Leafy-stemmed opposite-leaved species (annual or nearly so): petals small, white, unequal, connate at the base into a gamopetalous corolla, which is split down one side. — *Montia* proper.

**M.\* fontána**, L. Small and ascending or procumbent annual, or subperennial by rooting from the nodes, especially in water or very wet places, moderately succulent: stems an inch to a span or when floating even a foot long: leaves opposite, from obovate- to linear-spatulate, from a tenth to half an inch long including the petiole-like base, in uppermost pairs one often reduced to a scarious vestige or bract: inflorescence terminal or lateral, loosely few-several-flowered: calyx and globose capsule barely a line long: corolla white, little surpassing the calyx. — Spec. i. 87; Fl. Dan. t. 131, 1926. Two forms as to seeds, not clearly distinguishable otherwise, viz.: 1. Seeds not shining, thickly muriculate in close lines: *M. minor*, Gmel. Fl. Bad. i. 301. 2. Seeds more or less shining, areolate-tuberculate, the tubercles being in various degrees flattened and smoothed: *M. rivularis*, Gmel. l. c. 302, & *M. lamprosperma*, Cham. Linnaea, vi. 565, t. 7, f. 2, seed. — Wet places and running water, Newfoundland, Labrador (Greenland), New Brunswick, Lower Canada, and on islands near Mt. Desert, Maine, Great Cranberry Isle, *Rand*, Great Duck Island, *Redfield*; to Alaskan Islands and Brit. Columbia, the smoother-seeded form; also Oregon and California, mostly the rough-seeded or typical species. From the latter form the imperfectly characterized *Claytonia Hallii*, Gray, Proc. Am. Acad. xxii. 283 (*C. Chamissonis*, var. *tenerrima*, Gray, l. c. viii. 378, and probably *Montia Hallii*, Greene, Fl. Francis. 180), is not to be distinguished even by corollar characters. (Most cool and temperate parts of the world.)

**8. SPRÁGUEA**, Torr. (*Isaac Sprague*, inimitable botanical draughtsman, illustrator of this and of very many other genera, among them those of the Genera Am. Bor. Or. Illustrata.) — Pl. Frém. in Smiths. Contrib. vi. 4, t. 1, & Bot. Mex. Bound. 37; Hook. Bot. Mag. t. 5143. — Single genuine species, almost too near the following genus, but may be retained.

**S. umbelláta**, Torr. l. c. Winter-annual or biennial with a tap-root, or perennial, glabrous, with fleshy spatulate leaves, either all rosulate-clustered at the crown and scape (2 to 8 inches high) naked or nearly so, or with few to several similar but smaller scattered cauline leaves: inflorescence usually umbellate-cymose, at first capitate-glomerate, at length 5-13-radiate (usually from a short scarious involucre) into imbricately densely flowered simple or forking scorpioid cyme-branches, or with these scattered; flowers subsessile, some scarious-bracteate: scarious sepals dull white or rose-tinged, in age 3 to 5 lines in diameter, in anthesis equalling the rose or purple or whitish (ephemeral but marcescent) petals: stamens two opposite petals and the third alternate: these and the style exserted. — *S. paniculata*, Kellogg,<sup>1</sup> Proc. Calif. Acad. Sci. ii. 187, f. 56; Curran, Bull. Calif. Acad. Sci. i. 132, also *S. umbellata*, var. *montana*, M. E. Jones, Bull. Torr. Club, ix. 31, are mere forms, the latter sometimes with alternate flowering branches low down on the scape. *Calyptidium umbellatum* & *C. paniculatum*, Greene, Bull. Torr. Club, xiii. 144 (petals marcescent-connivent around ovary and lower part of exserted style, not carried up on enlarging capsule). *C. nudum*, Greene, Pittonia, i. 64.<sup>2</sup> — Sierra Nevada and Cascade Mountains, from the Yosemite to borders of Brit. Columbia, and Nevada to N. W. Wyoming; in alpine and subalpine stations quasi-perennial, but flowering only once; on sand-washes of streams at lower levels

<sup>1</sup> The supposed difference in the form of the seeds, adduced by California botanists for the separation of this species from *S. umbellata*, rests upon a misapprehension, as the seeds of the typical *S. umbellata* are quite as reniform as those of "*S. paniculata*."

<sup>2</sup> Addsyn. *S. nuda*, Howell, Erythea, i. 39. ? *Calyptidium monospermum*, Greene, Erythea, iii. 63, chiefly distinguished by its "1-seeded" capsules.

growing as an annual or biennial; first coll. by *Frémont*. The most marked subalpine form is

**Var. caudicifera**, GRAY. Branching from the crown, the caudex-like branches extending for a year or more, and the leaves below dying away, at length the rosulate tufts terminated by solitary naked scapes of an inch or two in length bearing the globular glomerate inflorescence: tap-root probably not perennial: leaves short and small. — Gray in Patterson, Check-list N. Am. Pl. (1892) 14.<sup>1</sup> — High mountains, from Oregon and Washington to Wyoming.

**9. CALYPTRIDĪUM**, Nutt. (A kind of diminutive of *καλύπτρα*, a covering or calyptræ. Genus said to have "petals united into a minute diaphanous conical corolla, slightly 3-toothed at apex, soon detached from the base and carried upon the summit of the elongated capsule." But, in fact, the petals are quite distinct, and they close over each other and over the pistil after the ephemeral anthesis, and are carried up as aforesaid, just as they are in *Claytonia* and most other *Portulacaceæ*!) — Low or depressed and succulent winter annuals (of W. North America), branched from the base, with alternate spatulate leaves, and mostly second insignificant flowers with very small (white) petals, but accrescent and more or less colored and scarious calyx. — Nutt. in Torr. & Gray, Fl. i. 198 (excl. syn. *Talinum monandrum*, which is *Monocosmia*, Fenzl, with inaccrescent calyx enclosing utricular fruit); Benth. & Hook. Gen. i. 159; Wats. Bot. King Exp. 44; Brew. & Wats. Bot. Calif. i. 78; Gray, Proc. Am. Acad. xxii. 284, with new character.

\* Petals 4: stamens in the same species 1, 2, or 3, when solitary opposite a petal: capsule little or not at all surpassing the fructiferous calyx; seeds acute-margined. Connects with *Spraguea*!

**C. quadripétalum**, WATSON. A span high: leaves oblong-spatulate, the larger 2 inches long including tapering base and petiole: flowers crowded as if imbricated in a naked and secund scorpioid-spiciform inflorescence: sepals round-reniform, plane, at maturity fully 3 lines in diameter, white-scarious and rose-tinged with greenish centre: petals comparatively large: style very short: capsule oblong-oval, 10–20-seeded, not surpassing the fructiferous sepals. — Proc. Am. Acad. xx. 356.<sup>2</sup> — Lake Co., California, *Torrey* (1865); and along headwaters of Eel River, in same county, *Rattan* (1884).<sup>3</sup> Has the sepals of *Spraguea*.

**C. Párryi**, GRAY. Depressed, small-leaved: leaves (only half inch long) spatulate or the rosulate radical ones cuneate-obovate with long tapering base: spikes in age secund and scorpioid, but often with short few-flowered clusters: fructiferous sepals orbicular or oval, not emarginate at base, less complanate, herbaceous with narrow white margin, one or two lines long, a little shorter than the oblong capsule: style half the length of the ovoid ovary. — Proc. Am. Acad. xxii. 285. — Mountains of San Bernardino Co., California, in Bear Valley, *Parry* (1876, distrib. as *C. roseum*, var. *robustum*), *Parish*, 1885.

\* \* Petals 2 or 3: stamen one, alternate with the petals: sepals moderately accrescent, green-herbaceous with scarious margin: seeds more turgid, obtuse-edged: inflorescence looser and more paniculate, the short clusters hardly scorpioid: leaves spatulate with long tapering base, the larger inch or more long.

**C. róseum**, WATSON. An inch to a span high, diffuse: sepals orbicular, plane, becoming 2 or 3 lines in diameter, the broad scarious margin white or tinged with rose: petals only 2 and small: style very short, 2-parted and with subcapitate stigmas: capsule ovate-oblong, not surpassing the calyx, 6–12-seeded. — Bot. King Exp. 44, t. 6, f. 6–8; Brew. & Wats.

<sup>1</sup> Add syn. *S. multiceps*, Howell, Erythra, i. 39. As striking as the extreme form of this variety may be, it appears to pass by slight gradations into the typical form of the species.

<sup>2</sup> Add syn. *C. tetrapetalum*, Greene, Fl. Francis. 182.

<sup>3</sup> Also in Sonoma Co., acc. to Greene.

Bot. Calif. i. 78. — Dry districts, eastern borders of California and adjacent Nevada (where first coll. by *Torrey*, 1865) to E. Oregon and Wyoming, in very depauperate form, first coll. by *Parry*.

- C. monándrum**, Nutt. Depressed or spreading stems a span or so long: sepals only a line long, narrow-margined, little accrescent: petals more commonly 3: filament subulate: style very short, undivided: capsule linear, becoming much exserted, 5–10-seeded. — Nutt. in Torr. & Gray, Fl. i. 198 (excl. the doubtful syn.); Gray, Bot. Ives Rep. 8; Brew. & Wats. Bot. Calif. i. 78. — S. California on the coast, from San Diego (where first coll. by *Nuttall*) to Los Angeles,<sup>1</sup> and to W. Arizona.

## ORDER XXI. TAMARISCINÆ.

By B. L. ROBINSON.

Trees, shrubs, or rarely perennial herbs, with alternate entire thickish often small and scale-like exstipulate leaves and regular perfect or rarely dioecious flowers. Sepals 4 to 5, free nearly or quite to the base and imbricated. Petals of equal number, free or connate into a gamopetalous 4–5-lobed corolla, inserted beneath and outside of a hypogynous or nearly hypogynous disk. Stamens 4 or 5 to  $\infty$ ; filaments free or connate at the base or rarely united into a tube for most of their length; anthers oblong, bilocular, introrse, often appendaged at the apex. Ovary single, free, unilocular; carpels, parietal placentæ, and free styles or stigma-lobes 3 or 4 each; few or numerous erect ovules anatropous with ventral raphe. Fruit capsular; valves as many as the styles; seeds few to many, often provided with a hairy appendage or less frequently winged; embryo straight; albumen often scanty or none. — A small but composite order, represented in our limits only by the sparingly naturalized *Tamarix* of cultivation and the anomalous genus *Fouquieria*, which shows almost equal affinity to *Crassulaceæ*.

1. **TAMARIX**. Sepals 4 to 6. Petals free nearly or quite to the base. Stamens 4 to 12, distinct or nearly so. Ovary ovate-attenuate, with 3 to 5 short thickish styles. Placentæ multi-ovulate, essentially basal. Leaves very small and scale-like.
2. **FOQUIERIA**. Sepals 5, unequal. Petals united into a tubular gamopetalous 5-lobed corolla. Stamens 10, 15, or  $\infty$ , free or nearly so. Ovary ovoid, not attenuate; styles 3, slender, free or united; placentæ parietal, extending the whole length of the ovary and more or less intruded as partial septa. Leaves fleshy, obovate. Flowers showy.

1. **TÁMARIX**, L. TAMARISK. (Classical Latin name.) — Gen. no. 240; Ledeb. Ic. t. 253, 254, 256; Bunge, Tent. Monog. Tamar.; Benth. & Hook. Gen. i. 160; Baill. Hist. Pl. ix. 244; Niedenzu in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 6, 293. — Asiatic and Mediterranean ornamental shrubs and trees with slender scaly branchlets and spicate white or roseate flowers of small size. A single species often cultivated for ornament is sparingly and locally established in America.

**T. GÁLICA**, L. Glabrous: stems and flexuous branches purplish brown: minute *juniper*-like leaves ovate, acuminate, subcarinate, semi-amplexicaul, pale green or somewhat glaucous, half line in length, at first closely imbricated, later scattered; tips incurved: spikes dense,

<sup>1</sup> Northward to the San Rafael Mts., Santa Barbara Co., *Ford*.

cylindrical, flexuous, rather blunt, terminal on the short racemously arranged upper branchlets: flowers small, numerous: petals oblong, about a line in length, white, cream-color, or purplish tinged: anthers yellow or purple. — Spec. i. 270; Sibth. Fl. Gr. t. 291; Bunge, l. c. 61. — A beautiful shrub frequent in cultivation and tending to escape in the Southern States; permanently established on James Island, near Charleston, S. Car., *C. E. Smith*; also naturalized in S. and W. Texas, *Joor, Heller, &c.*; fl. spring and early summer. (Introd. from the Mediterranean Region.)

**2. FOUQUIÉRIA, HBK. CANDLEWOOD.** (Dedicated to *Pierre Edouard Fouquier*, professor of medicine at Paris during the first part of the present century.) — Nov. Gen. & Spec. vi. 81, t. 527; Niedenzu, l. c. 298. *Fouquiera*, Spreng. Syst. ii. 568; DC. Prodr. iii. 349; Benth. & Hook. Gen. i. 161; Baill. l. c. 241. *Bronnia*, HBK. l. c. 83, t. 528. *Philetaria*, Liebm. Philet. en ny anomal slägt. 5, t. 1, & Vidensk. Selsk. Skrivt. ser. 5, ii. 283. *Idria*, Kellogg, Proc. Calif. Acad. Sci. ii. 34. — Armed shrubs or small trees (nearly or quite leafless during drought) with terminal racemes or panicles of showy flowers. Leaves of the primary shoots and developed branches soon deciduous, leaving only the indurated outer or ventral portions of the petioles as phyllodial thorns (Engelm. Bot. Gaz. viii. 338) in the axils of which the more or less succulent foliar leaves are fascicled. Anomalous genus, of four species, chiefly Mexican and Lower Californian.

**F. splendens, ENGELM. (COACH-WHIP.)** A shrub, 6 to 10 or even 20 feet high, branching near the base: long branches gray, deeply furrowed between the decurrent bases of the slender spreading spines: leaves obovate, rounded at the apex, cuneate at the base, 1-nerved, half inch to inch in length: inflorescence racemose, thyrsoid, elongated, often branched from the base, rather dense; pedicels short: sepals rounded, subscarious, 3 lines in diameter: tubular corolla bright scarlet, over an inch in length, with spreading or recurved obtuse lobes: stamens 8 to 12, exserted: capsules 6 to 8 lines in length, with 3 or 4 lance-oblong coriaceous valves; seeds white, lance-oblong, with long fringe of spirally thickened hairs. — Engelm. in Wislitz. Tour. 98, 113; Gray, Pl. Wright. i. 76, ii. 63; Torr. in Sitgr. Rep. 165, & Bot. Mex. Bound. 148; Am. Gard. xiii. 759, with fig. *F. spinosa*, Torr. in Emory, Rep. 147, t. 8, not HBK. — Rocky hillsides, W. Texas to Arizona and S. California. (Mex., Lower Calif.) Often cultivated by the Mexicans to make impenetrable hedges.

**F. spinosa, HBK. l. c. iii. 452** (*Bronnia spinosa*, HBK. l. c. vi. 83, t. 528), of Northern Mexico, may be expected on our southwestern frontier. It has a trunk simple below, and may be readily distinguished from the foregoing by its broad and open inflorescence (the slender pedicels being 6 to 12 lines in length).

## ORDER XXII. ELATINACEÆ.

By A. GRAY.

Low and bland herbs; with opposite or sometimes verticillate simple dotless leaves with stipules between them; small hermaphrodite and completely isomerous regular flowers usually solitary in their axils; hypogynous sepals and petals imbricated in the bud, these persistent or marcescent; short stamens as many or twice as many as the petals and when of equal number alternate with them; ovary with as many cells as sepals; axile placentation; distinct introrsely stigmatose styles or sessile stigmas; indefinite anatropous ovules; capsular fruit, the



valves alternate with the dissepiments; and oblong straight or curved seeds, the crustaceous testa filled or nearly so by the cylindraceous embryo; the cotyledons short and thick. Only two genera.

1. **ELATINE**. Flowers 2-4-merous. Sepals membranaceo-herbaceous, obtuse, without midrib. Capsule globose, membranaceous. Mostly aquatic annuals or sub-perennials, glabrous.
2. **BERGIA**. Flowers 5-merous. Sepals pointed or acute, with thickened midrib and scarious margins. Capsule ovoid, of firm texture. Terrestrial, some suffrutescent, usually pubescent.

1. **ELATINE**, L. **WATERWORT**. (Old Greek and Latin name for some herb, from *ἐλάτη*, a fir-tree, absurdly applied by Linnæus to this genus because a whorled-leaved species had been named *Potamopithys*, i. e. River Pine.) — Aquatic and subaquatic annuals or sub-perennials by rooting from the nodes; ours all depressed little plants, an inch or two high, mostly creeping by rooting from the nodes, occurring both in aquatic and terrestrial forms; with small flowers in the axils of the entire leaves, when under water not rarely fertilized without opening; fl. summer. — Gen. no. 335; Seubert, Monogr. in Nov. Act. Nat. Cur. xxi. 38; Benth. & Hook. Gen. i. 162; Gray, Proc. Am. Acad. xiii. 361.

§ 1. **CRÝTA**, Seubert, l. c. Flowers 2-3-merous, 2-3-androus: thin capsule often bursting irregularly, the delicate portions evanescent or fragile; seeds slightly curved: leaves simply opposite, in ours sessile or subsessile and the flowers sessile. — *Crypta*, Nutt. Jour. Acad. Philad. i. 117 (§ *Crypta*, Gray, Gen. Ill. i. 220), answers to this section more extended.

**E. triándra**, SCHK. Leaves oblanceolate or nearly lanceolate with gradually tapering base: petals and stamens commonly 3, but sepals often only 2: seeds ascending over the whole thickened axis of the capsule, more slender than those of the following. — Handb. i. 345, t. 109<sup>b</sup>, f. 2; Seubert, l. c. t. 2, f. 1-8; Gray, Proc. Am. Acad. xiii. 361, 362. — Ponds, Illinois and Nebraska, *E. Hall*; Yellowstone Lake, *Tweedy*. Rare in Amer., widely distributed in Old World.

**E. Americána**, ARN. Leaves obovate, very obtuse (1 to 3 lines long): flowers 2-merous or occasionally 3-merous throughout, in aquatic form rarely opening and the ovules and seeds mainly basilar, in terrestrial form flowers expanding and with larger rose-colored petals, the seeds more axile; these cylindraceous, a third line long, slightly curved, clathrate-sculptured with 9 or 10 longitudinal lines and 20 to 30 cross-bars. — Edinb. Jour. Nat. & Geogr. Sci. i. 431; Torr. & Gray, Fl. i. 203; Gray, Gen. Ill. i. 220, t. 95, & Proc. Am. Acad. l. c. *E. minima*, Fisch. & Mey. Linnæa, x. 73; Seubert, l. c. t. 2, f. 9, 10. *E. Clintoniana*, Peck, Rep. Reg. Univ. N. Y. xxii. 52, terrestrial form. *Peplis Americana*, Pursh, Fl. i. 238. *Crypta minima*, Nutt. Jour. Acad. Philad. i. 117, t. 6, f. 1, & Gen. App.; Torr. Fl. N. & Midd. States, i. 32. ? *Leptina autumnalis*, Raf. Jour. Phys. lxxxix. 96 (1819). — In mud and shallow water, New England<sup>1</sup> to Virginia and Brit. Columbia, along the Rocky Mountains to Colorado and the Sierra Nevada to S. California. (Mex., Austral., E. Ind., &c.)

**E. brachyspérma**, GRAY. Leaves oblong or oval with narrowed base: flowers mostly 2-merous: seeds short-oblong, straightish, barely quarter line long, sculptured in 6 or 7 longitudinal lines with 10 or 12 cross-bars. — Proc. Am. Acad. l. c.; Wats. Bot. Calif. ii. 436. — Illinois and Texas, *Hall*, *Bebb*, &c., to Arizona, *Leemmon*, and coast<sup>2</sup> of California, *Anderson*, *Orcutt*; chiefly terrestrial.

<sup>1</sup> Also northward into Brit. America from Tadousac, *Dr. G. G. Kennedy*, and Hull, Quebec, *Macoun*, to Vancouver Isl., *Macoun*.

<sup>2</sup> Also on plains in the interior of the state, acc. to Greene, Fl. Francis. 113. Add syn. *Alsinastrum brachyspermum*, Greene, Man. Bay-Reg. 62.

§ 2. ELATINÉLLA, Seubert, l. c. 46. Flowers 4-merous and 8-androus, very rarely 3-merous and 6-androus: capsule firmer, septifragal.

**E. Californica**, GRAY. Leaves obovate or spatulate with tapering base, lower ones distinctly petioled: flowers short-peduncled, expanding: petals white: seeds curved into a hook or partial ring (as in *E. Hydropiper*), a third line long, sculptured with 10 or 12 longitudinal and numerous transverse lines.—Proc. Am. Acad. xiii. 361, 364; Wats. l. c.—Sierra Valley, E. California,<sup>1</sup> Lemmon; Spokane Co., Washington, *Suksdorf*.

2. **BÉRGIA**, L. (*Peter Jonas Bergius*, Swedish botanist of the 18th century.)—Mant. ii. 152.—Tropical and subtropical genus. Dehiscence generally septicidal. But in the N. American species,

§ **BERGÉLLA**, with dehiscence septifragal, the firm portions remaining attached to the placentiferous axis. Habit of *B. ammanioides*, &c.—*Elatine*, subg. *Bergella*, Gray, Gen. Ill. i. 219, t. 96. *Bergella*, Schnizl. Ic. t. 219.

**B. Texana**, SEUBERT. Annual herb, a span to a foot high, branched from the base, puberulent: stems glandular-pubescent, very leafy: leaves obovate-oblong or spatulate with tapering base, an inch or half inch long, veiny, serrulate: flowers fascicled in the axils, short-pedicelled: sepals almost 2 lines long, acuminate, equalling the white or whitish petals: stamens either 5 or 10: seeds oblong, a little curved, obscurely clathrate-reticulate under a lens.—Seubert in Walp. Rep. i. 285; Brew. & Wats. Bot. Calif. i. 80. By error "*B. Americana*, Seubert," Wats. Bot. King Exp. 45; Gray in Hall, Pl. Tex. 5. *Merimea* ?*Texana*, Hook. Ic. t. 278. *Elatine Texana*, Torr. & Gray, Fl. i. 678; Gray, Pl. Lindh. pt. 2, 187, & Gen. Ill. (subg. *Bergella*) l. c. *Bergella Texana*, Schnizl. l. c.—Sandy banks of streams, W. Texas (first coll. by *Wright*) and Arkansas;<sup>2</sup> also W. Nevada, various parts of California, and on the Columbia River; apparently a recently dispersed weed.

## ORDER XXIII. HYPERICACEÆ

By J. M. COULTER.

Herbs or shrubs with opposite entire leaves dotted with pellucid spots or dark glands, and no stipules. Flowers perfect, regular, hypogynous, solitary or cymose. Sepals 4 or 5, imbricated in bud, herbaceous and persistent. Petals 4 or 5, mostly convolute in bud, deciduous, and yellow or flesh-color. Stamens usually numerous and 3- or 5-adelphous, occasionally with alternating glands; anthers 2-celled, longitudinally dehiscent, mostly versatile. Carpels 2 to 5, united to form a 1-celled or more or less perfectly 3-5-celled ovary, which contains numerous anatropous ovules; styles as many as the carpels, slender, distinct or more or less united. Fruit (in ours) a septicidal capsule; seeds exalbuminous; embryo usually straight.—A small order, but represented in all temperate and warmer regions. Its close relationship to *Guttifera* has suggested its inclusion in that order, from which it differs in its often herbaceous habit, comparatively thin leaves, perfect flowers, and filiform styles.

1. **ASCYRUM**. Sepals 4, very unequal, the outer pair very broad, the inner much smaller. Petals 4, very deciduous. Stamens numerous, distinct or slightly united at base, with no

<sup>1</sup> Also at Sta. Monica, Calif., *Dr. Hasse*, and near Great Falls, Montana, acc. to R. S. Williams, Bull. Torr. Club, xix. 194.

<sup>2</sup> Also in Missouri and Indian Territory, *Bush*, and Kansas, *vide* Hitchcock.

interposed glands. Ovary strictly 1-celled, of 2 or 3, very rarely 4 carpels; styles distinct or united below; stigmas not capitate. Capsule ovoid.

2. **HYPERICUM.** Sepals 5,<sup>1</sup> approximately equal. Petals 5, deciduous or marcescent. Stamens usually numerous and 3- or 5-adelphous, with or without interposed glands. Ovary of 3 to 5 carpels, 1-celled or more or less completely 3-5-celled; styles 3 to 5, distinct or united even to the apex; stigmas often capitate. Capsule conical to globose or oblong.

1. **ASCYRUM, L.** ST. PETER'S-WORT. (*\*Ασκυρον*, used by Dioscorides for a plant presumably of this order.) — Low suffruticose leafy and smooth plants, with small black-dotted leaves, and nearly solitary light yellow flowers on bibracteolate pedicels. A genus of four or five species, peculiar to E. North America, the West Indies, and Central America, but represented in Asia by a single species of the Himalaya region. The propriety of a generic separation from *Hypericum* is very doubtful. — Gen. no. 607; Torr. & Gray, Fl. i. 156, 671; Gray, Gen. Ill. i. 211, t. 91; Benth. & Hook. Gen. i. 164, excl. syn. *Isophyllum*; Coulter, Bot. Gaz. xi. 79; Engler in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 6, 208, excl. syn. *Isophyllum*.

\* Diffuse: leaves narrowed at base, not clasping: inner sepals very small or obsolete: petals about as long as outer sepals: styles 2, distinct or united.

**A. pumilum, Michx.** Low, 3 to 9 inches high, with spreading branches which are somewhat two-edged and winged above: leaves linear-oblong to oval, sometimes spatulate or narrowly obovate, 2 to 4 lines long, about a line wide: pedicels 3 to 6 lines long, bibracteolate near the base, becoming more or less reflexed: inner sepals obsolete or nearly so: petals obovate, little longer than the ovate acute or obtuse outer sepals: styles as long as the ovary. — Fl. ii. 77; Torr. & Gray, Fl. i. 156. *A. pauciflorum*, Nutt. Gen. ii. 15; Choisy in DC. Prodr. i. 555. — Dry ground, Georgia and Florida.

**A. hypericoides, L.** Taller, becoming 2 feet high or more, from decumbent and branched at base to somewhat erect and branched above: leaves oblong, varying between narrowly linear and narrowly obovate, 3 to 18 lines long, 1 to 4 lines wide, more or less plainly biglandular at base: pedicels 1 to 3 (rarely reaching 6) lines long, bibracteolate close to the flower: outer sepals ovate or cordate-ovate, obtuse or acute; inner sepals evident, petaloid: petals linear-oblong to narrowly obovate: styles short. — Spec. ii. 788. *A. Crux-Andree*, L. Spec. ed. 2, ii. 1107, and of authors. *A. multicaule*, Michx. Fl. ii. 77. — Damp ground and banks of streams, or dry thickets and woodlands towards the south, from Massachusetts (Nantucket) to Florida, Illinois, and Texas, and extending to the West Indies, Mexico, and Central America. Among the extreme southern and southwestern forms there appear some with unusually narrow or short leaves, but they cannot be separated even varietally from the ordinary type, and the attempt to maintain two distinct species seems untenable. In any event, the North American plant should bear its original Linnæan name as above.

\* \* Erect and stouter: leaves broader and thicker, more or less clasping: inner sepals 3 to 6 lines long, sometimes as long as the outer, seldom petaloid: petals mostly much longer than the outer sepals: styles 3 (rarely 4), generally distinct.

**A. stans, Michx.** Stems 1 to 2 feet high, simple or branched above, conspicuously two-edged and even winged: leaves oblong to oval, varying to obovate, closely sessile and somewhat clasping,  $\frac{1}{2}$  to 2 inches long and 3 to 8 lines wide: pedicels 2 to 6 lines long, bibracteolate near the middle: outer sepals ovate to orbicular-cordate; inner ones lanceolate: styles short. — Michx. in Willd. Spec. iii. 1473, & Fl. ii. 77; Choisy in DC. Prodr. i. 555; Torr. & Gray, Fl. i. 157; Gray, Gen. Ill. i. 212, t. 91. — Sandy ground in the Atlantic and Gulf States, from New Jersey to Texas. The leaves vary widely, but the usual size is about an inch long and 5 to 6 lines in width.

**A. amplexicaule, Michx.** With the general habit of *A. stans*: leaves ovate-cordate, often broadly so, clasping, half inch or more long and nearly as wide: pedicels 2 to 6 lines

<sup>1</sup> One anomalous species (*H. microsepalum*) is 4-merous.

long, with very small bractlets near the base or none: outer sepals ovate-cordate, resembling the leaves; inner ones linear-lanceolate: styles about as long as the ovary. — Fl. ii. 77; Torr. & Gray, Fl. i. 157. *A. Cubense*, Griseb. Plant. Cub. 40. *Hypericum tetrapetalum*, Lam. Dict. iv. 153. — Low ground, Georgia and Florida. (Also Cuba.)

2. **HYPÉRICUM**, Tourn. **ST. JOHN'S-WORT**. (An ancient Greek name.)

— Herbs or shrubs, with cymose yellow or flesh-colored flowers, and more or less black-dotted and pellucid-punctate sessile leaves. Very variable in size of leaves, sepals, and flowers. A genus of about 200 species, widely distributed but chiefly in north temperate regions. In North America almost exclusively restricted to the Atlantic region. — Inst. 254, t. 131; L. Gen. no. 606; Torr. & Gray, Fl. i. 157, incl. *Elodea*; Gray, Gen. Ill. i. 213, t. 92, 93; Benth. & Hook. Gen. i. 165; Coulter, Bot. Gaz. xi. 81, incl. *Elodea*; Keller in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 6, 208. *Sarothra*, L. Gen. ed. 6, no. 383. *Isophyllum*, Spach, Ann. Sci. Nat. ser. 2, v. 367. *Elodea*, Juss. Gen. 255, not Michx. *Elodes*, Adans. Fam. ii. 444. *Triadenum*, Raf. Med. Repos. hex. 2, v. 352. There are at least thirty-five additional generic synonyms.

*H. SETÓSUM*, L. Spec. ii. 787, *H. ELÁTUM*, Ait. Kew. iii. 104, and *H. TRIPLINÉRVÉ*, Vent. Hort. Cels. t. 58, all credited to North America, should be excluded, since the first proves to be a complex founded upon descriptive phrases, and the other two are Old World species.<sup>1</sup>

§ 1. **ISOPHYLLUM**, Spach (as genus). Sepals and petals 4 (occasionally 5): stamens numerous and distinct, with no interposed glands: styles 3, at first united into a long sharp beak, becoming distinct: capsule 1-celled, with projecting placenta: branching shrubs, with yellow flowers. — Ann. Sci. Nat. ser. 2, v. 367.

**H. microsepalum**, GRAY. Decumbent or erect, half to a foot high or more: leaves very small, oblong-linear and obtuse, 3 to 4 lines long and hardly a line wide: flowers showy, about an inch broad, clustered at the summits of the branches: sepals slightly unequal, linear to oblong, mostly obtuse, much shorter than the somewhat unequal petals: capsule oblong-ovate, 2 to 3 lines long; seeds oblong, minutely striate and pitted. — Gray in Wats. Bibl. Index, 456; Coulter, Bot. Gaz. xi. 82. *Ascyrum microsepalum*, Torr. & Gray, Fl. i. 157; Gray, Gen. Ill. i. 212; Chapm. Fl. 39. *Isophyllum Drummondii*, Spach, l. c. 368. — Georgia and Florida. A species distinctly intermediate between *Ascyrum* and *Hypericum*, and referred to either genus by botanists. Its association with *Ascyrum*, however, depends only upon the usually 4-merous flowers, while in every other feature it is distinctly a *Hypericum*.

§ 2. **HYPÉRICUM** proper. Sepals and petals 5, the latter deciduous or marcescent, convolute in æstivation: stamens mostly numerous, either distinct or united at the very base into 3 or 5 clusters, and with no interposed glands: styles 3 to 5, distinct or united; stigmas often capitate: capsule 1-celled, or 3-5-celled: shrubs or herbs, with yellow flowers.

\* Stamens very numerous, either distinct or united into sets.

— Styles 5, united below, distinct above; stigmas capitate: capsule 5-celled: tall perennial herbs with large leaves and flowers.

**H. Áscyron**, L. Usually branching above, 2 to 5 feet high: leaves ovate-lanceolate, clasping, mostly acute, 2 to 5 inches long, about an inch wide, pellucid-punctate with elongated dots: flowers 1 to 2 inches broad, solitary at the ends of branches and in terminal cymes: sepals lanceolate to ovate, acute, 4 to 6 lines long: capsule ovoid-conical, 9 lines long; seeds

<sup>1</sup> For fuller statement see Bot. Gaz. xi. 82.

terete, with a slightly winged rhaphe. — Spec. ii. 783; Maxim. Pl. Nov. Asiat. iv. 162. *H. pyramidatum*, Ait. Kew. iii. 103; Torr. & Gray, Fl. i. 158. *H. ascyroides*, Willd. Spec. iii. 1443; Choix. in DC. Prodr. i. 545. *H. macrocarpum*, Michx. Fl. ii. 82. — In the Atlantic region as far south as Connecticut and Pennsylvania, and extending westward to Missouri, Minnesota, and the Winnipeg Valley, and doubtless farther northwest. (Throughout N. E. Asia, and in Eu.)

+ — Styles united into a long sharp beak, finally becoming distinct; stigmas minute, not capitate: more or less shrubby plants.

++ Styles usually 5 and capsule 5-celled: bushy shrubs with crowded leaves.

**H. Kalmianum**, L. A foot or two high: leaves linear to oblanceolate, tapering at base, 1 to 2 inches long, 2 to 4 lines wide, pellucid-punctate with round dots, glaucous beneath: cymes few-flowered: sepals lanceolate to oval, half as long as the petals: capsule ovate, about 3 lines long, often somewhat lobed; seeds abruptly and minutely pointed. — Spec. ii. 783; Torr. Fl. N. Y. i. 86, t. 13; Torr. & Gray, Fl. i. 158. — Rocky and sandy shores, Canada, Niagara Falls, and about the Great Lakes. The capsules may be 4- or 6-celled, but the 5-celled condition is by far the most common.

**H. lobocarpum**, GATTINGER. A shrub 5 to 7 feet high, with upright branches: leaves linear-lanceolate to narrowly oblong, 1 to 3 inches long, 3 to 9 lines broad, with smaller ones in axillary fascicles: flowers numerous, smaller than in the last (usually resembling those of *H. densiflorum*): sepals linear-lanceolate, not foliaceous: capsule 2 to 3 lines long, lanceolate and tapering to the long strong beak, completely 5-celled and deeply 5-lobed, in most cases the five carpels almost distinct, and at maturity falling away separately from the central axis. — Bot. Gaz. xi. 275. — Oak barrens of Middle and Western Tennessee, Gattinger, Western Mississippi, Stewart, and Southern Louisiana, Daves, and probably throughout the Lower Mississippi region. The type specimens were growing in a swampy region difficult to penetrate. In size and general habit the plant closely resembles *H. densiflorum*, with perhaps even denser flower clusters; but the flowers may become almost as large as those of *H. Kalmianum* and *H. prolificum*, which latter species it very closely resembles as to its leaves. It is impossible to distinguish the species from forms of *H. prolificum* and *H. densiflorum* in the absence of capsules. Certain forms also resemble *H. fasciculatum* in their narrow, rigid, and very revolute leaves, and in the axillary fascicles.

++ ++ Styles usually 3 and capsules completely 3-celled: branching shrubs.

**H. prolificum**, L. Leaves linear-lanceolate to narrowly oblong, narrowed at base, mostly obtuse and mucronulate, 1 to 3 inches long, 3 to 9 lines broad, with axillary fascicles of smaller ones: flowers numerous,  $\frac{1}{2}$  to 1 inch broad: sepals unequal, foliaceous, lanceolate to ovate, mucronate, much shorter than the petals: capsule lanceolate to ovate, 4 to 6 lines long. — Mant. 106; Choix. in DC. Prodr. i. 547; Torr. & Gray, Fl. i. 159, excl. var.  $\gamma$ . *H. rosmarinifolium*, Torr. & Gray, l. c., not Lam. *Myriandra ledifolia*, Spach, l. c. 365. — From New Jersey to Georgia, Alabama, Arkansas, Missouri, and Minnesota. The leaves are exceedingly variable in size, often resembling those of the next species, especially at the south, but the flowers and capsules are much larger and much fewer. Flowers with four styles are occasionally found, making the separation from the last two species difficult.

**H. densiflorum**, PURSH. More shrubby and taller, sometimes 5 to 6 feet high, much more branching: leaves more crowded, narrower and shorter: flowers much more numerous and smaller: sepals smaller, not foliaceous: capsule ovate, 2 to 3 lines long. — Fl. ii. 376; Choix. l. c. *H. galioides*, Pursh, l. c., not Lam. ? *H. prolificum*, var.  $\gamma$ , Torr. & Gray, l. c. *H. prolificum*, var. *densiflorum*, Gray, Man. ed. 5, 84. *Myriandra spathulata*, Spach, l. c. — From the pine barrens of New Jersey to Florida, Tennessee, Arkansas, and Texas. Occasional forms with large leaves closely simulate the last species, but the flowers and capsules can be distinguished easily. Four and even five styles sometimes occur, but the flowers upon any plant are prevailingly 3-styled, and even the 5-styled capsules are distinct from those of *H. lobocarpum*, which are narrow and relatively long, tapering from the base to the prominent beak, besides being very deeply lobed.

**H. Buckléii**, M. A. CURTIS. Low,  $\frac{1}{2}$  to 1 foot high, widely branching from the base: leaves oblong, obtuse, narrowed at base,  $\frac{1}{2}$  to 1 inch long, 2 to 4 lines broad, paler beneath

and more or less black-dotted : flowers solitary (sometimes in threes) and terminal, on long peduncles, about an inch broad : sepals obovate, not half so long as the petals : capsule conical, 4 to 5 lines long. — Am. Jour. Sci. ser. 1, xlv. 80 ; Chapm. Fl. 39. — Cliffs, mountains of North Carolina, South Carolina, and Georgia. The original form of the specific name is that given above, and not *H. Buckleyi*, as commonly printed.

++ ++ ++ Styles 3 : capsule 1-celled, or almost 3-celled by the projecting placentæ : shrubby at least at base.

= Placentæ projecting nearly to the centre of the ovary.

a. Sepals broad, ovate, foliaceous : flowers large and showy, solitary or in leafy cymes : leaves rather broad and somewhat coriaceous : shrubby.

**H. aúreum**, BARTRAM. Widely branched above, 2 to 4 feet high : leaves oblong, more or less attenuate at base, obtuse or acute, 1 to 3 inches long, 3 to 9 lines broad : flowers often solitary, 1 to 2 inches broad, very showy : sepals very unequal, often enclosing the capsule : petals orange-yellow, firm, reflexed : stamens excessively numerous : capsule ovate-conical, not lobed, 3 to 5 lines long. — Travels, 383 ; Torr. & Gray, Fl. i. 161. *H. frondosum*, Michx. Fl. ii. 81 ; Choisy in DC. Prodr. i. 544. *H. ascyroides*, var.  $\beta$ , Poir. Suppl. iii. 694. *H. amœnum*, Pursh, l. c. 375 ; Nutt. Gen. ii. 16 ; Choisy, l. c. — South Carolina and Georgia to Tennessee, Alabama, and Texas. The leaves and sepals vary much in size, certain mountain forms having leaves closely resembling those of *H. prolificum*.

**H. myrtifólium**, LAM. More or less branching : leaves cordate-oblong, clasping, obtuse (rarely acute),  $\frac{1}{2}$  to 1 inch long, 3 to 6 lines broad, those of the cyme usually much smaller : flowers less than an inch broad, in compound cymes : sepals resembling the leaves, often larger than the floral bracts, often reflexed : capsule as in the last, but coriaceous and 3- or 4-lobed or -angled. — Dict. iv. 180 ; Choisy, l. c. 547 ; Torr. & Gray, l. c. 161. *H. glaucum*, Michx. Fl. ii. 78 ; Choisy, l. c. *H. rosmarinifolium*, Choisy, l. c., not Lam. *H. sessiliflorum*, Willd. in Spreng. Syst. iii. 346 ; Torr. & Gray, l. c. 166. *Myriandra glauca*, Spach, l. c. — From South Carolina to Florida and Alabama.

b. Sepals small, very narrow : flowers small, axillary and terminal : leaves narrow and much fasciated in the axils : shrubby and branching.

**H. fasciculátum**, LAM. One to ten feet high : leaves very narrowly linear and revolute, coriaceous, crowded, closely sessile, not tapering at base, 2 to 8 lines long : sepals resembling the leaves : capsule 3-lobed, oblong-conical to ovate-conical, few-seeded, a line or two long. — Dict. iv. 160 ; Choisy, l. c. 554 ; Torr. & Gray, Fl. i. 160. *H. nitidum*, Lam. l. c. *H. aspalathoides*, Willd. Spec. iii. 1451 ; Pursh, l. c. 376. *H. fasciculatum*, var. *aspalathoides*, Torr. & Gray, l. c. 672. *Myriandra nitida*, *brachyphylla*, & *galioides* of Spach, l. c. — Wet pine barrens, North Carolina to Florida, Louisiana, and Eastern Texas. Very variable in length of leaves, the rather striking short-leaved forms being the var. *aspalathoides*, although they represent Lamarck's type material of the species. Certain large forms, four to ten feet high, with unusually long leaves, appear quite distinct, but they are connected with the shorter-leaved forms by a complete intergradation.

**H. galióides**, LAM. Like the last, but leaves longer and broader, linear-lanceolate to oblanceolate, generally mucronate, always tapering at base and subpetiolate, not so revolute,  $\frac{1}{2}$  to 3 inches long, as many lines wide : sepals linear-lanceolate, acute, tapering at base. — Dict. iv. 161 ; Choisy, l. c. 550 ; Torr. & Gray, Fl. i. 159. *H. axillare*, Lam. l. c., not Michx. *H. fasciculatum*, Michx. in Willd. Spec. iii. 1452, not Lam. *H. ambiguum*, Ell. Sk. ii. 30 ; Torr. & Gray, l. c. 162, 673. *H. galioides*, var. *ambiguum*, Chapm. Fl. 40. *Myriandra Michauxii*, Spach, l. c. — Wet ground, Delaware to Florida, East Tennessee, and Louisiana. In general *H. fasciculatum* and *H. galioides* may be distinguished from each other easily, the leaves being of entirely different types, but narrow-leaved forms of the latter species often become perplexing except to one very familiar with the group. The leaves of this species range from these very narrow forms to the broad ones which stand for the variety *ambiguum*. These large-leaved plants are recorded as becoming as much as 12 feet high. These two species bear much resemblance to *H. lobocarpum*, which has the leaves of both and the same deeply lobed capsule.

c. Sepals small : flowers small, in naked cymes : leaves rather broad, thin, and veiny : somewhat shrubby at base, a foot or two high, simple or branching.

**H. adpressum**, BARTON. Leaves linear-lanceolate to narrowly oblong, mostly acute, usually ascending, about 2 inches long, 3 to 4 lines broad, revolute, pellucid-punctate without black dots, translucently veiny : cymes leafy only at base, dichotomal flowers mostly very short-pedicelled : sepals linear to lanceolate, acute,  $\frac{1}{2}$  to  $\frac{3}{4}$  as long as the petals, often reflexed : capsule ovate to oblong, about 2 lines long ; seeds oblong. — Fl. Philad. ii. 15 ; Torr. & Gray, Fl. i. 159. *H. Bonaparteæ*, Barton, Fl. N. Am. iii. 95, t. 106. *H. fastigiatum*, Ell. Sk. ii. 31 ; Torr. & Gray, l. c. 166. *H. adpressum*, var. *fastigiatum*, Torr. & Gray, l. c. 673. — Moist ground, Massachusetts to New Jersey, Pennsylvania, and Georgia.

**H. nudiflorum**, MICHX. Leaves thinner, ovate-lanceolate or oblong, obtuse, 2 to 3 inches long,  $\frac{1}{2}$  inch broad, pellucid-punctate and with very small crowded black dots : cymes pedunculate, naked at base, loosely flowered, dichotomal flowers pedicelled : sepals variable, linear to oblong, about  $\frac{1}{2}$  as long as the petals : capsule ovate-conical, about 3 lines long ; seeds cylindrical, with prominent rhaphe. — Michx. in Willd. Spec. iii. 1456 ; Torr. & Gray, l. c. 162. *H. cistifolium*, Coulter, Bot. Gaz. xi. 86, not Lam. — From North Carolina through the Gulf States to Texas. The more naked cymes, and the broader leaves with their very numerous and crowded black dots, serve to distinguish this species easily from the last.

= = Placentæ projecting a little, or not at all : sepals unequal.

a. Leaves mostly linear, with rather large and scattered pellucid dots : flowers in somewhat leafy-bracted cymes : capsule conical or globose ; seeds large, oval, strongly rugose transversely.

**H. cistifolium**, LAM. Simple or branched, 1 to 3 feet high : leaves linear to narrowly oblong, mostly obtuse, 2 to 3 inches long, 3 to 6 lines wide : cyme loosely flowered, dichotomal flower mostly sessile : sepals varying from small and linear to ovate and as long as the petals : capsule from depressed-globose to ovoid, about 2 lines long ; seeds with rhaphe almost winged. — Dict. iv. 158, not Coulter, Bot. Gaz. xi. 86. *H. rosmarinifolium*, Lam. l. c. 159, not Torr. & Gray, Fl. i. 159. *H. sphaerocarpum*, Michx. Fl. ii. 78 ; Torr. & Gray, l. c. 163 (*sphaerocarpon*) ; Coulter, l. c. 87. — Rocky banks of the Ohio and its tributaries, southward to Arkansas and Alabama. The large and rough seeds are the most characteristic ones of the genus, and serve to distinguish the species readily from any others likely to be confounded with it.

**H. dolabriforme**, VENT. Low, straggling,  $\frac{1}{2}$  to  $1\frac{1}{2}$  feet high : leaves linear (rarely narrowly oblong-linear), widely spreading, an inch or less long, 1 to 2 lines broad, mostly acute : cyme usually few-flowered, dichotomal flower pedicelled : sepals large and foliaceous, lanceolate to ovate, acute or acuminate, as long as the petals : capsule ovate-conical, coriaceous, almost triquetrous, about 3 lines long. — Hort. Cels. t. 45 ; Pursh, l. c. 378 ; Choisy, l. c. 547 ; Torr. & Gray, Fl. i. 162. *H. procumbens*, Desf. in Willd. Spec. iii. 1450 ; Michx. Fl. ii. 81 ; Pursh, l. c. 379 ; Choisy, l. c. — Dry sterile hills, Kentucky, Tennessee, and Missouri.

b. Leaves oblong, obtuse : flowers in nearly naked cymes : capsule ovate ; seeds oblong, minutely striate and pitted.

**H. opacum**, TORR. & GRAY. One to four feet high : leaves linear-oblong, about 1 inch long and 2 to 4 lines wide, closely sessile, pellucid-punctate with minute crowded dots, often rusty beneath : flowers 3 to 5 lines broad, in divaricate cymes, the dichotomal flowers mostly sessile : sepals oblong to obovate, about half as long as the bright yellow petals : capsule 2 to 3 lines long. — Fl. i. 163. *H. punctulosum*, Bertol. Misc. Bot. xiii. 18, t. 3, f. 2. *H. cistifolium*, Torr. & Gray, l. c. 674, not Lam. — South Carolina and Georgia to Florida and Mississippi.

**H. ellipticum**, HOOK. Mostly herbaceous, 10 to 20 inches high : leaves elliptical-oblong, sessile or tapering at base,  $\frac{1}{2}$  to  $1\frac{1}{2}$  inches long, 3 to 5 lines broad, pellucid-punctate with large scattered dots, translucently veiny : flowers 4 to 6 lines broad, occasionally 4-merous, in few-flowered cymes, the dichotomal flowers pedicelled : sepals mostly foliaceous and spreading, oblanceolate to narrowly obovate, usually shorter than the pale yellow petals : capsule as in the last. — Fl. Bor.-Am. i. 110 ; Torr. & Gray, Fl. i. 164. *H. sphaerocarpum*, Barton,

Fl. Philad. ii. 14, not Michx. — Moist ground, from Canada to Pennsylvania and westward to Minnesota and the Winnipeg Valley.

+ + + Styles 3 or 4, very long, distinct and spreading, with capitate stigmas: capsule ovate, strictly 1-celled, a line or two long: simple or branching herbs, 1 to 3 feet high, with ascending sessile or clasping leaves, and the uppermost branches of the cyme bearing alternate distant flowers.

**H. virgátum**, LAM. Leaves ovate, oblong-lanceolate, or narrowly oblong, acute,  $\frac{1}{2}$  to 1 inch long, 2 to 4 lines wide: flowers bright yellow, 4 to 8 lines broad, in nearly naked cymes: sepals lanceolate to ovate, acute or acuminate, keeled below, more or less foliaceous and enclosing the small capsule. — Dict. iv. 158; Choix. l. c. 547; Torr. & Gray, Fl. i. 166. *H. angulosum*, Michx. in Willd. Spec. iii. 1454; Choix. l. c. 546; Torr. & Gray, l. c. 164, 673; Gray, Man. ed. 5, 85. *H. hedyotifolium*, Poir. Suppl. iii. 700. — Sandy or rocky ground, from the pine barrens of New Jersey to the mountains of Georgia, Tennessee, and Kentucky. The species is quite variable in the size and form of its leaves, but the general type is oblong-lanceolate, about an inch long and three lines broad. The following varieties can be recognized usually without difficulty:

**Var. ovalifolium**, BRITTON. Leaves oval to obovate, not more than twice as long as broad, mostly obtuse, rather strictly erect or almost appressed. — Trans. N. Y. Acad. Sci. ix. 10. — Pine barrens of New Jersey. The short broad usually erect and distant leaves give to the plant an aspect quite different from that of the more southern species. Apparently the common form of the New Jersey pine barrens, the species proper appearing with great distinctness only farther south.

**Var. acutifolium**, COULTER. Usually taller and more branching, with leaves linear-lanceolate, tapering to a very acute apex, an inch or more long, and a line or two broad. — Bot. Gaz. xi. 106. *H. acutifolium*, Ell. Sk. ii. 26; Torr. & Gray, Fl. i. 167. — From South Carolina to Florida.

**H. pilósum**, WALT. Scabrous-tomentose, mostly simple: leaves ovate-lanceolate, strictly erect or even appressed, 4 to 6 lines long, 1 to 2 lines wide, sometimes much reduced: flowers 3 to 5 lines broad, in few-flowered cymes: sepals ovate-lanceolate, acute: petals more than twice as long, involute when old. — Car. 190; Choix. l. c. 549; Torr. & Gray, Fl. i. 163; *H. setosum*, L. Spec. ii. 787, as to Clayton's plant in Gronov. Virg. 88. *H. simplex*, Michx. Fl. ii. 80; Choix. l. c. *Asegyrum villosum*, L. Spec. ii. 788. — Wet pine barrens, South Carolina to Florida and Louisiana.

+ + + + Styles 3, long, distinct, and usually spreading, with capitate stigmas: capsule ovate, 3-celled, more or less covered with amber-colored glands and exhaling a heavy odor when crushed: petals marcescent: whole plant (including petals and anthers) more or less black-dotted: herbs, with rather large leaves and flowers, the petals much longer than the sepals.

+ + Eastern species: plants 1 to 4 feet high: capsules mostly not lobed.

**H. perforátum**, L. Much branched (usually a leafy branch in the axil of every leaf of the primary stem): leaves linear to oblong, obtuse, mostly tapering at base,  $\frac{1}{2}$  to 1 inch long, 1 to 5 lines wide: flowers numerous in loose cymes, about an inch broad: sepals linear-lanceolate, very acute or acuminate: petals bright yellow, black-dotted along the margin: capsule conical-ovate, 2 to 3 lines long. — Spec. ii. 785. — Common everywhere in old fields as a weed difficult to extirpate. (Nat. from Eu.)

**H. maculátum**, WALT. Simple below, more or less branched above, conspicuously dotted all over: leaves oblong- to lance-ovate, or even cordate-ovate, obtuse or acute, more or less clasping, sometimes tapering at base, 1 to 3 inches long, 4 to 9 lines broad: flowers smaller, 3 to 6 lines broad or even less, usually crowded: sepals lanceolate to ovate, acute: petals pale yellow, with black lines as well as dots: capsule conical-ovate, 2 to 3 lines long, often thickly covered with conspicuous amber-colored glands. — Car. 189; Michx. Fl. ii. 80; Torr. & Gray, Fl. i. 161, 673; Coulter, Bot. Gaz. xi. 107. *H. Virginicum*, Walt. l. c., not L. *H. punctatum*, Lam. Dict. iv. 164; Choix. l. c. 547; Reichenb. Ic. Bot. Exot. i. 61, t. 88. *H. corymbosum*, Muhl. in Willd. Spec. iii. 1457; Torr. & Gray, l. c. 160; Gray, Man. ed. 5, 85. *H. micranthum*, Choix. Prodr. Hyper. 44, t. 5; Hook. Fl. Bor.-Am. i. 109. — From Canada



and Minnesota to Florida and Texas. Exceedingly variable in foliage and in habit. Mountain forms are sometimes strictly simple, while in the southwest forms occur with almost the same branching habit as in *H. perforatum*.

- H. gravéolens**, BUCKLEY. Simple or somewhat branched above: leaves large, elliptical-oblong, obtuse, closely sessile or clasping, 2 to 3 inches long, about an inch wide: flowers usually an inch or more broad, in few-flowered cymes: sepals lanceolate, very acute: petals very scantily black-dotted, if at all: capsule somewhat lobed, ovate, 3 to 5 lines long. — Am. Jour. Sci. ser. 1, xlv. 174. Gray, Gen. Ill. i. 214, t. 92. — Mountains of S. W. Virginia and North Carolina.

++ ++ Western species: plants 3 inches to 2 feet high: capsules 3-lobed, 3 to 4 lines long: petals bright yellow, often tinged with purple, with a few black dots along the margin.

- H. formósum**, HBK. From running rootstocks, simple or somewhat branching, often with numerous small branchlets,  $\frac{1}{2}$  to 2 feet high, usually conspicuously black-dotted along margins of leaves, sepals, and petals, and upon anthers: leaves ovate-oblong, obtuse, more or less clasping, about an inch long and half inch or more broad, those of the branchlets much smaller and often tapering at base: flowers  $\frac{1}{2}$  to 1 inch broad, in loose corymbs: sepals lanceolate to ovate, obtuse or acute. — Nov. Gen. & Spec. v. 196. *H. Scouleri*, Hook. Fl. Bor.-Am. i. 111; Torr. & Gray, Fl. i. 160. *H. formosum*, var. *Scouleri*, Coulter, l. c. 108. — Throughout the whole mountain region of western North America. The separation of a northern form, *H. Scouleri*, from the Mexican *H. formosum* seems to be entirely untenable. Certain forms of the Pacific and Great Basin regions, with narrow leaves tapering at base, approach the following species, which may be but a variety.

- H. concinnum**, BENTH. Somewhat shrubby and branching at base, 3 to 18 inches high, black-dotted as in the last, but often scantily so, very leafy: leaves thickish, linear to oblong, usually not clasping, commonly folded,  $\frac{1}{2}$  to 1 inch long or more, 1 to 4 lines broad, acute: flowers over 1 inch broad, few, in rather close clusters at summit of stem: sepals ovate, mucronate-acute or very acuminate, longer than the capsule. — Pl. Hartw. 300; Brew. & Wats. Bot. Calif. i. 81. *H. bracteatum*, Kellogg, Proc. Calif. Acad. Sci. i. 65. — Apparently restricted to the drier mountain regions of Central California. While the lower and more shrubby habit, and the narrower and acute not clasping leaves usually distinguish this species easily from the last, there are forms with the leaves narrow and acute, but more or less clasping, which are still clearly *H. concinnum*, although not so easily distinguished.

\* \* Stamens 5 to 20, mostly in 3 clusters: styles 3 (sometimes 2), short, distinct; stigmas capitate: capsules ovate to conical, one-celled: small and slender annuals, with very small flowers, and petals shorter than the sepals.

+ Procumbent or ascending, or forming dense mats, diffusely branching: leaves rather broad, obtuse, clasping: capsule a line or two long.

- H. anagalloïdes**, CHAM. & SCHLECHT. Often forming dense mats: stems an inch to a foot long: leaves oblong to broadly ovate, or even orbicular, very obtuse, 5- or 7-nerved at base, 2 to 6 lines long and almost as broad: flowers 3 to 4 lines broad, in few-flowered naked or leafy cymes: stamens 15 to 20: sepals foliaceous, unequal, lanceolate to broadly ovate, longer than the ovate capsules. — Linnæa, iii. 127; Torr. & Gray, Fl. i. 167, 674. ?*H. mutilum*, Wats. Bot. King Exp. 46. — Wet grounds, from Lower California to Brit. Columbia, and extending eastward into Montana. The Pacific representative of the next species, which it approaches too nearly in certain forms. Both are very closely allied to the Asiatic *H. Japonicum*, Thunb., and all three may constitute but one specific type. An erect form from a decumbent base, with leaves equalling or exceeding the internodes, and a terminal cyme on a short naked peduncle, has been set apart by Professor E. L. Greene as var. *Nevadense* (Fl. Francis. 113).

- H. mútilum**, L. Like the last, but more erect and diffusely branching, 3 inches to 2 feet high: leaves oblong or ovate, or even orbicular,  $\frac{1}{2}$  to 1 inch long, 2 to 4 lines broad, 5-nerved at base: flowers in very loose leafy cymes: stamens 6 to 12: sepals linear to lanceolate, usually shorter than the oblong or ovate capsule. — Spec. ii. 787; Torr. & Gray, Fl. i. 164. *H. quinquennervium*, Walt. Car. 190; Choisy in DC. Prodr. i. 550; Hook. Fl. Bor.-Am. i. 110. *H. parviflorum*, Willd. Spec. iii. 1456; Pursh, Fl. ii. 377. *H. stellarioides*, HBK. Nov.

Gen. & Spec. v. 196. *H. boreale*, etc., Bicknell, Bull. Torr. Club, xxii. 213, in part. — Canada and Minnesota to Florida and Texas. (Adj. Mex.) In some cases the cymes become almost or even entirely naked, and such plants are apt to be confused with the next species. However, the widely spreading inflorescence, or at least the oblong or ovate capsule, will serve to separate them from *H. gymnanthum* with its strict cymes and ovate-conical capsules. Certain forms throughout the Gulf States, from Florida to Texas and Mexico, with open cymes inclined to be naked and unusually large foliaceous sepals, may represent a worthy variety.

+ + Almost simple, with strict stems and branches: flowers in naked cymes: sepals linear to linear-lanceolate, acuminate.

**H. gymnanthum**, ENGELM. & GRAY. One to three feet high: leaves cordate-ovate, clasping, often quite distant,  $\frac{1}{2}$  inch or more long, 5- or 7-nerved and 3 to 5 lines wide at base, tapering to an acute or obtuse apex: flowers in strict mostly few-flowered elongated cymes: stamens 10 to 12: sepals 1 to 2 lines long, about equalling the ovate-conical capsule. — Pl. Lindh. pt. 1, 4; Walp. Ann. ii. 188. *H. mutilum*, var. *gymnanthum*, Gray, Man. ed. 5, 86. — From Delaware and adjacent Pennsylvania to Southern Illinois, Arkansas, Louisiana, and Eastern Texas. Ascherson and Uechtritz refer this species to *H. Japonicum*, Thunb., but it seems to be very distinct. If the Asiatic species occurs in our flora at all, it is under the name *H. anagalloides*.

**H. Canadense**, L. From an inch or two to a foot or more high: leaves linear to linear-lanceolate, mostly tapering to the sessile 3-nerved base,  $\frac{1}{2}$  to 1 inch long or more, 1 to 2 lines wide: flowers in rather loose cymes: stamens 5 to 10: capsule very acutely conical, 2 to 3 lines long, longer or shorter than the sepals. — Spec. ii. 785; Torr. Fl. N. Y. i. 89; Torr. & Gray, Fl. i. 165. *H. thesiifolium*, *pauciflorum*, & *Moranense*, HBK. Nov. Gen. & Spec. v. 192, 193. *H. Canadense*, var. *minimum*, Choisy. in DC. Prodr. i. 550. — Wet sandy soil, from Canada to Georgia, and westward to Nebraska, Dakota, and the Winnipeg Valley, and doubtless extending to the Pacific; also in Texas. (Mex.) Exceedingly variable in size, but usually distinguishable by its slender habit, and narrow and often reduced leaves, which mostly taper at base. In certain situations all the forms develop reduced rounded and more crowded leaves below. It seems impossible to distinguish clearly the varieties ordinarily recognized, but disregarding intergrading forms two extreme variations may be defined as follows:

**Var. majus**, GRAY. Stems much stouter and usually much taller: leaves larger, 1 to 2 inches long, 4 to 6 lines broad, lanceolate, 5- or 7-nerved at base, more or less clasping, often very acute: flowers in larger more crowded cymes: sepals long-pointed: capsules larger. — Man. ed. 5, 86. *H. majus*, Britton, Mem. Torr. Club, v. 225. — Ranges with the species; also in Washington, *Piper*. In certain regions it seems worthy of specific rank, but in large series of specimens the intergradation is complete.

**Var. boreale**, BRITTON. Dwarf, 1 to 3 inches high, simple and few-flowered: leaves oblong, obtuse, 4 to 5 lines long, 1 to 2 lines broad, the lower ones smaller and more crowded, oval or orbicular. — Bull. Torr. Club, xviii. 365. *H. Canadense*, var. *minimum*, Coulter, Bot. Gaz. xi. 110, and most American authors, not Choisy. *H. boreale*, & *H. mutilum*, var. *boreale*, Bicknell, Bull. Torr. Club, xxii. 213, in part. — Throughout Canada and the Northwest Territory, and extending into the United States about Lake Superior; also on wet grounds in the Dells of the Wisconsin, *Lapham*.

+ + + Bushy-branched, with rigid erect black-dotted stems and branches: leaves very slender and rigid or minute, erect or appressed: flowers scattered along the upper part of leafy branches.

**H. Drummondii**, TORR. & GRAY. Stems and alternate branches rather stout, 10 to 30 inches high: leaves linear-subulate, erect,  $\frac{1}{4}$  to 1 inch long, one-nerved; flowers pedicellate: stamens 10 to 20: capsule ovate, about 2 lines long, not longer than the sepals; seeds large, oval, strongly ribbed and transversely lacunose. — Fl. i. 165. *Sarothra Drummondii*, Grev. & Hook. Bot. Misc. iii. 236, t. 107. — In dry soil, from Georgia and Florida to Texas, and extending northwest through the states of the Mississippi Basin into Illinois.

**H. nudicaule**, WALT. Stem and opposite branches filiform and wiry, 4 to 20 inches high, with the awl-shaped leaves so minute and appressed as to appear naked: flowers very small,

mostly sessile: stamens 5 to 10: capsule very acutely conical, 1 to 3 lines long, much longer than the sepals; seeds very much smaller than in the last, oblong, minutely striate and pitted. — Car. 190. *H. setosum*, L. Spec. ii. 787, as to Pluk. syn. *H. Sarothra*, Michx. Fl. ii. 79; Torr. & Gray, Fl. i. 165; Gray, Gen. III. i. 214, t. 93, & Man. ed. 5, 86. *H. gentianoides*, Britt. Sterns & Poggenb. Prel. Cat. N. Y. 9. *Sarothra gentianoides*, L. Spec. i. 272. *S. hypericoides*, Nutt. Gen. i. 204; Barton, Fl. N. A. iii. 59, t. 92. — Dry sandy soil, Canada to Florida, and west to Illinois, Arkansas, and Texas.

§ 3. **ELODÉA**, Spach (as genus). Sepals and petals 5, the latter deciduous, imbricate in æstivation: stamens 9 (rarely more), strongly triadelphous, three large orange-colored glands alternating with the phalanges: styles 3, distinct; stigmas not capitate: capsule elongated-oblong, 3-celled: perennial herbs, in marshes or shallow water, with small close clusters of flesh-colored flowers in the axils of the leaves at the summit of the stem. — Hist. Veg. v. 363.

**H. Virgínicum**, L. Mostly simple, 1 to 2 feet high: leaves oblong to ovate, very obtuse or emarginate, clasping by a broad base, about  $1\frac{1}{2}$  inches long and  $\frac{1}{2}$  inch broad, glaucous beneath and black-dotted: axillary flower-clusters at the ends of elongated branches: sepals lanceolate to ovate: filaments united below the middle: capsule 4 to 5 lines long. — Syst. Nat. ed. 10, 1184, & Spec. ed. 2, ii. 1104; Choisy. l. c. 546. *H. campanulatum*, Walt. Car. 191. *H. emarginatum*, Lam. Dict. iv. 154. *Elodea Virginica*, Nutt. Gen. ii. 17; Torr. & Gray, Fl. i. 167; Gray, Gen. III. i. 216, t. 94. *E. campanulata*, Pursh, Fl. ii. 379; Coulter, Bot. Gaz. xi. 111. *Elodes Virginica*, Gray, Man. ed. 5, 86. *E. campanulata*, Wats. & Coulter in Gray, Man. ed. 6, 95. — Apparently throughout the British possessions, and extending southward in the Atlantic region to Florida and Louisiana, and in the interior to Minnesota. (E. Asia.)

**H. petiolátum**, WALT. Resembling the last, but usually taller and more branching: leaves 2 to 5 inches long,  $\frac{1}{2}$  to 1 inch broad, tapering to a sessile base or petioled, not so glaucous or black-dotted beneath: axillary flower-clusters almost sessile: filaments united about to the middle. — Car. 191. *H. axillare*, Michx. Fl. ii. 81. *H. paludosum*, Choisy. l. c. 546. ?*H. tubulosum*, Walt. Car. 191; Choisy. l. c. *Elodea petiolata*, Pursh, Fl. i. 379; Torr. & Gray, Fl. i. 168. ?*E. tubulosa*, Pursh, l. c.; Nutt. l. c.; Torr. & Gray, Fl. i. 168. *Elodes petiolata*, Gray, Man. ed. 5, 86. — From Virginia to Florida, Louisiana, Arkansas, and Tennessee.

ORDER GUTTIFERÆ. **CLÚSIA FLÁVA**, L., was in the collection made on Key West, many years ago, by *Blodgett*, probably a chance tree: not since met with.

## ORDER XXIV. TERNSTRÆMIACEÆ.

BY A. GRAY.

Showy shrubs or trees (American and E. Asiatic); with alternate and simple pinnately veined leaves; no stipules; the flowers hypogynous, hermaphrodite, polyandrous and otherwise mostly 5-merous throughout; with imbricated sepals and petals. Stamens monadelphous or pentadelphous at base, where the short tube or ring or the phalanges are connate with base of petals; anthers 2-celled and opening lengthwise. Fruit capsular, commonly woody, the cells few-seeded; seeds with a large embryo and little or no albumen. — Contains the *Camellia*, Tea-Plant, and the two following genera, of the Tribe *Gordonieæ*.

1. **STUARTIA**. Calyx 1-2-bracteolate, of 5 or 6 ovate or narrower sepals. Petals as many, rounded-obovate, erose-crenulate, united at base by union with the monadelphous

ring of the filaments. Ovules a pair in each of the 5 cells, ascending, anatropous. Capsule loculicidally 5-valved; seeds lenticular, with crustaceous coat; embryo straight, with oval plane cotyledons and slender caulicle, nearly the length of the albumen.

2. **GORDONIA**. Calyx imbricately 3-4-bracteolate, of 5 rounded coriaceous and concave canescent sepals. Petals 5, silky-tomentulose externally. Stamens 5-adelphous. Style columnar; stigma 5-lobed; ovules 4 to 8 in each cell, anatropous, resupinate-pendulous. Seeds winged or wingless, destitute of albumen; embryo straightish, oblique, with the broad and thin cotyledons somewhat undulate-plicate, much longer than the caulicle.

1. **STUÁRTIA** (at first written STEWARTIA), L. (*John Stuart*, Marquis of Bute, statesman and botanist.) — Showy-flowered shrubs (two of E. United States and one or two peculiar ones in Japan), more or less pubescent with soft and simple hairs; with oval and petiolate barely serrulate deciduous leaves, and short-peduncled or subsessile mostly solitary axillary or subterminal flowers. Petals white or cream-color. — Act. Ups. 1741, 79, t. 2 (Catesb. Car. ii. App. 113, t. 13), & Gen. ed. 4, no. 1025; L'Her. Stirp. Nov. vi. 153, t. 73, 74 (with correct orthography and the two species); Torr. & Gray, Fl. i. 223; Gray, Gen. III. ii. 97, t. 138, 139. *Malachodendron*, Mitchell, Act. Phys.-Med. Acad. Nat. Cur. viii. App. 216. *Stewartia* & *Malachodendron*, Cav. Diss. v. 302, 303; Juss. Gen. 292, 275; Lam. III. iii. t. 593; DC. Prodr. i. 528.

§ 1. **STUÁRTIA** proper. Styles wholly combined and a 5-crenulate stigma: sepals and petals only 5: capsule very woody, globular; seeds marginless, smooth and shining. — Gray, l. c. 99.

**S.\* Malachodéndron**, L.<sup>1</sup> Shrub 6 to 12 feet high: leaves soft-pubescent beneath, as also the rounded sepals: petals inch or two long: stamens purple. — Spec. ii. 698 (*Malachodendron*); Marsh. Arbust. 149; L'Her. l. c. t. 73; Walt. Car. 176; Audubon, Birds Amer. t. 17; Torr. & Gray, Fl. i. 224. *S. Virginica*, Cav. Diss. v. 303, t. 159; Michx. Fl. ii. 43; DC. Prodr. i. 528; Gray, Gen. III. ii. 99, t. 138; Garden, xxxiv. 280, with fig. *S. Marilandica*, Donn, Cat. Hort. Cantab. ed. 3, acc. to Andr. Bot. Rep. vi. t. 397. *S. nobilis*, Salisb. Prodr. Stirp. 386. — Woods in the low and middle country, Florida and Louisiana to N. Virginia and W. Arkansas; fl. spring.

§ 2. **MALACHODÉNDRON**, Gray, l. c. Styles distinct, slender; stigmas in-trorse-subcapitate: petals often 6: capsule ovate-pyramidal and pointed, less woody; seeds dull, wing-margined. — *Malachodendron*, Cav. l. c. 302.

**S. pentágyna**, L'HER. Pubescence of longer and sparser more deciduous hairs, and leaves larger than in the preceding (5 or 6 inches long): sepals acute: stamens pale. — Stirp. Nov. vi. 155, t. 74; Nouv. Duham. i. 15, t. 6; Smith, Exot. Bot. ii. t. 110; Torr. & Gray, l. c.; Hook. Bot. Mag. t. 3918; Gray, Gen. III. ii. 100, t. 139.<sup>2</sup> *S. montana*, Bartr. Trav. 334. *Malachodendron ovatum*, Cav. Diss. t. 158, f. 2; Michx. l. c.; Lam. l. c.; Lindl. Bot. Reg. t. 1104. *M. pentagynum*, Choisy. Mém. Ternst. 49. *Cavanilla florida*, Salisb. Prodr. Stirp. 385. — Woods, mountains of Carolina, Georgia, and adjacent Tennessee and Kentucky; fl. early summer.

2. **GORDÓNIA**, Ellis. LOBLOLLY BAY. (Dr. Garden, who sent the original species to Ellis, desired the genus to be named in honor of *Dr. James Gordon* of Aberdeen, his preceptor, but Ellis, in correspondence with Linnæus, substituted *James Gordon*, a well known London nurseryman of that day.) — Shrubs or

<sup>1</sup> This name has been altered from *S. Virginica* on grounds of priority. The coincidence of the specific name with that of the subsequently applied sectional name *Malachodendron* is unfortunate, but scarcely forms a valid reason for discarding the former.

<sup>2</sup> Add Sargent, Gard. & For. i. 415.

small trees (of E. United States and Asia), with mostly coriaceous leaves, naked leaf-buds, showy axillary or subterminal flowers, and white petals. — Phil. Trans. lx. 520, t. 11; (Catesb. Car. i. t. 44); L. Mant. ii. 556; Gray, Gen. III. ii. 101, t. 140–142.<sup>1</sup>

§ 1. GORDÓNIA proper. Filaments short, on the summit and inner surface of five thickened disk-like lobes which are confluent at base into a cup or ring: petals well united at base: capsule pointed with the base of the short style; valves entire; seeds 4 or by abortion 2 in each cell, pendulous from its inner angle toward the base, membranaceous-winged upward. — Gray, l. c.

**G. Lasianthus**, ELLIS, l. c. 523. (LOBLOLLY BAY.) Tree 60 to 80 feet high, or arborescent shrub: leaves subsessile, lanceolate to oblong with tapering base, firm-coriaceous, callous-serrulate, shining, 4 to 6 inches long, the veins inconspicuous: flowers rather long-peduncled: petals concave, often 2 inches long: capsule ovoid, canescent. — L. Mant. ii. 570; Cav. Diss. vi. 307, t. 161; Sims, Bot. Mag. t. 668; Lam. III. iii. t. 594; Nouv. Duham. ii. t. 68; Michx. f. Hist. Arb. Am. iii. 131, t. 1 (*Lasyanthus*); Audubon, Birds Amer. t. 168; Gray, l. c.<sup>2</sup> *G. pyramidalis*, Salisb. l. c. 386. *Hypericum Lasianthus*, L. Spec. ii. 783. — Swamps, near the coast, Virginia to Florida and Mississippi; fl. early summer.

§ 2. FRANKLÍNIA, Torr. & Gray, l. c. 223. Filaments elongated, in 5 distinct clusters, each directly adnate to the base of one of the nearly distinct petals: style slender, deciduous; ovules 6 or 8 in each cell, downwardly imbricated: capsule globular, obtuse, loculicidally 5-valved from apex to below the middle, and then septucidally from base upward; seeds closely packed on the salient axile placentæ, angled by mutual pressure, wingless or nearly so; embryo unknown: leaves deciduous. — Gray, l. c.

**G. pubescens**, L'HER. Tree or tall shrub: leaves submembranaceous and veiny, obovate-spatulate, serrulate, canescently puberulent beneath, tapering at base, short-petioled, 5 to 10 inches long: flowers subsessile, as large as of preceding and more open. — Stimp. Nov. vi. 156; Lam. Dict. ii. 770; Cav. Diss. vi. 308, t. 162; Vent. Malm. t. 1; Michx. f. Hist. Arb. Am. iii. 135, t. 2; Audubon, Birds Amer. t. 185; Torr. & Gray, Fl. i. 223; Gray, Gen. III. t. 142, & 141 in part.<sup>3</sup> *G. Franklini*, L'Her. l. c.<sup>4</sup> *Franklinia Altamaha*, Marsh. Arbust. 49; Bartr. Trav. 16, 467. *Michauxia sessilis*, Salisb. l. c. 386. *Lacathea florida*, Salisb. Parad. Lond. t. 56. — Near Fort Barrington on the Altamaha River, coll. Bartram, but not since found: now known only in cultivation; fl. summer.

## ORDER XXV. CHEIRANTHODENDREÆ.

By A. GRAY.

Trees or shrubs, with rusty furfuraceous-tomentulose stellular pubescence, alternate palmately lobed leaves, small caducous stipules, and hermaphrodite terminal flowers simply pentamerous throughout, but apetalous. Calyx deeply 5-parted, colored but persistent, strongly quincuncial-imbricated, within more or less nectariferous-pitted at base, subtended by 3 caducous or deciduous bractlets.

<sup>1</sup> Add syn. *Lasianthus*, Adans. Fam. ii. 398.

<sup>2</sup> Add Sargent, Silv. i. 41, t. 21.

<sup>3</sup> Add Sprague & Goodale, Wild Flowers, 194, t. 47.

<sup>4</sup> Add syn. *G. Altamaha*, Sargent, Gard. & For. ii. 616, & Silv. i. 45, t. 22.

Stamens 5, alternate with the sepals and monadelphous; anthers adnate-extrorse, 2-celled, the cells parallel and more or less elongated, opening lengthwise. Ovary 5-celled (rarely and casually 4-celled), with numerous horizontal anatropous ovules in the axis; a single filiform style terminated by a minute undivided stigma. Capsule hispid, loculicidally 5-valved; seeds rather large, oval or obovoid, with crustaceous naked testa, and a straight embryo nearly the length of the fleshy albumen; the cotyledons broadly oval and foliaceous, plane except some incurving of the margins; radicle short. Pollen-grains smooth, somewhat trigonous, delicately reticulated. — Gray, Proc. Am. Acad. xxii. 203. — Consists of the Mexican Hand-tree (*Cheiranthodendron*, Larreat., *Cheirostemon*, Humb. & Bonpl.) and the following.

1. **FREMONTIA**, Torr. (The discoverer, *Gen. John Charles Frémont*, distinguished Western explorer.) — Bractlets (3, sometimes 5?) minute, caducous. Sepals plane and thin (not carinate), roundish, rotately spreading in anthesis. Stamens regular; filaments at base obscurely adnate to the bottom of the calyx, monadelphous to or above the middle; anthers elongated-oblong, emarginate at both ends, adnate to a small and narrow inconspicuous connective; the cells reniform-incurved and at length contorted or flexuous, obscurely camerate and sausage-like. Capsule ovoid, firm-coriaceous; seeds smooth and not appendaged. — Pl. Frém. in Smiths. Contrib. vi. 5, t. 2, not of Emory Rep.; Hook. f. Bot. Mag. t. 5591; Benth. & Hook. Gen. i. 212, 982; Masters, Gard. Chron. 1869, 610, & Seem. Jour. Bot. vii. 298; Brew. & Wats. Bot. Calif. i. 88; Gray, l. c. 304.<sup>1</sup>

**F. Californica**, Torr. l. c. 6. Branching shrub or arborescent, 4 to 20 feet high, with hard wood and dark-colored bark: leaves subcoriaceous, round-cordate to round-ovate, moderately 3-5-lobed or -cleft, tawny-canescens or ferruginous beneath, the larger 2 inches wide: flowers short-peduncled on very short lateral branches: calyx nearly glabrous, accrescent, thin, wholly light yellow in anthesis, becoming 2 or 3 inches in diameter, marcescent in age, within hairy at base and with a small nectariferous pit: capsule inch long, hispid with short pungent hairs; the cells villous within. — *Cheiranthodendron Californicum*, Baill. Hist. Pl. iv. 70, but genera quite distinct.<sup>2</sup> — California, on dry hills, chiefly of the lower western slopes of the Sierra Nevada, from Hunt's Val., Lake Co., Bolander, southward; fl. spring; first coll. by *Frémont*.

## ORDER XXVI. MALVACEÆ.

By A. GRAY; the genera *Anoda*, *Wissadula*, *Malachra*, and *Cienfuegosia* revised by B. L. ROBINSON.

Herbs or soft-wooded shrubs or even trees, with bland mucilaginous juice, tough fibrous inner bark, alternate and mostly palmiveined stipulate leaves and usually stellate or fasciculated pubescence. Flowers usually hermaphrodite, polyandrous and monadelphous, with calyx valvate and corolla convolute in the

<sup>1</sup> Add Garden, xxix. 8, t. 525, xxxiii. 562, 566; Sargent, Silv. i. 47, t. 23.

<sup>2</sup> Add syn. *Fremontodendron Californicum*, Coville, Contrib. U. S. Nat. Herb. iv. 74.

bud, both 5-merous, the petals united at very base and adnate to tube of filaments (column). Anthers reniform and 1-celled, dehiscent round the convex side; pollen-grains hispidulous. Gynœcium oligo-polymerous; seeds amphitropous, with little albumen or none; embryo incurved, and broad foliaceous cotyledons variously plicate or contortuplicate. Peduncles axillary; pedicels often articulated with the peduncle or under the calyx. Calyx persistent, often subtended by an involucl like an accessory calyx, sometimes called an *epicalyx*. — A readily distinguished and well defined order. The tropical suborder *Bombaceæ* consists of trees.

TRIBE I. MALOPEÆ, with indefinitely numerous 1-seeded carpels congested without order or in a 5-lobed head, has no N. American representatives. *Malope malacoides*, L., a European annual, sometimes cultivated in gardens, is in Walter's Flora, probably by mistake; and Elliott's plant, from his own account and opinion, was a mallow. *Kitaibelia*, of Hungary, is in gardens.

TRIBE II. MALVEÆ. Carpels as many as the style-branches and stigmas, crowded or combined in a single series around a central axis from which they commonly separate at maturity, 1-few-ovulate. Staminal column antheriferous at the summit.

Subtribe I. EUMALVEÆ. Style-branches filiform, longitudinally stigmatose anteriorly. Carpels numerous or rarely few, mostly reniform and indehiscent, containing a solitary peritropous-ascending ovule and reniform seed.

\* Stamens simply monadelphous: flowers (hermaphrodite) involucellate under the calyx by three or more bractlets, except in some species of *Callirhoë*.

1. **MALVA**. Involucl of 3 or rarely 2 distinct small bractlets. Calyx 5-cleft. Petals obovate or deeply emarginate. Mature carpels round-reniform, beakless, much compressed, cohering in a depressed circle around the axis (which is not expanded or enlarged at top), at length separating from it and from each other. Herbs, of the Old World.

2. **ALTHÆA**. Involucl of several (6 to 9 or more) bractlets more or less gamophyllous at base. Flowers and fruit of *Malva*.

3. **LAVATERA** § **SAVINIONA**. Involucl of 3 more or less gamophyllous bractlets. Petals reflexed after anthesis, emarginate or truncate, unguiculate. Staminal column elongated. Axis of fruit with more or less conical top. Carpels beakless. Shrubby. Flower-stalks articulated above the middle.

4. **CALLIRHOË**. Involucl 1-3-phyllous or wanting. Petals cuneiform or flabelliform, the broad truncate summit erose-denticulate. Mature carpels (10 to 20) straightish or little incurved, compressed, more or less beaked or apiculate, the incurved short beak in typical species with cavity separated from that containing the seed. Perennials with thick and farinaceous napiform or fusiform root, one or two species excepted.

\* \* Stamens more or less united into phalanges in a double series: flowers hermaphrodite or by abortion of stamens sometimes dioecio-polygamous, mostly without involucl.

5. **SIDALCEA**. Calyx 5-cleft or -parted. Petals commonly emarginate or truncate. Staminal column in the typical species distinctly double; the exterior series distinctly below the summit of the common synema and of 5 distinct 4-10-antheriferous phalanges; inner or terminal series of about 10 mostly 2-antheriferous phalanges, or irregularly more or less geminate stamens. Carpels 5 to 9, reniform, at maturity separating from a persistent axis, then more lacerate ventrally, rarely somewhat 2-valved.

\* \* \* Stamens at summit of simple column, not in phalanges: flowers dioecious: no involucl.

6. **NAPÆA**. Calyx short, not angulate, 5-lobed. Petals obovate, entire. The ♂ flowers with 15 to 20 stamens in a single series, and a mere rudiment of pistil; the ♀ flowers

with short column 15-20-toothed and no anthers or bare rudiments. Filiform style-branches 8 to 10. Carpels at maturity separating from very small central axis, beakless, barely apiculate, hardly at all reniform, chartaceo-coriaceous, smooth, closed, or at length opening ventrally or even 2-valved; seed reniform.

Subtribe II. *SIDEÆ*. (*Sidæa* & *Abutilæa*, Gray, Gen. III. ii. 47.) Style-branches terminated by a capitate or truncate stigma. Carpels 1-few-ovulate.

\* Seeds 1 to 3 in each carpel, reniform, at least the lower from an ascending ovule and the radicle inferior: calyx usually more or less involuclate-bracteolate.

7. *MALVASTRUM*. Ovule and seed solitary, conformed to the rounded cavity of the carpel.

8. *SPHÆRALCEA*. Ovules 1 to 3 and seeds 1 or 2 sometimes 3 in each carpel, the cell of which is more or less extended and empty above, usually rugose-reticulated below.

9. *MODIOLA*. Ovules and seeds 2, one in each compartment of the transversely septate carpel; radicle in both seeds inferior or descending. Stamens only 10 to 20, all at very apex of the column, when only 10 indistinctly collected in five 2-antheriferous phalanges, the additional stamens when present singly interposed.

\* \* Seeds solitary or few in each carpel, at least the lower one resupinate-pendulous, turgid, usually obscurely and obtusely trigonous or cordiform; the radicle in pendulous seeds superior or ascending: no involucl under the calyx or (in one section of *Sida*) this represented by 1 to 3 setaceous deciduous bractlets: carpels tardily if at all deciduous at maturity, not rarely hanging for some time by a thread or dorsal partly detached nerve.

+ Carpels 3-ovuled, 1-2-seeded; lower part in fruit strongly reticulate, upper scarious, in the manner common in *Sphæralcea*.

10. *HORSFORDIA*. Upper pair of ovules abortive, or all three fertile. Carpels 8 to 12, disjoined at maturity, early 2-valved above, converting the upper and usually empty scarious portion into a pair of erect and somewhat spreading wings, which equal or exceed the firm reticulated basal portion. Shrubs.

+ + Carpels 1-ovuled, the cell usually filled by the seed.

11. *ANODA*. Ovule and seed resupinate-horizontal or in some pendulous. Carpels 5 to 20, mostly radiate-divergent in a depressed capsule which breaks up at maturity, the partitions or sides of the carpels evanescent or obliterated, the firmer dorsal and superior portion (commonly bearing a divergent cusp) partly embracing the (naked or arilliform-coated) turgid seed. Calyx usually explanate under the fruit.

12. *SIDA*. Ovule and seed pendulous. Carpels with enduring walls, not divergent, either pointless or with single or geminate erect or incumbent cusps or awns.

+ + + Carpels 2-9-ovuled, 1-9-seeded; their summits or cusps (if any) usually divergent.

13. *WISSADULA*. Carpels 5, transversely and imperfectly bilocellate or constricted in the middle; upper and divergent portion 2-valved, containing one or two ascending or horizontal seeds (rarely seedless); lower subclavate, mostly with a single pendulous seed.

14. *ABUTILON*. Carpels 5 to 30, homomorphous and continuous, 3-9-ovuled, tardily if at all separating, apically and dorsally dehiscent or at length 2-valved.

TRIBE III. *URENÆ*. Carpels or cells of the ovary 5, half as many as the style-branches and capitate stigmas, opposite the petals, uniovulate. Staminal column antheriferous along the upper part, but not at the truncate or 5-toothed summit. Seeds ascending; radicle superior.

\* Carpels dry, akene-like, separating at maturity, with or without a narrow axis.

15. *MALACHRA*. Flowers several and sessile in a capitate or glomerate leafy-involucrate cluster. Calyx not involuclate, 5-cleft, the lobes 3-nerved. Staminal column short, bearing about 20 stamens near its naked apex. Mature carpels obovoid and ventrally angulate, pointless and naked, somewhat dehiscent ventrally.



16. **URENA.** Flowers often glomerate but not involucrate, each involucellate by a whorl of 5 partly united bractlets, connate with base of calyx. Staminal column short. Mature carpels indehiscent, glochidiate over the entire surface.

17. **PAVONIA.** Flowers pedunculate. Calyx involucellate by a whorl of 5 to 15 narrow bractlets. Staminal column either rather short or elongated. Carpels (in ours indehiscent) rounded, either muticous and unarmed or 1-3-awned, these awns or spines sometimes retrorsely barbed or glochidiate.

\* \* Carpels combined into a globular drupaceous berry, in age the nutlets becoming dry and separating.

18. **MALVA VISCUS.** Calyx involucellate with 7 to 12 narrow bractlets. Petals unequal-sided, strongly convolute, and with a lateral lobelet or auricle below, which holds them erect in anthesis. Staminal column long and slender, exerted, sparsely antheriferous.

**TRIBE IV. HIBISCEÆ.** Carpels or cells of the ovary (3 to 10) of the same number as the style-branches and stigmas. Fruit a loculicidal capsule; cells opposite the sepals when of the same number; no central column. Staminal column antheriferous along the upper part, but not at the truncate or 5-toothed summit. Stigmas capitate or capitate.

\* Style-branches distinct and spreading: seeds mostly reniform.

19. **KOSTELETZKYA.** Bractlets of the involucre several or sometimes nearly wanting. Ovary 5-celled, a solitary ascending ovule in each cell. Capsule depressed, saliently 5-angled.

20. **HIBISCUS.** Bractlets of the involucre several, sometimes few or almost wanting. Ovary and capsule 5-celled; the cells (rarely 2-locellate by a false partition) 2-many-ovuled, few-many-seeded.

\* \* Style undivided, bearing 3 to 5 sessile stigmas at the mostly thickened summit: seeds not reniform; cotyledons much conduplicate and crumpled.

21. **THESPESIA.** Involucre of 3 to 5 small and narrow commonly deciduous bractlets. Calyx truncate or tardily 5-lobed. Capsule nearly indehiscent, woody-coriaceous, 5-celled, few-seeded. Cordate-leaved trees.

22. **CIENFUEGOSIA.** Involucre of few or several small or narrow bractlets, or nearly obsolete. Calyx deeply 5-cleft. Capsule loculicidal, of 3 or 4 or rarely 5 cells and valves, few-seeded; cotyledons not dark-dotted. Shrubby or suffrutescent.

23. **INGENHOUSIA.** Involucre of 3 triangular-lanceolate entire herbaceous bractlets, persistent. Calyx saucer-shaped, truncate. Stigma obscurely 3-lobed. Capsule globular, coriaceous, 3-celled, 3-valved; valves partly villous inside; seeds 5 to 8 in each cell, tomentulose-puberulent and glabrate; cotyledons dark-dotted.

24. **GOSSYPIUM.** Involucre of 3 ample and cordate lacinate or dentate foliaceous bractlets distinct or united at base, persistent. Calyx truncate or 5-lobed. Stigmas and valves and cells of the capsule 5, rarely fewer; seeds numerous, very long-woolly, rarely naked; cotyledons dark-dotted.

1. **MÁLVA**, Tourn. **MALLOW.** (The ancient Latin name.)—Inst. 94, in part; L. Gen. no. 557; Benth. & Hook. Gen. i. 207.<sup>1</sup>—Herbs, summer-flowering, with rose-colored or white petals. A genus of the Old World, which, now expurgated of heterogeneous elements (Gray, Gen. Ill. ii. 46, 49, t. 116), should the rather include the two following, these differing only in unessential and varying particulars.

\* Flowers only from upper axils, surpassing the subtending leaves, forming a somewhat racemose or paniculate inflorescence at the summit of stem and branches: petals much longer than calyx: stems erect from a perennial root: radical leaves cordate-rotund and little lobed; cauline deeply cleft or dissected: escaped from cultivation.

<sup>1</sup> Add E. G. Baker, Jour. Bot. xxviii. 242.

**M. MOSCHÁTA**, L. (MUSK MALLOW.) Pubescent with spreading mostly simple hairs: lower (rarely all) leaves suborbicular, rather shallowly incised; middle and upper cauline leaves deeply 5-parted and the divisions palmately or pinnately parted into linear lobes: carpels in fruit rounded on the back, very hairy. — Spec. ii. 690.<sup>1</sup> — Waste-grounds and roadsides, near dwellings occasionally. (Nat. from Eu.) In Maine called *Musk Rose*.

**M. ÁLCEA**, L. Pubescence short and stellate: cauline leaves 5-parted into oblong or broadly linear and barely incised divisions: flowers larger: carpels glabrous. — Spec. ii. 689. — Roadsides in a few places, E. New England and Michigan. (Nat. from Eu.)

\* \* Flowers fascicled in the axils of most of the leaves, surpassed by their long petioles: leaves round-cordate or reniform and merely obtusely lobed: root annual or biennial.

+ Flowers large and showy, 1½ to 2 inches in diameter: bractlets rather broad, oblong or ovate-lanceolate.

**M. SYLVÉSTRIS**, L. l. c. (HIGH MALLOW.) Hairy: stem erect, a foot to a yard high: leaves 5-7-lobed: flowers an inch or more in diameter, generally mauve- or reddish-purple: carpels about 10, reticulate-rugose on the back and with angled edges, glabrous or short-pubescent. — Roadsides, &c., escaped from cultivation in some places. (Nat. from Eu.)

+ + Flowers smaller: bractlets narrower, lanceolate to oblong-linear.

**M.\* VERTICILLÁTA**, L. l. c. Erect subsimple or branching mostly smoothish annual with large shallowly 5-7-lobed crenate leaves: flowers subsessile, purplish or nearly white: calyx tending to close in fruit: carpels at maturity scarcely reticulated, the transverse ridges starting at the edges not branched and not attaining the fine straight rarely obscure mid-nerve. — A troublesome weed in gardens about Middlebury, Vt., *Brainerd*. (Adv. from Asia, N. Afr.)

**M.\* CRÍSPA**, L. (Syst. Nat. ed. 10, 1147), the CURLED MALLOW of the gardens, near which it is sometimes spontaneous, a species of uncertain nativity, is perhaps, as originally conceived by Linnæus (Spec. ii. 689), merely a variety of the preceding, from which it differs chiefly in the more finely crenulate and undulate leaf-margins.

**M. ROTUNDIFÓLIA**, L. (COMMON or DWARF MALLOW.) Pubescent or almost glabrous: stems procumbent from a large and deep firm root: leaves rounded, slightly 5-7-lobed, crenate: corolla barely half inch in diameter, surpassing the calyx, pale: carpels about 15, puberulent and rounded but not reticulated on the back. — Spec. ii. 688; Gray, Gen. III. ii. t. 116. — A common weed, extending across the continent, especially abundant in the Atlantic States and northward; fl. spring to autumn. (Nat. from Eu.)

**M.\* PARVIFLÓRA**, L.<sup>2</sup> Glabrous or sparsely hairy: stems erect or ascending from an annual root: leaves somewhat angulate-lobed: pedicels short: calyx larger than in the preceding or with broader lobes, widely spreading under the fruit: carpels glabrous, sharply and transversely reticulate-rugose on the back, the margins of which are somewhat winged and denticulate. — Diss. Dem. Pl., Amœn. Acad. iii. 416; DC. Prodr. i. 433; Jacq. Hort. Vind. t. 39; Greene, W. Am. Sci. iii. 155. *M. borealis*, Gray, Pl. Fendl. 15, & Gen. III. t. 116, f. 5, 6; Brew. & Wats. Bot. Calif. i. 83, at least in great part; Coulter, Contrib. U. S. Nat. Herb. i. 31, ii. 36; not Liljebl. *M. rotundifolia (borealis)*, Fries, Novit. ed. 2, 218. *M. obtusa*, Torr. & Gray, Fl. i. 225. — Abundant on the Pacific Coast from Brit. Columbia to S. California and Mexico, east to Texas; also locally established in waste places in the Atlantic States. (Nat. from Eu.?) Varying greatly in size, and under the most favorable circumstances, as in S. California, attaining gigantic stature for an annual.

**M.\* PUSÍLLA**, Smith. Similar in habit and foliage to the last preceding species: calyx-lobes mostly closed over the fruit: pedicels usually somewhat longer, tending to be reflexed in fruit: carpels dorsally rugose-reticulate, at first tomentulose, later nearly or quite glabrate; margins obscurely if at all denticulate, not at all winged. — Eng. Bot. t. 241. *M. parviflora*,

<sup>1</sup> The *M. Alcea* of Rand & Redfield's Fl. Mt. Desert is an exceptional form of *M. moschata*, with none of the leaves deeply cleft.

<sup>2</sup> Dr. Gray did not recognize the American occurrence of this species, which under the name *M. borealis* was confused with the next.

Huds. Fl. Ang. 307, not L. *M. borealis* ["Wallm. in"] Liljebl. Sv. Fl. ed. 3, 374; Reichenb. Ic. Bot. Crit. t. 20; Fl. Dan. t. 1825; E. G. Baker, Jour. Bot. xxviii. 341. *M. Nicaënsis*, of several Am. authors, not of Allioni. — Centr. and S. California, about dwellings, &c., considerably less frequent than the last, from which it can sometimes scarcely be distinguished; also rarely found on ballast in the Atlantic States. (Nat. from Eu.)

2. **ALTHÆA**, Tourn. (Ancient Greek and Latin name of MARSH MALLOW, from ἄλθω, to heal.) — Old World herbs; A. RÓSEA, Cav., the Hollyhock, common in cultivation, and the following sparingly naturalized. — Inst. 97; L. Gen. no. 561.

A. OFFICINÁLIS, L. (MARSH MALLOW.) Perennial from a thick and deep root (which yields the mucilage for which the plant is officinal), 2 to 4 feet high, branching, tomentose-canescens: leaves broadly ovate, serrate, partly incised or 3-lobed: peduncles axillary, short, several-flowered: flowers short-pedicelled: petals pale rose-color, half inch long: carpels 15 to 20. — Spec. ii. 686; Fl. Dan. t. 530; Woodv. Med. i. t. 53; Torr. & Gray, Fl. i. 229. — Borders of salt marshes, New England and New York, also in a few places westward and southward to Michigan and Arkansas; fl. summer. (Nat. from Eu.)

A.\* CANNÁBINA, L. (Spec. ii. 686), readily distinguished from the preceding by its digitately 5-parted or -divided leaves, has been found more or less established in vacant lots in Washington, D. C., *G. Oliver* (acc. to Holm, Proc. Biol. Soc. Wash. vii. 40).

3. **LAVÁTERA**, Tourn. (Dedicated by Tournefort to one of the family *Lavater*, a physician, of Zurich.) — Mém. Acad. Paris, 1706, 86, t. 7; L. Gen. no. 558; Dill. Cat. Pl. Giss. App. 155, t. 10.<sup>1</sup> — Founded on the common annual *L. trimestris*, L., of the gardens (§ *Stegia*, DC.), which has an umbrella-shaped top to the axis of the fruit. In the other sections of the genus the top is conical, either large or small. All Old World plants (most of them shrubby), except the following, of the § SAVINIÓNA (*Saviniona*, Webb & Berth. Phyt. Can. i. 30), which are insular arborescent shrubs (Canarian and Californian!) with long-petioled maple-shaped leaves, small caducous stipules, and a distinct joint in the flower-stalk at some distance below the flower.

L. **assurgentiflóra**, KELLOGG. Shrub with simple stems, 6 to 15 feet high, soft-puberulent or glabrate, the young parts sometimes canescent: leaves 5-7-cleft, 3 to 6 (or at largest even 9) inches broad; lobes ovate-triangular, coarsely and irregularly obtusely dentate: pedicels few in the fascicles or rarely solitary, slender, inch or two long, commonly recurved-assurgent: bractlets of the 3-parted involucre oblong-lanceolate, shorter than the triangular moderately accrescent calyx-lobes: petals cuneiform and truncate or obcordate, inch or more long, mauve-purple and darker-veined; claw bearded-pubescent at base: column glabrous: fruit below strongly winged between the carpels and apex not dilated nor exserted; mature carpels 6 to 8, turgid, roundish and nearly nerveless on the back, glabrous or almost so. — Proc. Calif. Acad. Sci. i. 11, 14; Brew. & Wats. Bot. Calif. i. 83, ii. 437. — Islands off the coast of S. California, Anacapa,<sup>2</sup> San Clemente, San Miguel, &c., and naturalized or cultivated on the mainland as far north as San Francisco;<sup>3</sup> fl. from earliest spring. Near the Canarian *L. acerifolia*, Cav., and considerably variable.

<sup>1</sup> Add E. G. Baker, Jour. Bot. xxviii. 210 (*et seq.*), and for further literature on the origin and distribution of the Pacific species of this interesting and geographically dissevered genus, see Le Conte, Bull. Calif. Acad. Sci. ii. 516; Greene, Gard. & For. iii. 378, 379, & Pittonia, i. 260-263; Brandegee, Zoe, i. 109, 189; Parish, *ibid.* 300.

<sup>2</sup> Upon the small rocky Island of Anacapa, from which, it is said, the original specimens were secured, the species has not since been observed and may now be extinct, although found on various neighboring islands.

<sup>3</sup> Mr. T. S. Brandegee (Zoe, i. 189) states that it is cultivated as far north as Mendocino Co., Calif., and inland to the foot-hills of the Sierras.

**L. insularis**, WATSON. Low, cinereous-puberulent: leaves 7-lobed; the lobes roundish-oval, very obtuse and obtusely dentate: pedicels less than inch long, shorter than the flower, at length deflexed: bractlets of involucl spatulate, almost distinct, rather shorter than the flowering and much shorter than the largely accrescent fructiferous calyx: petals spatulate-obovate, emarginate, inch and a half long, purplish, naked at base of claws: column glabrous: fruit nearly of the preceding, of about 10 carpels. — Proc. Am. Acad. xii. 249, & Bot. Calif. ii. 437. — Coronados Islands near San Diego, S. California, *Cleveland*.

**L. OCCIDENTÁLIS**, Watson, Proc. Am. Acad. xi. 113, 124; Brew. & Wats. Bot. Calif. i. 83, of Guadalupe Island off Lower California, differs from the last preceding (which may be a form of it) in the oblong bractlets of involucl more united at base, and a moderately dilated depressed-conical top to the axis of fruit.

**L. VENÓSA**, Watson, Proc. Am. Acad. xii. 249, coll. by *Dr. Streets* on San Benito Island, Lower California, in incomplete specimens,<sup>1</sup> has somewhat similar leaves, but slender pedicels (an inch or two long), oval bractlets of involucl nearly distinct and equalling the calyx, smaller purple and dark-veiny petals, their claws with hairy tufts at base (in the manner of the first species), and more compressed carpels with striate-nerved sides.

**4. CALLÍRHOË**, Nutt. (*Καλλιρόή*, the name of more than one mythological female.) — E. North American herbs, with mostly showy crimson-purple or flesh-colored flowers. Cauline leaves palmately or pedately dissected; stipules free. — Jour. Acad. Philad. ii. 181 (on species destitute of involucl); Gray, Pl. Fendl. 16, & Gen. Ill. ii. 51, t. 117, 118.<sup>2</sup> *Nuttallia*, Bart. Fl. N. A. ii. t. 62; Hook. Exot. Fl. t. 171, 172.

§ 1. Perennials, some perhaps biennials, with thick and farinaceous napiform or fusiform root: mature carpels of rounded or subreniform outline.

\* Carpels with small and deciduous beak or point, or none, even on the back and the thin sides not rugose, at length often 2-valved: involucl 3-phyllous: calyx 5-lobed to the middle: peduncles short, umbellately few-several-flowered: stipules small: root fusiform.

**C. trianguláta**, GRAY. Roughish-pubescent, erect, 2 feet high: radical and lower leaves ovate-lanceolate with deeply cordate base to deltoid or slightly hastate, crenate, rarely incised or pedately cleft; upper cauline variously and often deeply cleft and the lobes narrow, some pedately hastate: pedicels about the length of the flower: bractlets of involucl spatulate, rather small, seldom equalling the deltoid-ovate obscurely 1-nerved calyx-lobes: petals purple, three fourths inch long, the summit repand. — Pl. Fendl. 16, Gen. Ill. ii. t. 118, f. 6, 7, & Man. ed. 5, 100. *Malva triangulata*, Leavenw. Am. Jour. Sci. vii. 62. *M. Houghtonii*, Torr. & Gray, Fl. i. 225, 681. *Nuttallia cordifolia*, Nutt. Jour. Acad. Philad. vii. 98. *N. triangulata*, Hook. Jour. Bot. i. 197. — Sandy barrens and prairies, Alabama and N. Carolina to Indiana and Minnesota; fl. summer.

\* \* Carpels indehiscent, with rugose-reticulated back and sides up to the short and broad inflexed beak: involucl 3-phyllous, close to the 5-parted calyx: sepals lanceolate, elongated, 3-5-nerved: peduncles elongated, 1-flowered: stipules conspicuous, ovate: perennial root napiform, large; fl. summer.

**C. involucrâta**, GRAY. Hirsute or even hispid: stems procumbent: leaves of rounded outline, palmately or pedately 5-7-parted or deeply cleft, and the mostly cuneate divisions incisely lobed, the lobes oblong to lanceolate: peduncles surpassing the leaves: bractlets of involucl linear to oblong, about half the length of the spreading calyx-lobes: petals commonly inch long and crimson-purple or cherry-red, varying to paler, the edge of the broad summit erose-denticulate: carpels 18 to 25, pubescent externally or the beak hairy, at length glabrate. — Pl. Fendl. 15, 16, Pl. Lindh. pt. 2, 159, & Gen. Ill. t. 117; Meehan, Native

<sup>1</sup> This species has since been secured by *Lt. Pond* and by *Dr. Edw. Palmer*, whose much better material fully confirms the characters upon which the species was based. See Greene, Pittonia, i. 261-263, and Vasey & Rose, Contrib. U. S. Nat. Herb. i. 21.

<sup>2</sup> Add E. G. Baker, Jour. Bot. xxix. 49.

Flowers, ser. 1, ii. t. 2; Sprague & Goodale, Wild Flowers, t. 26. *C. verticillata*, Grœnl. Rev. Hort. 1862, 171, with plate. *C. palmata*, Buckl. Proc. Acad. Philad. 1861, 449, small form, pale-flowered.<sup>1</sup> *Nuttallia involucrata*, Nutt. ex Torr. Ann. Lyc. N. Y. ii. 172. *Malva involucrata*, Torr. & Gray, Fl. i. 226; Hook. Bot. Mag. t. 4681. — Plains, Minnesota, Eastern Iowa and Nebraska to Texas; fl. all summer. Varies in size and color of flower, hairiness, and breadth of leaf-lobes: passing into

**Var. lineariloba**, GRAY. Less hirsute, or with only close and short pubescence, or almost glabrous: stems ascending: leaves smaller, inch or two in diameter; upper or all of them dissected into linear lobes: corolla pink or lilac, often with white centre: carpels glabrate. — Proc. Acad. Philad. 1862, 161. *C. lineariloba*, Gray, Proc. Am. Acad. xix. 74. *Malva involucrata*, var. *lineariloba*, Torr. & Gray, l. c. *M. lineariloba*, Young, Fl. Texas, 180. — Texas, first coll. by Berlandier, then by Drummond. (Mex., Gregg, Palmer,<sup>2</sup> &c.)

\* \* \* Carpels rugose-reticulated at maturity, the short and broad hollow beak incurved: involucrel none or in *C. Papaver* 1-3-phyllous: calyx 5-parted, the tapering acute or acuminate lobes 3-nerved: peduncles 1-flowered: stipules not large: root napiform.

**C. alcæoides**, GRAY. A span to a foot high, erect, strigulose-pubescent or glabrate: radical leaves oblong- or deltoid-cordate and coarsely crenate or incised, or some pedately 3-5-parted into oblong or linear divisions or lobes, the middle one longer; cauline more divided: peduncles corymbosely approximate at summit of stem, an inch or more long: calyx 3 to 5 lines long: petals half inch or more long, rose-color or pale: carpels disposed to dehiscence. — Pl. Fendl. 18, & Man. ed. 5, 100; Wats. Bibl. Index, 132. *C. alcæoides* & *C. macrorhiza*, Gray, Pl. Fendl. 18, & Gen. Ill. ii. 53. *Sida alcæoides*, Michx. Fl. ii. 44; Torr. & Gray, Fl. i. 234, 681. *Sida macrorhiza*, James fide Wats. l. c. *Malva pedata*, var. ? *umbellata*, Torr. & Gray, Fl. i. 227. — Barrens and plains, Tennessee and Kentucky, Michaux, Dr. Currey; rare. Nebraska and Kansas to Texas; first coll. by James.

**C. Papáver**, GRAY. Sparsely hirsute or partly glabrous: stems a foot or two high, ascending, slender, rather naked above: leaves mostly pedately 3-5-parted, the radical into oblong or lanceolate, and cauline into narrowly lanceolate or linear divisions of about equal length, the larger ones 2 or 3 inches long: peduncles few, elongated, much surpassing the leaves: involucrel commonly of 3 linear bractlets, often a little remote from calyx, sometimes wanting: calyx about half inch long: petals sometimes inch and a half long, erose-denticulate at broad summit, red-purple. — Pl. Fendl. 17, & Gen. Ill. t. 118, f. 5, carpel. *Malva Papaver*, Cav. Diss. ii. 64, t. 15, f. 3; DC. Prodr. i. 431; Torr. & Gray, Fl. i. 226, 681, excl. syn. *M. Nuttalloides*, Croom, Am. Jour. Sci. xxvi. 313, & xxviii. 168. *Nuttallia Papaver*, Graham, Bot. Mag. t. 3287; Sweet, Brit. Fl. Gard. ser. 2, t. 279. *N. grandiflora*, Paxt. Mag. Bot. v. 217, with plate. — Open woods, W. Georgia and Florida to Louisiana and E. Texas; fl. spring and summer.

**C. digitata**, NUTT. Sparsely hirsute or mainly glabrous: stem a foot or two high, erect, few-leaved: leaves palmately or pedately 5-7-parted; primary radical ones round-cordate, some with short rounded lobes, others parted into narrow divisions or lobes; the cauline commonly with narrow linear divisions or lobes (1 to 3 inches long); upper ones reduced to small simple bracts: peduncles subracemose, elongated and filiform: involucrel always wanting: petals inch long, red-purple (varying to white or violet), the summit fimbriolate. — Jour. Acad. Philad. ii. 181; Gray, Pl. Lindh. pt. 2, 160, Pl. Fendl. 17, Pl. Wright. i. 15, & ii. 20; Torr. & Gray, Pacif. R. Rep. ii. 160. *Nuttallia digitata*, Bart. Fl. N. Am. ii. 74, t. 62; Sweet, Brit. Fl. Gard. t. 129; Sims, Bot. Mag. t. 2612; Hook. Exot. Fl. t. 171. *N. palmata*, Torr. Ann. Lyc. N. Y. ii. 171. *N. pedata*, Hook. Exot. Fl. t. 172. (*Sida pedata*, Nutt. in herb.) *N. cordata*, Lindl. Bot. Reg. t. 1938. *Malva digitata* & *M. pedata* (excl. var.),

<sup>1</sup> Add syn. *C. involucrata*, var. *palmata*, Britton, Trans. N. Y. Acad. Sci. ix (1890), 133.

<sup>2</sup> One of Dr. Palmer's specimens, included by Dr. Gray in var. *lineariloba*, has subsequently been described by E. G. Baker, Jour. Bot. xxix. 49, as var. *TENUÍSSIMA*, Palmer. It was collected in Northern Mexico east of Saltillo (not *Salt-hills* as stated in descr.), and represents an extreme form as to dissected foliage. Var. *NOVO-MEXICANA*, E. G. Baker, l. c., collected near McNees's Creek, New Mexico, Fendler, without number, a form with leaves few-lobed and lobes broadly lanceolate and acute, represents the other extreme. More ample material of these different forms may well show specific differences.

Torr. & Gray, Fl. i. 227. — Prairies, &c., Arkansas<sup>1</sup> to Texas; fl. spring; first coll. by Nuttall.

§ 2. Annual: carpels short-beaked, densely pubescent: involucl of 3 linear bractlets.

C.\* *scabriúscula*, ROBINSON, n. sp. Erect, subsimple, a foot and a half high, covered throughout with a fine close slightly rough stellate tomentum: leaves suborbicular in outline, deeply and palmately 5-cleft; lobes oblong or lanceolate, entire or few-toothed, obtuse; petioles of the lower leaves 3 or 4 inches long, channelled above; the upper leaves shortly petioled; stipules lance-linear: peduncles rather rigid, considerably exceeding the subtending sessile foliaceous 3-5-parted bracts: calyx-lobes lanceolate, acuminate, 3-nerved, 4 or 5 lines long: obovate subtruncate petals more than an inch in length: carpels with lateral walls often although not always evanescent in manner of *Anoda*; styles somewhat persistent. — Collected on the Colorado River of Texas by Dr. Sutton Hayes (no. 80) while on the El Paso and Ft. Yuma Wagon Road Exped. A single specimen in herb. Gray.

§ 3. Annual: mature carpels with beak little shorter than the body; the latter with smooth back, 3-crenate at summit: no involucl.

C. *pedáta*, GRAY. Stem erect, a foot or even a yard high, leafy: radical and lower leaves round-cordate, palmately or pedately 5-7-lobed or -parted and the lobes coarsely toothed or incised, upper 3-5-cleft or -parted usually into narrow divisions: peduncles longer than the leaves and somewhat racemose at summit of stem: calyx 5-parted; lobes triangular-lanceolate and attenuate, 3-nerved: petals inch or less long, red-purple or cherry-red, varying to lilac, erose at broad summit: mature carpels straight with the thick beak excised within, more or less rugulose-reticulated on the sides, somewhat disposed to dehiscence at base. — Pl. Fendl. 17, Pl. Lindh. pt. 2, 160 (excl. syn. Bart. & Hook.), Gen. Ill. ii. 53, t. 118, Pl. Wright. i. 15, & ii. 20; Grœnl. Rev. Hort. vi. (1857) 429, f. 148. *Sida* (*Nuttallia*) *pedata*, Nutt. in herb., apparently, but not *N. pedata*, Hook., &c. — Prairies and thickets, common in Texas,<sup>2</sup> first coll. by Berlandier; fl. spring & summer.

5. *SIDÁLCEA*, Gray. (Name compounded of *Sida*, to which the known species had been referred, and *Alcea*, from some general likeness to that genus.) — Herbs of W. North America, erect; with mostly palmately or pedately parted or deeply cleft leaves, small stipules, and purple or pink or sometimes white flowers of moderate size, appearing in spring and summer, mostly collected in terminal racemes or spikes, not rarely polygamous by the abortion of the anthers; the ♀ flowers being smaller. Involucls mostly 0, rarely present. Carpels beakless or with distinct apiculation. — Gray in Benth. Pl. Hartw. 300, Pl. Fendl. 18, & Gen. Ill. ii. 57, t. 120; Benth. & Hook. Gen. i. 201.<sup>3</sup>

§ 1. Annuals, typical species, all Californian, spring-flowering: phalanges conspicuous.

\* Stamineal column conspicuously double; the five exterior phalanges borne much below the summit, petaloid-dilated, convolute in æstivation, quadrate or oblong, undivided, their truncate summit 5-10-antheriferous on very short free filaments; interior or terminal phalanges mostly 10, linear and 2-antheriferous: petals with broad summit minutely erose-denticulate, bright purple or rose-colored.

— Carpels dorsally reticulated or favose; meshes short.

<sup>1</sup> Missouri, McDonald Co., *Bush*, "uncommon"; also reported earlier from Lawrence and Jasper Counties by G. C. Broadhead, Bot. Gaz. i. 9.

<sup>2</sup> Northward to the Cimarron Val., Ind. Territory, *Carleton*, acc. to Holzinger.

<sup>3</sup> Add Gray, Proc. Am. Acad. xxi. 409, xxii. 286; Greene, Bull. Calif. Acad. Sci. i. 74; E. G. Baker, Jour. Bot. xxix. 51.

**S. diploscypha**, GRAY. Soft-hirsute, and with some fine soft pubescence, a foot or two high, with spreading branches and racemously or corymbosely few-flowered peduncles: leaves round-reniform in outline, earliest merely crenate, the rest 5-7-parted and divisions mostly 2-3-lobed, lobes and divisions of lower leaves broadish, of upper linear, of the sessile bracteal ones almost filiform: calyx-lobes lanceolate-subulate: petals inch long: carpels beakless, depressed- or cochleate-reniform and more or less reticulate-rugose at maturity, lightly sulcate down the back, at separation leaving behind on the receptacle as many subulate obtuse processes of nearly the height of the narrow central receptacle. — Gray in Benth. Pl. Hartw. 300, Pl. Fendl. 19, & Gen. Ill. t. 120, f. 1-6; Brew. & Wats. Bot. Calif. i. 84; Greene, Bull. Calif. Acad. Sci. i. 79. *Sida diploscypha*, Torr. & Gray, Fl. i. 234, 682; Hook. & Arn. Bot. Beech. 326, t. 76. — N. and W. California, not uncommon in grain-fields; first coll. by Douglas.

**Var. minor**, GRAY. Smaller, the corolla barely inch and a half in diameter, seemingly deeper-colored and with a dark-purple centre: mature carpels more rugose and turgid. — Pl. Fendl. 19.<sup>1</sup> — Valley of the Sacramento, and Lake Co.; the earliest collectors being Frémont and Hartweg.

**S. hirsuta**, GRAY. Stem soft-hirsute, at least above, often glabrous below, strict or with ascending branches, commonly 2 feet high, bearing numerous flowers in dense and rather short racemes or spikes: cauline leaves palmately or pedately 7-9-parted or -divided into narrowly linear and entire divisions; lower glabrous; bracts mostly small and inconspicuous: calyx densely cinereous-pubescent and hirsute; the lobes triangular-lanceolate: petals inch or less long, light rose-color: carpels at maturity three fourths orbicular or subreniform, reticulated on the back and sides, ventrally tipped with a soft and hairy erect at length deciduous subulate beak, at separation leaving a scarious portion of insertion on the thickish receptacle. — Pl. Wright. i. 16; Torr. Pacif. R. Rep. iv. 72; Gray, Proc. Am. Acad. xxi. 410. *S. delphinifolia*, Gray, Pl. Fendl. 19, & Gen. Ill. ii. t. 120, f. 10-12; Benth. Pl. Hartw. 300, not *Sida delphinifolia*, Nutt. *S. Hartwegi*, Brew. & Wats. Bot. Calif. i. 84, mainly; Greene, Bull. Calif. Acad. Sci. i. 78. — Valley of the Sacramento and of the Stanislaus, in low and wet but soon exsiccated grounds; first coll. by Hartweg, then by Bigelow.

+ + Carpels dorsally striate-reticulated with long meshes or several-ribbed.

**S.\* calycosa**, M. E. JONES.<sup>2</sup> Like the foregoing, but with broader leaflets and smaller and less copious flowers: stem pale green or stramineous, covered toward the summit with sparse spreading pubescence: stipules ovate, acuminate, large, 3 lines in length, green: inflorescences terminal, spicate, short and dense: calyx-lobes ovate or ovate-lanceolate, acuminate (3 or 4 lines long): mature carpels reniform, striate-nervose on the rounded back, minutely reticulated on the sides, the slender weak beak evanescent. — Am. Nat. xvii. 875; Gray, Proc. Am. Acad. xxi. 410. — Sonoma Co., on Russian River, M. E. Jones.

**S.\* sulcata**, CURRAN. More slender and branching: stem mostly glabrous, purplish: leaf-segments narrow: stipules very small, dark reddish, a line in length: inflorescence at length loose: flowers rather small for the group and of deep color: calyx smaller and less inclined to become scarious than in the last preceding species: petals reversed-deltoid, 6 or 8 lines in length and breadth. — M. K. Curran in Greene, Bull. Calif. Acad. Sci. i. 79. Reduced to *S. calycosa* by Gray, Proc. Am. Acad. xxi. 410, Greene, Fl. Francis. 104, and E. G. Baker, Jour. Bot. xxix. 51, but apparently distinct. — Central California, Eldorado Co., Mrs. Curran, Mariposa Co., at White Rock, Congdon, and Marin Co., near Lagunitas Lake, Dr. Merrill.

\* \* Exterior phalanges closely approximate to the interior at the summit of the column, 2-parted into narrow divisions, each 2-antheriferous; interior phalanges less conspicuous; structure therefore similar to that of the ordinary perennial species.

**S. Hartwégi**, GRAY. Slender, paniculately branching, a foot or two high, minutely pubescent: leaves simply palmately or pedately 3-7-parted into linear divisions, or some of these occasionally 2-3-lobed and broader: flowers few or several and rather loose in short racemes, minutely bracteate: calyx-lobes lanceolate, attenuate-acuminate: petals half to three fourths inch long, deep pink-purple: carpels at full maturity reniform-incurved (at first with basal

<sup>1</sup> Add syn. *S. secundiflora*, Greene, Fl. Francis. 103.

<sup>2</sup> Description altered to exclude the next following species.

portion straighter), strongly or even favosely rugose-reticulated, closed or slightly open at ventral base, the small and soft glabrous apiculation evanescent; some soft thin processes left on the receptacle. — Gray in Benth. Pl. Hartw. 300, Pl. Fendl. 20, & Proc. Am. Acad. xxi. 409. *S. tenella*, Greene, l. c. partly. — California, with *S. hirsuta* in the valley of the Sacramento, also on dry hillsides; first coll. by Hartweg; also from Colusa Co. to Mariposa. Smaller-flowered forms reach extreme in

**Var. tenella**, GRAY. Slender and more branching, much smaller-flowered: petals quarter to third inch long, lighter-colored. — Proc. Am. Acad. xxii. 286. *S. tenella*, Greene, Bull. Calif. Acad. Sci. i. 7. — On the Little Chico, Butte Co., Mrs. Austin. Anthers abortive and styles very long in some flowers.

§ 2. Perennials, strong-rooted, spring- or mostly summer-flowering, with flowers in naked (either single or paniculate) terminal spikes or racemes: exterior phalanges closely approximate to the interior or terminal stamens at summit of the column: petals seldom at all erose or denticulate.

\* Phalanges manifest, at least the exterior series, but the membrane often more or less cleft or parted: leafy-stemmed (except in *S. parviflora*, var. ? *Thurberi*): some or all of the cordate-orbicular lowest leaves barely crenate-lobed or incised; the upper cauline always deeply parted.

+ Corolla uniformly white: anthers bluish.

**S. cándida**, GRAY. Glabrous or almost so: stem 2 or 3 feet high from somewhat creeping rootstocks, leafy to the spiciform inflorescence: radical leaves obtusely lobed or crenate-incised; cauline (4 to 8 inches broad) 5-7-parted and divisions 2-3-lobed at apex, or uppermost 3-5-parted into lanceolate entire divisions: calyx-lobes deltoid: petals half inch or more long: carpels nearly glabrous and smooth (or slightly puberulent and in age obscurely reticulated on the sides), thin. — Pl. Fendl. 20, 24, & Gen. Ill. ii. t. 120, f. 9 (androcium); Torr. & Gray, Pacif. R. Rep. ii. 126, t. 2; Greene, Bull. Calif. Acad. Sci. i. 74. — Along streams in the higher Rocky Mountains of Colorado, New Mexico, and Utah; first coll. by Fremont.

+ + Corolla rose-color or mauve-purple, rarely a white variety.

++ Herbage cinereous with a short and soft several-rayed stellular pubescence, no hirsute or hispid hairs.

**S. Califórnica**, GRAY. Stems 2 or 3 feet high, erect, bearing a simple loosely-flowered spiciform raceme: lower leaves 2 or 3 inches broad: calyx-lobes 3-5-nerved, ovate-deltoid becoming deltoid-lanceolate: petals inch long: young carpels sparsely hispidulous-puberulent on the back: phalanges of outer series broad and short, truncate, 4-5-antheriferous on short filaments. — Pl. Fendl. 19, & Proc. Am. Acad. xxii. 286. *Sida Californica*, Nutt. in Torr. & Gray, Fl. i. 233. — Santa Inez Mountains near Santa Barbara, California (abundant in Mission Cañon and Cassitas Pass); first coll. by Nuttall.

++ ++ Herbage green, at least not cinereous: coarser pubescence when present of simple or geminate or few-rayed stellular hairs: species difficult to discriminate, apparently more or less confluent.

= Mature carpels when dry rugulose-reticulated, at least on the sides, mostly on the back also (sometimes smooth or nearly so in *S. Oregana*): petals (except in *S. Oregana* & *S. parviflora*) half inch to full inch long.

**S. malvæflóra**, GRAY. Hirsute or stems and petioles even hispid with few-rayed and some simple spreading hairs, but hardly any minute stellular pubescence: stems ascending or erect from decumbent base, 8 inches to 2 feet high (or rarely more) from a thick stock or root, simple and bearing simple loosely few-many-flowered spiciform racemes: petals about inch long: lobes of fructiferous calyx from deltoid-ovate to lanceolate: mature carpels lightly rugulose-reticulated, when young almost smooth. — Proc. Am. Acad. xxi. 409, & xxii. 286, not of earlier publications, except as to syn. *Sida malvæflora*, DC. *S. humilis*, Gray, Pl. Fendl. 20; Brew. & Wats. Bot. Calif. i. 84; Greene, Bull. Calif. Acad. Sci. i. 75.<sup>1</sup> *Sida*

<sup>1</sup> Add syn. *S. delphinifolia* (and var. *humilis*), Greene, Fl. Francis. 105.



*malvæflora*, DC. Prodr. i. 474 (Mociño & Sesse, Fl. Mex. Ic. ined., & Calques des Dess. t. 70, doubtless collected at Monterey; figure wants radical leaves, shows well the hispidity of stem and petioles, notwithstanding the "glabriuscula" of the Prodr.); Hook. & Arn. Bot. Beech. 326. *S. delphinifolia*, Nutt. in Torr. & Gray, Fl. i. 235, form with mostly dissected leaves. *Nuttallia malvæflora*, Fisch. & Trautv. in Fisch. & Mey. Ind. Sem. Hort. Petrop. iii. 1837, 41. — Low grounds and hillsides along and near the coast, from San Diego to Mendocino Co., California; first coll. by Mociño & Sesse.

**S.\* parviflora**, GREENE. Stems several, quite glabrous toward the base, subsimple, terminating in long slender loose racemes: lowest leaves orbicular, crenate-toothed, the others deeply divided, with divisions lobed: flowers small; pedicels (2 to 3 lines long) subtended by simple linear bractlets scarcely their own length: calyx somewhat hirsute-pubescent: petals a third to half inch long: carpels glabrous, at length distinctly reticulated; beak somewhat recurved. — *Erythraea*, i. 148. *S. malvæflora*, Torr. Bot. Mex. Bound. 38, in part, not Gray. — Meadows, S. California, Los Angeles Co., Lyon, Hasse, San Bernardino Co., Parish, Miss Cummings. (Sonora, at Ojo de Gavilan, where first coll. by Thurber in 1851.) Chiefly distinguished from the preceding by the smooth stem and considerably smaller flowers borne in longer more slender racemes. Prof. Greene (l. c.) states that Mr. Parish's specimen (no. 2080) was referred by Dr. Gray to *S. glaucescens*. It was collected, however, in May, 1889, more than a year after Dr. Gray's death.

**Var.\* (?) Thúrberi**, ROBINSON, n. var. A foot high: leaves small, chiefly basal; those of the almost naked stems sparse, divided into narrow linear segments: flowers white. — Las Playas, Sonora, near the U. S. boundary, Thurber, 334, 340, and perhaps also in New Mexico or Arizona.

**S. asprélla**, GREENE. No hirsute or hispid pubescence whatever: stem 2 to 5 feet high, simple, roughish with minute and dense stellular almost scurfy pubescence, or below glabrous: leaves moderately lobed or only uppermost dissected, pubescent with few-rayed short stellular hairs: raceme virgate, loosely flowered, very naked: pedicels sometimes longer than fruiting calyx, commonly very short: petals usually inch long: calyx canescent, in fruit mostly 5 lines long; lobes from ovate becoming triangular-lanceolate: carpels rugose-reticulated throughout and glabrous at maturity, becoming concave or grooved on the back and acute-angled at sides. — Bull. Calif. Acad. Sci. i. 78, founded on a lax and decumbent leafy state, perhaps from growing in thickets; Gray, Proc. Am. Acad. xxii. 286. — Hillsides of the lower Sierra Nevada, from Yuba to Siskiyou Co., Greene, Mrs. Curran; at Chico descending to the low foot-hills, where the stem is strict.

**S. campéstris**, GREENE. Either glabrous up to the inflorescence or with some hirsute pubescence at least below and close stellular cinereous pubescence above: stems 2 to 5 feet high, when large branching above: rounded lower leaves variously lobed; upper usually 5-7-parted into narrow divisions: racemes strict, either rather dense and spiciform or more loosely flowered: petals over half but rarely full inch long, their emarginate summit often lacinate-erose: calyx 4 or 5 lines long at least in fruit, minutely canescent, sometimes also with soft slender hairs, sometimes nearly glabrous; the lobes in age usually lanceolate-acuminate: carpels roughish rugose- or favose-reticulated and commonly pubescent, the back rather rounded and dorsal angles obtuse. — Bull. Calif. Acad. Sci. i. 76 (founded on one form); Gray, l. c. *S. Oregana*, Gray, Pl. Fendl. 20, partly.<sup>1</sup> *Sida malvæflora*, Lindl. Bot. Reg. t. 1036; Hook. Fl. Bor.-Am. i. 108. — Moist meadows, where usually smooth or glabrate, or dry hills or plains, there more pubescent and base of stem with radical petioles hirsute with deflexed or spreading hairs, N. California to Brit. Columbia west of the Cascade Range; first coll. by Douglas.

**S. Oregána**, GRAY. Very like the last preceding, merely puberulent or nearly glabrous up to the inflorescence, 2 to 5 feet high: racemes simple or commonly paniculate, at length loosely flowered: flowers comparatively small: petals a third to half inch long: calyx canescent, in fruit 2 or 3 lines long and the lobes broadly deltoid: carpels obscurely rugulose-reticulated, at least the dorsal angles and sides, the back smooth or smoothish. — Pl. Fendl. 20, partly, & Proc. Am. Acad. xxii. 287. *Sida Oregana*, Nutt. in Torr. & Gray, Fl. i. 234.

<sup>1</sup> Add syn. ? *S. malvæflora*, Macoun, Cat. Canad. Pl. ii. 313.

— Idaho and interior of Oregon and Washington; <sup>1</sup> first coll. by *Nuttall*. Also westward as far as Portland, Oregon.

**S. glaucéscens**, GREENE. Glabrous and smooth up to and even through the inflorescence or an obscure pubescence on the pale or light green foliage: stems slender, a foot or two high, simple or rather freely branching: leaves an inch or two in diameter; upper ones 5-7-parted into narrow divisions: racemes loose: petals about half inch long, sometimes much smaller, not rarely white: fructiferous calyx about 3 lines long, from nearly glabrous to cinereous-puberulent, with lobes attenuate or acuminate from a broad base: mature carpels relatively large, thin-walled, turgid, glabrous, coarsely reticulated, with the dorsal reticulations mostly longer than broad, sometimes nearly smooth and even. — Bull. Calif. Acad. Sci. i. 77. *S. malvaeflora*, Wats. Bot. King Exp. 46, in considerable part. — Higher Sierra Nevada, California and Nevada, for most of its length, and east to Antelope Island, Utah, *Stansbury*, *Watson*; the earliest collectors, *Beckwith* and *Anderson*. Also Oregon (part of no. 71, *E. Hall*) and near Victoria, Brit. Columbia, *Fletcher*; pistillate plants, with bright green foliage. Connects with the following subdivision.

= = Mature carpels smooth and even, glabrous or nearly so.

a. Calyx large, 6 lines in length.

**S.\* Hendersóni**, WATSON. Tall and nearly glabrous: leaves large, deeply 5-7-cleft; segments irregularly few-lobed or -toothed: flowers large in loose subsimple terminal spicate raceme: bracts linear, exceeding the short pedicels: calyx large, even in anthesis full half inch in length; segments ovate, acuminate, purplish: petals, in dried state, deep purple, about an inch in length: carpels few, 7 or 8, quite smooth, rather strongly beaked. — Proc. Am. Acad. xxiii. 262. — Oregon, near Clatsop Bay, *Prof. L. F. Henderson*, July, 1887, no. 1413; and (acc. to *Piper*) Washington, on beach near Seattle, and in brackish marshes at the mouth of the Skohomish; also on Vancouver Isl., near Victoria, *Macoun* (no. 53, distr. as *S. Oregana*). A maritime species with the foliage of *S. Oregana* but much larger more deeply colored flowers.

b. Flowers smaller: calyx  $2\frac{3}{4}$  to 4 lines in length: not rarely with hirsute pubescence on the stem and petioles and even on the calyx: upper cauline leaves mostly parted into linear divisions or these again lobed.

**S. Neo-Mexicana**, GRAY. Stems a foot to a yard or even "8 feet" high, the larger branching or with paniculate loosely flowered racemes: lower pedicels as long as the (2 or 3 lines long) calyx. — Pl. Fendl. 23, & Proc. Am. Acad. xxii. 287. *S. malvaeflora*, Gray, Pl. Wright. i. 16, mainly (excl. syn.), ii. 20; Greene, Bull. Calif. Acad. Sci. i. 75. — Moist ground, mountains of New Mexico and Arizona to those of Colorado; <sup>2</sup> first coll. by *Fendler*. (Adj. Mex., *Gregg*.)

**S. spicata**, GREENE. Stems a foot or two high, simple or sparingly branched: flowers in a dense and oblong or sometimes looser and interrupted spike; pedicels all much shorter than the calyx or hardly any: calyx 3 or 4 lines long. — Bull. Calif. Acad. Sci. i. 76. *Callirhoe spicata*, Regel, Gartenfl. xxi. 291, t. 737, f. 3, 4, from cult. plant. Also cult. as "*Sidalcea Murryana*." — Sierra Nevada, California and adjacent Nevada, first coll. by *Anderson*, north to Grant Pass, <sup>3</sup> S. Oregon, *Henderson*. The looser-flowered form nearly approaches *S. Neo-Mexicana*.

\* \* Phalanges indistinct, most of the stamens separate, but the outermost combined merely at base in threes or fours: scapose: leaves all pedately dissected.

**S. pedáta**, GRAY. Sparsely or below copiously hirsute: scapes a foot or less high, ascending-erect from a short stock rising from a tuberous root, 1-2-leaved at base, naked above or with a single small leaf: leaves all alike, pedately 5-7-parted or nearly divided and the narrow cuneate divisions (barely inch long) 3-lobed or basal ones 2-lobed; the lobes

<sup>1</sup> This species extends southward to Napa Co., Calif., acc. to W. L. Jepson. The stipules in the type are narrow and attenuate, but a noteworthy form, with shorter relatively broader stipules but without other distinctions, has been found in Washington State by *Piper* and by *Suksdorf*.

<sup>2</sup> Northward to Wyoming, *A. Nelson*.

<sup>3</sup> And to Umpqua Valley, Oregon, *Th. Howell*.

narrow, linear to oblong and entire: spike many-flowered, at length elongated: short pedicels and calyx minutely stellate-puberulent, the lobes triangular-acuminate (2 lines long): petals 4 or 5 lines long, rose-purple: carpels mostly very smooth. — Proc. Am. Acad. xxii. 288. — Bear Valley in the San Bernardino Mountains, at 6,000 feet, in wet places, *Parish*.

\* \* \* Phalanges as in the last: inflorescence dense: leaves flabelliform or reniform-orbicular, crenate, but none of them divided or parted.

**S.\* Hickmáni**, GREENE. Tall leafy loosely stellate-pubescent perennial with habit of *Malvastrum*: leaves thin, the lower suborbicular, the upper flabelliform, larger,  $1\frac{1}{2}$  to  $1\frac{3}{4}$  inches broad, rather deeply crenate-toothed but not lobed: flowers racemose-spicate, not very crowded; pedicels short; geminate<sup>1</sup> bracts and involuclate bractlets narrow, elongated, linear, villous: rose-purple petals 8 lines in length: carpels glabrous, smooth except for a few transverse wrinkles, which do not reach the middle of the back. — Pittonia, i. 139. — Reliz Cañon, Monterey Co., California, *J. B. Hickman*.

**Var.\* (?) Parishii**, ROBINSON, n. var. Lower in growth and with shorter stellate pubescence rather than pubescence: leaves of similar form but smaller, thicker, and less deeply crenate: bracts and bractlets broader, ovate to lanceolate: flowers more crowded, a third smaller. — *S. Hickmani*, Greene, *Erythea*, iv. 65, not of Pittonia. — Western slope of San Bernardino Mts., California, *S. B. Parish*, no. 3786. Although certainly worthy varietal rank, this plant, if observed at intermediate stations, will probably be found to pass into the type.

§ 3. Anomalous species, annual, with freely branching leafy stems, vitiform leaves, and glomerate inflorescence: flowers polygamo-diœcious: phalanges of the rather few stamens indistinct at very summit of the column.

**S. malachroides**, GRAY.<sup>2</sup> Hirsute or soft-hispid with spreading stellate-fascicled or some simple hairs: stem 3 to 6 feet high, equally leafy to the top: leaves angulately 3-7-lobed, membranaceous, 2 to 5 inches broad; the broad lobes unequally or doubly dentate: flowers in dense short (and either sessile or pedunculate) terminal and axillary spikes or heads: calyx naked or subtended by one or two slender-subulate caducous bractlets; lobes ovate, acuminate: petals white or purplish, quarter inch or more long: ♂ flowers commonly pistiliferous and perhaps often fertile; outer phalanges short and lacinate or 2-3-parted, and the lobes 1-3-antheriferous, very close to the inner series of distinct or geminate stamens: ♀ flowers with few and abortive anthers or none, and with 7 to 9 smooth and glabrous thin-walled carpels. — Proc. Am. Acad. vii. 332; Brew. & Wats. Bot. Calif. i. 84; Greene, Bull. Calif. Acad. Sci. i. 80. *S. vitifolia*, Gray, l. c., a softer-pubescent and less hispid form. *Malva malachroides*, Hook. & Arn. Bot. Beech. 326; Torr. & Gray, Fl. i. 681; Gray, Pl. Fendl. 16. — California near the coast from Monterey to Mendocino Co.;<sup>3</sup> the earliest collectors, *Douglas* and *Coulter*.

**6. NAPÆA**, [Clayt.] L. GLADE MALLOW. (From *νάπη*, a glade, or *Ναῖται*, dell-nymphs.) — L. Syst. Nat. ed. 6, 120, & Spec. ii. 686; name later ascribed by Linnæus (Gen. ed. 5, no. 748) to Clayton; Clayt. Fl. Virg. ed. 2, 102; L. Amœn. Acad. iii. 18 (excl. *N. hermaphrodita*); Gray, Pl. Fendl. 20, & Gen. Ill. ii. 55, t. 119. — Single species.

<sup>1</sup> In this, as in some other species of this genus, the floral bracts of the primary axes are morphologically stipules of obsolete leaves.

<sup>2</sup> Prof. E. L. Greene has separated this species, at first (Fl. Francis. 106) as *Sidalcea* § *Hesperalcea*, and later (Pittonia, ii. 301) as an independent genus, *Hesperalcea* (*H. malachroides*, Greene, l. c.). To the habitual distinctions, which were quite well known to Dr. Gray, Prof. Greene adds only one of a technical nature, namely, the form of the cotyledons. These he has observed to be abruptly contracted at the base, not cordate as in some species of *Sidalcea*. However telling this difference may prove in future, it is as yet unsatisfactory, the embryos of many *Sidalceæ* being still unknown.

<sup>3</sup> Southward to the Sta. Lucia Mts., *Miss Eastwood*, and northward to Humboldt Co., *Blankinship*, acc. to Brandegee, *Zoe*, iv. 150.

**N. dioica**, L. Strong-rooted perennial, roughish-pubescent: stems nearly simple, 5 to 9 feet high: leaves ample; radical often a foot or more in diameter, palmately 9-11-cleft and the segments laciniate-pinnatifid into lanceolate incisely serrate lobes; upper 5-7-cleft or -parted into lanceolate or triangulate-acuminate incisely serrate divisions or lobes: flowers small, numerous in umbellate clusters forming terminal corymbs: petals white: carpels smoothish, at maturity surpassing the calyx. — Spec. ii. 686. *N. scabra*, L. Mant. ii. 435; Lam. Ill. t. 579, f. 2. *Sida dioica*, Cav. Diss. t. 132, f. 2; Pursh, Fl. ii. 453; DC. Prodr. i. 466; Torr. & Gray, Fl. i. 234, 681. — Limestone valleys of the Alleghanies, Pennsylvania to Virginia; also rich bottom lands, Ohio and Illinois;<sup>1</sup> not common, but is in cultivation; fl. summer.

**7. MALVÆSTRUM**, Gray. FALSE MALLOW, as the name (coined by De Candolle for a group which also includes all true *Malvæ*) may denote. — Pl. Fendl. 21, Gen. Ill. ii. 59, t. 121, 122, & Bot. U. S. Expl. Exped. 146; Benth. & Hook. Gen. i. 201.<sup>2</sup> — Large genus of herbs and undershrubs, American and some S. African, of various habit.

\* Peduncles or at least the earlier ones long and slender, 1-flowered: petals rose-color or white: calyx involuclate by 3 slender bractlets: carpels orbicular, rugose, pointless: annuals, not canescent, usually with some hispid or hirsute spreading hairs. — *Pedunculosa*.

**M. rotundifolium**, GRAY. Erect, a span to a foot high, hirsute or hispid, with simple and stellate spreading hairs: leaves very long-petioled, reniform-orbicular, coarsely crenate, obscurely or not at all lobed: flowers comparatively large: petals half inch long, rose-purple commonly with a crimson blotch toward the base: carpels 40 or more, very flat, therefore narrow on the back, rugose-reticulate; the thick axis with somewhat membranaceous-dilated summit. — Proc. Am. Acad. vii. 333; Brew. & Wats. Bot. Calif. i. 85.<sup>3</sup> — Desert of the Colorado, California and Arizona, from the Mohave southward, Cooper, Palmer, Janvier.

**M. \* exile**, GRAY.<sup>4</sup> Soon spreading or decumbent, short stellar-pubescent but often with some longer spreading hairs: stems a span to 2 feet long, slender, branching: leaves usually small, 5-7-lobed, and lobes commonly laciniate: flowers of different plants of two intergrading sorts, one chiefly pistillate with small white, roseate, or violet-purple petals (3 to 5 lines long), the other much larger, perfect and with petals violet-purple (6 to 10 lines long): carpels fewer and much smaller than in the preceding species, thicker and very strongly rugose. — Bot. Ives Rep. 8, & Proc. Am. Acad. vii. 333; Brew. & Wats. l. c.<sup>5</sup> *M. Parryi*, Greene, Fl. Francis. 108 (form with larger and perfect flowers). — Sandy washes, Colorado Desert with the preceding and north to Nevada and along the San Joaquin, California; first coll. by Parry, then by Newberry.

\* \* Peduncles short or none: petals yellow: calyx involuclate: pubescence of stem and foliage close or appressed, in the earlier species more or less strigose, in the later subcanescent or cinereous. — *Sidoides*.

— Annual, northern.

**M. angustum**, GRAY. Erect and low (a foot or less high), with spreading branches: leaves lanceolate, inch or so long, denticulate, nearly glabrous to the naked eye, 1-nerved and with a pair of obscure basal veins, short-petioled: flowers solitary or glomerate in the axils: bractlets of involucl and stipules setaceous: calyx angulate, accrescent (in age half inch broad), with short and broad triangular lobes: petals little surpassing the calyx: carpels 5 or 6, thin-chartaceous at maturity, reniform, pointless, puberulent, smooth, at length 2-valved. — Pl. Fendl. 22, & Man. ed. 5, 101. *Sida hispida*, Hook. Jour. Bot. i. 198, perhaps

<sup>1</sup> Also northward to Minnesota, Lapham, Sandberg, acc. to Upham.

<sup>2</sup> Add lit. Gray, Proc. Am. Acad. xxii. 288, E. G. Baker, Jour. Bot. xxix. 164. With regard to the doubtful S. African *Malveopsis*, Presl, to which Kuntze (Rev. Gen. i. 72) has uncritically reduced *Malvastrum*, see Baker, l. c. xxxii. 38.

<sup>3</sup> Add syn. and lit. *Malveopsis rotundifolia*, Kuntze, l. c.; Coville, Contrib. U. S. Nat. Herb. iv. 74.

<sup>4</sup> The description of this species has been amplified to show more clearly the polygamous nature of the flowers.

<sup>5</sup> Add syn. *Malveopsis exilis*, Kuntze, l. c.

Ell. Sk. ii. 159, hardly Pursh, Fl. ii. 452.<sup>1</sup> — Gravelly and rocky hills and banks, Nashville, Tennessee (not seen farther east), and along the Mississippi from St. Louis northward, west to Kansas; fl. late summer.

+ + Chiefly perennial, subterminal: pubescence not lepidote-stellate.

**M. Rugéii**, WATSON. Suffrutescent, a yard high, branching: stems strigose with 2-4-rayed close hairs: leaves deltoid-ovate to oblong, inch or two long, rather long-petioled, coarsely and irregularly serrate, sparsely and minutely pubescent, straight-veined: flowers sessile or nearly so in the axils and subcapitate at the ends of the branches: bractlets of involucre subulate: calyx-lobes from triangular-ovate to short-acuminate, shorter than the orange-yellow petals: mature carpels about 15, depressed-reniform, much compressed, hispidulous above, pointless or with an obscure point behind the inflexed apex. — Proc. Am. Acad. xvii. 367, without the synonymy; Chapm. Fl. ed. 2, 608. *Malva scoparia*, Jacq. Collect. i. 59, & Ic. Rar. t. 139, not L'Her. *M. corchorifolia*, Desr. in Lam. Dict. iii. 755 (good specif. name). *M. Americana*, var., Shutt. in distr. pl. Rugel, no. 90. — S. Florida, Rugel, Garber, Curtiss, dist. by the latter as *Melochia serrata*; perhaps introduced. (San Domingo, &c.)

**M. tricuspidatum**, GRAY. Suffrutescent or northwardly only annual, a foot or yard high, freely branching, strigose with mostly 2-rayed (i. e. medifixed) or some 3-rayed and some simple hairs: leaves slender-petioled, from round-ovate or subcordate to ovate-oblong, irregularly and thickly serrate, larger obscurely 3-lobed, numerous straight-veined: flowers mostly solitary in the axils, mostly surpassed by the petioles: petals bright yellow (expanding only at midday), exceeding the calyx: carpels 8 to 11, depressed and conduplicate-reniform, hirsute at summit, bearing an awn-like cusp just back of the inflexed apex (splitting into two in dehiscence) and a pair of short and blunt ones on the back. — Pl. Wright. i. 16, & Bot. U. S. Expl. Exped. 148; Griseb. Fl. W. Ind. 72. *M. carpinifolium*, Gray, Pl. Fendl. 22, a mistake. *Malva Coromandeliana*, L. Spec. ii. 687, but not native to India. *M. tricuspidata*, Ait. f. Kew. ed. 2, iv. 210; DC. Prodr. i. 430. *M. Americana*, Cav. Diss. ii. 80, t. 22, f. 2, not L. *M. subastata*, Cav. l. c. 72, t. 21, f. 3. *M. Domingensis*, Spreng. in DC. l. c. 431. *M. Lindheimeriana*, Scheele, Linnæa, xxi. 470 (*Malvastrum Lindheimerianum*, Walp. Ann. ii. 153). *Sida bracteolata* & *S. carpinoides*, DC. l. c. 460, 461.<sup>2</sup> — Texas and Florida; also a ballast-weed farther north. (Trop. Amer. and nat. on most trop. shores.)

**M. scoparium**, GRAY. Frutescent, with minute stellate-canescens and no strigose pubescence: leaves ovate or deltoid-ovate, or subcordate, acutely serrate, with few pairs of straight veins: flowers sessile or nearly so in the axils and subspicate at ends of branches: calyx finely canescent, with ovate lobes obtuse or barely acute: mature carpels canescently pubescent at depressed top, bearing a pair of conical tubercles on the back, but no apical cusp or a mere vestige. — Bot. U. S. Expl. Exped. 147. *Malva scoparia*, L'Her. Stirp. Nov. t. 27; ? Cav. Diss. t. 21, f. 4. — Mountains south of Tucson, Arizona, Pringle (distr. as *M. tricuspidatum*), Parish. (Mex., S. Am.)

**M. spicatum**, GRAY. Frutescent, pubescent, not strigose, 2 or 3 feet high: leaves deltoid-ovate, crenate-serrate, rarely obscurely lobed, more sparsely-veined, larger 5-ribbed at base, slender-petioled: flowers mainly in terminal heads or at length cylindrical spikes: calyx barbately hirsute or hispid; the lobes acuminate: mature carpels depressed-reniform, hirsute at top, pointless, the inflexed apex rostrately extended. — Pl. Fendl. 22. *M. Americanum*, Torr. Bot. Mex. Bound. 38. *Malva spicata*, L. Spec. ed. 2, ii. 967. *M. Americana*, L. Spec. ii. 687, as to syn. Breyne. Cent. 124, t. 57. *M. spicata, ovata, & polystachya*, Cav. Diss. t. 20, f. 2, 4, & t. 138, f. 3.<sup>3</sup> — S. Texas, on the lower Rio Grande, Schott. Introduced at Apalachicola, Florida, Chapman. (Mex., Trop. Am., and now dispersed through tropics.)

+ + + Warm-temperate perennial, cinereous with lepidote-stellar very short pubescence: flowers solitary and subsessile in upper axils, foliaceous-involucellate.

**M. Wrightii**, GRAY. A foot or two high: rigid stems ascending from a lignescent base, sparingly branched: leaves from subcordate-oval to oblong, obtuse, rather coarsely serrate and slender-petioled: bractlets of the involucre ovate or subcordate, adnate to base of calyx

<sup>1</sup> Add syn. *Malveopsis hispida*, Kuntze, l. c.

<sup>2</sup> Add syn. *Malvastrum coromandelianum*, Garcke, Bonplandia, v. 295. *Malveopsis Americana*, Kuntze, l. c.

<sup>3</sup> Add syn. *Malveopsis spicata*, Kuntze, l. c.

and more or less surpassed by the ovate-acuminate calyx-lobes: petals half inch long: carpels 15 to 20, firm-coriaceous, much compressed, brownish red at maturity, smooth, the narrow back flat with acutish angles, hirsute at top, where it is dorsally 2-gibbous and ventrally subulate-aristate or pointed. — Pl. Fendl. 21, Pl. Lindh. pt. 2, 160, & Gen. III. ii. 60, t. 122. *Malva aurantiaca*, Scheele, l. c. 469, therefore *Malvastrum aurantiacum*, Walp. Ann. ii. 153.<sup>1</sup> — Mesquit soil, Texas, *Drummond*, *Wright*, *Lindheimer*, &c.; fl. summer.

\* \* \* Peduncles or pedicels short: petals scarlet, copper-colored or sometimes rose-colored: carpels wholly pointless: involucl of 2 or 3 very slender or rarely ovate bractlets, often deciduous, or obsolete. — *Sphaeralceoides*. Western perennials, some shrubby, canescent or tomentose with many-rayed stellar pubescence.

⊕ Pubescence wholly lepidote and silvery, i. e. of peltate scales fringed with very many short hairs, indistinguishable except with a good lens: leaves very narrow.

**M. leptophyllum**, GRAY. A foot or less high from lignescens base and stock; stems very numerous, erect or ascending, slender: lower leaves short-petioled and 3-parted or -divided into narrow linear divisions; upper simple and sessile, mostly filiform: flowers few and racemose at summit: petals copper-red, less than half inch long: fruit depressed-globular, slightly surpassing the triangular calyx-lobes; carpels 9 or 10, tomentulose, thickish and rounded on the back, sides coarsely and strongly reticulated. — Pl. Wright. i. 17, ii. 20.<sup>2</sup> — S. W. Texas and New Mexico, *Wright*, *Thurber*, &c., to S. Utah, *Mrs. Thompson*.

⊕ ⊕ Stem and leaves (at least on the lower surface) canescent-tomentose with short pubescence: calyx and rather narrow lanceolate to linear involucellate bractlets hirsute or villous: leaves roundish or obscurely lobed, obtusely dentate or crenate: carpels suborbicular, thin-walled and promptly 2-valved at maturity, smooth or when young tomentose.

**M.\* Pálmeri**, WATSON.<sup>3</sup> Herbaceous stem stout, equably leafy to summit: leaves 2 or 3 inches long, covered on both surfaces with short and persistent stellate tomentum; the base truncate or subcordate; petioles long: flowers few and sessile in a capitate cluster at the summit of a terminal peduncle, foliaceous-bracteate: calyx-lobes ovate-lanceolate, attenuate, 5 lines in length, with the linear little shorter involucellate bractlets soft-hirsute: petals inch long, light rose-color. — Proc. Am. Acad. xii. 250, & Bot. Calif. ii. 437. — San Luis Obispo Co., California, at Cambria, a mile from the beach, *Palmer*. A peculiar species.

**M.\* involucratum**, ROBINSON, n. sp. Branches terete, finely stellate-pubescent: leaves thickish, rugulose and soon wholly glabrate above, a little paler and finely stellate-pubescent beneath, 3-lobed and crenate, cordate at the base with a shallow mostly narrow sinus; lobes obtuse or rounded; petioles 6 lines to inch and a half long: flowers smaller than in the last preceding species, densely capitate; heads terminal, solitary, involuclate with several broad sessile ovate or oblong acute or obtusish bracts; bractlets 3, lanceolate: calyx half inch in length; segments ovate, acuminate, 2½ to 3 lines long: corolla pale purple or white, 10 lines in length: carpels about 10. — California, at Jolon, *Brandegee* (herb. Gray), and between Jolon and King City, *Miss Eastwood* (herb. Calif. Acad. Sci.). An interesting species (presumably of restricted range), with habit of the preceding but different foliage and smaller flowers.

**M. densiflorum**, WATSON. Two or three feet high, suffrutescent below: leaves round-cordate, tomentose on both surfaces, inch or more in diameter, rather long-petioled: flowers numerous in sessile heads along the naked summit of the branches, distant or approximate in an interrupted spike: calyx with ovate at length attenuate-acuminate teeth and along with slender bractlets and whole inflorescence hispidly hirsute with slender spreading hairs: petals half inch long, rose-red: carpels glabrous. — Proc. Am. Acad. xvii. 368. — S. California, near San Jacinto Mountains in the Colorado Desert, *Parish*, and San Juan Capistrano, *Nevin*.

⊕ ⊕ Foliage and carpels of the last division: bractlets of the involucels broad, ovate, acuminate, stellate-tomentulose but not hirsute nor villous.

<sup>1</sup> Add syn. *Malveopsis aurantiaca*, Kuntze, l. c.

<sup>2</sup> Add syn. *Malveopsis leptophylla*, Kuntze, l. c.

<sup>3</sup> The description of this plant has been modified to exclude more clearly the next following nearly related but quite distinct species.

**M.\* aboriginum**, ROBINSON, n. sp. Branches covered with a soft white felted tomentum: leaves broadly ovate, cordate with a shallow and narrow sinus, obtuse, 3-5-lobed and crenate-dentate, inch and a half in length, somewhat broader, rugulose above, scarcely paler beneath, borne on petioles of nearly their own length: flowers sessile, glomerate in the upper axils and above forming elongated flexuous almost naked interrupted terminal inflorescences: bractlets of the involucre 3, ovate, 4 to 5 lines in length, 3 to 3½ lines in breadth, sometimes slightly connate at the base: calyx short and strongly plicate-angled, canescent-tomentulose; segments broader than long, abruptly acuminate: carpels about 8. — Indian Valley, California, *Mrs. M. K. Curran*, June, 1885 (herb. Calif. Acad. Sci.). Well characterized among American species by its broad bractlets, which, however, occur in some South African congeners.

+ + + + Herbage and calyx densely stellate-tomentose; no hirsute hairs: involucre bractlets more naked, filiform, rather deciduous: carpels oval with excised insertion, thin-walled, at length smooth, promptly 2-valved: leaves rounded, obscurely lobed, rather short-petioled, thickish: stems robust, 2 or 3 or even 6 to 8 feet high.

**M. marrubioides**, DURAND & HILGARD. Suffruticose? 2 or 3 feet high, roughish with short-rayed tomentose pubescence: leaves broadly ovate, rarely subcordate, irregularly and often sharply dentate, inch or two long, or uppermost smaller: flowers subsessile in short subsessile axillary clusters: calyx-lobes long-attenuate or caudate-acuminate from an ovate base, at length half inch long: petals over half inch long, rose-color. — *Jour. Acad. Philad.* ser. 2, iii. 38, & *Pacif. R. Rep.* v. 6, t. 2; *Brew. & Wats. Bot. Calif.* i. 85; *Gray, Proc. Am. Acad.* xxii. 290. *M. foliosum*, *Wats. ibid.* xx. 356.<sup>1</sup> — California, near Millerton on the upper San Joaquin, *Heermann*; also Santo Thomas, northern borders of Lower California, *Orcutt*, 1884.

**Var. paniculatum**, GRAY, l. c. Less canescent: flowers copious in loose sometimes slender-pedunculate panicles, some rather slender-pedicellate. — Northern part of Lower California, at All Saints' Bay, *Orcutt*, 1886.

**M.\* Fremontii**, TORR.<sup>2</sup> Shrubby below, 4 to 8 feet high, densely soft-tomentose with longer-rayed stellar pubescence: leaves pentagonal or roundish, shallowly or scarcely at all cordate, crenate-toothed, the larger 3 inches broad: flowers in axillary-sessile or short-pedunculate clusters, at summit of stem interrupted-spicate: calyx densely lanate-tomentose, the short triangular acute lobes 2 to 2½ lines long, mucronate with a more naked tip: "flowers rose-scented; petals rose-color," hardly half inch long. — *Torr. in Gray, Pl. Fendl.* 21.<sup>3</sup> *Sphæralcea Lindheimeri*, *Brew. & Wats. Bot. Calif.* i. 86, as to Calif. pl., not *Gray*, the resemblance superficial. — Mountains of California, from San Bernardino Co., *Parish*, to Calaveras Co., *Rattan*; first coll. by *Frémont*, next by *Brewer*.

**Var.\* cercophorum**, ROBINSON, n. var. Calyx much longer, 7 to 8 lines in length; the lance-linear divisions caudate-attenuate, equalling or nearly equalling the petals. — Arroyo del Valle, Alameda Co., California, coll. *Prof. E. L. Greene*, 14 June, 1895 (herb. Univ. of Calif.).

**M.\* arcuatum**, ROBINSON, n. comb. Shrub with long subsimple terete branches covered with a dense white felted tomentum: leaves ovate, petiolate, obtuse or rounded at the base, deeply crenate but scarcely or not at all lobed, thickish and very rugose, soon green above but densely canescent-tomentose beneath: flowers sessile in the upper axils and forming at the ends of the branches long interruptedly spicate unilateral inflorescences; bractlets linear-filiform, equalling the calyx: this soft tomentose but by no means so densely woolly as in the last preceding species: petals roseate, three fourths inch long: young carpels densely tomentose. — *Malveopsis arcuata*, *Greene, Man. Bay-Reg.* 66. *Malvastrum marrubioides*, *Greene, Fl. Francis.* 109, not *Dur. & Hilg.* — California, "eastern slopes of the Coast Range back of Belmont." A species to be recognized by its peculiar very rugose ovate not pentagonal leaves.

<sup>1</sup> Add syn. *Malveopsis marrubioides*, *Kuntze*, l. c.

<sup>2</sup> The description of this species has been slightly modified to exclude more clearly the next following.

<sup>3</sup> Add syn. *Malveopsis Fremontii*, *Greene, Erythea*, i. 171.

+ + + + + Herbage and calyx canescent with close and fine stellate pubescence, no hispid or hirsute hairiness: involucellate bractlets small and mostly deciduous.

++ Frutescent or truly shrubby: leaves barely lobed: carpels in age glabrous or nearly so, smooth, thin-walled, 2-valved.

= Flowers glomerate-spicate to racemose-paniculate: buds acutish.

**M.\* Davidsonii**, ROBINSON, n. sp. Tall shrub or small tree "six to fifteen feet in height," branchlets stout, flexuous: leaves thickish, but not rugose, rather large, 2 to 3 inches in diameter, deeply cordate with narrow sinus, 5-angled or shallowly 5-lobed, varying to 3-lobed, irregularly dentate, covered on both sides (as are the branchlets and petioles) with copious loose whitish stellate tomentum: flowers numerous, clustered in or shortly racemose from the upper axils and also forming dense rather stiff sub-spicate terminal inflorescences: bractlets considerably shorter than the calyx: calyx-segments canescent-tomentose and without more naked mucronate tips, enervose or faintly 1-nerved: petals rose-purple, half to three fourths inch long: carpels stellate-tomentose above. — *M. splendidum*, Davidson, *Erythea*, iv. 68, not Kell. — Sandy soil, S. California from the Coast Mts. of Los Angeles Co., where coll. in San Fernando Valley, 1895, by Dr. A. Davidson (who first distinguished the species from *M. Fremontii*), and earlier at Big Tajungo by Lyon, to Antelope Valley, *Parish*, no. 1955, and Bear Valley, San Bernardino Co., *Parish*, Aug. 1879, the earliest collection. The last two specimens have leaves with more rounded lobes. This species, heretofore referred to *M. Fremontii*, differs from it in its less densely tomentose calyx, shorter bractlets and deeply cordate leaves. Its obsoletely nerved calyx and some other characters argue for its distinctness from the still somewhat obscure *M. splendidum*, Kellogg.

**M. Thurberi**, GRAY. Stems 3 to 15 feet high, with the woody base often an inch or more thick: pubescence all very short and close, almost scurfy: leaves roundish, mostly subcordate, crenate, obscurely 3-5-lobed or some 3-cleft, inch or two in diameter, some larger: flowers in sessile or short-peduncled clusters, spicately or sometimes paniculately disposed on virgate nearly naked branches, "fragrant": calyx-lobes broadly ovate, obtuse and with or without a short point: petals about half inch long, rose-purple: carpels obovate-oval, very like those of *M. Fremontii*. — Pl. Thurber. 307; Brew. & Wats. l. c. 85. *Malva fasciculata*, Nutt. in Torr. & Gray, Fl. i. 225.<sup>1</sup> — Dry hills, &c., S. California, from San Luis Obispo to San Diego, and on the islands; also east to Arizona; first coll. by Nuttall. (Sonora, Thurber.)

**Var. laxiflorum**, GRAY. Inflorescence somewhat loosely paniculate. — Proc. Am. Acad. xxii. 291. *M. splendidum*, Kellogg, Proc. Calif. Acad. Sci. i. 65; Brew. & Wats. l. c., but wrong carpels described.<sup>2</sup> — Sierra Santa Monica to Los Angeles and to S. Utah, a mere form of the species.

= = Flowers chiefly terminal on the branchlets of a pyramidal and more or less fastigiate panicle, not evidently racemose: buds obovate, very obtuse.

**M.\* nesioticum**, ROBINSON, n. sp. A much branched shrub; branches canescent with a minute tomentum: leaves of firm texture, somewhat pentagonal, shallowly 3-5-lobed, when well developed deeply and narrowly cordate, green and appearing smooth (yet minutely stellate-pubescent) above, canescent beneath, rather short-petioled, often revolute at the crenate or subentire margins: branches of the rather rigid panicle numerous, ascending: calyx finely canescent-pubescent; segments obtusish, not equalling the tube: bractlets a third to half as long as the calyx: rose-purple petals 6 to 8 lines long. — *M. Thurberi*, var. *laxiflorum*, Gray, Proc. Am. Acad. xxii. 291, in small part; Greene, Bull. Calif. Acad. Sci. ii. 392. — Island of Sta. Cruz, California, Greene, 1886, *Brandeggee*, 1888. A doubtful species, perhaps only an extreme form of the variable *M. Thurberi*, as regarded by Dr. Gray, but with decidedly different foliage and inflorescence from any variety of the mainland as yet seen.

++ ++ Herbaceous, low, from running rootstocks: leaves pedately 3-5-parted or nearly divided: carpels round-reniform, tomentulose-pubescent, reticulate-rugose, tardily and incompletely dehiscent.

<sup>1</sup> Add syn. *Malvastrum fasciculatum*, Greene, Fl. Francis. 108. *Malveopsis fasciculata*, Kuntze, l. c.; Greene, Man. Bay-Reg. 66.

<sup>2</sup> Add syn. *Malveopsis splendida*, Kuntze, l. c.



**M. coccineum**, GRAY. A span or two high, tufted, somewhat silvery-canescant, the pubescence of the calyx looser, even somewhat villous: leaves inch or less in diameter; the cuneate or narrower divisions mostly 2-3-cleft into spatulate or linear lobes: flowers short-pedicelled, crowded or at length looser in a terminal leafy-based raceme: calyx-lobes lanceolate-triangular, in age incurved over the fruit: petals copper-scarlet or brick-red. — Pl. Fendl. 21, 24 (partly), Pl. Wright. i. 17 (with var. *dissectum*, which is merely the most narrow-leaved form), Gen. Ill. ii. t. 121, & Man. ed. 5, 101. *Malva coccinea*, Nutt. in Fraser, Cat., & Gen. ii. 81. *Cristaria coccinea*, Pursh, Fl. ii. 453; Sims, Bot. Mag. t. 1673. *Sida coccinea*, DC. Prodr. i. 465; Hook. Fl. Bor.-Am. i. 108.<sup>1</sup> *S. dissecta*, Nutt. in Torr. & Gray, Fl. i. 235; Hook. & Arn. Bot. Beech. 327, the narrower-leaved form. — Plains from the Saskatchewan and W. Iowa to W. Texas, thence west to S. Arizona and E. Oregon;<sup>2</sup> first coll. by Nuttall. A tall form with broad-lobed leaves has been called var.\* *elatum*, by E. G. Baker, Jour. Bot. xxix. 171.

Species of doubtful affinity, not seen by the editor.

**M.\* orbiculatum**, GREENE. "Suffrutescent, the stout, erect, and simple branches 2 to 3 feet high; whole plant densely tomentose: leaves short-petioled, 1 to 2 inches long and as broad, the lower and smaller round-reniform, the upper orbicular, not even obscurely lobed but coarsely crenate, very obtuse or slightly retuse: flowers many, nearly sessile and densely glomerate in the axils of the upper leaves and at almost leafless subterminal nodes: bractlets setaceous, much shorter than the lanceolate acuminate deep calyx-lobes: corolla deep rose-color, 6 lines long or more: fruit unknown." — Fl. Francis. 109 (whence descr.). — "Mountains south of Tehachapi, Kern Co.," Calif., Greene.

**8. SPHÆRÁLCEA**, St. Hil. (Σφαῖρα, a sphere, ἀλκία, a mallow, the fruit commonly spherical.) — Pl. Us. Brás. t. 52, & Fl. Bras. Merid. i. 209; Gray, Gen. Ill. ii. 69, t. 127, & Proc. Am. Acad. xxii. 291; Benth. & Hook. Gen. i. 294 (excl. *Meliphlea*, Zucc.).<sup>3</sup> — Herbs or suffruticose plants (American with one or two S. African), with habit of *Malvastrum* and *Abutilon*, founded on *S. Cisplatina* of Buenos Ayres. The first division confluent with the second on one hand, with *Malvastrum* on the other.

\* Fruit usually more or less globose-depressed: ovules 1 or 2, the upper seldom maturing: mature carpels more or less reniform, tomentulose or glabrate, and with thin and smooth summit or upper half usually empty, at maturity directly deciduous from the axis, only upper part bivalvular- or introrse-dehiscent; lower and seminiferous portion strongly and firmly reticulated over the thin or diaphanous sides: perennial herbs except perhaps the first.

+ Root simple, apparently winter-annual: short scarious summit of mature carpel inflexed.

**S. Coulteri**, GRAY. Canescent on younger parts, when older rather loosely stellular-pubescent and becoming greenish: stems about a foot high, numerous, ascending from the tap root: leaves roundish-subcordate, seldom inch long, obscurely or more distinctly 3-lobed, incisely or doubly crenate: flowers clustered in axils and racemose at summit, short-pedicelled: calyx barely 3 lines long: petals quarter or third inch long, orange-scarlet: carpels 15 to 20, at maturity over a line long, flat, reniform in outline from the strong incurvation of the quadrate-oblong scarious empty apex, 1-ovuled, the thin seminiferous body also scarious but strongly reticulated and as if fenestrate throughout, the firm meshes dark colored. — Proc. Am. Acad. xxii. 291. *S. Fendleri*, Torr. Bot. Mex. Bound. 39, mainly. *Malvastrum Coulteri*, Wats. Proc. Am. Acad. xi. 125; Brew. & Wats. Bot. Calif. i. 85 (thin projection within carpel not found).<sup>4</sup> — W. Arizona, on and near the Gila, first coll. by Th.

<sup>1</sup> Add syn. *Malveopsis coccinea*, Kuntze, l. c.

<sup>2</sup> Northwest to Kamloops Lake, Brit. Columbia, acc. to J. M. Macoun.

<sup>3</sup> Add E. G. Baker, Jour. Bot. xxxi. 361.

<sup>4</sup> Add syn. *Malveopsis multiflorum*, Greene, Fl. Francis. 109. *Malveopsis Coulteri*, Kuntze, Rev. Gen. i. 72.

Coulter, then by Schott, Lemmon, &c.; common at Maricopa, Gray & Farlow.<sup>1</sup> One of the transitions to *Malvastrum*.

+ + Perennial (?) with carpels almost as in *Malvastrum*, reniform, uniovulate, deeply reticulate upon the sides; the upper sterile portion relatively minute and inconspicuous, incurved, muticous.

**S.\* (?) Orcúttii**, ROSE. Finely tomentose and canescent throughout, 2 to 3 feet high, branched above: leaves petiolate, ovate-oblong, slightly 3-lobed; lobes broad and rounded, barely crenulate or entire, the middle one much the longest, the basal sometimes obscure: flowers small, closely grouped in and shortly racemose from the upper axils, becoming at the summits of the branches interruptedly subspicate: calyx about  $2\frac{1}{2}$  to 3 lines in length: corolla 4 lines long, vermilion, drying purplish: carpels in a depressed-globose stellate-pubescent head, not much over a line in length. — Contrib. U. S. Nat. Herb. i. 289. — Near Canso Creek in the Colorado Desert, California, *Orcutt*. An anomalous species, which, except for its obvious affinities to several *Sphæralceæ*, could with equal propriety be referred to *Malvastrum*.

+ + + Perennials, mostly with lignescent roots: upper and mostly empty thin and smooth half of mature carpel moderately incurved or erect: species of difficult discrimination, at least without mature fruit.

++ Leaves all or mainly palmately or pedately parted: mature carpels very blunt, rarely with an obscure mucro, occasionally 2-seeded: petals brick-red or orange-scarlet.

**S. pedatifida**, GRAY. Cinereous-puberulent or stellar-hirsutulous, a foot or two high: stems slender, often loosely branched: leaves with linear or when wider with pinnately lobed divisions: petals quarter to half inch long: mature carpels strongly rugose or even tuberculate on the back, barely 2 lines long. — Proc. Am. Acad. xxii. 291. *Malvastrum pedatifidum*, Gray, Pl. Lindh. pt. 2, 160, Pl. Wright. i. 17, & ii. 20. *Sidalcea atacosa*, Buckley, Proc. Acad. Philad. 1861, 449. — On the Rio Grande from El Paso downward, and at San Antonio, S. Texas; first coll. by *Wright*. (Adj. Mex.)

**S. pedáta**, TORR. Silvery-canescant with very short and soft stellar pubescence, a span to 2 feet high, rather stout: leaves with cuneate and incisely lobed divisions (sometimes narrower): petals half inch to almost inch long: mature carpels nearly of the preceding but obscurely rugose or reticulated on the back. — Torr. in Gray, Pl. Fendl. 23, & Pl. Wright. i. 17 (name only); Gray, Proc. Am. Acad. xxii. 291. *Sida grossulariæfolia*, Hook. & Arn. Bot. Beech. 326; therefore *Malvastrum grossulariæfolium*, Gray, Pl. Fendl. 21. *M. coccineum*, Gray, l. c., partly (no. 81), & Pl. Wright. i. 16. ? *M. coccineum*, var. *grossulariæfolium*,<sup>2</sup> and some of *Sphæralcea Emoryi*, Wats. Bot. King Exp. 47, 48. — W. borders of Texas and New Mexico to S. Arizona and N. W. Nevada; first coll. by *Frémont*. Smaller forms much resembling *Malvastrum coccineum*, except in the fruit. *Malva Creeana*, Graham, Bot. Mag. t. 3698, if N. American, probably came from this, perhaps through hybridization with something else. Passes into

**Var. angustiloba**, GRAY, with divisions of the leaves linear or narrowly oblanceolate and entire. — Proc. Am. Acad. xxii. 292. *Malvastrum coccineum*, var. ? Gray, Pl. Wright. i. 17. — W. Texas to Arizona, *Wright*, *Schott*, &c.

++ ++ Leaves undivided, at most obtusely 3-5-lobed, roundish, mostly cordate.

= Canescent, even on the calyx, with short and close stellar pubescence, not lanate-tomentose: carpels wholly muticous, subcoriaceous on the back to the rounded summit, within fully half smooth and thin.

**S. Munroána**, SPACH. Leafy to the top, a foot or two high, minutely canescent: leaves crenately toothed or sometimes incised: inflorescence mostly thyrsoïd-glomerate: petals red (usually scarlet, but sometimes rose-red), only half inch long: calyx 2 or 3 lines long, not surpassing the depressed fruit: mature carpels only a line or two long, oval-reniform. —

<sup>1</sup> Also W. Mex., *Palmer*, *Hartman*.

<sup>2</sup> Some of Dr. Watson's specimens from the Humboldt Mts., Nevada (no. 196, in part), have much larger flowers (calyx-lobes 5 lines in length), and are probably distinct, yet in default of fruit even their generic affinities are somewhat doubtful.

Hist. Veg. iii. 353; Gray, Proc. Am. Acad. xxii. 292. *Malva Munroana*, Dougl. in Lindl. Bot. Reg. t. 1306; Hook. Bot. Mag. t. 3537, & Fl. Bor.-Am. i. 106. *Nuttallia Munroana*, Nutt. Jour. Acad. Philad. vii. 16. *Malvastrum Munroanum*, Gray, Pl. Fendl. 21 (excl. syn.); Wats. Bot. King Exp. 47, partly.<sup>1</sup> — Dry plains, interior of Brit. Columbia east to Idaho, south through Nevada and Utah perhaps to New Mexico and Arizona;<sup>2</sup> first coll. by Douglas.

**S. ambigua**, GRAY. Less leafy, a foot to a yard high, tomentulose-canescens: leaves crenulate-toothed: inflorescence more racemiform: petals rose-color, varying to white, half inch to inch long: calyx 4 to 6 lines long, with acute or acuminate lobes surpassing the moderately depressed fruit: carpels reniform-oblong, commonly 3 lines long (deciduous and free at maturity). — Proc. Am. Acad. xxii. 292. *S. Emoryi*, Gray, Bot. Ives Rep. 8; Wats. l. c. partly;<sup>3</sup> not Gray, Pl. Fendl. & Pl. Wright. — Arid plains, &c., Arizona, Nevada (the earliest collectors, *Newberry*, *Palmer*, &c.) to S. California, *Thurber*, *Nevin*, *Cleveland*.<sup>4</sup>

**S. sulphúrea**, Watson, Proc. Am. Acad. xi. 113, 125, of Guadalupe Island off Lower California, is a peculiar pale yellow-flowered species of this division, with habit of the original *S. Cisplatina*, St. Hil.

== = Densely tomentose: the leaves pannose and calyx thickly woolly.

**S. Lindheimeri**, GRAY. Stems decumbent, a foot or two long: leaves round-cordate (larger 2 inches long), very obscurely if at all lobed, irregularly or doubly crenate: flowers more or less racemose at the ends of branches: calyx nearly half inch long: corolla rose-red, the petals half inch long: mature carpels glabrous, oblong-reniform, much compressed, 2 lines long, narrowed in the middle; lower half strongly reticulate-rugose; smooth upper half similarly rounded, commonly empty: ovules 2 or 3. — Pl. Lindh. pt. 2, 162; Wats. Bot. King Exp. 48, excl. syn.; not Brew. & Wats. Bot. Calif. i. 86. — Prairies of S. Texas, *Berlandier*, *Lindheimer*. (Adj. Mex.)

++ ++ ++ Leaves undivided, more or less lanceolate, not rarely subhastately 3-lobed: pubescence close, canescent.

**S. hastuláta**, GRAY. A span to a foot high, with ascending stems leafy to the top: leaves slender-petioled, inch or two long, obscurely toothed or entire on the margin, some lanceolate or oblong with cuneate or truncate base, some with a pair of short either ascending or diverging lobes near the base, rarely with broader subcordate base: flowers few, mostly slender-pedicelled: petals orange-red, half inch long: calyx with triangular-lanceolate lobes surpassing the slightly depressed fruit: mature carpels 3 lines long, ovate and with deep reniform ventral excision, tipped with small deciduous vesp, often 2-seeded, the smooth upper longer than the rugose-reticulated lower portion. — Pl. Wright. i. 17, & ii. 21; Wats. Proc. Am. Acad. xvii. 331. — S. Texas and New Mexico; first coll. by *Berlandier*. (Adj. Mex.)

**S.\* subhastáta**, COULTER. Much like the last preceding species but usually lower and frutescent: leaves smaller, thicker, very rugose and with somewhat coarser tomentum: flowers few, borne in the upper axils, somewhat smaller and more deeply colored than in the preceding: pedicels mostly only a line or two long: carpels (acc. to Coulter) without any cusp at the tip. — Contrib. U. S. Nat. Herb. i. 32, ii. 38. — W. Texas, *Thurber*, *Havard*, *Nealley*; ? Mimbres Mts., New Mexico, *Wright*; Arizona, *Toumey*. (A form from Coahuila, *Palmer*, scarcely differs except in its larger flowers.)

\* \* Fruit little or not at all depressed: carpels 2-3-ovulate, 1-3-seeded, mostly oblong and with some ventral excision, disposed to dorsal as well as ventral dehiscence, after separa-

<sup>1</sup> Add syn. *Malveopsis Munroana*, Kuntze, Rev. Gen. i. 72.

<sup>2</sup> Also Laramie, Wyoming, *A. Nelson*.

<sup>3</sup> Add syn. *S. Emoryi*, Brew. & Wats. Bot. Calif. i. 86; Greene, Fl. Francis. 110 (excl. syn.). *S. Munroana*, Coville, Contrib. U. S. Nat. Herb. iv. 74, as to no. 634, appears also to be *S. ambigua*.

<sup>4</sup> Mr. S. B. Parish of San Bernardino, California, has called attention to the fact that there is a purple-flowered form of *S. ambigua* at Palm Springs, S. California. The species also shows considerable variation in the size of flowers, density of inflorescence, shape and pubescence of leaves. But these distinctions cannot as yet be correlated for a satisfactory specific or even varietal subdivision.

tion from the axis cohering by their sides and held by a short thread which at length commonly peels off from the base of the dorsal suture (and when detached sometimes goes with the carpel, sometimes is left on the receptacle): perennial herbs.

+ Carpels canescent or glabrate on the back: leaves comparatively small, not maple-like.

++ Lanceolate to linear, not lobed, rarely even incised, short-petioled.

**S. angustifolia**, DON. Subcanescent with somewhat scurfy pubescence, 2 to 5 feet high, very leafy throughout: leaves 2 to 5 inches long, quarter to full inch wide, thickly and irregularly crenulate, lower occasionally subhastately incised near base: flowers clustered and short-pedicelled in most axils of the branches: petals rose-red, half to three fourths inch long: calyx little surpassing the globose umbilicate fruit: mature carpels in the typical species oblong, 2 lines or more long, rounded at summit, thinnish and smooth throughout, or basal portion very slightly rugulose. — Syst. i. 465; Spach, Hist. Veg. iii. 353; Benth. Pl. Hartw. 7; Gray, Pl. Fendl. 23, & Pl. Wright. i. 21; Wats. Proc. Am. Acad. xvii. 331. *Malva angustifolia*, Cav. Diss. ii. 64, t. 20, f. 3, & Ic. t. 68; Hook. Bot. Mag. t. 2839. *Sphæroma angustifolium*, Schlecht. Linnæa, xi. 353. (Only Mexican.)

**Var.\* violacea**, J. B. DAVY. Leaves somewhat narrower: petals violet-purple: carpels (as in the type) destitute of mucros. — Erythea, iii. 118. — Banks of the Rio Grande at Painted Cave, Texas, *J. Burtt Davy*, no. 36.

**Var. cuspidata**, GRAY. Leaves mostly smaller and narrower: petals quarter to third inch long, red: carpels narrower, tipped with an erect cusp or mucro (sometimes very short or partly deciduous, sometimes a persistent awn of a line in length, divided into two at dehiscence), the short basal portion below the excision either slightly or conspicuously rugose-reticulated on the sides. — Proc. Am. Acad. xxii. 293. *S. stellata*, Torr. & Gray, Fl. i. 228. *S. angustifolia*, var., Gray, Pl. Wright. l. c.; Wats. l. c. *Sida stellata*, Torr. Ann. Lyc. N. Y. ii. 171. — Texas to Arizona and S. Colorado; <sup>1</sup> first coll. by James. (Adj. Mex.)

++ ++ Leaves of oblong or roundish outline, often cordate, mostly 3-5-lobed, sometimes more dissected: cusps of the carpels directed more or less outwardly.

== Leaves thickish, rugose and undulate: carpels not at all rugose-reticulated.

**S. Emoryi**, TORR. A foot or two high, stout, suffrutescent, branching, leafy to top, and with mostly axillary subsessile flowers: pubescence furfuraceous-tomentose, canescent and turning ferruginous: leaves from roundish-subcordate and obtusely 3-lobed to subhastate-oblong (inch or two long), rugose and plicate-veiny above with undulate-crisped margins: calyx mostly half inch long: petals brick-red, three fourths inch long: fruit about hemispherical, tomentose outside; mature carpels fully 3 lines long, ovate-reniform, of rather firm texture throughout, smooth on the sides quite to base, at least not at all reticulated, apex a bipartite cusp. — Torr. in Gray, Pl. Fendl. 23, & Pl. Wright. i. 21, only partly of others. — Arizona, Valley of the Gila, *Emory, Parry*. (Adj. Chihuahua, Mex., *Gregg, Thurber*.)

== Leaves thinner, not rugose: mature carpels more or less rugose-reticulated on the sides of the lower portion; fruit more elevated: species perhaps confluent.

**S. Fendleri**, GRAY. From green and minutely stellular-pubescent or glabrate to cinereous-puberulent or subcanescent: stems 2 to 5 feet high, leafy nearly to the thyrsoid-paniculate inflorescence: leaves ovate-oblong or subhastate, or lower roundish and subcordate, nearly all incised or lobed, some deeply 3-cleft and the lobes incised: petals rose-red, not over half inch long: calyx 2 or barely 3 lines long, shorter than the mature ovoid and truncate fruit: mature carpels 2 lines long, ovate and slightly excised, distinctly cuspidate, the short lower portion rather strongly rugose-reticulated. — Pl. Wright. i. 21, ii. 21. *S. miniata*, Gray, Pl. Fendl. 19, & Gen. III. ii. 70, t. 127, excl. syn. *S. incana*? var. *oblongifolia*, Gray, Pl. Wright. ii. 21. *S. incana*, var. *Fendleri*, Wats. Cat. Pl. Wheeler Rep. 7. — Mountains of W. Texas to New Mexico and Arizona, apparently reaching to the Rio Grande; first coll. by *Fendler*.

**S. incana**, TORR. A foot or two high, diffusely branched, velvety-canescenscent with fine and very close pubescence: leaves (half inch to inch or more long) cordate or subcordate and obtusely 3-lobed, rarely hastate- or lanceolate-oblong, usually 3-lobed or -cleft, the lobes from obscurely crenulate to obtusely incised: inflorescence sometimes axillary-clustered, commonly

<sup>1</sup> Also eastward to Hamilton Co., Kansas, *Hitchcock*.

more naked and racemose-paniculate: flowers of the preceding or often with longer calyx surpassing the globose-ovoid fruit of fewer carpels, their cusps sometimes obsolete. — Torr. in Gray, Pl. Fendl. 23, & Pl. Wright. i. 21. — Plains of New Mexico and Arizona. (Adj. Chihuahua, Mex., *Wislizenus*.)

**Var. dissécta**, GRAY. A form with small leaves deeply 3-5-cleft or parted into obovate or narrowly spatulate usually 2-3-lobed divisions: passing freely into the ordinary form. — Pl. Wright. i. 21. *S. Fendleri*, var. *dissecta*, Watson, Bibl. Index, 143, partly. — New Mexico and Arizona, *Wright*, *Thurber*, &c.

**S. Wrightii**, GRAY. A foot or two high, subcanescently tomentose with looser stellate pubescence: stems simple, herbaceous, racemously several-flowered at naked summit: leaves long-petioled, roundish-cordate (about inch long), thinnish, some lower ones crenately incised, others 3-5-lobed, or nearly parted and the cuneate divisions 2-3-lobed: petals apparently purple and small: calyx-lobes barely equalling the hemispherical fruit of 12 to 15 carpels; these minutely puberulent on the back, ovate-subreniform, 2 or 3 lines long, mucronate-tipped, the short lower portion delicately but conspicuously reticulated on the sides. — Pl. Wright. ii. 21. — On a mountain near Lake Santa Maria, Chihuahua, a little below the U. S. and Mexican boundary, *Wright*.

**S. Rúsbyi**, GRAY. Stems a foot high from a lignescent base, slender, smooth and glabrous or nearly so, spicately or racemously few-several-flowered at the naked summit: leaves green, slightly pubescent (less than inch in diameter), roundish in outline, all pedately parted and divisions 3-5-cleft into narrow short lobes: petals red, quarter or third inch long: calyx loosely and canescently pubescent; the lobes ovate, barely equalling the hemispherical fruit; this nearly of preceding or shorter, and the carpels with obscure mucronation and sides at base obsoletely rugulose. — Proc. Am. Acad. xxii. 293. — Near Prescott, Arizona, *Rusby*, no. 537.

**S. CEDROSÉNSIS**, Kellogg, the fruit of which is unknown, from Cedros Island off Lower California, is probably *S. Emoryi*, or possibly *S. ambigua*.

+ + Carpels hirsute or hispid with long bristly hairs: leaves comparatively large, 3-7-cleft as in maple; cauline with ovate-acute and serrate lobes: tall herbs, green, but more or less pubescent.

**S. acerifolia**, NUTT. From stellately pubescent to glabrate: stems 2 to 6 feet high: leaves 2 to 6 inches long and wide: flowers clustered in upper axils and interruptedly spicate at summit: pedicels usually shorter than calyx, and the ovate lobes of this shorter than or little surpassing the mature fruit: petals rose-color varying to white, half inch to nearly inch long: carpels obovate-oblong, thinnish, with smooth sides, 2-3-seeded. — Nutt. in Torr. & Gray, Fl. i. 228; <sup>1</sup> Hook. Bot. Mag. t. 5404; Wats. Bot. King Exp. 48. *S. rivularis*, Torr. in Gray, Pl. Fendl. 23, & Bot. Wilkes Exped. 255. *Malva rivularis*, Dougl. in Hook. Fl. Bor.-Am. i. 107; Torr. & Gray, l. c. 226. — Along streams, Rocky Mountains, from Dakota to Colorado, <sup>2</sup> N. Nevada, Washington, and Brit. Columbia; first coll. by Douglas; also near Altorf, Kankakee Co., Illinois, *E. J. Hill*.

**S. longisépala**, TORR. More slender: stems and stalks hirsute with long and spreading scattered hairs: flowers sparse: peduncles or pedicels long and slender: calyx-lobes caudate-acuminate, sometimes inch long, equalling the rose-colored petals: fruit, &c., nearly of the

<sup>1</sup> Torr. & Gray cite as syn. "*Malva (Sphæroma) acerifolia*, Nutt. ! mss.," but Nuttall's starred label bearing this name accompanies, at least in herb. Gray, a hirsute-pubescent smooth-carpelled *Malvastrum*, apparently a close ally of the S. African *M. calycinum*. It is evident that there has been some confusion in labelling, probably in herb. Durand, whence the specimen comes. This should not, however, in any way invalidate *Sphæralcea acerifolia*, readily recognizable from its excellent characterization.

<sup>2</sup> Among the Colorado specimens of this species, Miss Alice Eastwood calls attention (*Zoe*, iv. 6) to two forms, one large-leaved and with few chiefly axillary flowers, the other smaller-leaved and with more showy terminal nearly naked spikes. In a similar way Prof. Macoun (*Cat. Canad. Pl.* ii: 314) distinguishes in S. Brit. Columbia a coarse plant with sharp-lobed leaves from a more slender form with obtuser lobes. In a considerable series of specimens, these and various other variations appear to be indiscriminate.

preceding. — Bot. Wilkes Exped. 255.<sup>1</sup> — Washington, on the upper Columbia River, *Pickering* & *Brackenridge*, *Tweedy*, *Brandegee*.

9. **MODÍOLA**, Mœnch. (The fruit of the form of a *modiolus*, which is either a small measure or the nave of a wheel.) — Low and diffuse chiefly subperennial herbs, of the warmer parts of America, hirsute with simple or geminate hairs; with rounded palmately lobed and incised green leaves, small flowers solitary on axillary peduncles, a persistent involucre of 3 foliaceous bractlets, small dull-red petals, a depressed fruit of 15 to 30 thin-coriaceous carpels; these reniform, much compressed, the back at summit bearing a bipartite cusp, at length falling free from the axis, and tardily 2-valved from the top. — Meth. 619; St. Hil. Fl. Bras. Merid. i. 210, t. 43; Gray, Gen. III. ii. 71, t. 128. — Several forms, probably all of one species.

**M. multifida**, Mœnch, l. c. 620. Stems a span to a foot or two long: peduncles commonly filiform and equalling or surpassing the petiole: petals 2 or 3 lines long, little surpassing the calyx: carpels hirsute, at least when young. — Torr. & Gray, Fl. i. 229. *M. Caroliniana*, Don, Syst. i. 466; Gray, Gen. III. ii. 72, t. 128. *Malva Caroliniana*, L. Spec. ii. 688 (Dill. Elth. i. 5, t. 4); Cav. Diss. ii. t. 15, f. 1; Michx. Fl. ii. 44; DC. Prodr. i. 435. — Waste grounds, Virginia to Florida and Texas, near the coast, and sometimes a ballast-weed farther north;<sup>2</sup> fl. all summer. (Mex. to Buenos Ayres, &c.)

10. **HORSFÓRDIA**, Gray. (*Frederick Hinsdale Horsford*, of Vermont, associate of C. G. Pringle in the collection of rare N. American plants.) — Densely and somewhat roughly stellate-tomentose shrubby or suffrutescent plants, with much the habit of *Abutilon* or *Sphæralcea*, with carpels rather of the latter but seed of the former; the leaves cordate to lanceolate and barely denticulate, thickish; the chiefly axillary peduncles 1-flowered. — Proc. Am. Acad. xxii. 296. — Two species.<sup>3</sup>

**H. alata**, Gray, l. c. 297. Frutescent, 3 to 6 feet high: leaves subcordate and ovate-lanceolate (1 to 3 inches long): petals purple, half inch long, much surpassing the ovate-acuminate calyx-lobes: carpels 10 or 12, with upper pair of ovules abortive; upper empty portion dehiscent long before maturity into a pair of narrowly oblong obtuse erect scarious wings of thrice the length of the basal seminiferous body. — *Sida alata*, Wats. Proc. Am. Acad. xx. 356. — Along water-courses in mountains of N. W. Sonora, below the boundary of Arizona, *Pringle*. (Therefore Mex.)

**H. Newberryi**, Gray, l. c. More shrubby: lower leaves more cordate: petals bright yellow (according to Orcutt's note), quarter inch long, nearly twice the length of the acutish calyx-lobes: carpels 8 or 9, 2-3-seeded; the scarious upper 2-valved portion obliquely and broadly oval, somewhat divergent, hardly twice the length of the reticulated basal body. — *Abutilon Newberryi*, Wats. Proc. Am. Acad. xi. 125; Brew. & Wats. Bot. Calif. i. 87, excl. syn. *Sphæralcea crotonoides*, Torr. in herb. — Arizona, in the bed of the Gila, &c., *Emory*, *Newberry*, *Parry*; adjacent Californian desert, *Parish*; cañons on borders of Lower California, *Palmer*, *Orcutt*. (Adj. Sonora, Mex., *Pringle*.)

11. **ANÓDA**, Cav. (Ceylonese name of an *Abutilon*, recorded by Burmann, taken up for this American genus by Cavanilles.) — Annuals, chiefly Mexican, with variable hastate or deltoid or cordate leaves (sometimes 3-5-cleft) and single flowers on slender axillary or at summit racemose peduncles. — Diss.

<sup>1</sup> Cited in Proc. Am. Acad. xxii. 294, by clerical error, as *S. leptosepala*.

<sup>2</sup> Also occasional in California, as at Auburn, coll. *Mrs. Ames*, and about Los Angeles, *Miss Merritt*, acc. to Dr. Davidson.

<sup>3</sup> Two more species of N. W. Mexico and Lower Calif. have since been added.

i. 38, t. 10, 11, & Ic. v. t. 431; Schlecht. Linnæa, xi. 205; Gray, Gen. Ill. ii. 63, t. 124, & Proc. Am. Acad. xxii. 297.<sup>1</sup> [Revised by B. L. ROBINSON.]

§ 1. EVANŌDA, Gray. Seed horizontal (minutely papillose and puberulent), destitute of accessory coating or in one species with a very thin and fragile veinless pellicle; capsule much depressed and radiatiform, of 9 to 20 dorsally beaked or cuspidate (rarely pointless) carpels, the flat summit hirsute or hispid: calyxlobes triangular or subovate, acute or acuminate: leaves very diverse in same species. — Proc. Am. Acad. l. c.

\* Corolla violet or purple varying to white: calyx widely spreading under and mostly surpassing the hispid fruit: herbage destitute or nearly so of stellate pubescence but variably hirsute-hispid or hispidulous with usually simple bristly hairs, or else glabrate: slender peduncles nearly all subtended by leaves.

**A.\* lavaterioides**, MEDIC. Lowest leaves cordate and usually angulate; upper deltoid or hastate or subtrilobate, the margins either irregularly dentate or entire: petals commonly cuneiform and retuse, from a third to nearly an inch long: carpels 15 to 20, rather conspicuously beaked, the dorso-basal portion wholly thin-scarious and veinless and with slender mid-nerve, the sides or partitions wholly obliterated in the breaking up of the fruit; seed naked, puberulent. — Malv. 19; Hook. f. & Jackson, Index Kew. i. 139. *A. cristata*, Schlecht. Linnæa, xi. 210; Garcke in Regel, Gartenfl. xxxvi. 428, & in Engl. Jahrb. xxi. 387. *A. triloba* & *A. Dilleniana*, Cav. Diss. i. 39, 40, t. 10, f. 3, & t. 11, f. 1. *A. hastata*, Gray, Gen. Ill. ii. t. 124, Pl. Wright. i. 20, ii. 23, & Proc. Am. Acad. xxii. 298, not Cav. (*Abutilon, lavateræ flore, fructu cristato*, Dill. Elth. i. 3, t. 2.) *Sida cristata*, L. Spec. ii. 685, excl. var.  $\beta$ ; Curtis, Bot. Mag. t. 330; Andr. Bot. Rep. t. 588. — S. Texas to Arizona. (Mex., S. Am., &c.) Leaves exceedingly variable even upon the same individual. Our form usually has the upper leaves elongated and conspicuously hastate.

**A.\* triangulâris**, DC. Hispid-pubescent upon the younger parts, but at length glabrate below, 8 inches to 2 feet high: stem (often purplish-tinged) suberect, in well developed specimens with several ascending branches from near the base: leaves typically deltoid-ovate, acute, more or less deeply and irregularly crenate-dentate, rather pale green, glaucescent beneath; the uppermost, rarely all, deltoid-lanceolate, more or less hastate: flowers much smaller than in the preceding species: petals only 3 or 4 lines long, pale blue, little exceeding the calyx: carpels 8 to 12; membranaceous septa of the capsule either subsistent at its base or (with the carpellary lining) loosely clinging to the seed. — Prodr. i. 459; Schlecht. l. c. 216; Garcke, ll. cc. *A. brachyantha*, Reichenb. Ic. Bot. Exot. t. 34. *A. hastata*, var. *depauperata*, Gray, Pl. Wright. ii. 23. *A. Arizona*, Gray, Proc. Am. Acad. xxii. 298 (form with seeds more or less invested). *Sida triangularis*, Willd. Enum. 725. — Texas to Arizona. (Mex., where acc. to Hartman used as a febrifuge; Lower Calif., S. Am.) In identifying this and related species kindly assistance has been received from Professor Garcke.

**Var.\* digitâta**, ROBINSON, n. comb. All but the lowest leaves hastately digitate, with elongated lanceolate to linear middle lobe and a pair of basi-lateral lobes on each side. — *A. Arizona*, var. *digitata*, Gray, l. c. — S. Arizona, Lemmon, no. 517, coll. of 1881.

**A.\* HASTÁTA**, Cav. (*A. acerifolia*, DC. l. c.; Gray, Proc. Am. Acad. xxii. 298, not 299) much resembles *A. lavaterioides*, but has the upper part of fruiting carpels coarsely reticulated, at length bilamellar and clathrate, nearly in the manner of the following. It may be expected on our southern border. The yellow-flowered plant, ascribed to *A. hastata* by Robinson & Greenman, Proc. Am. Acad. xxix. 382, is probably a distinct species.

\* \* Corolla yellow: calyx shorter-lobed, less explanate under the densely stellate-hirsute fruit, which it moderately or hardly surpasses. (Here also *A. lanceolata*, Hook. & Arn.)

**A. Wrightii**, GRAY. Erect, 2 to 5 feet high, viscidulous-puberulent and above more or less villous-hirsute: lower leaves deltoid-ovate and upper hastate-lanceolate: peduncles

<sup>1</sup> Add E. G. Baker, Jour. Bot. xxx. 73.

about equalling or exceeding the subtending leaves, or upper ones in a naked raceme and subtended by linear or filiform deciduous bracts: calyx canescently pubescent: petals dull yellow, a third to half inch long, changing to brown-purple at base: carpels 10 to 12, beaked; dorsal portion bilamellar at maturity; the tardily separable endocarpial layer of firm texture, clathrate-reticulate, loosely half enveloping the minutely or sparsely puberulent seed. — Pl. Wright. ii. 22, & Proc. Am. Acad. xxii. 299. *A. parviflora*, Wats. Bibl. Index, 132, & Proc. Am. Acad. xvii. 330, not Cav. — New Mexico, Wright. Has been cultivated in botanic gardens as *A. parviflora*. (Mex., Schaffner.)

§ 2. **SIDANÓDA.** Seed resupinate-pendulous in the 5 to 9 depressed or ascending dorsally umbonate or muticous merely puberulent carpels, destitute of accessory coating: flowers small, disposed to be racemose or paniculate: pubescence mostly fine and stellular; no bristly hairs. — Gray, Proc. Am. Acad. xxii. 299.

\* Corolla from blue to bluish white: calyx deeply 5-cleft, rotately spreading under and surpassing the depressed fruit. (Connecting the preceding with the present section.)

**A.\* Thúrberi**, GRAY, l. c. Slender, a foot or two high, green and barely puberulent or glabrate below and calyx puberulent-canescens: lower leaves cordate and dentate, upper hastate, but with spreading not strongly deflexed basal lobes: flowers mostly paniculate-racemose: petals only 2 or 3 lines long: carpels 8 or 9, the whole dorsal and thickish apical portion strongly 3-nerved; seed puberulent. — *A. hastata*, var.? Gray, Pl. Wright. ii. 23 (in part), & Pl. Thurb. 308. — S. Arizona, Thurber, Wright, Lemmon; Chenate Region, Texas, Nealley. (Chihuahua, Pringle, distrib. as *A. parviflora*, var.?) Prof. Garcke (in Engl. Jahrb. xxi. 390) fails to distinguish this species from *A. pubescens*, Schlecht., a Mexican plant in which the basal lobes of the upper deeply hastate leaves are strongly reflexed, and the flowers somewhat larger. No. 78 of Parry & Palmer, from San Luis Potosi, corresponds closely in these and other regards to Schlechtendahl's description.

\* \* Corolla yellow (sometimes pink in fading): calyx shorter and less deeply cleft, ascending or appressed to and not surpassing the little depressed fruit, its carpels (and closely embraced seeds) nearly vertical, the inflexed apical portion short.

**A. pentaschísta**, GRAY. Slender, a foot or two high, paniculately branched, minutely puberulent and more or less cinereous: lower leaves ovate or subcordate, somewhat 3-lobed; upper hastate or lanceolate or some linear: calyx 2 lines long, a little shorter than the bright yellow corolla: carpels 5, or not rarely 6 to 9; the dehiscent dorsal portion closely applied to and half covering the puberulent seed, membranous with inflexed apex thickish. — Pl. Wright. ii. 22, & Proc. Am. Acad. xxii. 299. — S. Arizona, Wright, to western borders of Texas, Parry. (Mex., Thurber, Palmer; Lower Calif., acc. to Brandegee.) Harvard's specimens from Vieja Mt., Texas, are greener and in sepals pass to

**Var.\* obtúsior**, ROBINSON, n. var. Foliage, pubescence, and inflorescence of the type: base more decumbent and branched, distinctly lignescent and perhaps perennial: calyx-lobes broadly ovate, very obtuse, mucronulate: carpels 5 to 10; seeds minutely granulated. — *Sida Palmeri*, J. G. Smith, Rep. Mo. Bot. Gard. vi. 113, t. 48, not Baker. — Near Corpus Christi, Texas, Nealley, 1894, in flower and fruit (types in U. S. Nat. Herb.); also a fragmentary fruiting specimen from same locality long ago coll. by Torrey (herb. Gray).

**A. abutiloídes**, GRAY. Somewhat robust, branching, 3 or 4 feet high, canescent (branches occasionally bearing some loose pubescence): leaves cordate and crenately serrate, caudate-acuminate or uppermost subcordate-lanceolate, all densely velvety-tomentose both sides: flowers all paniculate-racemose: calyx 2 or 3 lines long, half the length of the obovate (yellow becoming pinkish) petals; the lobes broadly ovate and apiculate: carpels 5 to 7, when mature 2 lines high and less deep, obscurely umbonate, septicidally separating almost entire, the diaphanous inner walls tardily breaking up and uncovering the enclosed puberulent seed; dorsal portion broad and cymbiform, thin-membranaceous, with short summit thickish, disposed to split down the back into two valves. — Proc. Am. Acad. xxii. 300. — Santa Catalina Mountains, S. Arizona, Pringle (distr. in 1882 as *A. pentaschista*, and as *Sida Berlandieri*, var.).



§ 3. **CLEISTANÓDA**, Gray, l. c. Seed (glabrous) completely and permanently invested by a firm corrugate-reticulated or in age clathrate (doubtless endocar-pial) arilliform coat: otherwise as in § 2.

**A.\* crenatiflóra**, ORT. Minutely puberulent or glabrate, the calyx canescent: lower leaves cordate and angulate or somewhat lobed, upper mostly hastate: upper flowers naked-racemose: petals yellow (or changing to purplish when drying): carpels 9 or 10, short-beaked or pointed, hirsute at the radiate summit, the permanent dorsal portion of firm texture or below reduced to a stout and rigid midnerve. — Dec. viii. 96; Schlecht. *Linnæa*, xi. 217. *A. parviflora*, Cav. Ic. v. 19, t. 431; DC. Prodr. i. 459; Reichenb. Ic. Bot. Exot. t. 44; Gray, l. c. *Sida parviflora*, Willd. Enum. 726. — So near our *S. W.* boundary (*Pringle*, &c.) that it is to be expected in Arizona. (Mex.; Lower Calif., *Brandegee*.)

**A. reticuláta**, WATSON. Herbage of preceding; but nearly all the leaves cordate angulate and upper 3-5-lobed, small: flowers mainly naked-racemose: petals blue, 2 or 3 lines long: fruit not radiate, hardly puberulent, of 10 oval carpels with rounded summit and not even umbonate on the back, the permanent dorsal portion thin-membranaceous, delicately 1-nerved below and veiny above, merely concave, at length nudating the arillate seed. — Proc. Am. Acad. xvii. 368; Gray, l. c. — *S. Arizona*, in the Santa Catalina Mountains, *Pringle*, 1881.

12. **SÍDA**, L. ( $\Sigma\delta\eta$ , unexplained Greek name of some plant.) — Herbs or sometimes undershrubs (most largely American and of warm regions), of various habit: pedicels mostly articulated; fl. summer and autumn, mostly open only in sunshine or for a few hours. — Syst. Nat. ed. 1, & Gen. no. 556; St. Hil. Fl. Bras. Merid. i. 173; Gray, Pl. Fendl. 22, & Gen. Ill. ii. 61, t. 123; Benth. & Hook. Gen. i. 203.<sup>1</sup>

§ 1. **PSEUDO-MALVÁSTRUM**, Gray. Usually 2 or 3 slender and deciduous bractlets under the more or less 5-angled calyx: flowers solitary or somewhat clustered in the axils of the leaves: peduncles commonly recurved or deflexed in fruit: low or depressed perennials, canescent with stellular and sometimes lepidote pubescence, except in the fruit very like species of *Malvastrum* and *Sphæralcea*. — Pl. Fendl. 23.

**S. hederácea**, TORR. Rather scurfy-canescens: stems decumbent: leaves obliquely sub-reniform or ovate-subcordate, irregularly dentate (half inch to 2 inches wide): calyx-lobes ovate or ovate-lanceolate, short-acuminate: petals pale yellow or white or sometimes "purple," barely half inch long, moderately surpassing the short-conical fruit of 6 to 10 turgid-ovate or triangular acutish tomentulose but glabrate carpels. — Torr. in Gray, Pl. Fendl. 23, Pl. Wright. i. 18, & ii. 21; Wats. Bot. King Exp. 48; Brew. & Wats. Bot. Calif. i. 86. *S. obliqua*, Nutt. in Torr. & Gray, Fl. i. 233, 681. *Malva Californica*, Presl, Rel. Haenk. ii. 121. *M. hederacea*, Dougl. in Hook. Fl. Bor.-Am. i. 107; Torr. & Gray, Fl. i. 227. *M. plicata*, Nutt. l. c. 227. — Low banks, Washington to S. California, Utah, Arizona, and W. Texas. (Mex.<sup>2</sup>)

**S. lepidóta**, GRAY. Throughout scurfy-lepidote, silvery when young: leaves obliquely deltoid-subcordate or triangular-lanceolate and commonly semicordate or semihastate, irregularly or incisely dentate, mostly acute, quarter to inch and a half long, slender-petioled: lower peduncles usually elongated and in fruit deflexed with apex incurved: petals half inch or more long, purple or white with purple tinge: calyx almost 5-parted, somewhat amplate

<sup>1</sup> Add E. G. Baker, Jour. Bot. xxx. 138.

<sup>2</sup> Also Lower Calif., *fide* Brandegee, and Chili, *fide* E. G. Baker (Jour. Bot. xxx. 138), who regards the S. American *S. sulphurea*, Gray, as a variety of *S. hederacea*. *S. hederacea*, var.? *parvifolia*, Hemsl. Biol. Cent.-Am. Bot. i. 104, never properly described, but vaguely credited to New Mexico, is (as to the Mexican types cited) not of this species, being in pubescence much nearer *S. lepidota*, of which it is probably only a depauperate round-leaved form.

and angulate in age; lobes becoming much acuminate from broad base, much surpassing the depressed glabrous and smooth fruit of 8 or 9 rounded and pointless thin-walled carpels. — Pl. Wright. i. 18, ii. 21; Rothrock in Wheeler, Rep. vi. 75. — Plains of W. Texas to Arizona, Wright, and later Rothrock, Lemmon, &c. With var. *depauperata*, merely a reduced form, and

**Var. sagittæfólia**, GRAY, ll. cc. Leaves all hastate- or sagittate-lanceolate or the base on one side bearing 2 or 3 narrow lanceolate lobes. — W. Texas to S. Colorado and S. Arizona; first coll. by Wright. (Chihuahua, Thurber.)

**S. cuneifólia**, GRAY. Tomentulose-canescens, ascending, much branched: leaves flabelliform or cuneiform, or some rotund with barely cuneate base, repand-dentate or crenulate around the broad summit, half inch or so long: stipules linear, herbaceous: flowers subsessile: petals yellow, barely quarter inch long: calyx not surpassing the oval fruit of about 5 turgid and thin-walled short-acuminate (and in dehiscence 2-beaked) carpels. — Pl. Lindh. pt. 2, 165, & Pl. Wright. i. 18. — Subsaline soil along and near the Rio Grande from Eagle Pass southward, S. Texas, Berlandier, Wright. (Adj. Mex., Berlandier.)

**S.\* Hélleri**, ROSE. Suffrutescent, much-branched, spreading or procumbent, cinereous, 2 feet high: leaves suborbicular, crenate, rounded or truncate at the base, seldom exceeding half inch in diameter, loosely stellate-pubescent upon both surfaces; slender petioles half or two thirds the length of the leaves: subsessile flowers small, leafy-bracted: ovate-oblong obtusish sepals becoming 3 lines in length: corolla "pale copper-colored": carpels obtuse. — Rose in Heller, Contrib. Herb. Frankl. & Marsh. Coll. i. 66. — Very common along sandy shores of Corpus Christi Bay at Oso, Heller, no. 1533. Similar to but clearly distinct from the last preceding species.

§ 2. **PSEUDO-NAPÆA**, Gray. Calyx (naked at base, as in the genus generally) short and 5-toothed, terete at base, unchanged in age: petals white: herbaceous green and nearly glabrous; the leaves ample and palmately cleft: flowers corymbulose in pedunculate panicles. — Pl. Fendl. 23.

**S. Napæa**, CAV. Glabrous or young parts minutely cinereous-puberulent: stems 3 to 7 feet high from a stout perennial root: leaves 3 to 8 inches long, 3-7-cleft; lobes triangular, long-acuminate, irregularly serrate: petals hardly half inch long: mature carpels triangular-ovate, acuminate, nearly glabrous. — Diss. v. 277, t. 132, f. 1; Willd. Spec. iii. 766; Sims, Bot. Mag. t. 2193; DC. Prodr. i. 466; Gray, l. c.<sup>1</sup> *Napæa hermaphrodita*, L. Spec. ii. 686. *N. lævis*, L. Mant. ii. 435; Lam. Ill. t. 579, f. 1. — Glades and river banks, rare, West Virginia and S. Pennsylvania on the Susquehanna, opposite Safe Harbor, Porter; <sup>2</sup> long cultivated in gardens; fl. late summer.

§ 3. **CALYXHYMÉNIA**, Gray. Calyx 5-lobed, naked, strongly 5-angled, much accrescent and membranaceous or scarious in age: carpels indehiscent, subrostrate or apiculate but muticous: petals yellow. — Proc. Am. Acad. xxii. 294.

**S.\* hastáta**, ST. HIL.<sup>3</sup> Loosely stellular-hirsute, green, partly glabrate: stems spreading or decumbent from a fleshy-ligneous perennial root, a foot or two long: leaves rather succulent, subcordate to oblong, obtuse, inch or two long, slender-petioled, crenate or serrate: peduncles solitary in the axils, one-flowered, soon recurved: petals buff-color, hardly exceeding the 5-parted calyx: lobes of the latter as if cordate, in anthesis 3 lines long and pale green, at length 5 or 6 lines long, membranaceous and veiny, together connivent and forming a vesicular globular and wing-angled loose covering over the fruit: carpels 10, ovate with short beak-like apex, very thin-membranaceous and reticulate-veiny, sulcate round the back, conformed to the turgid seed. — Fl. Bras. Merid. i. 190, t. 36, f. 2. *S. physocalyx*,

<sup>1</sup> Add syn. *S. hermaphrodita*, Rusby, Mem. Torr. Club, v. 223.

<sup>2</sup> Also in E. Tennessee, acc. to Chapman, and on the Potomac flats near Washington, D. C., acc. to Burgess.

<sup>3</sup> There appears to be no doubt of the identity of Dr. Gray's *S. physocalyx* with the South American plant (cf. E. G. Baker, Jour. Bot. xxx. 140), and the later name must give place to the earlier.

Gray, Pl. Lindh. pt. 2, 163, Pl. Wright. i. 20, & ii. 22. — River valleys, Texas to S. Arizona; the earliest collectors, *Berlandier*, *Lindheimer*, &c. (Adj. Mex.,<sup>1</sup> *Gregg*, *Palmer*.)

§ 4. **MALVÍNDÁ**, DC. Calyx naked, generally 5-angled, unchanged in age: leaves undivided: carpels mostly dehiscent at apex. — Prodr. i. 459; Gray, Pl. Fendl. 23, & Proc. Am. Acad. xxii. 294. *Malvinda*, Dill. Elth. 212, t. 171, 172; Medic. Malv. 23.

\* Flowers sessile or short-peduncled, mainly involucrate by petiolate leaves at the summit of the branches: petals reddish purple: low perennial with habit somewhat of *Stylosanthes*.

**S. ciliáris**, L. Diffuse, many-stemmed, a foot or less high, strigose-pubescent: leaves oblong or narrower, obtuse or retuse at both ends, or not rarely with cusp at tip, serrate above the middle, 3 to 9 lines long, long-petioled: stipules filiform- or spatulate-linear, conspicuous, at least the uppermost and the petioles hirsute-ciliate or barbate: petals quarter to near half inch long: carpels 5 to 8, turgid, very strongly rugose-reticulated and over the back not rarely tuberculate or muricate, dehiscent apex bicuspidate. — Syst. Nat. ed. 10, ii. 1145, & Spec. ed. 2, ii. 961 (Sloane's figure uncharacteristic); Cav. Diss. i. 21, t. 3, f. 9 (poor), & v. t. 127, f. 2 (excellent); DC. Prodr. i. 461; Chapm. Fl. 55. *S. anomala*, St. Hil. Fl. Bras. Merid. i. 177, t. 33. *S. Elliottii*, Torr. Bot. Mex. Bound. 39, as to pl. *Bigelow*. *S. involucreta*, A. Rich. Fl. Cub. 162. — Key West, Florida, *Blodgett*, *Rugel*. (W. Ind. to Brazil.)

**Var. fasciculáta**, GRAY. Leaves narrower and proportionally longer, mostly linear. — Proc. Am. Acad. xxii. 294. *S. fasciculata*, Torr. & Gray, Fl. i. 231. *S. anomala*, var. *Mexicana*, Moricand, Pl. Nouv. Am. 36, t. 24. *S. muricata*, Cav. Ic. vi. 78, t. 597, f. 1, seems to be a form of this. *Malvastrum linearifolium*, Buckl. Proc. Acad. Philad. 1861, 449. — Texas, near the coast, *Berlandier*, *Drummond*, *Wright*, &c. (Mex.)

\* \* Flowers solitary or clustered in the axils, or at length sparingly paniculate or glomerate at the summit of the stem in a few species, more or less pedunculate: calyx 5-angled, the summit in bud pyramidal: petals mainly yellow.

+ Stems diffusely decumbent or prostrate from a perennial root, filiform, sometimes villous with scattered long and spreading hairs, or destitute of them in the same species: leaves small, mostly subcordate at base, on filiform petioles of about equal length, about equalled by the filiform axillary peduncles: herbage minutely canescent: carpels mostly 5, little compressed, rugose-reticulated on the thin sides.

**S. diffusa**, HBK. Leaves from subcordate and roundish to lanceolate with almost truncate base, crenate-dentate: petals 3 or 4 lines long (yellow, in specimens seeming white), much surpassing the calyx: carpels barely apiculate or the dehiscent apex with two short stout points. — Nov. Gen. & Spec. v. 257, but petals not "violacea," nor capsule "apice depressa;" Wats. Proc. Am. Acad. xvii. 330. *S. filiformis*, Moricand, Pl. Nouv. Am. 38, t. 25 (narrow-leaved form without hairs); Rothrock in Wheeler, Rep. vi. 75. *S. filicaulis*, Torr. & Gray, Fl. i. 232; Gray, Pl. Lindh. pt. 2, 163.<sup>2</sup> — Texas<sup>3</sup> (first coll. by *Berlandier*) to Arizona. (Mex.)

**S. supína**, L'HER. Leaves round-cordate to cordate-ovate (largest an inch long): petals 2 or 3 lines long, little surpassing the calyx: carpels 2-rostrate at the dehiscent apex. — Stirp. Nov. t. 52; Chapm. Fl. 54. *S. pilosa*, & *S. ovata*, Cav. Diss. i. 9, t. 1, f. 8, & vi. t. 196, f. 2. *S. procumbens*, Swartz, Fl. Ind. Occ. ii. 1211. — Florida Keys. (W. Ind., S. Am.)

+ Stems erect: leaves rather long-petioled, crenate-dentate, nearly all cordate or subcordate: calyx ovate, with 5 broadly deltoid lobes: carpels 10 to 12, their apex before apical dehiscence 2-mucronate or 2-awned.

**S. cordifolia**, L. Annual (in tropics suffrutescent), densely and minutely soft-tomentose and velvety, very leafy: stem robust, rather tall: leaves ovate-cordate (1 to 3 inches long), sometimes obscurely angulate-lobed: flowers all short-peduncled, glomerate or clustered:

<sup>1</sup> Also S. Am., whence first descr. by St. Hilaire.

<sup>2</sup> *S. diffusa*, var. *setosa*, E. G. Baker, Jour. Bot. xxx. 291, being *S. filicaulis*, var. *setosa*, Gray, Pl. Wright. ii. 22, does not appear to differ essentially from the typical form of *S. diffusa*.

<sup>3</sup> Also on the keys of S. Florida, acc. to Chapman.

calyx canescent-tomentose, 10-angled below: petals quarter inch long, tawny yellow: carpels sparsely rugose, their awns commonly of about the same length and retrorsely hirsute (but rarely obsolete). — Spec. ii. 684 (Dill. Elth. t. 171); Cav. Diss. i. t. 3, f. 2. *S. multiflora*, *herbacea*, *micans*, *rotundifolia*, &c., Cav. l. c. *S. althæifolia*, Swartz, Prodr. 101. — Keys of Florida. (W. Ind. to S. Am., and most tropical shores.)

- S. tragiæfólia**, GRAY. Perennial, 2 feet high, stellular-pubescent or puberulent: leaves subcordate-oblong, obtuse (half inch to nearly 2 inches long), coarsely dentate, upper face glabrate: flowers mostly solitary in the axils and slender-peduncled: calyx membranaceous in age and barely pubescent, with somewhat 10-angled base: petals orange-yellow, sometimes half inch long: carpels with thin sides rugose-reticulated below, smooth towards the obtuse 2-mucronate apex which is green and partly bifid dorsally. — Pl. Lindh. pt. 2, 164. — *S. Arizona*, Wright (seeds, plant raised in Bot. Garden), Pringle, Lemmon, an ambiguous smaller-leaved form, more cinereous with minute pubescence. (Coahuila, Mex., Palmer.)

+ + + Stems erect, branching: leaves slender-petioled, truncate-obtuse or retuse at base, from ovate-oblong to linear; a small blunt or pointed hard tubercle usually underneath base of petiole, but sometimes obsolete: flowers small, nearly all short-peduncled, commonly clustered in the axils: calyx-lobes deltoid: carpels 5 or rarely more, reticulate-rugose and sometimes tuberculate, variably 2-dentate or 2-awned at tip: annuals becoming suffruticose in the tropics.

- S. spinósa**, L. Green and minutely puberulent, or upper face of the oblong-ovate or oblong-lanceolate serrate leaves glabrous and lower subcanescent: petals pale yellow, 2 or 3 lines long. — Spec. ii. 683; Walt. Car. 176; Cav. Diss. i. 11, t. 1, f. 9; Torr. & Gray, Fl. i. 231; Gray, Gen. III. ii. t. 123. — Waste grounds from S. New York to Kansas and southward, probably introduced weed, but in the Gulf States and Texas perhaps indigenous. (Most tropics.)

- S. angustifólia**, LAM. Canescent: branches virgate: leaves linear or narrowly lanceolate, or some of the lower linear-oblong, obtuse, 1 to 4 lines wide, crenately serrulate; petiole shorter, the tubercle under it often obscure or wanting, but sometimes manifest: otherwise very like the preceding, but hardly passing into it. — Dict. i. 4; Cav. Diss. i. 14, t. 2, f. 2; Gray, Pl. Wright. i. 19, ii. 21. *S. linearis*, Cav. Ic. iv. 6, t. 312, f. 1. *S. heterocarpa*, Engelm. in Gray, Pl. Lindh. pt. 2, 163. *S. spinosa*, var. *angustifolia*, Griseb. Fl. W. Ind. 74. — Texas and Arizona. (Mex. to Trop. Am., &c.)

+ + + + Stems erect: leaves mainly short-petioled or sessile, acute or obtuse but never cordate at base, usually quite destitute of tubercle under the petiole.

++ Cuneate-obovate or oblong-ovate to lanceolate leaves green or at most cinereous-puberulent, serrate or serrulate, the base entire: stems branching and leafy to the top: carpels 8 to 10: annuals in the U. S., suffruticose perennials in the tropics.

- S. rhombifólia**, L. Leaves from rhombic-oblong or ovate-cuneate to oblanceolate, obtuse, pale and cinereous-puberulent beneath; occasionally an obscure tubercle under the petiole; stipules setaceous, caducous: peduncles all or some of them elongated: calyx minutely cinereous-puberulent, the base at maturity with 5 to 10 nerves callous-thickened: petals pale yellow, sometimes red at base, about quarter inch long: carpels smoothish, subulately 1-awned, at least until dehiscence or fission, which is uncommon. — Spec. ii. 684 (*Malvinda unicornis*, &c., Dill. Elth. 216, t. 172, f. 212); Cav. Diss. t. 3, f. 12; Gray, Bot. U. S. Expl. Exped. 158; Griseb. Fl. W. Ind. 74. — A weed in waste grounds, N. Carolina to Florida and Texas; probably not indigenous. (Most tropics.)

**Var. Canariénsis**, GRISEB. l. c. Carpels with two short awns or points or soon dehiscent into two, sometimes almost pointless. — *S. Canariensis*, Willd. Spec. iii. 735. *S. Hondensis*, HBK. Nov. Gen. & Spec. v. 261. *S. Maderensis*, Lowe, Trans. Camb. Phil. Soc. iv. 35. *S. oculata*, Lowe, Fl. Mader. 592. — S. Carolina, Florida, &c.; an occasional ballast-weed as far north as Pennsylvania. (Most tropics.)

- S.\* acúta**, BURM.<sup>1</sup> Glabrous or minutely puberulent, much branched: leaves green, rather narrowly lanceolate, acute or acuminate, veiny, unequally serrate: stipules conspicuous,

<sup>1</sup> This species was called *S. carpinifolia* by Dr. Gray, but the name of Linnæus, f., has now generally given place to the earlier one of Burmann. Slight changes have been made in Dr. Gray's description to exclude the var. *carpinifolia*.

mostly longer than petiole, from filiform-linear to lanceolate, tardily deciduous: peduncles not longer than the calyx, or some of them twice or thrice longer (these jointed above the middle): petals yellow, varying nearly to white, quarter to half inch long: carpels reticulated-rugose, subulately 2-awned or 2-mucronate even before dehiscence. — Fl. Ind. 147; DC. Prodr. i. 460; Schumann in Mart. Fl. Bras. xii. pt. 3, 325; E. G. Baker, Jour. Bot. xxx. 238. *S. carpinifolia* of many authors, as to narrow-leaved forms. *S. stipulata*, Cav. Diss. i. 22, t. 3, f. 10; DC. l. c.; Chapm. Fl. 55. *S. glabra*, Nutt. Jour. Acad. Philad. vii. 90; Torr. & Gray, Fl. i. 232. — Waste ground near dwellings, Florida, perhaps not indigenous; also occasional as a ballast-weed as far north as New York. (Widely distributed in tropics of both hemispheres.)

**Var.\* carpinifolia**, SCHUMANN, l. c. 326. Leaves considerably broader, ovate or ovate-oblong, obtusish, rounded or even subcordate at the base. — *S. carpinifolia*, L. f. Suppl. 307; Cav. Diss. i. 21, & v. t. 134, f. 1; Jacq. Ic. Rar. t. 135. *S. spiræifolia*, Link, Enum. ii. 203; Reichenb. Ic. Bot. Exot. i. 23, t. 33. *S. carpinoides*, DC. Prodr. i. 461. — With the type in Florida but less frequent; also on ballast at Portland, Oregon, *Henderson*. (Mex., most tropics.)

++ ++ Leaves all or mostly linear or oblong-linear and obtuse at both ends, serrate or denticulate: carpels 9 to 12, glabrous, at maturity rugulose or reticulated on sides and back and 2-cuspidate or 2-mucronate at summit close behind the more or less inflexed short apex or rarely muticous: perennial herbs, with virgate branches: flowers yellow or in one changing to purple.

== Stem and calyx glabrous or nearly so.

**S. Elliottii**, TORR. & GRAY. Stems slender, a foot to a yard high: leaves mostly narrowly linear (inch or more long, 1 to 3 lines wide) or some lower ones occasionally oblong, serrulate: peduncles not articulated except at insertion, some shorter than the calyx but earlier ones commonly little shorter than the subtending leaf: petals half inch or more long: mature carpels strongly reticulate-rugose on the sides. — Fl. i. 231; Chapm. Fl. 55. *S. gracilis*, Ell. Sk. ii. 159, not Rich. (which is an obscure W. Indian species).<sup>1</sup> — Sandy and open woods, especially on the coast, S. Carolina to Alabama, Tennessee,<sup>2</sup> and S. Florida; first coll. by *Elliott*.

**Var.\* parviflora**, CHAPM. "Stem shrubby, smooth; leaves narrow-linear, obtuse, downy beneath; peduncles as long as the leaves; petals barely longer than the calyx." — Fl. ed. 3, 48 (whence descr.). *S. Lindheimeri*, Chapm. Fl. eds. 1 & 2, 55, not Engelm. & Gray. — "Key West, *Blodgett*." Not seen by the editor and from character perhaps a distinct species.

== Stem more or less puberulent, and lower face of the leaves and calyx cinereous.

**S. Neo-Mexicana**, GRAY. A span to a foot or more high, and diffusely many-stemmed from a ligneous base or root, minutely puberulent, hardly at all cinereous: leaves narrowly linear, sometimes linear-oblong: peduncles not articulated, short or very short (rarely over 3 or 4 lines long): petals orange-color, in age often changing to red, less than half inch long: mature carpels muticous or barely mucronulate. — Proc. Am. Acad. xxii. 296. *S. Elliottii*, var.? Gray, Pl. Wright. ii. 21; Torr. Bot. Mex. Bound. 39. *S. rhombifolia*, var.? *microphylla*, Hemsl. Biol. Centr.-Am. Bot. i. 106. — E. New Mexico,<sup>3</sup> *Wright*, *Thurber*, *Greene*; S. Arizona, *Lemmon*. (Chihuahua, Mex., *Pringle*, no. 577, and San Luis Potosi, *Parry* & *Palmer*, no. 88, small- and short-leaved form, *Schaffner*, no. 162, broader-leaved form.)

**S. Lindheimeri**, ENGELM. & GRAY. Cinereous-puberulent, 2 or 3 feet high, erect, herbaceous to base: leaves linear-lanceolate or some lower ones oblanceolate (2 inches or more long), or upper narrowly linear, commonly glabrate above: peduncles slender, about equaling the subtending leaves (half inch to 2 inches long), articulated above the middle: petals yellow, fully half inch long: carpels dorsally puberulent or glabrate, cuspidately 2-dentate. — Pl. Lindh. pt. 1, 5. *S. Elliottii*, with var. *Texana*, Torr. & Gray, Fl. i. 681. — Prairies of

<sup>1</sup> *S. rubro-marginata*, Nash, Bull. Torr. Club, xxiii. 102, appears to be merely a broad-leaved form of *S. Elliottii*.

<sup>2</sup> Extending to Stoddard Co., Missouri, *Bush*.

<sup>3</sup> Extreme W. Texas, *fide* Coulter, Contrib. U. S. Nat. Herb. ii. 40.

Texas and adjacent Louisiana, and south to the Rio Grande; first coll. by *Berlandier*, then by *Drummond*, *Lindheimer*, &c. (Adj. Mex.)

**S. lóngipes**, GRAY. Somewhat scabro-puberulent, not cinereous: stems about a foot high from a ligneous root, strict: leaves elongated-linear or the lower lanceolate, barely serrulate or crenulate, much surpassed by the (3 to 5 inches long) erect peduncles; these articulated toward the summit: petals orange-color, half inch long: carpels glabrous, muticous. — Pl. Wright. i. 19, ii. 21. — W. Texas, from Live-Oak Creek to the Pecos, *Wright*, *Woodhouse*, *Havard*.<sup>1</sup>

\* \* \* Flowers pedunculate and scattered in the axils or partly paniculate: calyx not angled, globular in the bud.

**S. filipes**, GRAY. Herbaceous from perennial root, 2 or 3 feet high, paniculately branched, rather slender, fulvous-canescens with close stellular pubescence: leaves very short-petioled, lanceolate or the lower oblong, serrate, hardly acute, subcordate or truncate at base, inch or two long: peduncles filiform, longer than the leaves, the small flower nodding in and after anthesis: calyx-lobes (hardly over a line long) ovate, obtuse: petals deep violet-purple, 2 lines long: carpels about 7, obtusely apiculate at the at length dehiscent apex, glabrate, the sides favose-rugose. — Pl. Lindh. pt. 2, 164, & Pl. Wright. i. 19. — Rocky ravines from near Austin, Texas, to the Rio Grande, *Wright*, *Schott*. (Adj. Mex., *Berlandier*, *Edwards*, *Palmer*, &c.)

**13. WISSÁDULA**, Medic. (An E. Indian name.) — Habit of *Abutilon*, and with paniculate or subspicate yellow flowers. — Malv. 24; Presl, Rel. Haenk. ii. 117, t. 69; Benth. & Hook. Gen. i. 204. — Genus of a few tropical species. [Revised by B. L. ROBINSON.]

**W.\* rostráta**, PLANCH.<sup>2</sup> Canescent with soft and close minute pubescence, no bristly hairs: leaves all cordate with deep narrow sinus, abruptly acuminate, entire, long-petioled; upper face glabrous or glabrate: flowers loosely paniculate, slender-pedicelled: petals 2 lines long: carpels mucronate; seeds 3 or 4, upper puberulent, lower one hairy. — [“Planch. in”] Hook. Niger Fl. 229. *W. mucronulata*, Gray in Torr. Bot. Mex. Bound. 39. *Sida hernandioides*, L’Her. Stirp. t. 58. *Wissadula periplocifolia*, var. *hernandioides*, Griseb. Cat. Cub. 25. (Must be different from the Indian *W. Zeylanica*, Medic., which seems to be introduced into America.) *Abutilon Nealleyi*, Coulter, Contrib. U. S. Nat. Herb. i. 32, ii. 41. — S. Texas, on the Rio Grande, *Schott*. (Adj. Mex., *Berlandier*, &c., W. Ind., S. Am., Afr.)

**W.\* holosericea**, GARCKE.<sup>3</sup> Robust, branching, 3 to 6 feet high, densely velvety-tomentose throughout, soft and white but in age usually tawny and somewhat roughish, heavy-scented: leaves broadly cordate, acute or acuminate, from almost entire to dentate, sometimes obscurely 3-lobed (the smaller 2 and larger 8 to 10 inches long): flowers short-peduncled, solitary in lower axils, and later ones corymbose-paniculate at summit: petals orange-yellow, half to three fourths inch long: carpels tomentose, not exceeding the short and broad calyx; seeds glabrous. — Zeitschr. f. Naturw. lxiii. 124. ? *Abutilon erosum*, Schlecht. Linnæa, xi. 367, *fide* E. G. Baker, Jour. Bot. xxxi. 74. *A. holosericeum*, Scheele, Linnæa, xxi. 471; Gray, Pl. Lindh. pt. 2, 162, & Pl. Wright. i. 20. *A. velutinum*, Gray, Gen. III. ii. 67, t. 125. — Rocky soil, W. Texas, *Wright*, *Lindheimer*, &c. (Adj. Mex., first coll. by *Berlandier*.)

**14. ABÚTILON**, Tourn. (Probably of Arabic origin, being a name used by Avicenna, for some plant, taken by commentators to be Indian Mallow.) — Herbs or shrubs, of warm countries, mostly with soft stellular pubescence or

<sup>1</sup> Also southeastward as far as Duval Co., Texas, *Nealley*, *fide* Coulter, Contrib. U. S. Nat. Herb. i. 32.

<sup>2</sup> This name is substituted for the *W. mucronulata* of Gray, on grounds of obvious priority, the identity of the species being evident both from specimens and from synonymy cited with their original descriptions.

<sup>3</sup> This species has been transferred from *Abutilon* to *Wissadula*, the structure of the fruit being, as Garcke has pointed out, clearly of the latter genus.

wool, cordate leaves, and axillary or paniculate flowers, the petals commonly yellow; fl. summer and autumn. — Inst. 99, t. 25; Gärtn. Fruct. ii. 251, t. 135; HBK. Nov. Gen. & Spec. v. 270; Gray, Gen. III. ii. 65, t. 125, 126.<sup>1</sup>

§ 1. Carpels in fruit coriaceous or chartaceous, not vesicular, more or less divergent or spreading at summit and mostly cuspidate or mucronate back of the proper apex.

- \* INDIAN MALLOWS, introduced species, tall and large: carpels numerous (11 to 30), mostly several-seeded, forming a broad capsule, hirsute at top, half inch to inch long, each hanging by thread when at length detached from the axis: leaves cordate, acuminate, from repand serrulate to crenate-dentate, long-petioled. — *Beloere*, Shuttl. in Gray, Pl. Wright. i. 21.

A.\* THEOPHRÁSTI, Medic.<sup>2</sup> (VELVET-LEAF.) Velvety and cinereous with very short and fine soft wooliness, annual: peduncles shorter than petioles: calyx very deeply 5-parted, half the length of the awn-beaked capsule: petals yellow, quarter inch long. — Malv. 28; E. G. Baker, Jour. Bot. xxxi. 214. *A. Avicennæ*, Gärtn. l. c. *Sida Abutilon*, L. Spec. ii. 685; Schk. Handb. t. 190. — A common weed in waste and cult. grounds, Maine to North Carolina, and westward at least to Kansas and Nebraska.<sup>3</sup> (Nat. from Eu., Asia.)

A. ÍNDICUM, Sweet,<sup>4</sup> var. hírtum, Griseb. Frutescent, velvety-canescant with short fine wooliness and branches hirsute or villous with clammy spreading hairs: peduncles equalling or shorter than petioles: carpels 15 to 30 in a globular capsule, little surpassing the calyx, barely mucronate: petals yellow, commonly purple at base, half inch or more long. — Fl. W. Ind. 78. *A. hirtum*, Sweet, Hort. Brit. i. 53; Don, Syst. i. 503. *A. graveolens*, Wight & Arn. Prodr. Fl. Ind. 56. *Sida hirta*, Lam. Dict. i. 7; Reichenb. Ic. Bot. Exot. ii. 152. *Beloere cistiflora*, Shuttl. in distr. pl. Rugel, 94. — Key West, Rugel, and perhaps elsewhere.<sup>5</sup> (Nat. from W. Ind. and Ind.)

A. PEDUNCULÁRE, HBK. Velvety-tomentose and under face of leaves very canescent, the branches and stalks villous or hirsute: peduncles equalling or surpassing the petioles (2 to 4 inches long): calyx deeply 5-cleft and with reduplicate-angled base; lobes ovate: petals rose-color, half inch or more long, little longer than the calyx: capsule with mucronate divergent beaks. — Nov. Gen. & Spec. v. 273, *fide* Griseb. l. c.; Chapm. Fl. ed. 2, 609. *Sida Hulseana*, Torr. & Gray, Fl. i. 233 (imperfect specimen), therefore *Abutilon Hulseanum*, Torr. in Gray, Pl. Fendl. 23; Chapm. Fl. 56. — S. Florida;<sup>6</sup> first coll. by *Hulse* at Tampa Bay, perhaps not of human introduction. (W. Ind., S. Am.)

A. JÁQUINI, Don (Syst. i. 503, Gray, Proc. Am. Acad. xxii. 300, not Chapm.; *A. lignosum*, A. Rich. Fl. Cub. 152, Griseb. Fl. W. Ind. 79, but not *Sida lignosa*, Cav.; *A. hypoleucum*, Gray, Pl. Wright. i. 20), of Mexico, comes near the U. S. boundary. It may be known by its seemingly cordate sepals equalling the hirsute erect-awned carpels.

- \* \* Carpels 7 to 10, at maturity about half to one third inch long, few-seeded (seeds mostly 3, one above the other), from soft-pubescent to canescent-puberulent, at separation hardly showing an attaching thread, thin-coriaceous to membranaceous: perennials, with cordate leaves and yellow corolla.

+ Fruit villous-pubescent, equalled by the calyx: corolla orange: flowers at least partly naked-paniculate. Extra-limital species.

<sup>1</sup> Add E. G. Baker, Jour. Bot. xxxi. 71.

<sup>2</sup> Name changed from the later *A. Avicennæ*, in accordance with the "Kew Rule." *Abutilon Abutilon*, Rusby, Mem. Torr. Club, v. 222, is also a synonym.

<sup>3</sup> Said also to occur in California, cf. Greene, Man. Bay-Reg. 67.

<sup>4</sup> Typical *A. Indicum*, widely distrib. in tropics of both hemispheres, has none of the glandular pubescence of the present variety, which by Schumann (in Mart. Fl. Bras. xii. pt. 3, 384) is regarded as a distinct species, *A. hirtum*, Sweet, while E. G. Baker follows Masters in ranking it a variety of *A. graveolens*, Wight & Arn. But Wight and Arnott (Prodr. Fl. Ind.) state that all these forms, incl. *A. Indicum*, "seem to pass by insensible gradations into each other."

<sup>5</sup> Also on the coast of Florida, acc. to Chapman.

<sup>6</sup> Now extending at least to Central Florida, where coll. near Eustis, by *Nash*.

- A. Pálmeri**, GRAY. Shrubby below, tall: stems and stalks pubescent and usually villous: leaves velvety-tomentose, round-cordate, dentate (larger 4 to 6 inches long): flowers mainly in a naked panicle: peduncles or pedicels about inch long: calyx very villous, in fruit half inch long, the lobes triangular-ovate, acuminate, little shorter than the petals: carpels about 8, with short subulate beaks, very villous; seed-coat warty. — Proc. Am. Acad. viii. 289. — Yaqui River,<sup>1</sup> N. Sonora, Mex., *Palmer*.
- A. aurantiacum**, WATSON. About a foot high, woody at base: leaves velvety-tomentose and canescent both sides, round-cordate with closed deep sinus, crenate, inch or two in diameter: peduncles mainly axillary and shorter than the leaves: calyx in fruit nearly half inch long, cleft to the middle, very pubescent, canescent; lobes ovate, acuminate, half the length of the petals: carpels 10, villous-pubescent, with short subulate beaks; seeds roughish-puberulent. — Proc. Am. Acad. xx. 357. — Lower California, a little below the U. S. boundary, *Parry*, *Orcutt*.
- + + Fruit pubescent or puberulent, equalled by or moderately surpassing the calyx: peduncles mainly axillary and shorter than the leaves.
- ++ Leaves very soft and velvety white-tomentose beneath, less so or even glabrate and at length green above; the veinlets mostly obscure: calyx 5-parted; lobes ovate, acuminate.
- A. permolle**, SWEET. Shrubby below, freely branching, 2 to 5 feet high: no villous hairs: leaves ovate-cordate and mostly acuminate (larger 4 inches, smaller inch long): later flowers somewhat paniced: petals half inch long, much exceeding the calyx; the latter hardly at all angled at base, barely equalling the 7 to 10 divergently mucronate-beaked carpels; seeds minutely warty. — Hort. Brit. ed. 1, 53; Don, Syst. i. 503; Gray, Pl. Wright. i. 20; Griseb. l. c.; Chapm. Fl. ed. 2, 609. *A. Jacquini*, Chapm. Fl. 66, not Don. *A. peraffine*, Shuttl. in distr. pl. Rugel, no. 956. *Sida permollis*, Willd. Enum. 723. — S. Florida, in many places. (W. Ind.)
- A. Wrightii**, GRAY. Ascending or decumbent and herbaceous from a lignescent stock: slender branches and stalks with some soft spreading hairs: leaves round-cordate, obtuse or acutish, an inch or more long, crenulate to dentate, very soft and white-tomentose beneath: calyx half inch long and little shorter than the petals, or more accrescent, angulate at base; the tapering acuminate lobes mostly surpassing the 7 or 8 pubescent subulate-aristate carpels; seeds smooth and glabrous. — Pl. Lindh. pt. 2, 162, & Pl. Wright. i. 20. — S. Texas, *Berlandier*, *Wright*, &c., and Arizona, *Pringle*. (Adj. Mex., *Berlandier*, *Pringle*.)
- A. Parishii**, WATSON. Wholly herbaceous, erect, 2 feet high, very white-tomentose: stem and stalks commonly villous with reflexed hairs: leaves very long-petioled, ovate-cordate, hardly acuminate, crenate-dentate, an inch or more long: peduncles all much shorter than the petioles: petals one third inch long: lobes of the deeply 5-parted calyx ovate, quarter inch long, little over half the length of the 7 or 8 (rarely 5 or 6) mucronate-beaked pubescent carpels; seeds puberulent. — Proc. Am. Acad. xx. 357. — Santa Catalina Mountains, *Pringle*, and near Lowell, Arizona, *Parish*.
- ++ ++ Leaves and stalks canescent or cinereous with short and partly scurfy-stellular down; the veinlets as well as veins conspicuous beneath.
- A. Lemmoni**, WATSON, l. c. Fruticose, a foot or two high, much branched, erect, very leafy: leaves ovate-cordate with shallow sinus, acute or acuminate, inch or more long: peduncles about the length of the slender petioles: petals quarter inch long: calyx 5-parted, canescent; lobes broadly ovate, in fruit 3 or 4 lines long, half or two thirds the length of the 8 or 9 puberulent-canescant mucronate-pointed carpels; seed-coat roughish-scurfy or puberulent. — Rocky hills, S. Arizona, *Thurber*, *Lemmon*, *Pringle*. (Lower Calif., *Streets*? *Orcutt*.)
- A.\* Berlandieri**, GRAY. Branching, lignescent: leaves mostly larger than in the last preceding species, ovate or somewhat ovate-oblong, shallowly cordate, crenate-dentate, acuminate: calyx deeply 5-parted; lobes ovate, acuminate, 4 to 6 lines long, equalling or exceeding the mature carpels: petals half inch in length. — Gray in Wats. Proc. Am. Acad. xx.

<sup>1</sup> This species was again collected by *Dr. Palmer* at Guaymas, Mex., but the plant so named, Contrib. U. S. Nat. Herb. i. 67, from Lower Calif., is probably distinct.



358; Coulter, Contrib. U. S. Nat. Herb. i. 32, ii. 41; Heller, Contrib. Herb. Frankl. & Marshall Coll. i. 64. — S. Texas, *Letterman, Nealley, Heller*. (Northern Mex., where first coll. by *Berlandier*.)

+ + + Fruit pubescent or canescent, short, but surpassing the comparatively small calyx: flowers all or mainly in an ample naked and nearly glabrous compound panicle: stems herbaceous, rather tall: leaves large, 4 to 9 inches wide or long, round-cordate with narrow or closed sinus, acuminate, and not rarely with lateral acuminate lobes or lobeleths.

**A. Sonóræ**, GRAY. Stem below and long petioles hirsute or hispid with long spreading hairs: leaves soft velvety-tomentose and canescent beneath, less so or green and glabrate above: calyx only 2 lines long, with ovate, obtuse lobes, canescent half the length of the corolla: truncate capsule 4 lines high, of 7 to 10 mucronate or mucronulate carpels. — Pl. Wright. ii. 23. — Hillsides on the Sonoita, just south of Arizona, *Wright*. (Chihuahua, Mex., *Pringle, Palmer*.)

**A. revéntum**, WATSON. Habit and leaves of the preceding: stem glabrous throughout or barely puberulent: calyx and corolla larger; lobes of the former more than half the length of the mucronulate or nearly pointless carpels. — Proc. Am. Acad. xxi. 418. *A. Sonoræ*, var., Gray, Pl. Thurb. 308. — S. Arizona and adjacent Sonora, *Thurber, Pringle*. (Chihuahua, Mex., *Palmer*.)

\* \* \* Carpels 5 or rarely 6 to 8, closely erect in the truncate capsule, 3 or 4 lines long, only mucronate-tipped, minutely pubescent or canescent; seeds 2 or 3, superposed: freely branching herbaceous perennials, small-flowered.

+ Corolla yellow, the petals 3 to 5 lines long: plants erect and bushy, a foot to a yard high, canescent throughout with minute and compact coating, the hairs quite indistinguishable.

**A. malacum**, WATSON. Pubescence somewhat pannose: stems rather stout: leaves round-cordate, acute or short-acuminate, veiny, 2 to 4 inches long, rather long-petioled: flowers numerous, paniculate-clustered and short-pedicelled, or some earliest solitary and rather slender-peduncled in axils: calyx 3 lines long, the acute or acuminate lobes appressed to and nearly equalling the broad and short stellular-puberulent capsule. — Proc. Am. Acad. xxi. 446. (Has been variously confounded with the next.) — Texas near the Rio Grande, from Laredo to El Paso, *Bigelow, Havard, Jones*. (Chihuahua, Mex., *Pringle*.)

**A. incánium**, SWEET. Pubescence minuter and whiter: leaves mostly ovate-cordate, serrate, larger 3 or 4 inches, smaller on the branchlets half inch long: flowers solitary and mostly slender-peduncled in the axils, and sometimes loosely and slightly paniculate on the branchlets: calyx a line or two long, at length usually reflexed under the more or less oblong truncate canescent-puberulent capsule; seeds when young smooth and glabrous, in age minutely cinereous-pubescent. — Hort. Brit. ed. 1, 53; Don, Syst. i. 501; Gray, Bot. U. S. Expl. Exped. 168, & Proc. Am. Acad. xxii. 301. *A. Texense*, & *A. Nuttallii*, Torr. & Gray, Fl. i. 231. *A. Texense*, Gray, Pl. Lindh. pt. 2, 161, & Pl. Wright. i. 21. *Sida incana*, Link, Enum. ii. 204. — S. Arkansas and Texas to Arizona. (Mex., Sandwich Islands.)

+ + Corolla brick-red or "pink," the petals 2 or 3 lines long: plants diffuse.

**A. párvulum**, GRAY. Stellular-puberulent, cinereous or greener, or when young canescent: stems slender, loosely spreading or decumbent from a ligneous root: leaves from rounded- to ovate-cordate, irregularly serrate, sometimes obscurely 3-lobed, thinish, half inch to 2 inches long: flowers mostly solitary and axillary on filiform peduncles: calyx a line or two long, at length reflexed under the short-ovoid capsule. — Pl. Wright. i. 21, ii. 23, & Proc. Am. Acad. xxii. 301. — W. Texas to S. Colorado and Arizona quite to the Rio Colorado; first coll. by *Wright*.

\* \* \* \* Carpels 5, short, submembranaceous, at length 2-valved, abruptly and divergently 10-awned (the 5 awns soon dividing); seeds 2 or 3, superposed: herbaceous, probably perennial, with green and membranaceous leaves, and small yellow flowers.

**A. Thúrberi**, GRAY. Green, not canescent, pubescence of 3-4-rayed and some simple bristly hairs: stems a foot or two high, slender, simple or paniculately branched above,

sparsely hirsute or hispid: leaves membranaceous, ovate-cordate, serrate, 2 inches or less long, on short but filiform simple and bractless peduncles; these mostly leafy-paniculate or racemose on short axillary shoots: calyx and slender peduncle barbate-hirsute; the former in fruit 3 lines long, short-campanulate, cleft to about the middle, closely applied to and nearly equalling the capsule, half the length of the orange-yellow petals: awns of the carpels a line or more long, sparsely hirsute; seeds glabrous. — Pl. Thurb. 307, & Proc. Am. Acad. xxii. 302. — Shady places, N. Sonora, not far below the U. S. boundary, *Thurber, Palmer*.

A. UMBELLÁTUM, Sweet, of this division, was collected by *Berlandier* in Tamaulipas, not far from the boundary.

§ 2. GAYOÍDES, Gray. Carpels numerous, membranaceous and vesicular in fruit, pointless, few-ovuled, 2–3-seeded: habit of *Gaya*, but no interior process. — Gen. Ill. ii. 67, t. 126.

A. **crispum**, MEDIC. Perennial, diffuse from a suffrutescent base, velvety-tomentulose or canescent, and slender branches with or without spreading villous hairs: leaves cordate, mostly acuminate, crenulate, veiny, inch or two long; uppermost nearly sessile: peduncles axillary, filiform, in fruit commonly refracted at the joint: petals pale yellow or whitish, 3 lines long: fruit half inch or more long, globular, inflated, of about 12 carpels, dorsally dehiscent, in age often undulate or crisped; seeds smooth. — Malv. 29 (as *crispum*); Sweet, Hort. Brit. ed. 1, 53; Don, Syst. i. 502; Gray, Pl. Fendl. 23, Pl. Wright. i. 21, & Gen. Ill. ii. 68, t. 126; Griseb. Fl. W. Ind. 79, & Cat. Cub. 26 (with var. *imberbe*, the form with no villosity). *A. trichodum*, A. Rich. Fl. Cub. t. 17. *Sida crispa*, L. Spec. ii. 685 (Dill. Elth. t. 5; Martyn, Hist. Pl. Rar. t. 29); Cav. Diss. i. 30, t. 7, f. 1, & t. 135, f. 2; DC. Prodr. i. 469, with *S. imberbis*. *Beloeore crispa*, Shuttl. in distr. pl. Rugel, no. 95. — S. Florida (chiefly the var. *IMBÉRBE*, Grisebach) and Texas to Arizona. (Mex., Trop. Am., Ind., &c.)

15. MÁLACHRA, L. (Μαλάχη, ancient name of some kind of Mallow.) — Hispid herbs (of the warm parts of America); with rounded and angulate or lobed leaves, setaceous stipules, involucreal leaves usually white at base, and yellow or whitish flowers appearing in summer. — Mant. 13; Gray, Gen. Ill. ii. 73, t. 129.<sup>1</sup> — Ours annual, perhaps not indigenous. [Revised by B. L. ROBINSON.]

M.\* **alceæfólia**, JACQ. Moderately hispid: leaves more or less 3–5-lobed: flower-heads pedunculate or subsessile: corolla yellow, sometimes white: carpels puberulent or glabrate at maturity, much shorter than the then attenuate-prolonged calyx-lobes. — Coll. ii. 350, & Ic. Rar. t. 549; Willd. Spec. iii. 769; DC. Prodr. i. 441; Gürke in Engl. Jahrb. xvi. 350. *M. capitata*, Swartz, Obs. 262, not L., *fide* Gürke. (W. Ind., S. Am.)

Var.\* **rotundifólia**, GÜRKE. Leaves of roundish outline obtusely angulate rather than lobed, the upper ovate or ovate-oblong. — Gürke in Mart. Fl. Bras. xii. pt. 3, 462 (where specific name is arbitrarily altered to *alceifolia*), & in Engl. Jahrb. xvi. 351. *M. capitata*, Cav. Diss. ii. 97 (in part), t. 86, f. 1; Mönch. Meth. 614; DC. Prodr. i. 440; Griseb. Fl. W. Ind. 80; Chapm. Fl. ed. 2, 609; not L. *M. rotundifolia*, Schrank, Pl. Hort. Mon. t. 56. *M. urens*, Holzinger, Contrib. U. S. Nat. Herb. i. 288, not Poir. — Keys of Florida, *Curtiss, Simpson*. (W. Ind., S. Am.)

M.\* **capitáta**, L. Moderately hispid: leaves roundish, sometimes undivided, when 3–5-lobed with sinuate-rounded open sinuses and lobes very obtuse: heads peduncled: involucreal leaves round-cordate and largely white: petals yellow: carpels nearly glabrous, not much surpassed by the ovate short-acuminate or acute calyx-lobes. — Syst. Nat. ed. 12, 458; Pers. Syn. ii. 248; Spreng. Syst. iii. 95; Hemsl. Biol. Cent.-Am. Bot. i. 115; not Cav., Desr., Sw., Mönch, nor DC., *fide* Gürke. *M. palmata*, Mönch, Meth. 615; DC. Prodr. i. 441, & Mém. Soc. Genève. v. 163, t. 5; Coulter, Contrib. U. S. Nat. Herb. i. 33, ii. 43. *M. triloba*, Desf.

<sup>1</sup> Add Gürke in Engl. Jahrb. xvi. 330–361, a critical monograph, bringing considerable new light upon the hitherto much confused specific synonymy.

Cat. Hort. Par. 246; DC. Prodr. i. 440. *M. Mexicana*, Gray, Gen. Ill. ii. 74, t. 129, probably not Schrad. — Texas, *Wright*. (Mex., W. Ind.)

**16. URÉNA**, Dill. (*Uren*, a Malabar name.) — More or less canescent herbs or undershrubs (of Asiatic or African origin); with small and sessile or short-peduncled flowers, yellowish or purplish corolla, and a small burr-like fruit. — Elth. 430, t. 319; L. Gen. no. 555.<sup>1</sup>

**U. LOBÁTA**, L. Leaves rounded, mostly broader than long, subcordate, angulately 3-lobed at summit, serrulate, upper face green, beneath an oblong gland on the base of one or three middle ribs: petals pink or rose-color. — Spec. ii. 692; Griseb. l. c. 81; Chapm. Fl. ed. 2, 609; and many synonyms and varieties. — About dwellings in Florida. (Nat. from W. Ind., thence from India.)

**17. PAVÓNIA**, Cav. (*Joseph Pavon*, one of the authors of the *Flora Peruviana*.) — Shrubby or suffrutescent plants of warm-temperate and tropical zones, of various habit, some near to *Urena*, others connecting with *Malvaviscus*. — Diss. ii. App. 2, & iii. 132, t. 45–49; DC. Prodr. i. 442; Gray, Gen. Ill. ii. 75, t. 130.

§ 1. Carpels 3-awned or 2–3-cornute, angled, thick.

**P. spinifex**, CAV. Shrubby, pubescent: leaves oblong-ovate and subcordate, dentate: flowers slender-peduncled, mainly axillary: bractlets of the involucre several, linear or lanceolate, fully equalling the calyx: petals yellow, an inch long, equalled by the column: mature carpels firm-coriaceous, bearing three long spiny retrorsely barbed awns, one subterminal and two lower marginal ones. — Diss. iii. 133, t. 45, f. 2; DC. l. c.; Chapm. Fl. ed. 2, 608. *Hibiscus spinifex*, L. Spec. ed. 2, ii. 978. — Coast of Florida; perhaps introduced, as it is at Charleston, S. Carolina. (Trop. Am.)

**P. racemósa**, SWARTZ. Shrubby, puberulent: leaves cordate, slender-acuminate, nearly entire, 3 to 5 inches long: flowers in a terminal naked raceme: bractlets of the involucre 6 or 8, oblong-lanceolate, nearly equalling the moderately 5-lobed calyx: petals greenish-yellow or whitish, three fourths inch long, surpassing the column: carpels smooth, with a pair of short triangular beaks near summit of margins, and a small medial apical crest. — Fl. Ind. Occ. ii. 1215; DC. l. c. 443; Griseb. l. c. 83; Chapm. l. c. *P. spicata*, Cav. Diss. iii. 136, t. 46, f. 1, but flowers not spicate. *Malache scabra*, &c., Trew, Ic. Pl. Sel. t. 90. — Coast and keys of S. Florida, in marshes, *Garber*, *Palmer*, *Curtiss*. (Trop. Am.)

§ 2. Carpels unarmed and pointless, obovoid, small, dorsally 1-nerved.

**P. HASTÁTA**, Cav. Frutescent, canescent with minute pubescence, much branched: leaves hastate, obtusely dentate, inch or two long: flowers slender-peduncled in the axils: bractlets of involucre 5 or 6, obovate to lanceolate, equalling the calyx: petals pale red with dark spot at base, half inch long: stamens in the short column sometimes few: carpels reticulated: flowers often cleistogamous. — Diss. iii. 138, t. 47, f. 2; Reichenb. Ic. Bot. Exot. iii. t. 227. *P. LeContii*, Torr. & Gray in Gray, Pl. Fendl. 16. *P. Jonesii*, Feay in Wood, Class-Book, ed. of 1861, 269. *Malva LeContii*, Buckley, Am. Jour. Sci. xlv. 176. *Greevesia cleisocalyx*, F. Muell. in Hook. Jour. Bot. & Kew Misc. viii. 8. — Georgia near the coast, introduced. (Nat. from extra-trop. S. Am.)

**P.\* lasiopétala**, SCHEELÉ.<sup>2</sup> Shrubby, tomentulose and cinereous: leaves cordate or subcordate, serrate or repand, sometimes slightly angulate-lobed, 1 to 3 inches long: flowers slender-peduncled in the axils: bractlets of involucre 5 to 8, linear, rather longer than the ovate acuminate 3–5-nerved calyx-lobes: petals rose-color, half to three fourths inch long: carpels smooth or obscurely reticulated. — Linnæa, xxi. 470. *P. Wrightii*, Gray, Gen. Ill.

<sup>1</sup> Add Gürke in Engl. Jahrb. xvi. 361–385.

<sup>2</sup> The earliest name, abandoned on account of its not infrequent inapplicability (the petals being often glabrous), is here restored on grounds of priority, as by Hook. f. & Jackson, Index Kew. ii. 442.

ii. 76, t. 130, Pl. Lindh. pt. 2, 161, Pl. Wright. i. 22, & ii. 24.<sup>1</sup> — Rocky woods, W. Texas; first coll. by *Lindheimer*. (Adj. Mex.)

**18. MALVAVÍSCUS**, Dill. (Composed of *Malva* and *viscum*, birdlime from the viscid or mucilaginous fruit.) — Tropical American (except our species), shrubs or tall herbs, with subcordate and occasionally angulate-lobed leaves, and showy red flowers on axillary peduncles. — Elth. 210, t. 170; Cav. Diss. iii. 131, t. 48; Gray, Gen. III. ii. 77, t. 131. *Achania*, Swartz, Fl. Ind. Occ. ii. 1221.

**M. Drummóndii**, TORR. & GRAY. Tomentulose: leaves round-cordate and mostly angulately 3-lobed, fully as broad as long: bractlets of the involucl narrowly spatulate: corolla vermilion-red, inch long: column at length well exserted: fruit red. — Fl. i. 230; Gray, l. c.; Griseb. Cat. Cub. 28. *Pavonia Drummondii*, Torr. & Gray, Fl. i. 682, the fruit at first fleshy<sup>2</sup> but at length dry and separable. (Near *M. mollis*, DC., which has slender involucl-late bractlets, &c.) — Texas, Louisiana, and Florida. (Adj. Mex., Cuba.)

**19. KOSTELÉTZKYA**, Presl. (*Prof. V. F. Kosteletzky*, of Prague.) — Perennial herbs (chiefly of N. and Central America), with cordate or sagittate and sometimes lobed leaves, and axillary or somewhat racemose or paniculate flowers. — Rel. Haenk. ii. 130, t. 70; Endl. Gen. 982; Gray, Gen. III. ii. 79, t. 132. *Pentagonocarpus*, Mich. acc. to Parl. Fl. Ital. v. 105.

§ 1. Column long and filiform, at length exserted and much surpassing the erect convolute corolla. — § *Orthopetalum*, Benth. Pl. Hartw. 285.

**K. Thúrberi**, GRAY. Herbaceous? 5 to 10 feet high, scabrous-puberulent, not hirsute: leaves round-cordate and angulately 3-lobed (lower not seen) or uppermost oblong-ovate and acuminate, serrulate, roughish-pubescent with 3-4-rayed short hairs, especially the lower face: flowers numerous in a loose and naked compound panicle: bractlets of the involucl setaceous, a line or two long: calyx 3 lines long, not accrescent: corolla less than inch long, rose-color, outer face obscurely puberulent: stamens rather few near the apex of the filiform column: capsule 3 lines high, glabrate, acutely 5-lobed, hispid along the angles. — Proc. Am. Acad. xxii. 314. *K. paniculata*, Torr. Bot. Mex. Bound. 40, not Benth. — Cañon near Cocospera, Sonora, Mex., at considerable distance below the Arizona boundary, *Thurber*, *Schott*. (Mex.)

§ 2. Column not longer than the widely open petals.

\* Flowers small: involucl of very few and setaceous bractlets: petals only quarter or half inch long: leaves hardly any hastate. (Like the preceding extra-limital.)

**K. digitáta**, GRAY. Roughly stellular-pubescent, paniculately much branched, slender, probably low: leaves digitately 3-5-parted into lanceolate or linear denticulate divisions; petioles hispid: flowers racemose, slender-peduncled: corolla apparently purplish: capsule setose at the angles; seeds glabrous. — Proc. Am. Acad. viii. 289. — Yaqui River, Sonora, *Palmer*. (Mex.)

**K. Coulteri**, GRAY. Hispidulous and the slender low stems or branches sparsely hispid: leaves small (barely inch long), cordate, either 3-5-lobed or deeply 3-5-cleft: peduncles mostly axillary, not surpassing the petioles: corolla yellow(?): capsule setose at the angles; seeds glabrous. — Pl. Wright. i. 23. — Yaqui River, Sonora, *Palmer*.<sup>3</sup> (Sonora Alta, Mex., *Th. Coulter*.)

<sup>1</sup> Add Meehan's Monthly, ii. 177, t. 2.

<sup>2</sup> According to Dr. E. Palmer the fruit, both raw and cooked, is eaten in Texas, where it bears the name of "May-apple."

<sup>3</sup> A second and doubtful form, with larger more deeply 5-7-parted leaves, has since been coll. by Dr. *Palmer*, near Guaymas, Mex., and is mentioned by Dr. Watson, Proc. Am. Acad. xxiv. 41. One or both these forms may be referable to *K. palmata*, Presl, Bot. Bemerk. 19 (*K. hispidula*, Garcke, Jahrb. Bot. Gart. Berl. i. 223); see Garcke in Engl. Jahrb. xxi. 395.

\* \* Flowers larger, the rose-colored petals an inch or more in length: bractlets of involucre filiform or setaceous-subulate, rather shorter than the calyx: seeds carinate-ribbed on the back.

**K. smilacifolia**, GRAY. Slender, glabrous or barely puberulent, 2 feet or more high: leaves all but the lowest hastate with long middle lobe linear-lanceolate and entire or denticulate and the lateral lobes mostly linear: branches few-flowered: calyx minutely canescent: capsule hispid, angles little salient; seeds glabrous, very obscurely lineate. — Pl. Wright. i. 23; Chapm. Fl. ed. 2, 610. *Hibiscus* (*Pentaspermum*) *smilacifolius*, Shuttl. in distr. pl. Rugel, no. 103, *vide* Gray, l. c. — Low grounds, between the Manatee River and Sarazota Bay, S. Florida, Rugel.

**K. Virginica**, PRESL. Stellular-puberulent, cinereous or green, and somewhat scabrous, 3 to 5 feet high: lower leaves cordate and often angulate or coarsely few-toothed, also serrulate: upper or some of them lanceolate-hastate (2 to 6 inches long), the lateral lobes or auricles short and triangular: calyx canescent: capsule hirsute, or hispid when young, the rounded lobes slightly carinate-angled; seeds as of the preceding. — Presl in Gray, Gen. III. ii. 80, t. 132; Gray, Man. ed. 2, 68; Chapm. Fl. 57, partly. *Hibiscus Virginicus*, L. Spec. ii. 697; Jacq. Ic. Rar. t. 142? Torr. Fl. N. Y. i. 114. *H. clypeatus*? Walt. Car. 177. *H. pentaspermus*, Nutt. Am. Jour. Sci. v. 298. *Pavonia Virginica*, Spreng. Syst. iii. 98. — Swamps near the coast, New York to Louisiana.<sup>1</sup>

**K. altheæfolia**, GRAY.<sup>2</sup> Roughish-tomentose with stellular hairs and finer down and branches roughly stellular-hirsute: leaves cordate, acuminate, and upper ovate-lanceolate with subcordate base and usually some of them hastate: calyx stellular-hirsute as well as canescent: capsule hirsute-hispid, carinate-angled; seeds glabrous, striate-lineate on the sides. — Pl. Wright. i. 23 (genus indicated but no specific descr.), & in Wats. Bibl. Index, 136 (first publication as species). *K. Virginica*, var. *altheæfolia*, Chapm. Fl. 57. *K. hastata*, Griseb. Cat. Cub. 28, not Presl. *Hibiscus Virginicus*, Michx. Fl. ii. 46; Ell. Sk. ii. 167, at least partly. *H. (Pentaspermum) altheæfolius*, Shuttl. in distr. pl. Rugel, no. 102. ? *Malva abutiloides*, Pursh, Fl. ii. 454, not L. — Marshes, chiefly along the coast, Carolina to Florida and Texas. (Cuba.)

**20. HIBISCUS, L. ROSE MALLOW.** (Name of Dioscorides for Marsh Mallow.) — Herbs, shrubs, or even trees, of warm-temperate and tropical countries, mostly with showy flowers produced in summer and autumn. — Gen. no. 562 (excl. syn.); DC. Prodr. i. 446; Gray, Gen. III. ii. 81, t. 133 (with *Abelmoschus*); Benth. & Hook. Gen. i. 207.

§ I. **EUHIBISCUS.** Calyx 5-cleft, not spathaceous, persistent, as also mostly the distinct bractlets of the involucre: capsule simply 5-celled. — *Hibiscus*, Endl. Gen. 982; Gray, l. c.

\* **MALVAVISCOIDES.** Corolla cylindraceous, the petals strongly convolute and erect or only at summit spreading, but not auriculate: column at length exserted: seeds rather numerous, clothed with long cottony wool. — Part of *Cremontia*, DC., of *Bombicella*, Griseb.

**H. tubiflorus**, DC. Frutescent or shrubby, with slender branches, hirsutely stellular-pubescent or on the stems hispidulous: leaves cordate or subcordate, serrate, sometimes angulate or 3-lobed: peduncles recurving, 1-flowered, longer than the petioles and upper longer than the leaves: bractlets of the involucre about 10, slender, hardly equalling the fructiferous calyx: corolla bright crimson, an inch long. — Prodr. i. 447; A. DC. Calques des Dess. t. 83; Gray, Proc. Am. Acad. xxii. 302. *H. Bancroftianus*, Macfadyen, Fl. Jam. 70; Griseb. Fl. W. Ind. 85. *H. truncatus*, A. Rich. Fl. Cub. 144, t. 16. *H. Pæppigii*, Garcke, Jahresb. Naturwiss. Ver. Halle, 1849-50, 133. *H. Floridanus*, Shuttl. in distr.

<sup>1</sup> A specimen somewhat intermediate as to pubescence between this species and *K. altheæfolia* has been collected at Stockton, Maryland, by *Rusby*.

<sup>2</sup> This name is arbitrarily altered to *K. altheifolia* by Dr. Rusby (Mem. Torr. Club, v. 224), who, overlooking the prior publication in Watson's Bibl. Index, cites the species as his own.

pl. Rugel, no. 104; Chapm. Fl. 58. *Achania pilosa*, Swartz, Prodr. 102, & Fl. Ind. Occ. ii. 1224; Ait. Kew. ii. 459. *A. Pappigii*, Spreng. Syst. iii. 100. *Malvaviscus pilosus*, DC. Prodr. i. 445. *M. Floridanus*, Nutt. Jour. Acad. Philad. vii. 89; Torr. & Gray, Fl. i. 229. — Keys of Florida. (W. Ind., Mex.)

\* \* BOMBICÉLLA, DC. Corolla widely spreading in anthesis: calyx mostly 5-parted or deeply 5-cleft: seeds rather numerous, bearing long cottony wool.

- H. Coulteri**, HARVEY. Suffrutescent and a foot or more high, or more shrubby and 6 to 8 feet high, strigosely hirsute with few-rayed stellular hairs: leaves (about an inch in diameter) of rounded or ovate outline; lowest commonly undivided, cordate or ovate, incisedly serrate and slightly lobed; upper 3-cleft and the lobes ovate or some 3–5-parted into narrower serrate lobes, sometimes all 3–5-parted: flowers few, long-peduncled: bractlets of the involucre 10 to 14, linear-setaceous, rigid, inch or less long, about the length of the attenuate-lanceolate 3-nerved lobes of the 5-parted calyx, both sparsely hispid with simple rigid hairs: petals broad, inch to inch and a half long, lemon- or sulphur-yellow and commonly purple-tinged: capsule glabrous, shorter than the calyx. — Harvey in Gray, Pl. Wright. i. 23. — W. Texas to S. Arizona in the mountains, Wright, Thurber, Havard, &c. (Adj. Mex., Berlandier, Th. Coulter, Gregg, &c.)

H. RIBIFOLIUS, Gray.<sup>1</sup> Proc. Am. Acad. v. 154, is a nearly related species of Lower California; also H. BISÉPTUS, Wats., of Chihuahua.

- H. denudatus**, BENTH. Suffrutescent, a foot or two high, canescent-tomentose: leaves ovate to rotund, slightly if at all cordate, half inch or inch long, slightly serrate: flowers short-peduncled in the axils and commonly along the somewhat naked flexuous summit of the branches: involucre of 4 to 7 short setaceous bractlets, sometimes half the length of the 5-parted canescent-tomentose calyx, sometimes shorter or almost obsolete: petals lavender-purple, half inch or more long: capsule nearly glabrous. — Bot. Sulph. 7, t. 3 (a more branched form, leafy to the top); Gray, Pl. Wright. i. 22, var. INVOLUCELLATUS (form with involucre more developed); Torr. Bot. Mex. Bound. 40. — El Paso, borders of Texas to Arizona, and borders of California. (Lower Calif., adj. Mex.)

\* \* \* KÉTMIÁ. Corolla spreading or open in anthesis: calyx herbaceous, applied to or filled by the fruit: seeds from glabrous to hirsute. — *Ketmia*, Tourn. Inst. 99, t. 26.

— Calyx 5-parted into lanceolate acuminate spreading lobes in the manner of the preceding: would be referred to that section but for the naked seed.

- H. cardiophyllus**, GRAY. Herbaceous from a lignescent perennial base, canescent-tomentose: stems a foot or more high, equally leafy to top: leaves round-cordate, obtuse, more or less crenate, 2 inches or less wide, slender-petioled: peduncles surpassing the leaves: involucre of about 10 spatulate-lanceolate 3-nerved tomentose bractlets, rather shorter than the calyx, which considerably surpasses the glabrous capsule: petals deep rose-red or "vermilion-red" (Palmer), an inch long: seeds rather few, puberulent. — Pl. Wright. i. 22, not Baill. — S. W. borders of Texas, Wright. (Adj. Mex., Th. Coulter, Berlandier, Gregg, &c.)

— Calyx 5-cleft or 5-toothed, campanulate.

++ Shrub, native of Armenia.

- H. SYRIACUS**, L. (SHRUBBY ALTHÆA of gardeners.) Tall shrub, nearly glabrous: leaves rhombic-ovate, incisedly dentate, mostly 3-lobed: flowers short-peduncled in the upper axils: petals often 2 inches long, rose-color, varying to white, dark purple at base. — Spec. ii. 695. — Escaped from cultivation in some parts of Atlantic States, but hardly naturalized; <sup>2</sup> fl. late summer. (Cult. from the Old World.)

++ ++ Tall perennial herbs (the first species shrubby in the tropics), large-flowered.

<sup>1</sup> This species, rediscovered at San José del Cabo by Brandegee, is to be distinguished by its pubescent capsule, the fruit of *H. Coulteri* being glabrous. The leaves of *H. ribifolius* are sparingly pubescent, even in the type, not glabrous as originally described, and the flowers are sulphur-yellow instead of purple.

<sup>2</sup> Now fully naturalized in various places from Pennsylvania to Georgia, acc. to Dr. Small.

== Bractlets of the involucler filiform or nearly so, mostly 2-forked or dilated at tip, or with one or two lateral lobes: flowers short-peduncled: corolla yellow: calyx mostly hispid or hirsute, its tube 10-ribbed, commonly an oblong gland on the midrib of the lobes: capsule strigose-hispid; seeds glabrous.

**H. furcellatus**, LAM. Shrubby, minutely tomentose, cinereous: leaves cordate, commonly angulate or 3-lobed, denticulate: corolla 3 inches long: calyx and capsule inch or more long. — Dict. iii. 358; Chapm. Fl. ed. 2, 610. — Shores of Indian River, S. Florida, *Palmer*, *Curtiss*; perhaps adventive. (Cuba, S. Am.)

**H. aculeatus**, WALT. Herbaceous, 2 to 6 feet high, very rough-hispidulous: leaves green, roundish in outline, lower somewhat cordate or reniform and angulate or 3-lobed; upper 3-5-cleft or parted into obovate or spatulate or narrower and often laciniate-dentate divisions: petals 2 inches long, with dark purple base. — Car. 177; Poir. Suppl. iii. 220; Torr. & Gray, Fl. i. 236. *H. scaber*, Michx. Fl. ii. 45; Ell. Sk. ii. 169. — Edges of swamps, S. Carolina to Florida and Louisiana.

== Bractlets of involucler entire, slender, numerous: flowers moderately long-peduncled: stems stout, 3 to 8 feet high.

a. Herbage tomentose or canescent, at least the lower face of the leaves: capsule with walls hairy inside; seeds glabrous, concentrically lineolate when dry, at full maturity minutely and sparsely papillose.

**H.\* lasiocárpos**, CAV.<sup>1</sup> Stem pubescent: leaves more or less velvety-tomentose both sides, cordate or subcordate, acuminate, crenately dentate, some angulate or slightly 3-lobed (4 to 6 or larger 8 inches long); upper ones often ovate-lanceolate: bractlets more or less ciliate with villous or hirsute hairs: calyx-lobes at maturity prominently 5-7-nerved: corolla white or pale rose-color with crimson or deep purple centre, the petals 3 or 4 inches long: capsule hirsute. — Diss. iii. 159, t. 70, f. 1 (only uppermost leaves figured); Gray, Proc. Am. Acad. xxii. 302 (excl. syn. *H. grandiflorus*).<sup>2</sup> *H. grandiflorus*, Torr. Ann. Lyc. N. Y. ii. 172; Torr. & Gray, Fl. i. 238, in part; Gray, Man. ed. 5, 102; not Michx. — Marshes, coast of Georgia to Louisiana, thence north to Tennessee, S. Illinois, S. Missouri, and W. Arkansas.<sup>3</sup> Pubescence soft-velvety: the species westward passing into

**Var. occidentális**, GRAY, l. c. 303. Leaves more uniformly cordate: capsule less hirsute but densely pubescent. — *H. Moscheutos* ? var. *occidentális*, Torr. Bot. Wilkes Exped. 256. *H. Californicus*, Kellogg, Proc. Calif. Acad. Sci. iv. 292; Brew. & Wats. Bot. Calif. i. 87; Wats. *ibid.* ii. 437.<sup>4</sup> — California on the Sacramento and San Joaquin; first coll. by *Pickering* & *Brackenridge*. (Mex. near Janos, Chihuahua, *Thurber*.)

**H.\* grandiflorus**, MICHX. Stem soon glabrous: leaves ample, 3-lobed, covered on both surfaces with a close pale tomentum, canescent beneath; lobes ovate, irregularly crenate or even incisely serrate, acute: bractlets of the involucler finely tomentose but not hispid-ciliate: corolla very large, 5 or 6 inches long. — Fl. ii. 46; Ell. Sk. ii. 166; Torr. & Gray, Fl. i. 238, in part. *H. lasiocarpus*, Gray, Proc. Am. Acad. xxii. 302, 303, as to syn. *H. grandiflorus*. — Brackish marshes, Florida, *Michaux*, *Curtiss*, *Nash*, and Georgia *fide* *Michaux*, who also extends the range westward to the Mississippi.

**H. Moscheutos**, L. Leaves canescent beneath with minute and close down, less so or glabrate and green above, ovate with rounded or subcordate base, acuminate; some lower ones angulately 3-5-lobed and incisely dentate and uppermost oblong-lanceolate; base of petiole and peduncle not rarely connate: bractlets and calyx canescent but not hairy; lobes of the latter nearly nerveless: petals 2 to 4 inches long, light rose-color or white, with crimson-purple base: capsule short-ovoid, glabrous. — Spec. ii. 693; Torr. & Gray, Fl. i. 237; Gray, Man. l. c., & Gen. III. ii. t. 133. *H. Moscheutos*, & *H. palustris*, L. Spec. ii. 693 (Cornut. Canad. t. 145; Moris. Hist. ii. sect. 5, t. 19, f. 6); Cav. Diss. iii. t. 65; Willd. Spec.

<sup>1</sup> Description and synonymy altered to exclude the next following species, which, as Dr. Small has pointed out (Bull. Torr. Club, xxiii. 127, 128), is with little doubt distinct.

<sup>2</sup> Add Watson, Gard. & For. i. 425.

<sup>3</sup> Also in Hemphill and Moore Counties, Texas, *Carleton*, *fide* *Holzinger*, Contrib. U. S. Nat. Herb. i. 203.

<sup>4</sup> Add Watson, Gard. & For. i. fig. 68 on p. 426 (without varietal name).

iii. 806, 808. *H. Moscheutos*, Sweet, Brit. Fl. Gard. t. 286; Lindl. Bot. Reg. xxxiii. t. 7; Fl. Serres, xii. t. 1233.<sup>1</sup> *H. palustris*, Sims, Bot. Mag. t. 882; Lindl. Bot. Reg. t. 1463; Jackson, Jour. Linn. Soc. xix. 9. *H. Carolinianus*, Chapm. Fl. 58. *H. roseus*, Thore in Loisel. Fl. Gall. ii. 434; DC. Prodr. i. 450; Sweet, Brit. Fl. Gard. t. 277; & *H. aquaticus*, DC. Fl. Fr. ed. 3, vi. 627, & Prodr. l. c.; the plant nat. in S. Eu. — Swamps, mostly brackish, Canada near L. Erie and L. Ontario, to Florida and E. Texas, but chiefly near the coast.

**H. incānus**, WENDL. Leaves mostly ovate-lanceolate and merely serrate: petals sulphur-yellow with crimson base: otherwise as *H. Moscheutos*. — Bot. Beob. 54, & Hort. Herrenh. fasc. 4, 8, t. 24; Willd. Spec. iii. 807; Torr. & Gray, Fl. i. 237; Chapm. Fl. 57. — Swamps, S. Carolina to Florida and Alabama; first coll. by *Bartram*.

b. Herbage glabrous and green throughout, very smooth: calyx accrescent, looser and thin-membranaceous in fruit: walls of capsule (always ?) glabrous within; seeds pubescent.

**H. coccīneus**, WALT. Leaves ample; lower palmately or pedately 5-7-parted into lanceolate acuminate divisions (4 to 8 inches long); uppermost hastately 3-cleft or ovate and 3-lobed, with middle lobe caudate-acuminate: calyx in fruit 2 inches long, deeply 5-cleft, much surpassing the glabrous capsule, the lobes triangular-lanceolate: petals deep red, spatulate-obovate, 3 to 5 inches long, widely spreading. — Car. 177; Bartr. Trav. 104; Torr. & Gray, Fl. i. 238; Chapm. Fl. 58; Meehan, Native Flowers, ser. 1, ii. t. 1. *H. speciosus*, Ait. Kew. ii. 456; Wendl. "Hort. Herrenh. fasc. 2, 15, t. 11"; Curtis, Bot. Mag. t. 360; Michx. Fl. ii. 47; Barton, Fl. N. A. i. 33, t. 9. — Swamps of Georgia and Florida, near the coast; first coll. by *Bartram*. (S. Am.)

**Var. integrifolius**, CHAPM. A form with only moderately 3-cleft or angulate-lobed but more serrate leaves. — Fl. ed. 2, 610.<sup>2</sup> — E. Florida, in deep marshes, *Chapman*.

**H. militāris**, CAV. Less tall: leaves mainly hastate, the middle lobe ovate-lanceolate and acuminate, but some upper ones only deltoid- or ovate-lanceolate, and lower broadly subcordate and 3-cleft: calyx slightly 5-lobed, becoming oblong-campanulate and at length ovoid, loosely enclosing the puberulent or glabrous capsule, the lobes incumbent: petals pale flesh-color with purple base, broad, 2 or 3 inches long, moderately spreading from erect base. — Diss. vi. 352, t. 198, f. 2; Willd. Spec. iii. 808; Hook. Bot. Mag. t. 2385; Torr. & Gray, Fl. i. 238. *H. lævis*, "Scop. Del. Flor. iii. 35, t. 17." *H. Virginicus*, Walt. Car. 177, not L. *H. hastatus*, Michx. Fl. ii. 45. *H. riparius*, Pers. Syn. ii. 254. *H. Carolinianus*, Muhl. Cat. 63, & probably Ell. Sk. ii. 168. — Wet banks of rivers, Pennsylvania to Minnesota and southward to Florida and Texas.

*H. Rosa-SINĒNSIS*, L. Shrub with very smooth green leaves and large intensely red flowers, may sometimes escape from cultivation in S. Florida and S. Texas, but hardly.

\* \* \* \* **TRIÓNUM**, DC. Corolla rotately spreading, open only for a few hours in sunshine: calyx vesicular-inflated and closed over the globular capsule: seeds not woolly. — *Trionum*, Medic. Malv. 46.

**H. TRIÓNUM**, L. (FLOWER-OF-AN-HOUR.) Annual, low, sparsely hispid or glabrate: lowest leaves round or cordate and 3-lobed; upper 3-5-parted into cuneate-oblong or spatulate and incised divisions, the middle one of upper leaves longer and lanceolate: calyx soon scarious and green-nerved: corolla sulphur-color or nearly white with a brown-purple eye: seeds muricate-papillose. — Spec. ii. 697; Curtis, Bot. Mag. t. 209; Reichenb. Ic. Fl. Germ. v. t. 181. *H. Collinsiana*, Nutt. in Torr. & Gray, Fl. i. 237, as to pl. Ware. *H. pallidus*, Raf. fide Wats. Bibl. Index, 135. — Spontaneous about gardens, and especially in the Mississippi Val. becoming a troublesome weed on cultivated ground. (Nat. from Eu., &c.)

§ 2. **ABELMÓSCHUS**. Calyx spathaceous, 5-toothed, splitting down one side and deciduous from or near the base: bractlets distinct, often deciduous: capsule 5-celled, many-seeded. — § *Manihot* and part of *Abelmoschus*, DC. *Abelmoschus*, Medic. Malv. 45. Introduced tropical annuals.

<sup>1</sup> Add Meehan's Monthly, ii. 161, t. 11.

<sup>2</sup> Add syn. *H. semilobatus*, Chapm. Fl. ed. 3, 52.



**H. MÁNIHOT, L.** Tall and stout, glabrous, with some bristly hairs on the branches and stalks : leaves large, palmately or pedately 5-9-parted into long and narrow lobes : bractlets oblong-lanceolate, persistent for some time : corolla 4 or 5 inches in diameter, pale yellow or straw-color with a dark purple eye : capsule oblong, hispid, especially on the angles. — Spec. ii. 696 ; Michx. Fl. ii. 45 ; Sims, Bot. Mag. t. 1702, & Hook. Bot. Mag. t. 3152 (the var. *palmaris*, with upper leaves cleft into ovate-lanceolate incisely serrate lobes) ; Torr. & Gray, Fl. i. 236. *H. Collinsiana*, Torr. & Gray, Fl. i. 237, partly. — Sparingly spontaneous in most southerly Atlantic States. (Nat. ? from S. E. Asia.)

**H. ESCULÉNTUS, L.** (OKRA, GOMBO.) Low, hairy or glabrate, not bristly : leaves rounded and 5-lobed, lobes broad : flowers on short stout peduncles : bractlets narrowly linear, caducous : corolla 3 or 4 inches in diameter, yellow, with purple eye : capsule oblong-lanceolate or narrower, 4 to 6 inches long (when young and mucilaginous used for okra or gombo soup). — Spec. ii. 696 ; Cav. Diss. t. 61 ; Desc. Fl. Ant. iv. t. 269. *H. Collinsiana*, Torr. & Gray, l. c. partly, not Nutt. — Rather cult. than nat. in S. Atlantic States. (Nat. ? from Africa via W. Ind.)

§ 3. **PARÍTIUM.** Involucel a campanulate 8-10-toothed or -cleft cup : calyx 5-cleft : capsule with the 5 cells more or less bilocellate by a dorsal thin-membranaceous and indehiscent bilamellar intruded false partition ; seeds numerous : stipules oblong, caducous. — *Paritium*, A. Juss. in St. Hil. Fl. Bras. Merid. i. 255. — Tropical trees or high shrubs : yield *Cuba* bast, &c.

**H. TILIÁCEUS, L.** Leaves ample, round-cordate, short-acuminate, entire or obscurely crenate, glabrous or glabrate above, tomentulose-canescens beneath, and bearing a linear gland on base of one or more of the ribs : involucel and calyx persistent : petals yellow, hardly over 2 inches long : seeds glabrous or merely puberulent. — Spec. ii. 694 ; Desc. Fl. Ant. ii. t. 148 ; Chapm. Fl. 58. *Paritium tiliaceum*, A. Juss. in St. Hil. Fl. Bras. Mer. i. 255 ; Griseb. Fl. W. Ind. 86. — Keys of S. Florida ; probably a natural introduction from W. Ind. (All tropical shores, probably of Old World origin, while the large-flowered hairy-seeded *H. elatus*, Swartz, is indigenous in America.)

**21. THESPÉSIA**, Solander. (Θεσπέσιος, divine or excellent.) — Mostly tropical trees or shrubs, with ample cordate and entire leaves, and large flowers ; habit of *Hibiscus*, § *Paritium*. — Solander in Correa, Ann. Mus. Par. ix. 290, t. 8, f. 2 ; Benth. & Hook. Gen. i. 208. *Mulvaniscus*, Gærtn., not Dill.

**T. POPÚLNEA**, Solander, l. c. Low tree : leaves green, barely puberulent : 1-flowered peduncles shorter than the petioles : petals 2 inches long, yellow and purplish : fruit globose, over an inch in diameter. — DC. Prodr. i. 456 ; Wight, Ic. i. t. 8 ; Griseb. Fl. W. Ind. 87. *Hibiscus populneus*, L. Spec. ii. 694 ; Cav. Diss. iii. t. 56, f. 1. — Keys of Florida, *Curtiss* ; probably introduced from W. Ind. (Most tropical shores, probably of Old World origin.)

**22. CIENFUEGÓSIA**, Cav. (*B. Cienfuegos*, a Spanish botanist of the time of Bauhin.) — Suffruticose or suffrutescent plants, with the habit of the smaller *Hibisci*, mostly yellow-flowered. — Cav. Diss. iii. 174, t. 72, f. 2. *Fugosia*, Juss. Gen. 274 ; Benth. & Hook. Gen. i. 208. *Cienfuegia*, Willd. Spec. iii. 723. *Redoutea*, Vent. Descr. Pl. Nouv. Jard. Cels, t. 11. [Revised by B. L. ROBINSON.]

**C.\* sulphúrea**, GARCKE. Herbaceous or nearly so, almost glabrous : stems ascending, barely a foot high : leaves oval, inch or two long, repand-dentate, rather long-petioled : peduncles about equalling the subtending leaves : involucel of 7 to 9 linear or spatulate-lanceolate bractlets, little shorter than the deeply 5-cleft calyx : petals greenish yellow or sulphur-yellow, nearly inch long : stigmas 4 or 5 : capsule globular, glabrous ; seeds 2 in each cell, tomentulose. — Bonplandia, viii. 150 ; Morong & Britton, Ann. N. Y. Acad. Sci. vii. 60. *Fugosia sulfurea*, St. Hil. Fl. Bras. Merid. i. 252, t. 49. *F. Drummondii*, Gray, Pl. Wright. i. 23 & ms. of present work ; J. G. Smith, Rep. Mo. Bot. Gard. vi. 113, t. 49. *El-*

*durandia Texana*, Buckley, Proc. Acad. Philad. 1861, 450. — Texas, Gonzales, *Drummond*, Corpus Christi, *Heller*, and lower Rio Grande, *Gen. Eaton*. (Also S. Brazil and Paraguay, *Morong*.)

- C.\* **heterophylla**, GARCKE, l. c. Shrubby, with slender spreading branches, almost glabrous: leaves from oval to linear-lanceolate and linear, entire, or some coarsely 3-5-toothed, equalled or surpassed by the peduncle, this clavate at summit: involucl of very few and minute subulate bractlets or nearly obsolete: calyx dark-dotted, 5-parted: petals half inch long, yellow with purple base: stigmas and valves of capsule 3 or 4; seeds few, densely woolly. — *Fugosia heterophylla*, Spach, Hist. Veg. iii. 397; Hook. Bot. Mag. t. 4218; Chapm. Fl. ed. 2, 609. *Redoutea heterophylla*, Vent. l. c.; DC. l. c. 457. — Keys of Florida, where first coll. by *Blodgett*. (W. Ind., S. Am.)

23. **INGENHOÚZIA**, DC. (*Dr. John Ingenhousz*, distinguished vegetable physiologist.) — Prodr. i. 474. *Thurberia*, Gray, Pl. Thurb. 308; Torr. Bot. Mex. Bound. 40, t. 6. (Bractlets of involucl not cordate, as inadvertently stated in Benth. & Hook. Gen. i. 209.)

- I. **triloba**, DC. l. c. Suffrutescent perennial, 4 to 10 feet high, glabrous throughout, with slender branches: leaves 3-parted or some pedately 5-parted into lanceolate acuminate entire divisions, or uppermost entire and lanceolate, slender-petioled, black-dotted as also branchlets: stipules small and very caducous: peduncles axillary and above subcorymbose: petals white turning rose-color, dark-dotted, inch long: capsule half inch long. — A. DC. Calques des Dess. p. 6, note. *Thurberia thespesioides*, Gray, l. c. *Gossypium Thurberi*, Todaro, Prodr. Gossyp. 7, & Rel. Cult. Coton. 120. — Cañons of S. Arizona. (Adjacent States of Mexico; first rediscovered by *Thurber*.)

24. **GOSSÝPIUM**, L. COTTON. (The late Latin name of Cotton plant.) — Tropical herbs or shrubs, cult. as annuals in warm-temperate regions, of a very uncertain number of ill-defined species; ours probably two, which have been intermixed by crossing, having palmately 3-5-lobed leaves and corolla sulphur-color or whiter, changing to rose-color at or before fading. — Syst. Nat. ed. 1, & Gen. no. 559; Benth. & Hook. Gen. i. 209.<sup>1</sup>

- G. **HERBÁCEUM**, L. (UPLAND COTTON.) Herbaceous as cultivated, either pubescent or glabrous: leaves with broadly ovate lobes: bractlets of the involucl roundish, much shorter than the corolla: capsule globular; seeds with a close persistent wool under the long cotton. — Spec. ii. 693. — Cultivated through S. Atlantic States, &c.; and a form of it (*G. religiosum*, Roxb. Fl. Ind. iii. 185, NANKIN COTTON) with tawny cotton, frutescent and run wild on the coast of Florida and Texas, probably from W. Indies.

- G. **BARBADÉNSE**, L. l. c. Larger, from herbaceous to shrubby: leaves deeper cleft and with longer more tapering lobes: bractlets of the involucl usually longer and more incised: petals with a deep crimson spot at base: capsule larger, ovoid and pointed; seeds smooth and naked when separated from the long cotton. — Cult. on the coast, as SEA-ISLAND COTTON, also upland. Of American origin.

## ORDER XXVII. STERCULIACEÆ.

By A. GRAY; the genus *Nephropetalum* by B. L. ROBINSON.

Trees, shrubs, or herbs (chiefly tropical or subtropical), with general characters of *Malvaceæ*, except that the anthers are of two (or three) parallel cells and ex-

<sup>1</sup> Add Schumann in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 6, 51. An extended scientific and economic treatment of the cultivated species of cotton has recently been issued from the Office of Experiment Stations, U. S. Dept. Agric., as Bull. 33.

trorse, the stamens not rarely reduced to five, these (or the phalanges) opposite the petals or the place of those when wanting, as in *Sterculiæ*. This tribe is represented by *Sterculia* (*Firmiana*) *platanifolia*, of China, &c., sometimes planted southward, remarkable for having its large and thin follicles opening long before maturity into a kind of leaf bearing two or three large seeds on the edges. The few N. American members of the order are of two tribes.

TRIBE I. HERMANNIÆ. Flowers perfect, 5-androus. Petals plane, strongly convolute in æstivation, usually marcescent.

1. **HERMANNIA**. Calyx deeply 5-cleft. Petals erect, obovate, with involute claws. Stamens 5, with no trace of a second series; filaments monadelphous at base, unappendaged. Ovary 5-celled, many-ovuled; styles filiform, connivent, but little if at all united. Capsule 5-celled, loculicidal; seeds reniform, with a strongly arcuate narrow embryo in copious fleshy albumen.

2. **MELOCHIA**. Calyx 5-cleft. Petals spatulate or oblong. Stamens 5, monadelphous below, sometimes as many interposed short teeth between the filaments. Ovary 5-celled, a pair of ovules in each cell; styles slender, united below, nearly distinct. Seeds mostly solitary in each cell of the 5-angled capsule; embryo straight in fleshy albumen, with broad flat cotyledons.

3. **WALTHERIA**. Calyx 5-toothed, turbinate, 10-nerved. Petals spatulate. Stamens 5; no intermediate teeth. Pistil of a single carpel; ovary 2-ovuled, but lower ovule infertile; style eccentric, filiform; stigma penicillate. Follicle akene-like, usually dehiscent lengthwise; seed (ascending) and embryo as in *Melochia*.

TRIBE II. BUETTNERIÆ. Flowers perfect. Petals ligulate and cucullate. Sterile stamens (staminodia) alternate with the fertile series at summit of stamens. (Here *Theobroma*, the chocolate-tree.)

4. **AYENIA**. Calyx 5-parted. Petals with a long concave claw, bearing an urceolate hood at the inflexed apex, which is more or less adnate with the urceolate summit of the stamens. Fertile stamens 5, one in each sinus between truncate staminodia; anthers short, of three parallel cells! Ovary stipitate, 5-celled, a pair of ovules in each cell; styles united into one, bearing a capitate or 5-lobed stigma. Capsule globular, muricate, 5-celled; the five 1-seeded carpels in dehiscence separating from a central column and septicidally from each other, then loculicidally 2-valved; seeds transversely rugose; albumen none; embryo straight, but the orbicular cotyledons longitudinally convolute.

5. **NEPHROPETALUM**. Calyx 5-parted. Petals unguiculate; blade concave, reniform, with deep sinus, free at the apex, neither appendaged nor glandular. Stamens and staminodia as in the last preceding genus. Ovary sessile, globose, 5-celled; cells 2-ovuled; styles simple, bearing capitate stigma. Capsule globular, muricate with pubescent processes; cells by abortion 1-seeded.

1. **HERMÁNIA**, Tourn. (*Paul Hermann*, professor at Leyden, who sent the first species to Tournefort.) — Inst. 656, t. 432; Dill. Elth. t. 147; L. Gen. no. 551; Gray, Gen. III. ii. 87, t. 135. — Large African (chiefly Cape) genus of frutescent plants, a few Mexican, and the following on our borders.

**H. Texana**, GRAY. Low, suffrutescent, tomentose-canescens with stellular pubescence: stipules minute, deciduous; leaves roundish and subcordate, obscurely serrate, inch or two long; short axillary peduncles loosely few-flowered; pedicels recurved in fruit: petals dull scarlet, 4 lines long; anther-cells with tapering tips: capsule globular, somewhat inflated, half inch or less long, villose-tomentose, short-stipitate; valves crested on the back with soft filiform processes; seeds coarsely favose. — Gen. III. ii. 88, t. 135 (figure wrong in representing spreading petals, single style, and erect capsules), Pl. Lindh. pt. 2, 165, & Pl. Wright. i. 24. — Rocky soil, S. and W. Texas, *Berlandier*, *Wright*, *Lindheimer*, &c. (Adj. Mex.)

**H. pauciflora**, WATSON. Lower, diffuse, cinereous-tomentulose or partly glabrate: leaves smaller, deltoid- or oblong-ovate, serrulate: peduncles 1-flowered: petals 2 or 3 lines long, yellow: anther cells blunt: capsule oval and deeper-lobed, glabrate, more vesicular, minutely toothed along the edges of the valves. — Proc. Am. Acad. xvii. 368. — Mountains near Tucson, S. Arizona, *Pringle, Lemmon.* (Mex., *Palmer.*)

**2. MELÓCHIA**, Dill. (From *melūchīye* or *melūchīa*, the Arabic name of the oriental pot-herb *Corchorus olitorius*, L., but borrowed by the Arabs, through the Syriac, from the Greek *μαλάχη* or *μολόχη*, the mallow.) — Elth. 221, t. 176; L. Gen. no. 553; Griseb. Fl. W. Ind. 93; Schumann in Mart. Fl. Bras. xiii. pt. 3, 27. — Tropical genus, barely on southern borders: flowers heterogone-dimorphous, small.

§ 1. **EUMELÓCHIA**, Griseb. l. c. Capsule pyramidal, simply loculicidal through the salient or wing-like angles: no involuclate bractlets: calyx not enlarging: leaves mainly with prominent and straight pinnate veins. — *Melochia*, DC. Prodr. i. 490; Gray, Gen. III. ii. 85, t. 134. (Sectional name not well chosen, for type of genus is of next section.)

**M. pyramidata**, L. Barely suffrutescent or even annual, glabrous: branches slender: leaves oblong-lanceolate or lower oblong-ovate, serrate, thin: peduncles terminal or opposite the leaves, loosely 1-few-flowered: calyx-lobes lanceolate, subulate-acuminate, shorter than the rose- or violet-red corolla: filaments monadelphous only at base: capsule almost vesicular, the wing-like angles with a salient point at base. — Spec. ii. 674; Cav. Diss. t. 172, f. 1; Gray, Gen. III. ii. 86, t. 134, & Pl. Lindh. pt. 2, 165. *Sida Sabeana*, Buckley, Proc. Acad. Philad. 1861, 449. — Texas, in rocky soil. (All trop. Am.)

**M. tomentosa**, L. Shrubby, finely tomentose-canescens: leaves rather firm, strongly plicate-veined, ovate to oblong, crenate or serrate: flowers more numerous and clustered: stamens monadelphous higher up: capsule tomentulose, with salient angles rounded or obtusely pointed at base. — Syst. Nat. ed. 10, 1140 (Sloane, Hist. t. 139); Cav. Diss. t. 172, f. 2; Torr. Bot. Mex. Bound. 40. *M. crenata*, Vahl, Symb. iii. t. 68. — Near the lower Rio Grande, *Berlandier, Schott.* (Trop. Am.)

§ 2. **RIÉDLEA**, Griseb. l. c. Capsule globular and obscurely or moderately 5-lobed, loculicidal and at length also mostly septicidal into half valves: involucl of 3 or more slender bractlets usually surpassing the unchanged calyx: venation commonly of the preceding. — *Riedlea*, Vent. Choix Cels, t. 37. *Riedleia*, DC. Prodr. i. 490, excl. spec. *Melochia*, Dill. Elth. 221, t. 176.

**M. hirsuta**, CAV. Suffruticose or herbaceous, 2 to 4 feet high, in the type silky-villous rather than hirsute: leaves short-petioled, from ovate-lanceolate or ovate-subcordate to oblong, serrate, often doubly serrate: flowers in small capitate clusters in axils of upper leaves (mostly reduced to bracts), therefore interruptedly terminal-spicate: calyx short-campanulate and with short ovate subulate-pointed lobes: corolla (anthesis matutinal) purple or violet: stamens in short-styled flowers distinct to below the middle, in the capillary long-styled monadelphous throughout: capsule hirsute. — Diss. vi. 323, t. 175, f. 1; Triana & Planch. Fl. Nov. Gran. 213; Schumann, l. c. 45. *M. serrata*, St. Hil. & Naud. Ann. Sci. Nat. ser. 2, xviii. 36. *M. serrata*, & *M. hirsuta*, Griseb. Fl. W. Ind. 93, 94, the two heterogone forms! *Riedlea serrata*, Vent. Choix Cels, 37, t. 37. *R. elongata*, Presl, Rel. Haenk. ii. 148, but not "California ad Monterey." *Mougeotia hirsuta*, HBK. Nov. Gen. & Spec. v. 331. (Trop. Am.)

**Var. glabrescens**, GRAY. Thin-leaved and thinly pubescent. — Gray in Patterson, Check-list, 1892, p. 17, name only. *Melochia serrata*, Chapm. Fl. ed. 2, 610. *M. hirsuta*, var. *Regnellii*, Schumann, l. c. t. 10, nearly. *Riedlea serrata*, var. *glabrescens*, Presl, l. c. 147, by character. — Low pine barrens, S. Florida, *Garber, Curtiss, &c.*

**M. CORCHORIFÓLIA**, L. Herbaceous, slightly hispidulous-pubescent or almost glabrous: leaves ovate or subcordate, thin, more loosely veined, mostly long-petioled: flowers capitate-clustered at leafy summit of stem or short branchlets: petals smaller, pale purple with yellow claws. — Spec. ii. 675 (Pluk. Alm. t. 44, f. 5; Dill. Elth. t. 176). *M. hirsuta*, Chapm. l. c.; Curtiss, distr. no. 400. — Streets of Mobile, Savannah, and in rice-field embankments, Georgia, Feay, Curtiss. (Nat. from India.)

**3. WALTHERIA**, L. (*A. F. Walther*, professor in Leipsic.) — Tropical and subtropical suffruticose plants: the common species of world-wide distribution: small-flowered. — Gen. no. 552.

**W. Americana**, L. Canescent-tomentose becoming fulvous: leaves from ovate to narrowly oblong, serrulate, plicate-veined: flowers in dense axillary glomerules, which are sometimes all sessile, sometimes pedunculate and then often compound: bractlets and calyx-lobes subulate, hirsute-villous. — Spec. ii. 673; DC. Prodr. i. 492; Chapm. Fl. 59. — Keys of Florida. (Most tropics.)

**W. detónsa**, GRAY. Minutely canescent, low and diffuse: leaves round-oval to oblong, somewhat serrulate, thin, with few and slender primary veins: flowers in small loose glomerules, some few sessile in axils, mostly interruptedly spicate or concatenate on slender peduncle or along slender summit of stems: calyx and ovary minutely canescent. — Pl. Wright. ii. 24; Torr. Bot. Mex. Bound. 40. — S. Arizona, *Thurber, Wright, Lemmon*. (Adj. Mex.)

**4. AYÉNIA**, Lœfl. (*Duc d'Ayen*, botanical patron.) — Suffruticose, small-flowered, all from warm parts of America, euphorbiaceous in habit. Pedicels axillary. — It. 199; L. Syst. Nat. ed. 10, 1247, & Gen. ed. 6, no. 1020; DC. Prodr. i. 487; Schumann, l. c. 101.

**A. pusilla**, L. Low and diffuse from a ligneous base, puberulent: leaves most variable, from orbicular or subcordate to narrowly lanceolate, serrate or sometimes entire, from a quarter to inch and a half long, slender-petioled: flowers solitary or 2 or 3 in short-peduncled fascicle: petals with nearly capillary claws and with a dorsal appendage to the hood: staminal column slender and at summit abruptly cup-shaped, its sterile lobes roundish, much longer than the anthers: ovary shorter than its slender stipe, which in fruit is of variable length. — Act. Stock. 1756, 23, t. 2 (Lœfl. It. 200), & Spec. ed. 2, ii. 1354; Cav. Diss. v. 289, t. 147; Gray, Pl. Wright. i. 24, ii. 24; Schumann, l. c. 105, t. 24. — Key West, Florida, and southern borders of Texas, Arizona, and California. (W. Ind., Mex. to Brazil.)

**A. microphýlla**, GRAY, ll. cc. Woody and rigid, a foot or less high, canescent with stellular pubescence: leaves orbicular or round-cordate, 2 or 3 lines long, dentate: flowers mostly solitary in the axils, short-pedicelled: hood or limb of petals without dorsal appendage: staminal column short and wholly cup-shaped; its sterile lobes thick, notched at summit and surmounted by a reflexed acuminate appendage: ovary and capsule shortly stipitate. — Rocky ravines, southwest borders of Texas to S. Arizona, *Wright, Pringle*. (Adj. Mex.)

**5. NEPHROPÉTALUM**, Robinson & Greenman. (Νεφρός, kidney, πέταλον, petal.) — Stellate-tomentulose shrub with simple ovate petiolate crenate-dentate leaves and very small flowers in pedunculate axillary few-flowered umbelliform cymes. — A single species of the habit of *Ayenia* and recently discovered on the Texan frontier. [By B. L. ROBINSON.]

**N.\* Pringlei**, ROBINSON & GREENMAN. Stems terete, at first cinereous-tomentulose, soon glabrate: leaves ovate, obtusely acuminate, crenate-dentate, palmately 7-nerved, deeply cordate with a narrow sinus, finely stellate-pubescent above, paler and tomentulose beneath, 3½ to 5 inches in length: cymes an inch in length, 2-3-flowered; pedicels about equalling the peduncles: flowers greenish, only a line in diameter. — Bot. Gaz. xxii. 168. — Valley of the Rio Grande at Hidalgo, Texas, *Pringle*, no. 2272.

## ORDER XXVIII. TILIACEÆ.

BY A. GRAY.

Trees, shrubs, or herbs, polyandrous and with two-celled anthers and valvate calyx like *Sterculiaceæ*. Sepals deciduous. Petals not rarely imbricated in the bud. Stamens hardly if at all monadelphous, yet sometimes 5-adelphous at base (the phalanges opposite the petals), and unconnected with the petals. Ovary 2-10-celled, and styles united into one; ovules anatropous or incompletely so, commonly pendulous with rhaphe ventral. Embryo in rather abundant fleshy albumen, and with broad foliaceous cotyledons. Except *Tilia* this is a mainly tropical order or of southern rather than northern hemisphere.

\* Herbaceous or barely shrubby: sepals 5, distinct, narrow: petals somewhat convolute in the bud.

1. **TRIUMFETTA**. Petals with glandular thickening or pit at base inside (rarely wanting). Stamens 10 to 30, distinct, usually on a short torus bearing the 2-5-celled ovary. Style filiform; stigma 2-5-lobed; cells of ovary 2-ovuled. Fruit globular, bur-like, being covered with prickles or bristles, indehiscent, rarely splitting into 2 to 5 closed carpels.
2. **CORCHORUS**. Petals naked at base. Stamens 10 to 30 or more, distinct. Ovary 2-5-celled; style commonly short; stigma slightly lobed. Capsule various, 2-5-celled, many-seeded, 2-5-valved, loculicidal.

\* \* Trees: petals imbricate or incompletely convolute in the bud.

3. **TILIA**. Sepals 5, lanceolate or ovate, subcoriaceous. Petals spatulate-oblong. Stamens numerous, on a short hypogynous torus, either indistinctly aggregated in 5 clusters or (in the American species) more or less 5-adelphous with a petaloid body (staminodium) to each phalanx placed before a petal; anther-cells quite separate or even short-stalked by forking of the apex of the filament. Ovary 5-celled, with a pair of ovules in each cell; style columnar, 5-lobed at summit; lobes introrsely stigmatose. Fruit globular, dry and woody-coriaceous at maturity, by abortion 1-celled, 1-2-seeded, indehiscent or tardily bursting; embryo in hard fleshy albumen; cotyledons contorted and crumpled, very broad and thin, palmately 5-lobed.

1. **TRIUMFETTA**, Plumier. (*G. B. Triumfetti* or *Trionfetti*, Italian botanist.) — Tropical weedy plants, yellow-flowered. — Nov. Gen. 40, t. 8; L. Gen. no. 864. — One species has reached Florida.

**T. SEMITRÍLOBA**, Jacq. Suffrutescent annual, minutely pubescent: leaves round-ovate, serrate, some angulate or 3-lobed: flowers in small paniculate fascicles: sepals quarter inch long, apiculate behind the hooded apex: stamens about 15: fruit 2-celled, 2 lines in diameter, the prickles as long, uncinately tipped, retrorsely hispid. — Enum. Pl. Carib. 22; L. Mant. 73; Chapm. Fl. ed. 2, 611; Schumann in Mart. Fl. Bras. xii. pt. 3, 134, t. 27, f. 2. — A weed near dwellings in Peninsular Florida. (Nat. from W. Ind.)

2. **CÓRCHORUS**, Tourn. (The Greek and Latin name of some plant, early applied to this genus.) — Mainly tropical or subtropical herbs or low shrubs; with small yellow flowers axillary or opposite the leaves. — Inst. t. 135; L. Gen. no. 442; Gray, Gen. III. ii. 93, t. 137.

**C. hírtus**, L., var. **glabellus**, GRAY. Annual, slender, from somewhat appressed pubescent to almost glabrous: leaves mostly lanceolate-oblong and acute, evenly serrate, slender-petioled: flowers 1 to 3 in a fascicle, 2 or 3 lines long, exceeding the pedicels: sepals

acuminate, about equalling the petals: stamens commonly 10: capsule siliquiform, 2-celled, often 2 inches long, compressed contrary to the partition, pointed by the short subulate style, divergently spreading or ascending, glabrous or minutely strigose-puberulent (not villous) and mostly straight. — Gray in Patterson, Check-list N. A. Plants, 1892, 17, name only. (For species, L. Spec. ed. 2, i. 747; Jacq. Hort. Vind. iii. t. 58; Schumann, l. c. 127, t. 26, with vars.) *C. siliquosus*, Torr. & Gray, Fl. i. 239; Gray, Gen. III. ii. 94, t. 137, not L. *C. pilolobus*, Gray, Pl. Wright. i. 24; Wats. Proc. Am. Acad. xvii. 332;<sup>1</sup> not quite of Link, Enum., &c. — Florida to S. Texas and Arizona. (Mex.)

**C. SILIQUOSUS**, L. Glabrous: leaves ovate to oblong-lanceolate; those of flowering branchlets often small and rounded: linear capsules 2 or 3 inches long, at apex truncate and apiculate with 4 short spreading teeth, two to each valve. — Spec. i. 529; Jacq. Hort. Vind. iii. t. 59; Griseb. Fl. W. Ind. 97, excl. ref. to Gray, Gen. III. — S. Florida, near dwellings, *Curtiss*. (Nat. from W. Ind.)

**C.\* ACUTÁNGULUS**, Lam.<sup>2</sup> Indian and African, naturalized in W. Indies, occurs as a ballast-weed at Pensacola, *Curtiss*. Its ovate leaves bear at base a pair of salient setiferous teeth; and the capsule is 5-celled and 5-corniculate at apex. — Dict. ii. 104.

**C. TRÍDENS**, L., an Old World species with narrow leaves and 3-celled 3-corniculate capsules, has occurred as a ballast-weed at Philadelphia. — Mant. ii. 566.

**3. TÍLIA**, Tourn. LINDEN, LIME-TREE, BASSWOOD. (The classical Latin name.) — Forest trees of temperate parts of northern hemisphere; with soft white wood, very fibrous and tough inner bark abounding in mucilage, few-scaled winter buds, rounded and often cordate veiny and serrate alternate leaves on long petioles, with membranaceous caducous stipules. Peduncles axillary, adnate half way up to an accompanying membranaceous ligulate bract, cymosely several-many-flowered. Flowers cream-color, opening in early summer. — Inst. 611, t. 381; L. Gen. no. 440.<sup>3</sup>

**T. EUROPEÁ**, L. (the small-leaved form, *T. parvifolia*, Ehrh., sometimes the larger-leaved *T. grandifolia*, Ehrh., or intermediate forms), the EUROPEAN LIME, is often planted as a shade tree in towns and may be known by the want of the petaloid scales (staminodia) among the stamens. These are conspicuous in all American species, which, moreover, seem to be as confluent as are the Old World forms. — Spec. i. 514.

**T. AMERICÁNA**, L. Leaves ample, glabrous (except in the tufted axils of the veins), of firm texture, both faces green, upper shining: floral bract usually tapering to stalked base: spatulate staminodes exceeding the stamens: fruit ovoid, a third to nearly half inch long, obsoletely costate. — Spec. i. 514; Marsh. Arb. 153; Michx. f. Hist. Arb. Am. iii. 311, t. 1; Gray, Gen. III. ii. 92, t. 136.<sup>4</sup> *T. glabra*, Vent. Monogr. Til. 9, t. 2; DC. Prodr. i. 513. *T. nigra*, Borkh. Handb. Forstb. ii. 1219; Spach, Ann. Sci. Nat. ser. 2, ii. 340, t. 15; Bayer, Monogr. Til. (ex Verh. Bot. Verein. Wien, xii. 1862) 53. *T. Canadensis*, Michx. Fl. i. 306. ? *T. pubescens*, Nouv. Duham. i. t. 51. — Woods, New Brunswick to Georgia, and west to Winnipeg, Kansas, and E. Texas, &c.

**T. PUBÉSCENS**, Arr. Small tree: leaves mostly thinner and rather small, pubescent beneath or glabrate in age: floral bract usually rounded at base and even the lowest very short-stalked: fruit globular, quarter inch long. — Kew. ii. 229; Vent. l. c. 10, t. 3; Michx. f. Hist. Arb. Am. iii. t. 3; Ell. Sk. ii. 3; Torr. & Gray, Fl. i. 240 (*T. Caroliniana*, Mill. Dict. ed. 8; Marsh. Arb. 154; Wang. Anpfl. Nordam. Holz. 56, are all doubtful and probably of preceding species, so this older name cannot be adopted.) *T. laxiflora*, Michx. Fl. i. 306; Spach, l. c. 343, t. 15. *T. Americana*, var. *pubescens*, Loud. Arb. i. 374, t. 24; Gray, Man. ed. 1, 72. — Wading Riv., Long Island, *E. S. Miller*, and from North Carolina to Florida and Texas.

<sup>1</sup> Add Coulter, Contrib. U. S. Nat. Herb. ii. 45.

<sup>2</sup> Species taken by Dr. Gray from imperfect material for *C. olitorius*, L.

<sup>3</sup> Add Gray, Proc. Am. Acad. xxii. 305.

<sup>4</sup> Add Gray, Pl. For. Trees N. A. t. 10 (fr. globose).

**Var. leptophylla**, VENT. l. c. 11. Leaves larger (sometimes equalling those of *T. Americana*) and membranaceous. — Torr. & Gray, l. c. — S. Carolina to Texas.

**T. heterophylla**, VENT. Large tree: leaves ample (oftener 6 or 8 inches long and of ovate outline), glabrous and shining above, whitish and when young canescent-puberulent and silvery beneath: floral bract tapering to short-stalked or subsessile base; this and especially the peduncle elongated: fruit globular, not costate or lineate. — Anal. Hist. Nat. Madrid, ii. 68 (1800), & Monogr. Til. (Mém. de l'Inst. class 1, iv.) 16, t. 5; Torr. & Gray, l. c. 239; Nutt. Sylv. i. 90, t. 23. *T. alba*, Michx. f. Hist. Arb. Am. iii. 315, t. 2, not Ait. *T. laxiflora*, Pursh, Fl. i. 363, not Michx. *T. Americana*, var. *heterophylla*, Loud. l. c. 375, t. 23. — Along the Alleghanies from S. Pennsylvania to Florida, west to S. Illinois and Tennessee.

*T. ALBA*, Ait. (*T. rotundifolia*, Vent.), is the Hungarian *T. argentea*, by mistake credited to N. America.

## ORDER XXIX. LINACEÆ.

By W. TRELEASE.

Herbaceous or suffrutescent terrestrial plants (in our region). Leaves soon alternate, only exceptionally opposite or in whorls of 3, sessile or nearly so, simple, entire except sometimes the uppermost, with or without stipules or their equivalents. Flowers racemose or in more or less open subpanicked cymes, often small but commonly showy, variously colored, perfect, mostly 5-merous, hypogynous, without a disk. Glands of the receptacle 5, small, opposite the sepals, which are mostly distinct, imbricate, often glandular-toothed. Stamens as many as the petals and alternate with them, slightly monadelphous at base, persistent; anthers oblong, introrse, more or less versatile, 2-celled, with longitudinal dehiscence. Carpels and styles 2 to 5; ovary slightly 4–10-lobed, its cells equal in number to the styles or twice as many from the intrusion of a false septum from the back of each cell, the true cells 2-ovuled. Seeds oily, with a little albumen; embryo usually straight, with plane cotyledons.

1. **LÍNUM**, Tourn. FLAX. (Ancient classical name.) — Flowers 5-merous, symmetrical except that in *Hesperolinon* the carpels are reduced in number. Sepals mostly persistent. Capsules splitting through the false septa and also septicidal in most species. Stipules replaced by small glands, or wanting. — Inst. 339, t. 176; L. Gen. no. 254; Torr. & Gray, Fl. i. 204, 678; Planch. Lond. Jour. Bot. vi. 593, vii. 165, 473, 507; Gray, Gen. Ill. ii. 107, t. 143, Proc. Am. Acad. vi. 521, & vii. 333; Engelm. in Gray, Pl. Wright. i. 25; Benth. & Hook. Gen. i. 242; Baill. Hist. Pl. v. 63; Brew. & Wats. Bot. Calif. i. 89, ii. 438; Trelease, Trans. St. Louis Acad. v. 7, t. 34; Reiche in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 4, 30. — Chiefly of the temperate regions of both hemispheres.

\* Exstipulate: leaves and bracts entire, alternate: pedicels elongated: flowers large, blue (though albinos sometimes occur): sepals not glandular-margined, persistent: petals not appendaged: filaments with slender intervening appendages: carpels 5, not cartilaginous at base; styles distinct: capsule large (3 or 4 lines long), with membranous septa, the half carpels somewhat longitudinally hollowed and 2-grooved on the back; false septa incomplete; seeds compressed, 2 to 3 lines long: bluish glabrous plants a foot or two high. — § *Eulinum*.



+ Annual: stigmas elongated: species introduced through cultivation.

**L. USITATISSIMUM, L.** Corymbosely branched above, loosely leafy: leaves lanceolate, very acute, 3-nerved, the larger an inch or two long: sepals broadly ovate, acuminate, the interior scarious-margined and ciliate, prominently 3-nerved, the lateral nerves evanescent: petals about 5 lines long: stigmas subclavate, about as long as the styles: capsule broadly ovoid-conical, about 3 lines long, a little surpassing the calyx, nearly indehiscent, the septa not ciliate. — Spec. i. 277; Torr. & Gray, Fl. i. 204; Reichenb. Ic. Fl. Germ. vi. t. 329, f. 5155; Planch. l. c. vii. 165; Boiss. Fl. Or. i. 860; Trelease, l. c. 12. — Along railroads, about flax-mills, in fields, etc., at various points throughout the country. (Introd. from Old World.)

**L. HUMILE, Mill.** Similar to and commonly confounded with the last, but mostly lower: capsule 3 to 4 lines long, nearly twice as long as the calyx, more deeply dehiscent, with ciliate septa. — Dict. ed. 8, no. 2; Planch. l. c.; Boiss. Fl. Or. i. 861; Trelease, l. c. *L. usitatissimum*, *β. crepitans*, Schüb. & Martens, Fl. Würtemb. 211. — In similar situations to the last, east of the Mississippi River. (Introd. from Old World.)

+ + Perennial but often flowering the first year: stigmas little longer than broad: Western.

**L. LEWISII, PURSH.** Mostly caespitose: leaves oval to linear, sometimes rather obtuse, 3-5-nerved, the larger over an inch long: flowers somewhat corymbd: sepals broadly ovate, the inner margins scarious, sometimes erose but not ciliate, more or less 3-5-keeled below: petals 7 to 10 lines long: capsule ovoid, frequently acute, 3 to 4 lines long, once or twice exceeding the calyx, incompletely 10-celled and 10-valved, with ciliate septa, the valves dehiscent widely above and separating through the mealy partitions nearly to the centre below. — Fl. i. 210; Barton, Fl. N. Am. i. 30, t. 8; Alefeld, Bot. Zeit. xxv. 250; Trelease, l. c. *L. perenne*, L. Spec. i. 277, in part; Torr. & Gray, Fl. i. 204; Gray, Gen. III. ii. 108, t. 143, f. 9, 10; Meehan, Native Flowers, ser. 1, i. 117, t. 30. *L. Sibiricum*, var. *Lewisii*, Lindl. Bot. Reg. t. 1163. *L. perenne*, var. *Lewisii*, Eat. & Wr. N. A. Bot. 302. *L. decurrens*, Kellogg, Proc. Cal. Acad. Sci. iii. 44, f. 11. *L. Lyallianum*, Alefeld, l. c. 251. — From the Hudson Bay region to Brit. Columbia, south through Washington and the Dakotas to California and Texas.

\* \* Exstipulate or with stipular glands: pedicels mostly short: flowers small or medium-sized, yellow: at least some of the sepals glandular-ciliate or serrulate: petals not appendaged: filaments without intervening appendages: carpels 5; stigmas capitate: capsule small (less than 3 lines long), with firm septa, the false septa sometimes membranous toward the inner margin or incomplete; seeds flattened, small. — § *Linastrum*.

+ Sepals persistent: capsule small (scarcely 2 lines long), 10-valved: carpels without cartilaginous insertions at base: more or less corymbosely or paniculately branched slender glabrous plants about a foot high.

+ + Leaves and bracts entire: no stipular glands: styles distinct to base.

— False septa nearly or quite complete, not ciliate: Eastern.

a. Stem terete below, only the lowest leaves opposite.

**L. FLORIDANUM, TRELEASE.** Perennial: stems several from the same root, erect, simple below, terete and striate or the branches slightly angled: leaves oblong or oblong-lanceolate, mostly acute, 1-nerved, the larger 10 lines long, mostly suberect: flowering branches few, ascending or recurving, sparingly leafy, with few sometimes secund flowers: sepals ovate, taper-pointed, keeled, the covered margins glanduliferous: petals about 3 lines long: capsule ovoid, a line and a half long, equal to or exceeding the calyx. — Trelease, l. c. 13. *L. Virginianum*, var.? *Floridanum*, Planch. l. c. vii. 480. — S. Carolina, Santee Canal, *Ravenel*, to Florida and Louisiana, Covington, *Drummond*, 96.

**L. VIRGINIANUM, L.** Similar to the last, annual, or suckering from the base, less clustered, more loosely branched, the flowering branches recurved-spreading or corymbose: leaves sometimes bluish, often spreading: capsule depressed-globose, very obtuse, a line long, mostly shorter than the calyx. — Spec. i. 279; Hill, Veg. Syst. xiv. t. 43, f. 1; Walt. Car. 117; Ell. Sk. i. 375; Torr. & Gray, Fl. i. 204; Planch. l. c.; Gray, Gen. III. ii. 108, t. 143, f. 1-8; Trelease, l. c. — Canada to N. Carolina and Alabama, westward to Texas and Missouri.

b. Stem angled : leaves mostly opposite below the first branch.

**L. striatum**, WALT. Annual: stems often somewhat clustered, ascending, striate and somewhat ridged even below : leaves yellowish-green, slightly viscid, elliptical-oblong, acute, several of the lower opposite or in whorls of 3 : flowering branches often forking, at first strikingly racemose, at length spaced out along the stem : calyx shorter : otherwise like the last. — Car. 118 ; Torr. & Gray, Fl. i. 205 ; Trelease, l. c. 14. *L. Virginianum*, Reichenb. Ic. Bot. Exot. ii. 35, t. 198. *L. Virginianum*, var. *oppositifolium*, Engelm. in Gray, Pl. Wright. i. 26. *L. simplex*, Wood, Class-Book, ed. of 1861, 276. — Range of the preceding, chiefly in wetter places. Canadian specimens with erect firm bluish leaves, may perhaps be variably separable.

= = False septa incomplete, ciliate.

a. Leaves opposite : adventive from Europe.

**L. catharticum**, L. (Spec. i. 281.) A small glabrous annual with opposite obovate small leaves, occasionally ciliate at base, slender nearly terete stem several times forked above, few small flowers terminating the branches, and minute 10-valved capsules about 1 line long, has been collected as a seaside introduction at Pictou, Nova Scotia, *Burgess*. (Adv. from Eu.)

b. Leaves chiefly alternate : Southwestern.

**L. Neo-Mexicanum**, GREENE. Annual or biennial (or perennial ?) : stems simple or branched below, strict, angled above : leaves narrowly oblong, the upper acute, 1-nerved or with 2 faint accessory nerves at base, less than 8 lines long : flowers on erect pedicels, in long virgate racemes : sepals lanceolate, obtuse to taper-pointed, sometimes 3-keeled, the inner margins minutely glandular : petals about 3 lines long : capsule broadly ovoid, rather acute, a line and a half long, about equalling the calyx, the false septa incomplete above. — Bot. Gaz. vi. 183 ; Trelease, l. c. — Arizona and New Mexico. (Northern Mex.)

**L. Kingii**, WATSON. Perennial, usually very glaucous : stems cespitose, subterete, ascending : leaves crowded and somewhat appressed, firm, oblong or spatulate, subacute, 1-nerved, 4 or 5 lines long : flowers densely corymbose-panicled at the ends of the branches : sepals small, broadly ovate, obtuse to taper-pointed, 3-nerved, the inner margins glandular-ciliate : petals 3 to 5 lines long : capsule ovoid, acute, a line and a half long, somewhat exceeding the calyx, the false septa incomplete nearly to the base. — Bot. King Exp. 49 ; Trelease, l. c. — Uinta and Wasatch Mountains of Utah to Wyoming.

**Var. pinetorum**, JONES. Compact and low : leaves elliptical, mostly obtuse, appressed and imbricated : flowers racemously disposed along the branches. — Proc. Calif. Acad. Sci. v. 628. — Utah, Uinta Mountains, *Hayden* ; Tropic, *Jones*, 5306.

++ ++ Sepals and bracts glandular-toothed : small globose stipular glands usually present : stems angled throughout : petals somewhat hairy at base : styles separate, or united below the middle : false septa of capsule incomplete, more or less ciliate.

**L. Gréggii**, ENGELM. Perennial, glaucous : stems mostly closely cespitose, branched below and somewhat panicled above : lower leaves commonly opposite or in whorls of 3, elliptic-lanceolate, acute, 1-nerved, entire, about 6 lines long, the upper small, remote, less serrulate than usual in the group : flowers rather numerous and closely placed, almost sessile : sepals lanceolate, acute, keeled and with a pair of faint lateral nerves : petals about 2 lines long : styles distinct : capsule globose-ovoid, a line and a half long, mostly about equal to the calyx. — Engelm. in Gray, Pl. Wright. i. 26. — Western Texas, Guadalupe Mountains, *Havard*, 5, Chisos Mountains, *Havard*, 1. (Mex.) Perhaps scarcely distinct from *L. Schiedeana*, Cham. & Schlecht.

**L. rupestre**, ENGELM. Perennial : stems several, slender, with few elongated nearly naked corymbose branches above : leaves linear, acute, 1-nerved, the lower scarcely 6 lines long, sometimes sparingly ciliate, the upper minute, glandular-serrulate : flowers mostly few and remote : sepals ovate, very acute or almost bristle-pointed, keeled, with a pair of fainter lateral nerves : petals 3 to 5 lines long : styles distinct nearly to the base : capsule globose-ovoid, a line and a half long, about equal to the calyx. — Engelm. in Gray, Pl. Lindh. pt. 2, 232 ; Trelease, l. c. 15. *L. Boottii*, var. *rupestre*, Gray, Pl. Lindh. pt. 2, 155. — Texas. (Northern Mex.)

**L. sulcátum**, RIDDELL. Annual, glabrous: stem subsimple below or with a few strict branches at base, corymbosely branched near the top: leaves lanceolate, very acute, 3-keeled with the lateral nerves close to the margin, the lowest entire, about 10 lines long, the upper much smaller and glandular-serrulate: flowers scattered on the rather short upper branches: sepals lanceolate, very acute, keeled and with a pair of more or less prominent lateral nerves, occasionally elongated and leaf-like: petals 6 lines long: styles variously united below the middle: capsule ovoid, rather acute, a line and a half long, often conspicuously shorter than the calyx. — Cat. Pl. Ohio, Suppl. 10; Gray, Man. ed. 5, 105; Trelease, l. c. 14. *L. Bootii*, Planch. l. c. vii. 475. — Connecticut to Manitoba, south to Virginia and Texas.

+ + Capsule medium-sized (2 to 3 lines long), 5-valved through the complete false septa, the true septa with cartilaginous dorsal thickenings at base: styles united almost to the top: stems mostly angled: upper leaves or bracts glandular-serrulate: petals bearded at base: rather rigid often very corymbose frequently puberulent alternate-leaved Western species.

+ Sepals at length deciduous: leaves scattered except sometimes at base of shoots, the broader spreading: stipular glands commonly present: capsule oblong-ovoid; false septa more or less thickened outwardly: small group of variable closely related species, with flowers ranging from deep orange to nearly white.

= Leaves narrow: capsule 2 lines long; false septa thickened for a very small distance.

**L. aristátum**, ENGELM. Much branched toward the base or throughout, the branches slender, ascending, bluish, glabrous or puberulent: leaves erect, narrowly linear-lanceolate, 3 or 4 lines long, awn-pointed, 1-nerved: flowers few, solitary at the ends of the branches or seemingly opposite the leaves, their pedicels long, grooved rather than wing-angled: sepals lanceolate, gradually aristate, with prominent midrib and occasionally 2 lateral veins above: petals 6 to 8 lines long: capsule scarcely more than half as long as the calyx; the false septa membranaceous except for a short distance from the outer margin. — Engelm. in Wislizenus, Tour Northern Mex. 101; Gray, Pl. Wright. i. 25, 26; Trelease, l. c. 15. — Southern Utah through Arizona, New Mexico, and Western Texas. (Northern Mex.)

**Var. súbteres**, TRELEASE. Blue-green, glabrous, of the lax habit of the type, though more branched below, nearly without stipular glands: branches slightly angled: pedicels sometimes greatly elongated (occasionally 2 inches long), not prominently winged: sepals acute, 1-nerved, more persistent than usual in the group. — Proc. Calif. Acad. Sci. ser. 2, vi. 285. — Nevada, Spruceмонт, Jones, and Utah, Bluff City, Wetherill, Willow Creek, Miss Eastwood.

**L. rígídum**, PURSH. Perennial?, glabrate or with the angles slightly roughened: stems somewhat caespitose, corymbosely branched above, the branches rather rigid and, like the pedicels, strongly wing-angled: leaves green to bluish, linear-lanceolate, obtuse or acute, about 6 lines long, 1-nerved, the broader often with 2 lateral keels towards the apex: flowers more or less numerous: sepals lanceolate, slender-pointed, short-awned, strongly 1-3-wing-nerved: petals sometimes 8 lines long: capsule somewhat shorter than the calyx, the false septa thickened for about a third their width. — Fl. i. 210; Torr. & Gray, Fl. i. 204, in part; Planch. l. c. vii. 474; Engelm. in Gray, Pl. Wright. i. 25; Trelease, l. c. 16. *L. annuum*, Nees, Verzeichn. Pfl. Maximilian von Wied, 5, & Bot. Zeit. ii. 547. — Brit. America to Oregon and Iowa, south to Texas. Also collected at Miami, Florida, in 1877, by Garber.

**Var. pubérulum**, ENGELM. Annual, blue-green, puberulent: stems mostly solitary and low, corymbosely stout-branched above: leaves linear, acute, 3 or 4 lines long, 1-nerved: otherwise like the type. — Engelm. in Gray, Pl. Wright. i. 25; Trelease, l. c. Colorado to Nevada, Southern California, and Texas.

= = Leaves usually broader, green: capsule  $2\frac{1}{2}$  lines long; false septa thickened for half their width.

**L. Berlandieri**, Hook. (as *L. Berendieri*). Perennial?, nearly glabrous, few-branched or simple below and rather closely corymbose above: leaves clear green, lanceolate, acute, mostly spreading, occasionally 3 lines wide and 15 lines long, more or less 3-ribbed: sepals elongated, lanceolate, gradually very acute, short-awned, strongly 3- or even 5-ribbed: petals

sometimes 10 lines long: capsule a third shorter than the calyx. — Bot. Mag. t. 3480; Gray, Gen. III. ii. 108, t. 143, f. 11-14; Planch. l. c. vii. 474; Engelm. in Gray, Pl. Wright. i. 25; Trelease, l. c. *L. rigidum*, var. *Berendieri*, Torr. & Gray, Fl. i. 204. — From the Red River (*Marcy Exped.*) through Texas. A low spreading cespitously branched plant from Galveston, *Lindheimer*, 22, *Van Huff*, Rio Brazos, *Drummond*, and S. W. Louisiana, *Dodson*, with the broad scarious margin of the sepals coarsely dentate, is var. *Plötzii*, Trelease, l. c. 16.

++ ++ Sepals persistent: leaves appressed, crowded and overlapping on the slender branches: no stipular glands: capsule globose-ovoid, 2 lines long; false septa entirely membranaceous.

**L. multicaule**, Hook. Annual?, more or less puberulent: leaves very narrow, mostly linear, awn-pointed, less than 3 lines long, 1-nerved below, often revolutely concave, frequently ciliate, the upper often scarious-margined: flowers mostly few, terminating the branches: sepals ovate, abruptly bristle-pointed, more or less evidently 1-nerved, with broad scarious often subentire margins: petals 4 or 5 lines long, deeper colored at base: capsule about as long as the sepals. — Hook. in Torr. & Gray, Fl. i. 678; Planch. l. c. vii. 185; Engelm. in Gray, Pl. Wright. i. 25; Trelease, l. c. *L. hudsonioides*, Planch. l. c. 186. — Texas, from the centre eastward.

\* \* \* Exstipulate or with stipular glands: pedicels often elongated: flowers mostly very small, yellow, white, or roseate: sepals usually glandular-ciliate, persistent: petals commonly with lateral teeth and 1 to 3 ventral appendages at base: filaments sometimes 2-toothed at base, otherwise unappendaged: carpels 2 or 3, without cartilaginous insertions; styles distinct; stigmas small, oblique or subcapitate: capsule very small (scarcely a line long), separating into twice as many valves as there are carpels, with firm septa long-ciliate at base; seeds mostly plump, small: mostly forking slender annuals, of the Pacific Coast. — § *Hesperolinon*.

+ Carpels 2: false septa complete: petals yellow, not appendaged.

**L. digynum**, GRAY. A span or less high, glabrous, somewhat glaucous: stems slender, striate, mostly simple below, several times corymbosely forked above, without stipular glands: leaves usually opposite, elliptic-spatulate, the larger 5 lines long, 1- or obscurely 3-nerved, the lower entire and obtuse, the upper serrate, acute or mucronate: flowers subracemose or loosely corymbd, short-pedicelled: sepals very unequal, ovate-oblong, obtuse, glandular-serrulate or lacerate, 1- to somewhat obscurely 3-nerved at base: petals  $1\frac{1}{2}$  lines long: capsule ovoid, slightly retuse at apex, a little shorter than the calyx. — Proc. Am. Acad. vii. 334; Brew. & Wats. Bot. Calif. i. 89; Trelease, l. c. 17. — Washington to the mountains of Central California. A small plant of the aspect of *L. catharticum*.

+ + Carpels 3: false septa incomplete: petals mostly appendaged.

++ Leaves glandular-denticulate: no stipular glands: false septa narrow.

**L. drymarioides**, CURRAN. A span or two high, sparingly white-villous: stems rather coarse at base, repeatedly dichotomous, with long slender internodes: leaves opposite or the lowest subverticillate, broadly ovate, the larger 5 lines long, rather loosely veined, acute or acuminate, with short crowded marginal glands: flowers roseate, scattered along the branches, mostly short-pedicelled: sepals lanceolate, acute or mucronate, minutely serrulate and occasionally glandular-ciliate, 1-nerved: petals minute, 2-toothed and appendaged at base, the median appendage rounded and glabrous or sometimes wanting: capsule ovoid, acute, as long as the calyx. — Bull. Calif. Acad. Sci. i. 152; Trelease, l. c. — Lake County, California, *Mrs. Curran*.

**L. adenophyllum**, GRAY. A span to a foot high, glabrate or somewhat villous, especially just above the nodes: stems slender, repeatedly forked, striate: leaves alternate or the lowest opposite or in threes, remote, very narrowly oblong, less than an inch long, folded along the midrib, obtuse, somewhat cordate, 1-nerved, closely and conspicuously glandular-denticulate: flowers yellow, terminating the branches, slender-pedicelled: sepals lanceolate, acute, usually minutely glandular-denticulate, 1-nerved: petals 2 or 3 lines long, the broad confluent appendages somewhat pubescent: filaments abruptly dilated and obtusely 2-toothed at base: capsule ovoid, acute, as long as the calyx. — Proc. Am. Acad.

viii. 624; Brew. & Wats. Bot. Calif. i. 90; Trelease, l. c. 18. — Western California, Lake and Mendocino Counties.

++ ++ Leaves entire, without marginal glands, alternate except sometimes at the very base: false septa widened below.

= False septa complete below: flowers yellow or yellowish.

**L. Clevelandi**, GREENE. A span to a foot high, glabrate, repeatedly dichotomous: leaves oblong, 5 lines long, 1-nerved, subacute, without stipular glands: flowers minute, on filiform pedicels (sometimes an inch long): sepals narrow, acute, sparingly glandular-ciliate: petals yellow or pale, a line long or less, 2-toothed, 3-appendaged, the median appendage oblong, glabrous: capsule ovoid, acute, somewhat longer than the sepals. — Bull. Torr. Club, ix. 121; Trelease, l. c. — California, Lake and Mendocino Counties.

= = False septa not reaching the axis except in the last species: flowers white, roseate, or purplish.

a. Loosely branched, the flowers slender-pedicelled.

**L. micranthum**, GRAY. A span to a foot high, of the aspect of the preceding, glaucous, somewhat soft-pubescent toward the base of the slender nearly terete branches, loosely dichotomous: leaves alternate, spatulate-oblong, 3 to 7 lines long, 1-nerved, obtuse or subacute, mostly with stipular glands: flowers white or faintly roseate, considerably exceeded by their slender straight pedicels: sepals ovate-lanceolate to oblong, subacute, the inner sparingly glandular-ciliate: petals 1 to occasionally  $2\frac{1}{2}$  lines long, 2-toothed, mostly unappendaged: capsule ovoid, acute, about equal to the sepals. — Proc. Am. Acad. vii. 333; Brew. & Wats. Bot. Calif. i. 90; Trelease, l. c. 18. — Oregon to the vicinity of San Francisco, California.

**L. spergulinum**, GRAY. Similar to the last and perhaps scarcely separable: leaves linear, 5 to 10 lines long, with or without stipular glands: flowers roseate, somewhat nodding on filiform pedicels (occasionally 7 lines long): petals 2 to 4 lines long, 2-toothed, 3-appendaged, the median appendage ligulate and the lateral sometimes greatly reduced: capsule ovoid, acute, nearly twice as long as the sepals. — Proc. Am. Acad. vii. 333; Brew. & Wats. Bot. Calif. i. 90; Trelease, l. c. 19. — Central California.

b. Often more corymbose, the short-pedicelled flowers rather closely clustered at ends of the branches.

**L. Califórnicum**, BENTH. Somewhat taller, glaucous, glabrate or sparingly puberulent near the nodes, loosely dichotomous, with angled or striate branches: leaves linear, 5 to 15 lines long, rather obtuse, with prominent stipular glands: flowers pale or roseate: sepals lanceolate, acute, keeled below, glabrous, rather thick, with pale sparingly glandular-ciliate inner margins: petals 2 to 3 lines long, 3-appendaged, the median appendage rounded, hairy: capsule ovoid, acute, a little shorter than the sepals. — Pl. Hartw. 299; Gray, Proc. Am. Acad. vi. 521; Brew. & Wats. Bot. Calif. i. 90; Trelease, l. c. — California, Butte and Colusa Counties to the region east of San Francisco. When low, leafy, and with rather dense inflorescence, it is the scarcely separable var. *CONFERTUM*, Gray in Trelease, l. c., of the San Francisco region, to which pertains the type of *L. Breweri*, Gray, Proc. Calif. Acad. Sci. iii. 102, & Proc. Am. Acad. vi. 521, from the Mt. Diablo Range, *Brewer*, 1181, the flowers of which are described by error as golden.

**L. congestum**, GRAY. From less than a span high to stout and tall: stem glabrous, glaucous, striate below, with corymbose angled branches at top: leaves mostly somewhat pubescent, linear-lanceolate, 3 to mostly 10 or 15 lines long, acute, with stipular glands: flowers rose-purple, in glomerate clusters terminating the branches: sepals ovate-lanceolate, acute, conspicuously pubescent: petals 3 to 4 lines long, 2-toothed, 3-appendaged, the median appendage elongated, somewhat hairy: capsule short-ovoid, nearly as long as the calyx, the false septa complete near the base. — Proc. Am. Acad. vi. 521; Brew. & Wats. Bot. Calif. i. 90; Trelease, l. c. 20. — California, in the region adjacent to San Francisco.

## ORDER XXX. MALPIGHIACEÆ.

BY A. GRAY.

Shrubs or woody climbers, with opposite simple mostly entire commonly stipulate leaves, regular 5-merous 5-10-androus and tri(rarely di)-carpellary flowers. Sepals imbricate and petals between imbricate and convolute in the bud, the latter usually unguiculate and penniveined. Ovules solitary in each cell, between orthotropous and anatropous, often uncinata, and ascending on the pendulous funiculus; micropyle superior. Seeds destitute of albumen; the embryo curved or coiled, or rarely straight. No dilated hypogynous disk. Commonly some large glands on outside of calyx. A tropical order, of which, however, six genera reach our southern borders.

\* Stamens 10, all perfect: styles 3.

+ Fruit wingless.

1. **BYRSONIMA**. A pair of thick glands on back of each sepal. Petals with slender claws reflexed in anthesis. Filaments short, monadelphous at base, there bearded. Stigmas acute. Fruit a small 3-celled drupe; embryo with slender and circinate coiled cotyledons.

2. **MALPIGHIA**. A pair of thick glands on back of most or all the sepals. Flowers of preceding, but base of filaments glabrous and stigmas truncate. Drupe containing 3 distinct dorsally 3-5-crested nutlets; embryo straight, with short radicle and plano-convex cotyledons.

3. **GALPHIMIA**. Calyx glandless. Petals spreading, with distinct claws and thickish midrib to denticulate blade. Filaments slender, distinct or nearly so; anthers oval. Styles filiform; stigmas minute. Fruit a 3-coccos capsule; embryo uncinata-incurved.

+ + Fruit winged, samaroid.

4. **HIRÆA**. Glands one or two on back of each sepal. Filaments and styles short. Ovary 3-lobed, 3-crested. Samara 1 to 3 maturing, broadly winged all round the margin; embryo with short cotyledons uncinata-incurved.

\* \* Flowers dimorphous, the more fertile cleistogamous, usually dicarpellary and with glandless calyx; these with only one or two diminutive stamens; the normal with 5 or 6 monadelphous stamens, two or three of them not rarely deformed and sterile: calyx 8-10-glandular: ovary of 3 lobes or carpels around the base of a single columnar style; stigma obliquely truncate or depressed-capitate.

5. **JANUSIA**. Normal flowers with unguiculate mostly entire petals. Fruit samaroid, winged on the back.

6. **ASPICARPA**. Normal flowers with unguiculate and mostly fimbriate petals, sterile or less fertile than the cleistogamous; cleistogamous flowers with hardly any style, maturing a single carpel (or sometimes a pair of carpels) into an oblique triangular nutlet, which usually becomes horizontally incumbent on the receptacle and in shape may be likened to the head of a serpent; cotyledons obovate, flattish, incurved.

1. **BYRSÓNIMA**, Rich. (*Byrsa*, a hide; bark or leaves used for tanning.) — Rich, in Juss. Ann. Mus. xviii. 481.

**B. lucida**, HBK. Shrub, erect, much branched, glabrous: leaves cuneate-obovate, inch or more long, obscurely veined, shining: flowers in short terminal racemes: petals nearly white, changing to rose-color or some to yellow, the blade reniform, equalled by the claw: drupes the size of peas, greenish. — Nov. Gen. & Spec. v. 147; DC. Prodr. i. 580; A. Juss. Malpigh. 40; A. Rich. Fl. Cub. 271; Chapm. Fl. 82. *Malpighia lucida*, Swartz, Fl. Ind. Occ. ii. 852. — Keys of S. Florida. (W. Ind.)

2. **MALPÍGHIA**, Plumier. (*M. Malpighi*, celebrated anatomist and physiologist of 17th century.)—American shrubs or small trees. Flowers not yellow. Pubescence when present of *malpighiaceous*, i. e. medifixed, hairs, these in some species rigid and fusiform, very sharp-pointed at the two ends and stinging.—Nov. Gen. 46; L. Gen. no. 358; Rich. in Juss. Ann. Mus. xviii. 480.

**M. glábra**, L. (BARBADOES CHERRY.) Shrub, wholly glabrous, with slender branches: leaves ovate, thinnish, inch or two long, almost sessile: peduncles axillary, short, umbellately several-flowered: petals rose-red or paler, with rounded erose blades: drupes red, small; the nutlets obtusely quadrangular, transversely rugose between the short crests or ribs.—Spec. i. 425 (Mill. lc. t. 181); Sims, Bot. Mag. t. 813; Torr. Bot. Mex. Bound. 48.—Corpus Christi Bay, and lower Rio Grande, Texas, *Schott, Palmer*. Perhaps introduced. (Mex., W. Ind.)

3. **GALPHÍMIA**, Cav. (Anagram of *Malpighia*.)—Suffrutescent or suffrutescent, with slender stems and branches terminated by racemes of usually yellow flowers.—Ic. v. 61, t. 489; A. Juss. Malpigh. 67, t. 7.—Chiefly Mexican.

**G. angustifolia**, Benth. A foot or two high: many slender stems from ligneous base and strigose-pubescent with medifixed hairs or glabrate: leaves glabrous, glaucous, variable, lanceolate or linear, acute at both ends and subsessile, or lower oblong to oval and obtuse at both ends and slender-petioled: raceme virgate, loosely-flowered: petals with oblong-ovate blades (a line or two long), yellow changing to red.—Bot. Sulph. 9, t. 5; Gray, Proc. Am. Acad. v. 155. *G. linifolia*, Gray, Pl. Lindh. pt. 2, 166, & Gen. Ill. ii. 196, t. 173.<sup>1</sup>—S. Texas, first coll. by *Berlandier*, then by *Wright*, &c. (Adj. Mex., Lower Calif.)

4. **HIRÆA**, Jacq. (*J. N. LaHire*.)—American shrubs, usually somewhat twining, and with cymulose flowers at ends of branches.—Enum. Pl. Carib. 4, & Stirp. Am. 137, t. 176, f. 42; A. Juss. l. c. 294, t. 19.

**H. macróptera**, DC. Glabrous or nearly so: leaves ovate-oblong to oblong-lanceolate, inch or two long, thinnish: petals yellow, 4 or 5 lines long including the short claw; blades rounded, crenulate-erose: fruit-wings when full grown an inch and a half across.—Prodr. i. 586; A. DC. Calques des Dess. t. 130. *H. septentrionalis*, A. Juss. l. c. 309; Gray, Pl. Wright. i. 37, & var., Gray, Pl. Thurb. 303.—Below the boundary of Arizona in Sonora, *Thurber, Palmer*, &c. (Mex.)

5. **JANÚSIA**, A. Juss. (Name in reference to the double facies of the flowers.)—Twining shrubby or suffrutescent plants. Solitary or umbellate-cymulose flowers at the ends of the branches or in the axils, the normal with yellow petals and mostly fertile; the minute cleistogamous ones in same or separate inflorescence.—Ann. Sci. Nat. ser. 2, xiii. 250, & Malpigh. 349, t. 21; Benth. & Hook. Gen. i. 262.

**J. grácilis**, Gray. Strigulose with medifixed hairs: numerous very slender diffuse and somewhat twining stems a foot or two high from a thick ligneous base: leaves lanceolate-linear, inch or more long, very short-petioled: flowers 1 to 3 together: petals about 2 lines long, with ovate or subcordate blade, turning reddish or brownish: fertile stamens 2 or 3: scarious fruit-wing oblong, 4 lines long.—Pl. Wright. i. 37, ii. 30; Torr. Pacif. R. Rep. vii. 9, t. 1.—Western border of Texas to Arizona; first coll. by *Wright*. (Adj. Mex.)

**J. CALIFÓRNICA**, Benth. Bot. Sulph. t. 4, is a related species from Lower California, with oval leaves.

<sup>1</sup> Add syn. *Thryallis angustifolia*, Kuntze, Rev. Gen. 89; and *T. angustifolia*, var. *oblongifolia*, A. M. Vail, Bull. Torr. Club, xxii. 228 (*G. linifolia*, var. *B*, *oblongifolia*, Gray, Pl. Wright. i. 36), the broad-leaved form.

6. **ASPICÁRPA**, Rich. (Ἀσπίς, used in the Latin sense, viper, καρπός, fruit, the nutlet likened to a viper's head.) — Low or diffuse suffrutescent plants, or woody-based herbs (of Mexico and adjacent borders). Slender erect or diffuse stems hardly at all twining, strigulose-pubescent with medifixed hairs. Glabrate or glabrous leaves. Flowers axillary or terminal. — *Mém. Mus. Par.* ii. 398, t. 13; *Lag. Nov. Gen. & Spec.* 1; *DC. Prodr.* i. 583; *A. Juss.* l. c. 343, t. 21.

**A. longipes**, GRAY. Stems diffusely spreading or decumbent, 2 or 3 feet long: leaves oval or ovate-oblong, obtuse and with rounded or subcordate base, thinnish, veiny (a third to inch and a half long), lower short-petioled: petaliferous flowers somewhat umbellate at ends of branches, with petals quarter inch long; cleistogamous flowers solitary on filiform axillary peduncles, and subtended by a pair of small foliaceous bracts: nutlets smoothish and with rounded or slightly margined lateral angles. — *Pl. Wright.* i. 37, ii. 30. — S. W. Texas to Arizona; first coll. by *Wright*, then by *Thurber*. (Adj. Mex., some forms near to *A. Hartwegiana*, *A. Juss.*)

**A. hyssopifolia**, GRAY. Stems erect, a span to a foot high: leaves linear-lanceolate or linear and closely sessile or partly clasping by a broadish base (half inch to inch long) or lowest short and oval, nearly veinless, glabrous: flowers all axillary and solitary; petaliferous on bractless peduncles nearly equalling the leaf, the fimbriate-edged petals 2 or 3 lines long; cleistogamous sessile: nutlet reticulate, with acutely crested back and marginless sides. — *Pl. Lindh.* pt. 2, 167, & *Pl. Wright.* ll. cc. — S. Texas, on and near the Rio Grande, *Wright*. (Adj. Mex., *Berlandier*, *Palmer*.)

## ORDER XXXI. ZYGOPHYLLACEÆ.

By A. GRAY.

Herbs or hard-wooded trees and shrubs, the branches commonly with articulated nodes, with opposite or alternate leaves, these more commonly pinnate and always impunctate, the leaflets entire; the 1-flowered peduncles often springing from the axils of the stipules, which are interpetiolar when the leaves are opposite. Flowers perfect, 5-merous (rarely 4-6-merous), regular and mainly symmetrical, all the parts free and hypogynous. Stamens double (in one genus rarely triple) the number of the petals and the outer series opposite them. Sepals mostly imbricate and petals either imbricate or convolute in the bud. Pistil of as many carpels as petals (or rarely twice as many or fewer), combined into a few-several-celled ovary and terminated by a common style and barely lobed stigma; ovules solitary or several in the cells, anatropous or nearly so, with micropyle superior. Fruit never baccate; embryo large and straight or merely curved. Leaves, when opposite, usually with one (sometimes suppressed or abortive) smaller than its fellow. Largely African and Asian; a few reaching our southern borders.

*PÉGANUM*, which belongs here rather than with *Rutaceæ*, is anomalous in the number of stamens, mostly fewer carpels, and numerous seeds. In the alternate leaves it agrees with two Mexican genera, *Sericodes* and *Chitonia*, of which the former may possibly belong to our flora, for

*SERICODES GRÉGGII*, Gray, occurs not far south of New Mexico.



\* Herbs, with no albumen to the seed, an almond-like embryo, and abruptly pinnate mostly opposite leaves.

1. **TRIBULUS.** Sepals and petals 5, rarely 4 or 6. Filaments slender, naked; those before the petals sometimes adnate to their bases; the alternate ones with a hypogynous gland behind each. Ovary sessile; cells as many or twice as many as petals, 1-5-ovuled. Fruit lobed, 5-10(-12)-coccous, i. e. splitting at maturity into as many hard and closed nutlets, these usually muricate or spinescent on the back.

\* \* Herbs with albumen to the seeds and alternate leaves.

2. **PEGANUM.** Sepals 4 or 5, foliaceous, often cleft or pinnatifid, open in the bud, persistent. Petals 4 or 5, lightly convolute in the bud. Stamens 12 to 15, inserted around a low annular disk, one series alternate with the petals, the others in pairs before them; filaments naked; anthers linear. Ovary 2-4-lobed, 2-4-celled; numerous ovules in each cell upon a central placenta; style slender, at length twisted, above acutely 2-4-angled and the angles stigmatose. Capsule globose, coriaceous, tardily or imperfectly dehiscent, many-seeded; seeds with spongy scrobiculate testa, and a slightly curved embryo in fleshy albumen.

\* \* \* Woody or suffrutescent plants, with albumen to the seeds and opposite leaves.

+ Leaves 1-3-foliolate: subherbaceous or suffruticose.

3. **FAGONIA.** Sepals 5, deciduous. Petals 5, unguiculate, early deciduous. Stamens 10, with filiform naked filaments and short anthers. Ovary sessile, 5-celled; a pair of collateral ovules in each cell. Fruit ovate, 5-lobed, subulate with the style, smooth, 5-coccous; the carpels separating from each other and from the styliiferous axis, dehiscent ventrally, and thin epicarp separable from the cartilaginous endocarp; seed solitary, with mucilaginous coat and horny albumen.

+ + Leaves abruptly pinnate; leaflets from one to several pairs: calyx deciduous.

4. **LARREA.** Sepals and petals 5. Stamens 10; filaments slender, bearing on the inside near the base a conspicuous 2-cleft or laciniate petaloid scale; anthers oblong. Ovary short-stipitate, globular, 5-celled, about 3 pairs of ovules in each cell; style filiform; stigmas 5, minute. Fruit villous, 5-lobed, 5-coccous; the carpels 1-seeded, at maturity separating from each other and from the slender axis, indehiscent; embryo slightly arcuate in the horny albumen; its oblong cotyledons anterior and posterior in the carpel.
5. **GUAIACUM.** Sepals and petals 5 or sometimes 4. Filaments naked or bearing a small scale; anthers oblong, incurved in age. Ovary variously stipitate, 2-5-angled, 2-5-celled, and with 4 or 5 pairs of ovules in each cell; style slender-subulate; stigma small. Fruit glabrous, 2-5-coccous, coriaceous or at first fleshy; the carpels 1- or sometimes 2-seeded, separating at maturity, ventrally and sometimes dorsally dehiscent; seed with thick coat and straight or somewhat curved embryo in horny albumen; oval cotyledons with edges or sometimes their faces ventral and dorsal in the carpel.

1. **TRÍBULUS**, Tourn. **CALTROPS.** (*Τρίβολος*, ancient name of *Trapa*, transferred by the herbalists to this genus.) — Prostrate or ascending herbs, mostly pubescent, with abruptly pinnate leaves, some or in certain species all of them becoming alternate by suppression of one of the pair, and yellow flowers on simple peduncles. — Inst. 265, t. 141; L. Gen. no. 360; Benth. & Hook. Gen. i. 264. *Tribulus* & *Kallstræmia* (Scop.), Endl. Gen. no. 6030, 6031; Gray, Gen. Ill. ii. 115, 117. t. 145, 146.

§ 1. Calyx deciduous: cells of the ovary only as many as the petals, i. e. 5, rarely 4, few-ovulate, forming as many nut-like spinescent or tuberculate 2-5-seeded cocci which at separation leave no central axis; the seeds superposed, nearly horizontal and separated by transverse septa. — *Tribulus*, Scop. Intro. 253, &c.

**T. cistoïdes**, L. Perennial: leaves silky-canescens, sometimes glabrate and greener: leaflets oblong, 3 to 5 lines long: petals usually an inch long, equalling the peduncle: carpels 3-5-seeded, tuberculate, armed with two to four long and stout spines. — Spec. i. 387; Jacq. Hort. Schœnb. t. 103; Gray, l. c. 116, t. 145; Griseb. Fl. W. Ind. 134. — Coast of S. Florida; also southwestern borders of Arizona. (Trop. cosmopolite mostly on sea coasts.)

**T.\* TERRÉSTRIS**, L. Silky-villous annual, branched from the base; branches elongated, decumbent: leaflets 5 to 7 pairs, small, oblong: short-peduncled flowers small: pale yellow petals a line or two in length, scarcely exceeding the sepals: hirtellous carpels with median warty or spinulose crest and 2 (to 4) stout spreading spines (those from neighboring sides of adjacent carpels approximate in pairs). — Spec. i. 387; Reichenb. Ic. Fl. Germ. v. t. 161; Schk. Handb. t. 115. — Not infrequently collected on ballast and made land in the Midd. and S. Atlantic States, *Brown, Parker*; also found at Newport, Rock Co., Nebraska, *J. M. Bates*, communicated by Prof. Britton.

§ 2. Calyx mostly deciduous: cells of the ovary double the number of the petals (8 to 10) and uniovulate, sometimes one or more of the alternate ones abortive: seed solitary and suspended in the cells.

**T.\* Califórnicus**, WATSON.<sup>1</sup> Depressed, cinereous-pubescent: leaflets (4 to) 5 or 6 pairs, 2 or 3 lines long, half as broad: petals 2 or 3 lines long: fruit ovate in outline, conspicuously beaked, the maturing carpels 2 lines long, armed with a few equal short rather sharp but soft spines. — Proc. Am. Acad. xi. 125; Brew. & Wats. Bot. Calif. i. 91; Gray, Proc. Am. Acad. xxii. 306.<sup>2</sup> — S. Arizona, *Pringle, Lemmon*. (Northern Mex., *Palmer*; Lower Calif., *Palmer, Brandegee*.)

**T.\* brachystylis**, ROBINSON, n. comb. Leaflets only 4 pairs, when fully developed considerably larger than in the last preceding species, 5 or 6 lines long, half as broad, very oblique at the base: calyx commonly deciduous much before the maturity of the fruit: petals 2 or 3 lines long, little exceeding the sepals, orange-yellow: carpels 9 or 10, carinate and bearing a few low warts; style short, not a line in length. — *Kallstrœmia maxima*, Gray, Pl. Wright. ii. 26. *K. brachystylis*, A. M. Vail, Bull. Torr. Club, xxiv. 206. — New Mexico, east side of Rio Grande, *Wright*, no. 912, at Mesilla, *Hayes*, and on mesa near Las Cruces, 3,900 feet, *Wooton*. (Guaymas, Mex., *Palmer*.) Distinguished from the following by its more promptly deciduous calyx, deeper-colored petals, and shorter style.

§ 3. Calyx more or less persistent: cells of the ovary by duplication double the number of the petals, 10 or 12, all fertile and uniovulate, at maturity forming as many rugose or barely tuberculate akeniform nutlets, which fall away from a persistent styliiferous axis; solitary seed suspended: stamens opposite the petals adnate to their bases: ours annuals, and the stems ascending. — *Kallstrœmia*, Scop. Introd. 212; Endl. l. c. no. 6031; Gray, Gen. Ill. ii. 117, t. 146.

**T. máximus**, L. Hirsute-pubescent: leaflets 2 to 4 pairs, oblong or oval, 4 to 9 lines long: peduncles not surpassing the leaves: sepals oblong-lanceolate, or in age linear, not surpassing the mature carpels: petals greenish yellow, quarter inch long: conical or thickened style hardly longer than the carpels (2 lines long), all but its base often deciduous from the fruit. — Spec. i. 386 (Sloane, Hist. Jam. i. 209, t. 172, whence Linnæus took the inappropriate name); Jacq. Ic. Rar. t. 462; Ell. Sk. i. 476. *T. terrestris*, Muhl. Cat. 42. *T. trijugatus*, Nutt. Gen. i. 277, but fruit wrong. *Kallstrœmia maxima*, Torr. & Gray, Fl. i. 213; Gray, Gen. Ill. ii. 118, t. 146; Engler in Mart. Fl. Bras. xii. pt. 2, 71. — Texas<sup>3</sup> to Arizona and borders of California; and naturalized eastward to Georgia and Florida. (Mex., S. Am., &c.)

<sup>1</sup> Description somewhat amplified to exclude more clearly the next following species.

<sup>2</sup> Add syn. *Kallstrœmia Californica*, A. M. Vail, Bull. Torr. Club, xxii. 230.

<sup>3</sup> Northward to Oklahoma Territory, where a noxious weed, acc. to Carleton, and Kansas, *Smyth, Hitchcock*.

**T. grandiflorus**, BENTH. & HOOK. Barbately hispid, or below and sometimes almost wholly glabrate: leaflets 4 to 7 pairs, oblong, from a quarter to full inch long: peduncles surpassing the leaves: sepals narrowly lanceolate, much acuminate, in age linear-attenuate, surpassing the fruit, shorter than the slender persistent style: petals deep yellow or orange, commonly an inch long. — Benth. & Hook. acc. to Wats. Bibl. Index, 149; Brew. & Wats. Bot. Calif. i. 91. *Kallstromia grandiflora*, Torr. in Gray, Pl. Wright. i. 28, & Bot. Mex. Bound. 42.<sup>1</sup> — Southwestern borders of Texas to Arizona and probably borders of California. (Mex. and Lower Calif., first coll. by *Th. Coulter*.)

**2. PÉGANUM**, L. (Ancient Greek name of Rue, transferred by Linnæus to the *Harmala* of the herbalists.) — Low and branching perennial herbs, with alternate mostly pinnately parted leaves, small and setaceous or subulate adnate stipules, and flowers solitary and terminal or opposite the leaves. — Gen. no. 443; Benth. & Hook. Gen. i. 287; Baill. Hist. Pl. iv. 418, 505, f. 506–508. — Four Mediterranean-Oriental and one Mexican species.

**P. Mexicánum**, GRAY. A span or two high from a deep lignescant root, very leafy: leaves rather fleshy, once or twice pinnately or subternately dissected into linear-filiform lobes; flowers very short-peduncled, 4-merous: petals pale yellow, shorter than the lacinate-cleft leaf-like sepals: filaments hardly dilated at base: fruit recurved on the short peduncle; seeds clavate-oblong (Pl. Wright. ii.) or like those of *P. Harmala*, L. — Pl. Wright. i. 30, & ii. 106. — Mountains of S. New Mexico and Arizona,<sup>2</sup> *Wright, Thurber*. (Adj. Mex., *Berlandier, Gregg, &c.*)

**3. FAGÓNIA**, Tourn. (*Guy C. Fagon*, professor of botany at Paris in the 17th century.) — An Old World genus, excepting the following and a very nearly related Chilean species. — Inst. 265, t. 141; L. Gen. no. 359.

**F. Californica**, BENTH. Suffrutescent, exceedingly branched, slender: stipules acerose, varying from 1 to 3 lines long: leaflets obovate-spatulate to lanceolate, quarter to half inch long, lateral ones seldom equalling the slender petiole: petals rose-purple, two or three lines long: fruit only 2 lines long, much shorter than the deflexed fructiferous peduncles. — Bot. Sulph. 10; Torr. Pacif. R. Rep. v. 359, t. 1; Wats. Bot. King Exp. 418; Brew. & Wats. Bot. Calif. i. 92. Varies from glabrous, var. *Hindsiana*, to granulose- or glandular-puberulent, var. *Barclayana*, Benth. l. c.<sup>3</sup> — Arid region of Arizona and S. E. California. (Adj. Mex., Lower Calif.)

**4. LARRÉA**, Cav., not Ort. (*J. A. H. de Larrea*, a Spanish ecclesiastic.) — Balsamic-resiniferous shrubs, all except the following species of extra-tropical South America, with fleshy-coriaceous small leaves, and short-peduncled or sessile yellow flowers terminating the numerous branchlets. — Anal. Hist. Nat. Madrid, ii. 119, t. 18, 19, & Ic. vi. 39, t. 559, 560; A. Juss. Mém. Mus. xii. 456, t. 15, f. 5.

**L. Mexicana**, MORICAND. (GOBERNADORA, CREOSOTE-PLANT.) Shrub 3 to 10 feet high, very much branched, somewhat unpleasantly balsamic-scented, viscous, very leafy: leaves very short-petioled, bright and deep green, mostly of a single pair of oblong inequilateral and somewhat falcate leaflets (a quarter to half inch long), which are closely sessile and somewhat connate by their broad bases: sepals ovate, silky: petals 3 or 4 lines long: staminal scales nearly equalling the filaments: fruit a quarter or third inch long. — Pl. Nouv. Am. 71, t. 48; Torr. in Emory, Rep. 138, t. 3; Gray, Gen. III. ii. 120, t. 147; Brew. & Wats. Bot. Calif. i. 92. — *L. glutinosa*, Engelm. in Wislitz. Tour Northern Mex. 93 (p. 9 of reprint).

<sup>1</sup> Add syn. *T. Fischeri*, Kell. Proc. Calif. Acad. Sci. vii. 162.

<sup>2</sup> Also in Eagle Mts. of extreme Western Texas, acc. to Coulter, Contrib. U. S. Nat. Herb. ii. 53.

<sup>3</sup> Add syn. *F. Californica*, var. *glutinosa*, A. M. Vail, Bull. Torr. Club, xxii. 229.

*Zygophyllum tridentatum*, Moc. & Sessé acc. to DC. Prodr. i. 706; A. DC. Calques des Dess. t. 159.<sup>1</sup> — Arid districts, S. Texas<sup>2</sup> to S. Utah and S. California; fl. summer. (Mex.)

**5. GUAIÁCUM**, Plumier. **LIGNUM-VITÆ**. (Aboriginal name.) — Tropical and subtropical American trees or shrubs, with very hard and heavy resinous wood, abruptly pinnate somewhat coriaceous leaves, and blue or purplish solitary or umbellate-fascicled flowers. — Nov. Gen. 39, t. 17; L. Gen. no. 394; Gray, Gen. III. ii. 121, t. 148, 149. — Name also written *Guajacum*, which, however, was not the original form.

§ 1. Filaments naked: branchlets much articulated: leaflets comparatively large and few, obovate to elliptical.

**G. sanctum**, L. (One of the two kinds of *Lignum-vitæ*, yielding Gum Guaiacum). Small tree: leaflets 3 or 4 or rarely 5 pairs, obovate-oblong or elliptical and oblique, inch or less long: petals very short-unguiculate, quarter to third inch long, double the length of the glabrous sepals: fruit short-stipitate, obovate in outline, wing-angled, abruptly pointed, usually all five carpels maturing. — Spec. i. 382; Gray, Gen. III. ii. 123, t. 148; Nutt. Sylv. iii. 17, t. 86 (var. *parvifolium*, a small-leaved form); Griseb. Fl. W. Ind. 134; Sargent, U. S. 10th Census, ix. 28.<sup>3</sup> *G. verticale* (Ort. Dec. viii. 93?), A. Rich. Fl. Cub. 321. *G. Sloanei*, Shuttl. in distr. pl. Rugel, no. 68, 69. — Keys of Florida. (W. Ind.)

§ 2. Filaments with a small scale at or near the base: leaflets approximate, comparatively small, narrow, and more numerous; stipules in our species small and subspinescent. — *Porlieria*, Ruiz & Pav. Prodr. 55, t. 9. *Guaiacum* § *Guaicidium*, Gray, l. c. 124, t. 149.

**G. Coulteri**, GRAY. Shrub 8 to 10 feet high: leaves 3 to 5 pairs, linear-oblong, obscurely veiny, half inch long: fruit 4-5-coccos, retuse at both ends, mucronulate, half inch high; the carpels merely carinate on the back. (Flowers not seen.) — Pl. Thurb. 312. — Below boundary of Arizona, in Sonora, between Rayon and Ures, *Thurber*. (Mex., *Th. Coulter*,<sup>4</sup> but needs comparison.)

**G.\* angustifolium**, ENGELM.<sup>5</sup> Much-branched shrub or small tree, with spinescent branches: leaflets 4 to 8 pairs, oblong-linear or linear-spatulate, quarter to half inch long, reticulated: flowers mostly single, very short-peduncled, 5-merous or occasionally 4-merous: filaments with a short scale at base: ovary 2-celled: fruit somewhat obcordate-bilobed, carinate-margined. — Engelm. in Wislitz l. c. 113 (p. 29 of reprint); Gray, Pl. Lindh. pt. 2, 158, & Gen. III. ii. 124, t. 149. *Porlieria angustifolia*, Gray, Pl. Wright. i. 28; Torr. Bot. Mex. Bound. 42. — S. and W. Texas from the Colorado south and west to the Pecos; where first coll. by *Lindheimer*. (Mex., first coll. by *Berlandier*.)

<sup>1</sup> The nearly related S. American *L. divaricata*, Cav., with which this species has recently been united (see A. M. Vail, Bull. Torr. Club, xxii. 229), has, in the four specimens at hand, more narrowly oblong and more widely spreading leaflets, which are less inclined to be falcate and are more decidedly connate. In herb. Gray, there is, on the other hand, a specimen collected by *Macrae* and labelled "Int. Buenos or Chili," which is without doubt identical with *L. Mexicana*. The following synonymy may be added to our own species: *L. tridentata*, Coville, Contrib. U. S. Nat. Herb. iv. 75. *Zygophyllum Californicum*, Torr. & Frém. in Frém. Rep. 257, acc. to Coville. *Covillea divaricata*, A. M. Vail, l. c., not *L. divaricata*, Cav.

<sup>2</sup> Northward to S. Colorado, acc. to Coulter, Man. Rocky Mt. Reg. 43.

<sup>3</sup> Add Silv. i. 63, t. 28.

<sup>4</sup> Also about Guaymas, Mex., *Palmer*.

<sup>5</sup> This species is referred to by Dr. Gray, Proc. Am. Acad. xxii. 306, as "*G. parvifolium*," while *G. parvifolium*, Planchon, was unnecessarily given a new name, *G. Planchoni*, Gray, which must fall into synonymy.

## ORDER XXXII. GERANIACEÆ.

By W. TRELEASE.

Herbaceous or suffrutescent terrestrial or marsh plants (in our region), of various duration. Leaves alternate or occasionally opposite or pseudo-verticillate, simple, parted or compound, mostly cut-toothed, the petiole commonly with stipular enlargements. Flowers either evidently cymose, solitary and terminal, or seemingly racemose or umbellate, usually showy, variously colored, perfect, mostly 5-merous (3-6-merous in *Limnantheæ*, and the earliest flower of *Oxalis* not infrequently 6-merous), symmetrical, nearly hypogynous. Glands of the receptacle as many as the sepals and opposite them (reduced and opposite the petals in *Oxalis*), or wanting when the flower is spurred. Sepals and petals distinct or nearly so. Stamens mostly twice as numerous as the petals, distinct (or somewhat connate in *Oxalis* and *Impatiens*); anthers round-oval, more or less versatile, 2-celled, with longitudinal dehiscence. Carpels as many as and alternate with the sepals, united about a columnar prolongation of the receptacle except in *Limnantheæ*; ovary usually deeply lobed, its cells 1-many-ovuled; styles mostly united below, the capitate or lateral stigmas usually distinct. Seeds exalbuminous or nearly so except in *Oxalis*; embryo straight or bent, the cotyledons somewhat plicate and lobed in the genera with dissected leaves.—Five very distinct tribes or suborders, which are generally treated as orders by Continental writers.

TRIBE I. GERANIEÆ. Flowers regular or nearly so, 5-merous. Sepals imbricate, persistent, enlarging somewhat in fruit. Petals imbricate, deciduous. Antheriferous stamens as many as and opposite the sepals, or twice as many, with persistent filaments. Glands of receptacle conspicuous. Carpels 2-ovuled, becoming 1-seeded, breaking elastically from the persistent fluted beak; seeds with little albumen; embryo with sinuously folded incumbent cotyledons.

1. GERANIUM. Leaves radiately divided. Peduncles 1- or mostly 2-flowered. Flowers regular. Stamens with anthers 10, except in *G. pusillum*. Ripened carpels dehiscent on the inner suture, the styler portion merely arched, and nearly glabrous on the inner side; seed often alveolate.

2. ERODIUM. Leaves often pinnately lobed or dissected. Peduncles mostly umbellately several-flowered. Upper petals slightly smaller than the others. Antheriferous stamens 5. Ripened carpels sharp-pointed below, at most tardily dehiscent, the styler prolongation when freed spirally twisting below, bearded on the inner side; seed smooth.

TRIBE II. PELARGONIEÆ. Flowers somewhat irregular. Sepals imbricate, the posterior spurred. Antheriferous stamens neither as many nor twice as many as the petals. Glands of receptacle wanting. Seeds exalbuminous.

3. PELARGONIUM. Spur decurrent and adnate to the pedicel. Stamens 10, or fewer by abortion, 7 usually with anthers. Carpels 5, 2-ovuled, at length dry, 1-seeded, plumed, beaked, breaking from the axis and coiling as in *Erodium*.

4. TROPÆOLUM. Spur free. Stamens 8, all with anthers. Carpels 3, 1-ovuled, fleshy, beakless.

TRIBE III. LIMNANTHÆ. Flowers regular, slightly perigynous, symmetrical. Sepals valvate, persistent and accrescent. Petals withering-persistent. Stamens twice as many as the petals, all antheriferous. Glands of the receptacle evident. Seeds exalbuminous.

5. FLØERKEA. Flowers solitary at the ends of bractless axillary peduncles, 3-5 (or rarely 6)-merous. Petals convolute or not overlapping when small. Carpels 1-ovuled, distinct, the 5-lobed style rising from the centre, in fruit becoming semi-drupaceous rugose-tuberculate nutlets; embryo straight, with flat cotyledons.

TRIBE IV. OXALIDÆ. Flowers regular, normally 5-merous, symmetrical, often heterogone. Sepals imbricate, persistent, scarcely accrescent. Petals convolute, often somewhat united toward the base. Stamens 10; filaments sometimes toothed or with an additional set of auricles or sterile scales. Glands of the receptacle greatly reduced or wanting, alternate with the sepals when present. Seeds albuminous.

6. OXALIS. Flowers dichotomously cymose or seemingly umbellate. Stamens monadelphous in 2 sets of different length. Ovary somewhat 5-lobed, forming a loculicidal several-seeded capsule tipped by the persistent distinct styles with capitate stigmas; seed with a longitudinally dehiscent ariloid outer coat, the firm inner integument usually sculptured; embryo straight, with plane cotyledons.

TRIBE V. BALSAMINÆ. Flowers irregular, hypogynous, usually unsymmetrical from the suppression of 2 sepals. Sepals and petals imbricate, deciduous. Stamens as many as the petals, all antheriferous. No glands of receptacle. Seeds exalbuminous.

7. IMPATIENS. Flowers several, on loosely branched bracteate axillary peduncles. Sepals 3, the posterior petaloid, saccate, and mostly slender-spurred. Petals 5, the lateral pair on each side united. Stamens somewhat united by their appendaged filaments and with more or less connate anthers. Style almost none; ovary not deeply lobed, somewhat fleshy. Valves of the capsule at length breaking elastically from their septa and coiling; seeds with 4 longitudinal ridges; embryo straight, with nearly plane cotyledons.

1. GERANIUM, Tourn. CRANESBILL. (Name from γέρας, a crane, because of the beaked fruit.)—Usually caulescent herbs with simple radiately divided petioled stipulate leaves, some of which are radical.—Inst. 266, t. 142; L. Gen. no. 554; Benth. & Hook. Gen. i. 272; Torr. & Gray, Fl. i. 206; Gray, Gen. III. ii. 127, t. 150; Trelease, Mem. Boston Soc. Nat. Hist. iv. 72, t. 9, 10, 12; Reiche in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 4, 8.—Widely distributed in temperate regions.

\* Perennial from a stout caudex: flowers large (7 to 14 lines in diameter).

+ Erect, not caespitose: leaves usually few, large (often 4 or 5 inches), incisedly 3-5-parted, with cuneate divisions, the lowest of which are 2-cleft and all once to thrice 3-lobed at apex and acuminate serrate; basal sinus mostly V-shaped.

++ Scarcely glandular except the calyx: petals purplish, not villous on the inner surface: fruiting pedicels erect.

G. maculatum, L. Over a foot high, beset with spreading or mostly retrorse hairs: leaves mottled, all the cauline except the primary pair greatly reduced: pedicels at length about an inch long, very slender: outer sepals finely villous: filaments somewhat ciliate: beak of fruit finely pubescent.—Spec. ii. 681; Bigel. Med. Bot. i. 84, t. 8; Raf. Med. Bot. i. 215, t. 42; Gray, Gen. III. ii. 128, t. 150; Trelease, l. c. 74.—Open groves, Canada and New England to the Great Lakes, south to Iowa, Mississippi, and Florida.

G. erianthum, DC. From a span to over a foot high, more leafy-branched: leaves in small specimens not over 2 inches wide, with more numerous narrower crowded lobes: pedicels

scarcely over half inch long, rather stout: calyx densely woolly-villous, many of its hairs gland-tipped; filaments long-pilose: beak of fruit canescent and somewhat villous. — Prodr. i. 641; Trelease, l. c. *G. maculatum*,  $\beta$ , Hook. Fl. Bor.-Am. i. 116. — Alaska and N. W. Brit. America. (N. E. Asia.)

++ ++ At least the pedicels conspicuously glandular-pubescent: petals more or less beset on the inner surface with long white rather stiff hairs: filaments villous: fruiting pedicels spreading or reflexed and bent.

**G. incisum**, NUTT. Coarser than the preceding and leafy-branched: pedicels and often petioles or even the entire plant dingy glandular-pubescent with rather short hairs, and somewhat unequally and commonly retrorsely villous, or occasionally (in a slender form) canescent with very short incurved hairs: petals purple: beak of fruit very glandular. — Nutt. in Torr. & Gray, Fl. i. 206; Trelease, l. c. 74. *G. albiflorum*, var. (?) *incisum*, Torr. & Gray, l. c. *G. Hookerianum*, var. *incisum*, Walp. Rep. i. 450. *G. viscosissimum*, Fisch. & Mey. Ind. Sem. Hort. Petrop. xi. Suppl. 18. *G. pentagynum*, Engelm. in Wisliz. Tour Northern Mex. 90. *G. Fremontii*, Macoun, Phænog. & Cryptog. Pl. of Canad. 10. *G. erianthum*, Torr. Bot. Wilkes Exped. 251; Lindl. Bot. Reg. xxvii. Misc. 44, xxviii. t. 52. — Woods and open places; the coarser more villous form from the mountains of Brit. Columbia and Saskatchewan to Oregon, Idaho, and S. Dakota; the slender more canescent form from Central California to Oregon, Idaho, and Utah. A form doubtfully referable here, with the purple glands of the next species and seemingly glabrous magenta petals, occurs in Oregon, Miss Mulford. Some Washington specimens have the glandular hairs almost concealed beneath the very abundant long hairs.

**G. Richardsonii**, FISCH. & TRAUTV. Slenderer, inconspicuously retrorsely pubescent below, the peduncles and pedicels and sometimes the upper part of the stem villous with long white hairs tipped with purple glands: leaves thin, the uppermost with the terminal lobe longer than the often greatly reduced lateral lobes: pedicels straighter: petals white, mostly roseate-veined: beak of fruit sparingly puberulent and glandular-villous. — Ind. Sem. Hort. Petrop. iv. 37; Trelease, l. c. 75. *G. albiflorum*, Hook. Fl. Bor.-Am. i. 116, t. 40. *G. Hookerianum*, Walp. Rep. i. 450. — Open places and ravines in the mountains, Saskatchewan to Utah and New Mexico. A reduced very slender occasionally somewhat cespitose plant, scarcely to be referred elsewhere, occurs in the mountains of New Mexico, *Walcott*; Arizona, *Knowlton*, *Lemmon*; and S. California. Some Colorado specimens have leaves approaching those of *G. Fremontii* in outline, and it is not certain that the two species do not hybridize.

**G. Mexicánum**, HBK. Slender, a couple of feet high, coarsely white hairy, the hairs appressed on the leaves, but little glandular: leaves 3-lobed with openly V-shaped basal sinus; the lowest very long-petioled; the uppermost less than an inch long, with the lateral lobes greatly reduced: flowers short-pedicelled: petals white, about 4 lines long: fruit not seen. — Nov. Gen. & Spec. v. 230. *G. Hernandezii*, Trelease, l. c. 76. — Huachuca Mountains, Arizona, *Lemmon*. Perhaps also Rio Zúñi, New Mexico, *Wootton*. (Mex.)

+ + Spreading and cespitose from the branched summit of the caudex, leafy-branched: leaves firm, of medium size (1 to 3 inches), 3-parted with broadly cuneate divisions; the cauline mostly truncate at base, incisely once or twice 3-lobed at apex; the lower once or, especially in radical leaves, twice cleft on the lower side: petals villous within: fruiting pedicels refracted.

**G. Fremontii**, TORR. A span to a foot or two high, the smaller plants sometimes subcaulescent, the larger with slender spreading leafy branches, dingy glandular-pubescent at least above: petals rather light rose-purple: beak of fruit dirty-glandular. — Torr. in Gray, Pl. Fendl. 26, & in Marcy, Rep. 303, t. 3; Trelease, l. c. 75. — Mountains, from the Black Hills to Utah and New Mexico, extending, in a more loosely branched perhaps separable form with longer and paler glandular hairs, into Arizona, *Knowlton*, *Lemmon*; and S. California, *Parish*, *Orcutt*. A tall form of the Colorado mountains, with loosely villous as well as short glandular pubescence, and often slender elongated petioles, is var. *PARRYI*, Engelm. in Gray, Am. Jour. Sci. ser. 2, xxxiii. 405.

**G. cespitosum**, JAMES. Usually slenderer, often rooting at the nodes, with longer slenderer retrorsely hispid or canescent but not glandular pedicels: petals roseate to rich

purple, turning brown, seemingly more spreading or reflexed than in related species: beak of fruit gray-pubescent: otherwise closely resembling the last, which it approaches by variously glandular forms of the extreme Southwest, while a few specimens with the pubescence of this species rather than of *G. Fremontii* have been collected in Colorado, Wyoming, and California. — James in Long, Exped. Am. ed. ii. 3, as *cæspitose*; Torr. Ann. Lyc. N. Y. ii. 173; Gray, Pl. Fendl. 25; Trelease, l. c. 75. — Arizona, New Mexico, and southward. (Lower Calif.)

\* \* Annuals or winter-annuals without a stout caudex (except in *G. pilosum*): leaves rarely 2 inches long, often much smaller: pedicels mostly bent in fruit except when crowded: flowers small (2 to 8 lines in diameter): petals not conspicuously villous within.

+ Segments of ripe ovary bearing a tuft of white hairs at the base within, the top not filiferous: leaves radiately lobed or mostly dissected.

++ Peduncles 1-flowered: leaves 3-cleft, with serrate acute divisions.

**G. SIBIRICUM, L.** Slender, repeatedly forked, short-villous: petals dingy white with purple veins: divisions of ovary puberulent and sparingly villous: seed minutely reticulate-areolate. — Spec. ii. 683; Trelease, l. c. 76. — Established on Manhattan Island, and occasional elsewhere, *e. g.*, Illinois, *Bebb*; California, *Miss Edmonds*. (Introd. from Asia.)

++ ++ Peduncles 2-flowered: leaves several-lobed.

= Peduncles and pedicels long (1 to 3 inches) and slender: carpels neither villous nor wrinkled: seed deeply pitted, subglobose.

**G. COLUMBINUM, L.** Very slender, spreading and prostrate, hispid with short close retrorse gray hairs which on the calyx are nearly confined to the nerves; not glandular: leaves 3- or 5-divided and dissected into numerous linear divisions: petals rose-purple: beak of fruit appressed-hispid. — Spec. ii. 682; Trelease, l. c. — Pennsylvania, Virginia, and S. Dakota. (Introd. from Eu.)

= = Peduncles and pedicels short (except in *G. Carolinianum*, var. *longipes*): carpels either conspicuously hairy or wrinkled.

a. Seed reticulately ridged or pitted: carpels hairy, not wrinkled.

**G. Carolinianum, L.** A span to a foot high, spreading when large, loosely gray-pubescent and mostly dingy-glandular: leaves incisely 3- or 5-parted, the cuneate segments more or less deeply cut-toothed or dissected, with the ultimate divisions rather broad: peduncles and pedicels seldom over an inch long, at length often densely crowded among the upper leaves: petals rose-colored: beak of fruit loosely villous or glandular; carpels villous-hispid, usually black; seed low-reticulate. — Spec. ii. 682; Trelease, l. c. *G. atrum*, Mönch, Meth. 285. *G. lanuginosum*, Jacq. Hort. Schœnb. ii. 8, t. 140. — Open places, Canada to Washington, south to the Gulf and California. Most common in the South and West. (Mex., W. Ind.) A form from New Braunfels, Texas, *Lindheimer*, with deeply pitted round seeds, but scarcely differing otherwise, is var. *TEXANUM*, Trelease, l. c. About New York City, and elsewhere in the East, a form with narrower sepals and longer pedicels and beak than usual is *G. Bicknellii*, Britton, Bull. Torr. Club, xxiv. 92.

**Var. longipes, WATSON.** Of looser habit: leaves commonly cleft into 3 equal broad primary lobes: peduncles long and spreading; pedicels scarcely bent. — Bot. King Exp. 50. — Mountains, Colorado and Utah to Washington, *Suksdorf*, and Brit. Columbia, *Macoun*.

**G. DISSECTUM, L.** Very like the preceding, but the principal lobes of the leaves conspicuously narrow, with ultimate divisions mostly slender, falcate, and very acute: petals deeper purple. — Cent. i. 21, & Amœn. Acad. iv. 282; Trelease, l. c. 77. — Vancouver Island to California. (Introd. from Old World.)

**G. PILOSUM, Forst. f.?** Slender and spreading from a thick perennial rootstock, the branches at length a foot or two long, retrorsely canescent-pubescent but not glandular: leaves nearly as in *G. Carolinianum* but smaller and with more open sinuses, the ultimate segments narrow: petals deep purple: carpels puberulent and somewhat villous. — Prodr. 91; F. Muell. Key Syst. Vict. Pl. i. 152. *G. retrorsum*, Greene, Man. Bay-Reg. 69. — About San Francisco Bay, California. (Adv. from Austral., N. Zeal.)



**G. PARVIFLÓRUM**, Willd. Slender and spreading, retrorsely gray-pubescent: leaves with broad less lobed divisions: flowers not aggregated, small, the deep violet petals little exceeding the calyx. — Enum. 716; A. Eastwood, *Erythea*, iv. 145. — California, Mt. Tamalpais, *Congdon*, *Duncan's Mills*, *Davy*. (Adv. from So. Pacific Ids.) Probably not separable from the preceding, with which, also, it has sometimes been referred to *G. dissectum*.

**G. ROTUNDIFÓLIUM**, L. Low and spreading, slender, scarcely a span high: pedicels, etc., villous with purple-glandular long white hairs: petals entire, small: fruit and seed nearly as in *G. dissectum*. — Spec. ii. 683; Trelease, l. c. 77. — Michigan and about New York City. (Introd. from Eu.)

b. Seed neither pitted nor reticulately ridged: petals scarcely exceeding the calyx except in the second.

**G. pusillum**, BURM. f. Slender, spreading, soft-pubescent or the calyx, etc., somewhat glandular-villous or with short glands: leaves small, round-reniform or the cauline truncate at base, equally cleft into about 7 cuneate oblong lobes each more or less regularly 3-toothed at apex: peduncles distributed along the stem: petals pale to deep violet, somewhat notched: antheriferous stamens only 5 (exceptional in the genus): fruit very small with puberulent beak, the carpels 1 line long, finely canescent, not wrinkled. — Spec. Geran. 27; L. Spec. ed. 2, ii. 957; Trelease, l. c. 77. — Open places, Canada to West Virginia, Ohio, and Illinois; also in Utah, *Jones*, and from Idaho northwestward.

**G. PYRENÁICUM**, BURM. f. (Spec. Geran. 27), a European perennial with the aspect, fruit, and seed of the last, but with obcordate petals twice as long as the calyx, appears to have been collected many years ago at Bethlehem, Pennsylvania, *Wolle*.

**G. MÓLLE**, L. Resembling *G. pusillum*, but lower, the leaves shorter-lobed and the flowers fewer, more numerous toward the top: softly and densely glandular-villous: petals deep purple, obcordate: fruit as large as in the last, but the carpels glabrous and conspicuously transversely wrinkled; seeds slightly striate. — Spec. ii. 682; Trelease, l. c. 77; A. Eastwood, *Erythea*, iv. 151. — Canada to Vancouver Island, south to California, Ohio, and New York. (Sparingly introd. from Eu.) Specimens with unwrinkled carpels have been collected at Falmouth, Mass., *Deane*, and Painesville, Ohio, *Beardslee*.

+ + Ovarian portion of ripened carpels deciduous from the style, bearing two bristle-like tufts of fibres at upper end: leaves 1-2-ternately divided.

**G. Robertiánum**, L. (HERB ROBERT.) A span to a foot and a half high, erect, spreading or decumbent, purple-tinged, puberulent and loosely glandular-villous, graveolent: leaves 3-5-angled, their ultimate lobes oblong, coarsely acuminate-toothed: pedicels rather short and not refracted: flowers open funnel-form, rose-purple: carpels loosely wrinkled, sparingly pubescent; seeds smooth. — Spec. ii. 681; Trelease, l. c. 78. *G. inodorum*, Don, Syst. i. 721. — Damp ravines, etc., New Brunswick and Canada to Pennsylvania, Ohio, and Minnesota. (Old World.)

2. **ERÓDIUM**, L'Her. STORKSBILL. (Name from *ἑρῳδῖος*, a heron, because of the beaked fruit.) — Acaulescent or at length caulescent herbs with the radical and cauline leaves either round-ovate and little lobed or elongated and pinnatisect. — Geraniol. t. 1-6; Willd. Spec. iii. 625; Torr. & Gray, Fl. i. 207 Gray, Gen. Ill. ii. 129, t. 151; Benth. & Hook. Gen. i. 272; Trelease, Mem. Boston Soc. Nat. Hist. iv. 80, t. 10; Reiche in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 4, 9. — Mostly natives of the north temperate portion of the Old World, some species widely distributed as weeds, especially in sandy regions.

\* Leaves round-ovate, not lobed or with approximated broad lobes: filaments greatly dilated at base: beak of fruit nearly 2 inches long; seeds large (2 to 2½ lines long). Native species.

**E. macrophýllum**, Hook. & Arn. Usually nearly or quite acaulescent, tomentose, with copious interspersed long glandular hairs, at least on the pedicels: leaves triangular-ovate or reniform to nearly deltoid, sometimes crenately lobed, carpels crenate: flowers mostly 2

or 3 together: petals white, 5 to 8 lines long, little surpassing the broad sepals: beak of fruit stout; ripened carpels more hairy than in our other species, conspicuously truncate at top. — Bot. Beech. 327; Torr. & Gray, l. c. 679; Trelease, l. c. 81. *E. Californicum*, K. Brandegee, Zoe, iv. 86. — Oregon, Ashland, *Howell*, through California. (Lower Calif., *Parry*, *Orcutt*.)

**E. Californicum**, GREENE. Tall and branching, puberulent and beset with purple-tipped glandular hairs: leaves ovate, reniform-cordate, crisped, crenate, crenately about 7-lobed: flowers frequently 5 or 6 in a cluster: petals deep rose-red or purple except in albinos. — Fl. Francis. 99, & Man. Bay-Reg. 70. — California, from San Francisco southward.

**E. Texanum**, GRAY. Cespitose, with ascending leafy branches, canescently appressed-pubescent, without glandular hairs: leaves elongated-ovate, cordate to truncate or the upper narrowed at the base, the radical slightly crenately lobed and the cauline obtusely 3-5-lobed with rather acute open sinuses, shallowly crenate to dentate: flowers in clusters of about 3: sepals narrow, often silvery, usually purple-veined: petals purple, 7 to 9 lines long on the earliest flowers, but mostly greatly reduced or suppressed: beak of fruit slender; carpels not prominently truncate. — Gen. III. ii. 130, t. 151, Pl. Lindh. pt. 2, 157, & Pl. Wright. ii. 25; Trelease, l. c. 81. — Texas to Central California and Lower California.

\* \* Foliage of the preceding, but the upper leaves more incisely cut and serrate: fruit small, its beak about an inch long; seeds not over  $1\frac{1}{2}$  lines long. Ballast plants from the Mediterranean Region.

**E. MALACÓIDES**, Willd. Caulescent, somewhat glandular and hispid-villous: upper leaves incisely 5-9-lobed, irregularly toothed: sepals tipped with bristle-like hairs: petals small, pale roseate. — Phyt. 10, & Spec. iii. 639; Reichenb. Ic. Fl. Germ. v. t. 185, f. 4868 (*Herodium*); Trelease, l. c. 81 (*malachoides*). — On ballast, New York City, *Brown*.

\* \* \* Leaves oblong-ovate, pinnatifid to tripinnatifid: fruit large, its beak 3 to 5 inches long; seeds as in the last. Occasional rather large caulescent plants from the Mediterranean region.

**E. CICÓNIUM**, Willd. Even the large cauline leaves subternately 2- or 3-parted with cuneate lobes, the lowest of which are often somewhat stalked, round-toothed: sepals long-pointed, not bristle-bearing: petals moderately large, deep dull purple. — Spec. iii. 629; Reichenb. Ic. Fl. Germ. v. t. 184, f. 4866 (*Herodium*); Trelease, l. c. 81. — On ballast, Philadelphia, *Martindale*.

**E. BÓRRYS**, Bertol. With coarse white pubescence: cauline leaves smaller, pinnatifid into oblong broad-based acute serrate segments: sepals mostly short-pointed and tipped with 1 or 2 short bristles: petals deep violet. — Amcen. Ital. 35; Trelease, l. c. 81. — Ballast and refuse, various points in California, and at Boston, Mass., *Murray*. Sometimes flowering when acaulescent and very small in all its parts.

\* \* \* \* Leaves oblong, pinnate or bipinnate: petals rose-purple, small: fruit small, its beak  $1\frac{1}{2}$  to  $1\frac{3}{4}$  inches long; seeds as in the preceding section. Hispid or glandular-villous cespitose Mediterranean species, established in the Southwest and occasional elsewhere.

**E. MOSCHÁTUM**, L'Her. Acaulescent and closely prostrate or soon with ascending branches, mostly stout and glandular: leaflets usually large, short-stalked, ovate to elliptical, serrate, somewhat incisely broad-lobed, the terminal cuneately 3- or 5-parted; stipules large, rather obtuse: sepals not terminated by long bristles: antheriferous filaments 2-toothed. — L'Her. in Ait. Kew. ii. 414; Willd. Spec. iii. 631; Torr. Pac. R. Rep. vii. 8; Reichenb. Ic. Fl. Germ. v. t. 184, f. 4867 (*Herodium*); Trelease, l. c. 81; Parish, Zoe, i. 8. — California and Lower California, and occasional in the Northern Atlantic States, usually in heavy soil.

**E. CÍCUTÁRIUM**, L'Her. Habit of the last, but mostly low and slender, less glandular, often coarsely canescent: leaflets small, nearly sessile, the uppermost confluent, more oblong, incisely pinnatisect with acute usually narrow often toothed lobes; stipules commonly small and acute: sepals with 1 or 2 terminal bristle-like hairs: filaments not toothed. — L'Her. in Ait. Kew. ii. 414; Hook. Fl. Bor.-Am. i. 116; Reichenb. Ic. Fl. Germ. v. 21, t. 183, f. 4864 (*Herodium*); Hook. & Arn. Bot. Beech. 136; Torr. & Gray, Fl. i. 208; Gray, Gen. ii. 130; Trelease, l. c. 82; Parish, Zoe, i. 8. — Vancouver to Lower California, Texas, and Colorado, chiefly in sandy soil, also occasional in the Eastern States.

**3. PELARGÓNIUM**, L'Her. (Name from *πελαργός*, a stork, for the same reason as in *Erodium*.) — At length caulescent herbs or low shrubs with leaves and stipules as in *Erodium*. Flowers usually clustered on commonly elongated peduncles. — Geraniol. t. 7–35, etc.; Benth. & Hook. Gen. i. 273; Reiche in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 4, 10. — Mostly natives of Africa and Australia, including the so-called *Geraniums* of cultivation.

**P. ÁNCEPS**, L'Her. Cespitously spreading from a stout root, with subsessile glandular pubescence above: leaves round-reniform, crenulate and obscurely crenately lobed, more or less crisped, usually much shorter than their petioles: flowers rather densely umbelled, minute, deep violet: petals about equal to and pedicels a little longer than the short scabrous sepals: beak of fruit about 6 lines long. — L'Her. in Ait. Kew. ii. 420; Jacq. Collect. iv. 184, t. 22, f. 3; A. Eastwood, Erythea, iv. 34. — Oakland, California, *Miss Eastwood*. A chance introduction. (Adv. from S. Afr.)

**4. TROPÆOLUM**, L. **NASTURTIUM**. (Name from *τρόπαιον*, a sign of victory, from the shield-shaped leaves.) — Climbing or spreading slender-stemmed pungent herbs with alternate frequently peltate round leaves. Stipules wanting or minute. Flowers solitary in the axils, mostly on slender peduncles. — Gen. no. 323; Benth. & Hook. Gen. i. 274; Reiche, l. c. 26; Buchenau in Engl. Jahrb. xv. 180–259, xxii. 157–183. — Natives of South America.

**T. MÁJUS**, L. Straggling, glabrous: leaves round, peltate, repand: flowers large, variously yellow or reddish, the lower petals fimbriate at base. — Spec. i. 345; Curtis, Bot. Mag. t. 23; Greene, Fl. Francis. i. 99. — A Peruvian plant, escaping from cultivation in California *vide* Greene, l. c.

**5. FLÆRKEA**, Willd. (Named after Flörke, a German botanist.) — Pungent, soft-stemmed annual herbs with alternate once-thrice-pinnately dissected petioled mostly exstipulate leaves. — Neue Schr. Ges. Nat. Fr. Berlin, iii. 448; Torr. & Gray, Fl. i. 210; Gray, Gen. III. ii. 139, t. 154; Benth. & Hook. Gen. i. 275; Baill. Hist. Pl. v. 20; Trelease, Mem. Boston Soc. Nat. Hist. iv. 85; Reiche in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 137. — Exclusively North American; the type of the genus trimerous, while the other species constitute *Limnanthes*, a scarcely separable genus which, however, is still maintained by some authors.

\* Flowers trimerous: petals oblong, entire, subacute, shorter than the sepals, open in æstivation: stigmas little enlarged: peduncles bent below the flower. — *Flærkea* proper.

**F. proserpinacoïdes**, Willd. l. c. 449. (FALSE MERMAID.) Glabrous, weak-stemmed, a span to a foot high: divisions of leaves 3 to mostly 5, linear, lanceolate or occasionally elliptical, remote, entire: petals white, not over a line long: fruit subglobose,  $1\frac{1}{2}$  to 2 lines long, loosely tuberculate. — Lindl. Jour. Bot. i. 1, t. 113; Torr. & Gray, Fl. i. 210; Gray, l. c.; Trelease, l. c. 85. *F. lacustris*, Pers. Syn. i. 393. *F. uliginosa*, Muhl. Cat. 36. *F. palustris*, Nutt. Gen. i. 229. *Nectris pinnata*, Pursh, Fl. i. 239. *Cabomba pinnata*, Schult. Syst. vii. 1379. — Canada to Oregon, south in the East to Pennsylvania and Illinois, and in the West to California and Utah.

\* \* Flowers 4–6-merous: petals oblong- to obovate-cuneate, truncate or emarginate, convolute: stigmas small, capitate: peduncles mostly straight. — *Limnanthes*.

† Flowers 4-merous: petals short and narrow.

**F. Macounii**, TRELEASE, n. comb. Glabrous, 2 or 3 inches high: divisions of leaves 5 to 9, remote, small, ovate, mostly 3-cleft, with acute lobes: sepals rather obtuse: petals white,  $1\frac{1}{2}$  to 2 lines long: nutlets obovoid,  $1\frac{1}{2}$  lines long, with very prominent tubercles. — *Limnanthes Macounii*, Trelease, l. c. 85. — Vancouver Island, *Macoun*.

- + + Flowers 5 (or exceptionally 6)-merous : petals broader, usually exceeding the sepals : nutlets about 2 lines long.

**F. Douglásii**, BAILLON. Glabrous, very spreading, the branches a span to a foot or more long : divisions of leaves 3 to mostly about 9, from linear and entire to mostly lanceolate and laciniately once or twice cleft into narrow acute lobes : sepals narrow, acute : petals yellow, white, or occasionally roseate near the end, rather narrow : nutlets from smooth to strongly tuberculate. — Hist. Pl. v. 20, f. 50-54 ; Greene, Fl. Francis. 100. *Limnanthes Douglasii*, R. Br. Lond. & Edinb. Phil. Mag. ii. 70 ; Lindl. Bot. Reg. t. 1673 ; Hook. Bot. Mag. t. 3554 ; Brew. & Wats. Bot. Calif. i. 95, excl. syn. ; Trelease, l. c. 85. *L. grandiflorus* and *L. sulphureus* of gardens. — Oregon to Southern California. A low form 2 or 3 inches high, with the petals scarcely equalling the rather broad sepals, from Table Rock, Oregon, Howell, 635, is *L. pumila*, Howell in herb. Tall Californian plants, a foot or more high, often at first somewhat woolly as in *F. alba*, constitute *F. versicolor*, Greene, Erythea, iii. 62.

**F. rósea**, GREENE. Glabrous, scarcely over a span high : divisions of leaves more linear or filiform, less incised : petals broader, whitish, marked by longitudinal roseate lines : fruit very rough : otherwise like the last. — Fl. Francis. 100. *Limnanthes rosea*, Hartw. in Benth. Pl. Hartw. 302 ; Brew. & Wats. Bot. Calif. ii. 438 ; Fl. Serres, v. 431 b ; Trelease, l. c. 85. — Northern Central California.

**F. álba**, GREENE. Low, rather erect and often subcorymbose : young parts and flower buds very white-woolly with long hairs : leaf-segments about 7, narrowly lanceolate, commonly entire except for the lowest pair which are 3-divided, but occasionally pinnatifid with about 5 ultimate segments : sepals relatively broad : petals yellowish white, often roseate or purplish at top : nutlets prominently rugose-tuberculate. — Fl. Francis. 100. *Limnanthes alba*, Hartw. in Benth. Pl. Hartw. 301 ; Brew. & Wats. Bot. Calif. i. 95 ; Trelease, l. c. 84. — Oregon and the Sierras of California. Tall plants, a foot or more high, with the flowers soon almost glabrous, have been collected in California, at Madera, Buckminster, Tunis Mill and Ione, Brandegee, and perhaps represent a state of *F. versicolor*, Greene, Erythea, iñ. 62, which is held to be merely a transiently hairy form of *F. Douglasii*.

**6. ÓXALIS**, L. WOOD SORREL. (Ὠξύς, sharp, from the acid taste.) — Annual or perennial acid herbs sometimes woody at base, with compound petioled leaves with entire or emarginate leaflets, some species producing cleistogamous flowers at base. — Gen. no. 377 ; Torr. & Gray, Fl. i. 210 ; Gray, Gen. III. ii. 111, t. 144 ; Benth. & Hook. Gen. i. 276 ; Baill. Hist. Pl. v. 41 ; Trelease, Mem. Boston Soc. Nat. Hist. iv. 86, t. 11 ; Reiche in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 4, 19. — Mainly South American and African, but a few species in the temperate regions of the Old and New World.

\* Caulescent : flowers yellow, sometimes, like the rest of the plant, tinged with red-purple.

+ Leaves unifoliolate, with free setaceous stipules : flowers homogone ?

**O. dichondræfólia**, GRAY. A span to a foot high, appressed gray-villous throughout, fruticose at base, the caespitose branches spreading : leaflet round-ovate, wavy-margined, cordate, abruptly mucronate, 6 to 15 lines long, articulated at the summit of the often longer petiole : flowers 6 lines long, solitary on axillary peduncles often exceeding the leaves, setaceous bibracteate near the top : sepals auriculately cordate : petals narrow, clawed, about twice as long as the calyx, rounded or mucronulate at apex : capsule round-ovoid, scarcely as long as the sepals ; seeds about 3 in each cell, broad, about 1 line long, with prominent tubercles somewhat obliquely confluent. — Pl. Wright. i. 27, ii. 25 ; Torr. Bot. Mex. Bound. 41 ; Trelease, l. c. 87, t. 11, f. 1 ; Heller, Contrib. Herb. Franklin & Marshall Coll. i. 54. — Southern and Southwestern Texas. (Mex.)

+ + Leaves pinnately trifoliolate, exstipulate : flowers heterogone ?

**O. Berlandieri**, TORR. About a span high, loosely dingy-villous throughout, suffrutescent at base, the few ascending basal branches rather strictly subcorymbose above : leaflets oblong,

short-stalked, about 5 lines long, obliquely emarginate, the terminal mostly larger and cuneate; the common petiole longer than the leaflets: flowers about 6 lines long, short-pedicelled, mostly 3 together, at the ends of axillary peduncles about equal to the leaves and very short-bracted at top: sepals lanceolate: petals obovate, thrice as long as the calyx, rounded at apex: capsule ovoid, a little surpassing the sepals; seeds 1 to 3 in each cell, reddish, fusiform, somewhat flattened, three fourths line long, with 8 longitudinal zigzag wings or rows of teeth. — Bot. Mex. Bound. 41; Trelease, l. c. 87, t. 11, f. 2. — Southern Texas.

+ + + Leaves palmately trifoliolate, exstipulate or with short adnate stipules: leaflets subsessile, somewhat obliquely obcordate-cuneate, variously surpassed by the common petiole: capsule several-seeded; seeds about three fourths line long, reddish brown, ovate, acute at apex, flattened, with 1 to 3 deep marginal grooves and numerous transverse ridges somewhat interrupted by 2 low longitudinal elevations on each side.

++ Flowers small, homogene, the styles about equalling the longer stamens.

= Leafy branches from a stout erect woody caudex.

**O. Wrightii**, GRAY. About a span high, more or less appressed-villous throughout, caespitose, the prostrate and rooting or ascending slender stems suffrutescent and more or less branched below: leaflets 2 to 5 lines long, often broader; the common petiole somewhat stipular-dilated at base: flowers about 5 lines long, orange-colored, often drying with a tinge of blue, 1 to 3 at the ends of (or occasionally distributed along) the elongated axillary peduncles, which are short-bracted at top; the refracted pedicels at length about 8 lines long: sepals lanceolate, mostly obtuse: petals obovate, twice as long as the calyx, usually emarginate: capsules oblong, several times as long as the sepals. — Pl. Wright. i. 27, ii. 25; Torr. & Gray, Pac. R. Rep. ii. 161; Torr. Bot. Mex. Bound. 41; Trelease, l. c. 88; Brandegee, Proc. Cal. Acad. Sci. ser. 2, i. 202; Parish, Erythea, iii. 60. — Central California to Texas. (Mex.)

= = Not from a stout caudex, herbaceous.

a. Without subterranean runners, mostly perennial: inflorescence seemingly umbellate; pedicels refracted in fruit.

**O. corniculata**, L. Annual, caespitose, prostrate and rooting at the nodes or ascending; the slender branches from a span to a foot long, somewhat rough-villous: leaflets 3 to 5 lines long and mostly a little wider; stipules evident, round-topped or truncate, adnate to the petiole: flowers about 3 lines long, solitary, or usually paired or umbelled; the shortly bracteate peduncles longer than the leaves; pedicels elongated: sepals lanceolate to oblong, rather obtuse: petals obovate, about twice as long as the calyx, obscurely crenulate or emarginate; styles and longer stamens about as long as the sepals: fruit as in the last. — Spec. i. 435; Jacq. Oxal. 16, 30, t. 5; Ell. Sk. i. 525; Zucc. Oxal. 34, & Nachtr. 53; Hook. Fl. Bor.-Am. i. 117; Torr. & Gray, Fl. i. 211; Reichenb. Ic. Fl. Germ. v. t. 199, f. 4896; Trelease, l. c. 88, in part, & Trans. St. Louis Acad. v. 286. *O. pusilla*, Salisb. Trans. Linn. Soc. ii. 243, t. 23, f. 5. — Occasional on the Atlantic coast, especially southward, and a greenhouse weed everywhere. (Introd. from Eu. and Tropics.) A form with deep red-purple stems and foliage, sometimes cultivated for bedding effect, and more or less persistent about gardens, is var. *atropurpurea*, Planch. Fl. Serres, xii. t. 1205, sometimes known also as var. *rubra*, var. *lurida*, and as *O. tropæoloides*.

**Var. Dillénii**, TRELEASE, n. comb. A span or less high, caespitose, mostly suberect, branched from the base, rather stout-stemmed, from a thickish perennial root, appressed gray-strigose: petiole dilated below the pulvinus into an entirely adnate stipular membrane: pedicels rather short and short, or exceptionally elongated and bracteate near the middle: flowers 4 or 5 lines long: petals frequently brown within toward the base: styles sometimes evidently longer than the stamens: capsule relatively large: otherwise like the type. — *O. Dillénii*, Jacq. Oxal. 15, 28 (*Oxys lutea Americana humilior et annua*, Dill. Elth. ii. 298, t. 221, f. 288); Pursh, Fl. i. 323; Zucc. Oxal. 35. ? *O. furcata*, Ell. Sk. i. 527. *O. corniculata*, Trelease, Mem. Boston Soc. Nat. Hist. iv. 88, in large part. *O. stricta*, Small, Bull. Torr. Club, xxiii. 267. — From the Great Lakes to Vancouver, Texas, Florida, and New Jersey. A more erect stouter and more canescent form than the type, appearing specifically distinct in spring, but the more prostrate forms, especially late in summer, passing into

the type. Some Floridan specimens for the present referred here (*Nash*, no. 118, *Palmer*, no. 67) have very slender capsules.

b. Producing horizontal perennial rhizomes in summer: inflorescence dichotomously cymose in luxuriant specimens; pedicels not refracted.

- O. stricta**, L. Annually renewed from the slender rhizomes: stems slender, solitary, erect, a span to a foot or more high, somewhat branched above, softly villous and a little strigose, or glabrescent: leaflets 3 to 8 lines long and mostly broader; slender elongated common petioles without evident stipules: flowers 3 to 4 lines long: pedicels slender, short, divergent: sepals lance-ovate, obtuse: petals subentire, scarcely twice as long as the calyx: styles generally a little longer than the stamens and sepals. — Spec. i. 435 (*Oxys s. trifolium luteum corniculatum Virginianum*, etc., Morison, *Plant. Hist.* ii. sec. 2, t. 17, f. 3); Jacq. *Oxal.* 29, t. 4 (but pedicels shown as refracted); Ell. Sk. i. 526; Zucc. *Oxal.* 34, & *Nachtr.* 64; Hook. *Fl. Bor.-Am.* i. 118; Torr. & Gray, *Fl.* i. 212; Gray, *Gen.* III. ii. 112, t. 144, f. 7–11. *O. corniculata*, var. *stricta*, Sav. in *Lam. Dict.* iv. 683; Trelease, l. c. 88. ?*O. florida*, Salisb. *Prodr.* 322. *O. ambigua*, Salisb. *Trans. Linn. Soc.* ii. 242, t. 23, f. 4. *O. cymosa*, Small, *Bull. Torr. Club*, xxiii. 267. — New Brunswick to South Dakota, Colorado, Indian Territory, and South Carolina; fl. some three weeks later than the preceding. (Old World.)

++ ++ Flowers larger, heterogone-trimorphous.

- O. recúrva**, ELLIOTT. A span high, at length with very slender prostrate stems a foot or more long, with greatly elongated internodes, from a seemingly perennial root, usually villous: leaflets 3 to 7 lines long, deeply notched; stipules small, adnate, somewhat rounded at top: flowers 5 to 6 lines long, usually in pairs, the very slender elongated pedicels a little arcuate, often bent near the capsules or refracted, occasionally bracted about the middle: sepals lanceolate, rather acute: petals more than twice as long as the calyx: styles decidedly longer than the sepals in the long-styled form. — Sk. i. 526 (the short-styled form); Small, *Bull. Torr. Club*, xxi. 474, t. 222. ?*O. Lyoni*, Pursh, *Fl.* i. 322. ?*O. cespitosa*, Raf. *New Fl.* ii. 27. *O. corniculata*, var. (?) *macrantha*, Trelease, l. c. 88, t. 11, f. 5, as to the eastern form. *O. macrantha*, Small, *Bull. Torr. Club*, xxiii. 268. — Pennsylvania to E. Texas and Florida. Intermediate in aspect between *O. stricta* and *O. corniculata*.

- O. púmila**, NUTT. Perennial, from at length woody creeping rootstocks: stems single or somewhat approximated, a span or two high, slender, more or less villous: leaflets 4 to 8 lines long and somewhat broader, without stipules: flowers 6 to 9 lines long, solitary or usually in pairs, bright yellow; pedicels very slender, elongated, spreading or somewhat refracted in fruit: sepals oblong, rather obtuse: petals about three times as long as the calyx: styles or longest stamens twice as long as the sepals: capsule usually little exceeding the sepals. — Nutt. in Torr. & Gray, *Fl.* i. 212, note. *O. Suksdorffii*, Trelease, l. c. 89, & *Trans. St. Louis Acad.* v. 288; Eliot, *Trans. St. Louis Acad.* v. 278, f. 1; Small, *Bull. Torr. Club*, xxiii. 456. *O. corniculata*, var. (?) *macrantha*, Trelease, *Mem. Boston Soc. Nat. Hist.* iv. 88, as to Californian specimens. — Oregon to Central California. The west-coast representative of the preceding: both comparable with a part of what has been referred to *O. microphylla*, Poir. in Australia. *O. pilosa*, Nutt. in Torr. & Gray, *Fl.* i. 212; Small, *Bull. Torr. Club*, xxiii. 457, of California from the Sacramento to Santa Barbara, if separable, differs chiefly in the stouter subterranean parts and the capsule 7 to 8 lines long.

- O. grándis**, SMALL. Perennial by slender horizontal rootstocks that are villous toward the base: stems single, little branched, at length 2 feet high, mostly stout and soft-villous throughout: leaflets about an inch long, often very cuneate and shallow-notched, brown-margined; no stipules: flowers 8 to 9 lines long, in few-flowered umbels, or cymose, their slender pedicels rather short, sometimes refracted in fruit: sepals ovate-oblong, obtuse: petals about three times as long as the calyx, bright yellow, brown-striate within at base: styles or longest stamens twice as long as the sepals. — *Bull. Torr. Club*, xxi. 475, t. 223. *O. recurva*, Trelease, l. c. 89, & *Trans. St. Louis Acad.* v. 289, not Ell. — Pennsylvania to S. Missouri and North Carolina. A trimorphous species long confounded with *O. stricta*.

\* \* Acaulescent, perennial by a slender rootstock covered above with imbricated dilated fleshy leaf-bases: flowers white or pinkish, mostly red-veined, homogone: leaves palmately trifoliate.

— Scapes 1-flowered: capsule round-ovoid, few-seeded.

**O. Acetosélla**, L. Sparingly villous: petioles a span long or less; leaflets 5 to 8 lines long and considerably wider, obcordate, with a small membranous fold in the sinus: scapes solitary or few, slender, a little longer than the leaves, bibracteate shortly above the middle: flowers about 8 lines long: sepals ovate-oblong, rather obtuse, purple-tipped: petals obovate, broadly notched, about 4 times as long as the calyx: capsule a line and a half long; seeds ovoid, acute above, obscurely pitted and with about 5 shallow grooves on each side. — Spec. i. 433; Jacq. Oxal. 20, 114, t. 80, f. 1; Reichenb. Ic. Fl. Germ. v. t. 199, f. 4898; Raf. Med. Bot. ii. 46, t. 68; Torr. & Gray, Fl. i. 211; Trelease, Mem. Boston Soc. Nat. Hist. iv. 90, t. 11, f. 7. *O. longiflora*, L. Spec. i. 433. *O. Americana*, Bigel. in DC. Prodr. i. 700; Zucc. Oxal. 26, & Nachtr. 35. — New Brunswick to Minnesota, south to Virginia and the mountains of North Carolina. (Old World.) Recurved scapes bear cleistogene flowers mostly concealed among the moss, etc., at base of the plant.

**O. Oregána**, Nutt. Coarser and more densely rusty-villous: petioles sometimes a foot long; leaflets becoming  $1\frac{1}{2}$  inches long, then relatively narrow: scapes shorter than the leaves, an inch to a span long, broadly bibracteate an inch or less below the flower: petals nearly an inch long: capsule 5 lines long; seeds nearly 2 lines long: otherwise resembling the preceding. — Nutt. in Torr. & Gray, Fl. i. 211. *O. Acetosella*, var. *Oregana*, Trelease, l. c. 90. *Oxys Oregana*, Greene, Man. Bay-Reg. 71. — Mountains, Washington to Central California.

— Scapes umbellately several-flowered: capsule linear-oblong, several-seeded.

**O. trilliifolia**, Hook. Aspect of larger specimens of the last, at most sparingly villous: petioles sometimes a foot long; leaflets 1 to 2 inches long, relatively narrow when large: scapes mostly several, as long as the leaves, umbellately about 6-flowered; pedicels from half inch becoming as much as 3 inches long: bracts narrow, acute: sepals ovate-lanceolate, variously acute: petals nearly white, deeply notched, 3 to 6 lines long, scarcely twice as long as the calyx: capsule 10 to 15 lines long; seeds reddish brown, oblong, somewhat longitudinally striate, obscurely coarsely pitted, a line long. — Fl. Bor.-Am. i. 118; Torr. & Gray, Fl. i. 211; Trelease, l. c. 90, t. 11, f. 9. *O. Oregana*, Brew. & Wats. Bot. Calif. i. 96, as to fruit and, in part, inflorescence. — Mountains, W. Washington and Oregon.

\* \* \* Acaulescent, perennial from a scaly bulb, in summer with slender scaly bulb-tipped rhizomes: flowers rose-violet, heterogone trimorphous (the mid-styled form sometimes suppressed): leaves palmately 3-10-foliolate: sepals (and usually leaflets) tipped with orange callosities.

— Capsules round-ovoid: leaflets 3, obreniform to openly cordate.

**O. violácea**, L. Glabrous or the pedicels and leaf-bases very exceptionally a little pubescent: petioles 1 to 6 inches long; leaflets 3 to 8 lines long, somewhat wider, broadly obcordate with divergent lobes, or obreniform, somewhat succulent: scapes once or twice as high as the leaves, umbellately 3-15-flowered: flowers 7 to 10 lines long; slender pedicels at length somewhat longer, recurved before and after flowering: sepals oblong-ovate, rather obtuse, with 2 more or less confluent callosities at apex: petals undulate or truncate, 3 times as long as the calyx: capsule  $2\frac{1}{2}$  lines long, a little exceeding the sepals; seeds compressed-ovoid, irregularly rugose-tuberculate, three fourths line long. — Spec. i. 434; Jacq. Oxal. 16, 35, t. 80, f. 2, & Hort. Vind. ii. t. 180; Sims, Bot. Mag. t. 2215; Ell. Sk. i. 525; Zucc. Oxal. 19, & Nachtr. 27; Torr. & Gray, Fl. i. 211; Gray, Gen. Ill. ii. 112, t. 144, f. 1-6; Baill. Hist. Pl. v. 24, f. 64; Trelease, l. c. 90, 95, t. 11, f. 10, Am. Nat. xvi. 13, f. 1-2, Bot. Gaz. xiii. 191, t. 12, & Trans. St. Louis Acad. v. 289. — New England to the Dakotas, Colorado, New Mexico, and Florida. Said to be introduced in Ceylon (Trimen, Handbook, i. 197), and Italy (Beguinot, Bull. Soc. Bot. Ital. 1895, 110). In late summer and autumn, after the leaves have disappeared, some specimens flower again on long slender scapes, the pedicels occasionally elongated and branched. An albino is also sometimes found.

— Capsule oblong-ovoid (unknown in *O. divergens*).

— Leaflets 3, large, thin, obcordate.

**O. MARTIÁNA**, Zucc. Large and lax, the leaflets with deep narrow sinus, without apical callosity, but dotted on the under surface and with a marginal row of small round orange

callosities: scapes and petioles more or less villous. — Oxal. 20. — Florida, *Meehan*, *Fredholm*, and in greenhouses elsewhere. (Adv. from S. Am.)

++ ++ Leaflets 3 to 5, medium-sized, rather succulent, obcordate-deltoid to V- or Y-shaped, nearly or quite without apical callosity.

= Leaflets 3, obcordate-deltoid to mostly V-shaped.

**O. Drummóndii**, GRAY. Glabrous: petioles about a span high; leaflets 3 to 10 lines long and decidedly broader, deeply V-shaped, usually with narrow spreading lobes: scape nearly twice as long as the leaves, umbellately few-flowered: flowers 7 to 10 lines long, their slender pedicels at length an inch long: sepals and bracts acutish, the former frequently with 4 to 6 more or less confluent apical callosities: capsule somewhat pubescent, 5 lines long; seeds pale brown, round-ovoid, flattened longitudinally, 8-10-creased and transversely wrinkled, half line long. — Pl. Wright. ii. 25; Torr. Bot. Mex. Bound. 41. *O. vespertilionis*, Torr. & Gray, Fl. i. 679; Trelease, Mem. Boston Soc. Nat. Hist. iv. 91, t. 11, f. 13. — Arizona, *Palmer*, and S. W. Texas.

= = Leaflets 3 to 5, deeply obcordate.

**O. divérgens**, BENTH. Glabrous: petioles an inch to a span long; leaflets mostly 4, 5 to 10 lines long and about as broad, obcordately parted to the middle, the lobes narrow and ascending: scapes 1 to 3 times as long as the leaves, umbellately 3-10-flowered: flowers 5 to 7 lines long, nearly equalling their slender pedicels: sepals rather acute, with 2 callosities. — Pl. Hartw. 9; ? Lindl. Bot. Reg. t. 1620 (white-flowered); Trelease, l. c. 91, t. 11, f. 11. *O. vespertilionis*, Gray, Pl. Fendl. 27. *O. violacea*, Gray, Pl. Wright. i. 27, ii. 25. — S. Arizona to W. Texas. (Mex.)

**Var. amplifólia**, TRELEASE, n. comb. Nearly glabrous: leaflets 3, an inch long, and twice as broad, rather thin, somewhat ciliate, very openly obcordate-deltoid with divergent lobes: flowers about 7 lines long, shorter than the pedicels: sepals broadly oblong, very obtuse, with 4 oblong callosities: petals obovate, entire, about 4 times as long as the calyx: capsule 4 to 5 lines long, about twice the length of the sepals; seeds ovate, acute above, transversely rugose, with about 4 longitudinal grooves on each side, half line long. — *O. latifolia*, Trelease, l. c. 91, t. 11, f. 12, not HBK. — Santa Rita Mountains, Arizona, *Pringle*, and Organ Mountains, New Mexico, *Vasey*, to S. W. Texas, *Havard*, and Magdalena Island, Lower California, *Brandegee*. Intermediate between *O. divergens* and *O. Drummondii*.

++ ++ ++ Leaflets 3 to 10, long but relatively narrow, rather succulent, obcordate-cuneate to mostly Y-shaped, without apical callosity.

**O. decaphýlla**, HBK. Glabrous: petioles a span long or less: leaflets  $\frac{3}{4}$  inch to 2 inches long, notched or parted halfway to the base, occasionally a little ciliate: scapes slightly longer than to twice as long as the leaves, umbellately several-flowered: flowers 5 to 10 lines long, scarcely shorter than the slender pedicels: sepals obtuse, with 2 apical callosities: capsule about 4 lines long, its cells about 4-seeded; seeds pale brown, compressed, round-ovoid, longitudinally 8-10-creased and transversely wrinkled, half line long. — Nov. Gen. & Spec. v. 238, t. 468; Trelease, l. c. 91, t. 11, f. 14. — Mountains of Arizona and New Mexico. (Mex.)

*O. CÉRNA*, Thunberg, a bulbiferous species with large yellow flowers, has been collected in Duval County, Florida, *Fredholm*, as escaped but not hardy. (Cape.)

**7. IMPÁTIENS**, Rivin. BALSAM, JEWEL-WEED. (Named from the elastic dehiscence of the fruit when touched.) — Annual mild herbs with succulent translucent stems and simple thin alternate petioled exstipulate leaves. Some small regular cleistogamous flowers normally produced in addition to the irregular ones. — Tetrap. t. 121; L. Gen. no. 680; Torr. & Gray, Fl. i. 208; Gray, Gen. Ill. ii. 133, t. 152, 153; Benth. & Hook. Gen. i. 277; Baill. Hist. Pl. v. 39; Trelease, Mem. Boston Soc. Nat. Hist. iv. 99; Warburg & Reiche in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 389. — A rather large genus, mostly of Asia and Africa.



- I. *aúrea*, MUHL.** (PALE TOUCH-ME-NOT.) Sometimes 5 or 6 feet high, mostly light green : leaves often 3 to 4 inches long, mostly exceeding their petioles, paler below, elliptical, coarsely crenate-serrate, rounded or acute at base, the apex and some teeth occasionally mucronate : bracts ovate, acute : flowers rather large, pale yellow, usually little mottled, exceptionally pinkish or white : the saccate sepal broadly conical, scarcely longer than broad, its slender spur short (2 to 3 lines in length), abrupt, refracted at base, the end notched. — Cat. 26. *I. pallida*, Nutt. Gen. i. 146 ; Torr. & Gray, Fl. i. 208 ; Trelease, l. c. 99. — Canada to the Saskatchewan, south to Kansas and North Carolina ; also in Oregon, *Lyll.*
- I. *biflóra*, WALT.** (SPOTTED TOUCH-ME-NOT.) Two to four feet high, somewhat orange- or purple-tinted and a little glaucous : leaves smaller, usually 2 or 3 inches long : bracts narrow : flowers orange or occasionally pinkish, usually copiously mottled with reddish brown : the saccate sepal evidently longer than broad, its slender spur long (4 to 5 lines), rather abrupt, flexuously recurved : otherwise resembling the last. — Car. 219 ; Willd. Spec. i. 1175 ; Pursh, Fl. i. 171 ; Rœm. & Schult. Syst. v. 349 ; Ell. Sk. i. 304. *I. fulva*, Nutt. Gen. i. 146 ; Hook. Fl. Bor.-Am. i. 117 ; Torr. & Gray, Fl. i. 209 ; Gray, Gen. III. ii. 135, t. 152, 153 ; Trelease, l. c. 99. *I. maculata*, Muhl. Cat. 26. *I. nolitangere*, B, Michx. Fl. ii. 149. — Newfoundland to Washington, south to Kansas and Mississippi. (Introd. into England.)
- I. *nolitángere*, L.** (The true TOUCH-ME-NOT.) Leaves larger, often more strikingly serrate, sometimes cordulate : flowers clearer yellow : saccate sepal larger and still more elongated, gradually tapering into the long recurved spur which usually is not notched at tip. — Spec. ii. 938 ; Reichenb. Ic. Fl. Germ. v. t. 198 b ; Ett. & Pok. Physiotypia Pl. Austr. x. t. 925. — Noosack River, Washington, *Suksdorf.* (Introd. from Eu.)

## ORDER XXXIII. RUTACEÆ.

BY A. GRAY ; the genera *Citrus* and *Amyris* revised by L. H. BAILEY and B. L. ROBINSON respectively.

Woody or rarely herbaceous plants, punctate with oil-glands in the form of pellucid or dark dots in the leaves, petals, &c., or as pustules, these charged with essential oil (graveolent, pungent, or aromatic). Leaves destitute of stipules, except prickles. Flowers 4–5-merous, mainly regular and mostly symmetrical. Stamens as many or twice as many as the sepals (imbricated in the bud) and petals or occasionally more numerous, inserted on or mostly around a hypogynous disk. Anatroous or amphitropous pendulous ovules two or more in each cell or carpel. Embryo straight or curved, either filling the seed or large in proportion to the albumen. — Order largely represented in the tropics and in the southern hemisphere, feebly so in North America, and the larger tribes absent. The characteristic dots are obsolete or wanting in one or more coriaceous-leaved species of *Xanthoxylum*.

RÚTA GRAVÉOLENS, L., the common Rue, of the Old World, a familiar denizen of gardens, is of a group represented in N. America by *Thamnosma*.

DICTÁMNUS FRAXINÉLIA, L., of Europe, which has somewhat irregular flowers and a 5-lobed ovary, in fruit becoming as many nearly separate and 2-valved carpels, is common in old gardens.

TRIBE I. RUTEÆ. Heavy-scented herbs or suffruticose plants, with strictly hermaphrodite flowers. Ovules several (3 to 20) in each cell or carpel. Embryo surrounded by fleshy albumen, more or less curved, except in *Dictamnus*.

1. **THAMNOSMA.** Flowers 4-merous but pistil dimerous. Calyx 4-lobed, short, persistent. Petals imbricate in the bud, erect or barely spreading in anthesis, ovate or oblong, inserted on the base of a thickened crenate or lobed hypogynous disk, deciduous. Stamens 8, with slender filaments and oval glandular-apiculate anthers. Ovary 2-lobed, more or less stipitate, with few or several ovules in each cell on a central placenta; style filiform, entire; stigma capitate. Capsule coriaceous, obcordate or didymous, few-seeded, loculicidal above; seeds reniform, with coriaceous testa and arcuate or incurved embryo in thin albumen. Leaves simple.

**TRIBE II. XANTHOXYLÆ.** Shrubs or trees, with aromatic or pungent and bitter bark and foliage, and either unisexual or hermaphrodite flowers. Ovules only a pair in each carpel or cell. Seeds usually solitary; embryo with superior radicle, mostly flat cotyledons, and surrounded by some albumen.

\* Carpels or capsule dehiscent: flowers hermaphrodite, 5-merous (sometimes 4-merous) and diplostemonous, symmetrical.

2. **CHOISYA.** Sepals imbricate in the bud, deciduous. Petals spreading, oblong with narrow base, slightly imbricate in the bud, deciduous. Stamens 10 or 8, with lanceolate filaments, those opposite the petals shorter; anthers somewhat didymous. Hypogynous disk inconspicuous. Ovary 5-lobed to below the middle, pubescent; the carpels conically produced at apex, bearing a pair of subcollateral ovules about the middle; styles ventral, filiform-clavate, connivent and cohering above, as also the enlarged terminal stigmas. Fruit dry, 4-5-cocccous or by abortion 2-3-cocccous; the mature carpels dorsally corniform-umbonate near summit, at length 2-valved, and the cartilaginous endocarp separating from the thin exocarp; seeds solitary or sometimes geminate, reniform, with nearly smooth subcrustaceous testa and arcuate embryo in thin albumen (in *C. dumosa*). Leaves opposite, palmately compound.

\* \* Fruit samaroid, indehiscent: flowers hermaphrodite or polygamous, 3-5-merous, usually 4-merous, isostemonous.

3. **HELIETTA.** Flowers nearly of *Ptelea*, but hermaphrodite and carpels as many as petals, united at the axis, separating in fruit into akeniform cocci, each bearing a large dorsal ascending wing.
4. **PTELEA.** Flowers monœciously or diœciously polygamous. Sepals 4 or 5, small, deciduous. Petals 4 or 5, commonly 4, much surpassing the calyx, imbricated in the bud, deciduous. Stamens 4 or 5, with narrow filaments, in sterile flowers inserted at base of a small annular disk; in fertile flowers small and often abortive. Ovary in sterile flowers rudimentary; in the fertile compressed, 2-celled (rarely 3-celled), with a pair of ascending hemitropous ovules in each cell, the lower ovule infertile; style short; stigma 2-lobed. Fruit an orbiculate 1-2-celled, 1-2-seeded samara, completely winged all round (the wing thin and reticulated), or in an anomalous species nucumentaceous and almost or wholly wingless. Leaves alternate, palmately trifoliate.

\* \* \* Carpels dehiscent: flowers diœcious, 3-5-merous, isostemonous, small.

5. **XANTHOXYLUM.** Calyx 3-5-lobed or -parted and petals (mostly imbricated in the bud) as many, in one species either calyx or corolla wanting. Stamens alternate with the petals. Pistil a mere rudiment in the ♂ flowers; in ♀ flowers as many carpels as petals and opposite them, or fewer, or rarely reduced to one, usually on an ovoid disk or short gynophore, connivent or slightly cohering ventrally (either as to ovaries or upper part of the styles), separating in age. Fruit drupaceous-follicular, at length partly 2-valved, the endocarp hardly at all separable; seed solitary or sometimes a pair, ovoid or globular, sometimes with a slightly fleshy at length friable outer coat, which falls away from the dark and shining crustaceous inner one; embryo straight or nearly so in fleshy albumen, with broad and flat cotyledons. Leaves alternate, mostly pinnate.

\* \* \* \* Carpel solitary with almost basal style, in fruit subdrupaceous: flowers hermaphrodite, 4-merous, diplostemonous.

6. **CNEORIDIUM.** Sepals 4, persistent. Petals 4, much larger, ovate, much imbricated in the bud. Stamens 8, short, those opposite the petals shorter; anthers ovate, mucronulate.

Pistil of a single carpel on a small cupulate disk; ovary globular, with a pair of ascending ovules; style suprabasal, clavellate; stigma subcapitate. Fruit globose, pea-shaped, thin-drupaceous, a narrow layer of pulp between the smooth epicarp and a parchment-like endocarp; seed globular, with a thick crustaceous testa, campylotropous; embryo almost annular in a very thin stratum of fleshy albumen; cotyledons oval, rather fleshy, longitudinally convolute-infolded. Simple-leaved shrub.

**TRIBE III. AMYRIDEÆ.** Shrubs or trees, balsamic-resinous, with hermaphrodite or polygamous flowers, and a solitary carpel with a terminal sessile stigma. Ovules a pair, collateral. Embryo straight, with very thick cotyledons; no albumen.

**7. AMYRIS.** Calyx 4-toothed, persistent. Petals 4, imbricated in the bud, at length widely spreading. Stamens 8, those opposite the petals shorter. Stigma sessile or subsessile, depressed-capitate. Drupe globular, with thin flesh and chartaceous putamen, 1-seeded.

**TRIBE IV. AURANTIEÆ.** Trees or shrubs, aromatic (fragrant with volatile oil), with hermaphrodite flowers. Stamens often 3 or 4 times as many as petals or somewhat indefinitely numerous, then disposed to be irregularly polyadelphous. Pistil of few or several cells or carpels completely combined, both as to ovary and style (the latter deciduous); ovules not rarely several in each cell. Fruit baccate and corticate; seeds destitute of albumen. Leaves 1-several-foliolate. Wholly of the Old World. The familiar genus is

**8. CITRUS.** Flowers 4-8 (mostly 5)-merous. Calyx cupular. Petals narrowly oblong, thickish, imbricated in the bud, deciduous. Stamens 20 to 60, inserted around a strong annular or cupular disk. Ovary several-celled and several ovules in each cell. Embryo straight, with short radicle and fleshy cotyledons; in cultivation not rarely two or more embryos developed in each seed.

**1. THAMNÓSMA,** Torr. & Frém. (*θάμνος*, a bush, *ὄσμή*, scent or bad smell.) — Rue-scented low-shrubby or nearly herbaceous pustulate-dotted plants, with small simple sessile alternate leaves, and somewhat racemiform inflorescence at ends of rigid branches. Petals yellowish or purplish-tinged. — Frém. Rep. 313; Torr. Pacif. R. Rep. iv. 73, t. 3; Benth. & Hook. Gen. i. 288; Brew. & Wats. Bot. Calif. i. 97. *Rutosma*, Gray, Pl. Lindh. pt. 2, 158.

**T. montána,** Torr. & Frém. l. c. Shrubby, broom-like: rigid branches pustulate, largely leafless: leaves very small, linear or broader, few or deciduous: petals half inch long, mostly erect, purple: filaments and style filiform, the latter exerted: ovary and capsule didymous, almost bifollicular at maturity, raised on a slender but occasionally short stipe; seeds few or by abortion solitary, somewhat cochleate-reniform, the coat nearly smooth; cotyledons linear. — Desert-region of Arizona and adjacent borders of Utah and California; first coll. by Frémont.

**T. Texána,** Torr. Herbaceous from a woody base: stems slender, erect or spreading, a foot or less high, leafy: leaves filiform-linear, half inch long: petals 2 lines long, ovate-oblong, spreading, pale greenish-yellow or whitish or purplish outside: style not exerted: stipe of deeply obcordate fruit very short or hardly any; seeds several, globular-reniform, muriculate-papillose; cotyledons oblong. — Bot. Mex. Bound. 42; Brew. & Wats. l. c.; Coulter, Man. Rocky Mt. Reg. 45. *Rutosma Texana*, Gray, l. c., Gen. Ill. ii. 144, t. 155, & Pl. Thurb. 298, 304. — Rocky hills, Texas to S. Colorado and Arizona; first coll. by Berlandier. (Adj. Mex., Gregg, & c.)

**2. CHOÍSYA,** HBK. (*J. D. Choisy*, Genevese botanist.) — Branching shrubs of Mexico and adjacent Arizona, glandular-punctate and aromatic, somewhat pubescent, with chiefly opposite palmately 3-9-foliolate leaves and sessile leaflets, and rather showy white or cream-colored flowers somewhat umbellately cymose at the summit of leafy branches. — Nov. Gen. & Spec. vi. 4, t. 513 (gynæcium incorrect); DC. Prodr. i. 724 (where char. "capsula 5-rostrata")

first appears); Adr. Juss. Mém. Rut. 107; Benth. & Hook. Gen. i. 297; Baill. Hist. Pl. iv. 471 (describes the separable endocarp); Morren, Belg. Hort. xxx. 314, t. 17; Gray, Proc. Am. Acad. xxiii. 224, second species added. *Juliana*, Ilav. & Lex. Nov. Veg. Desc. ii. 4. — Congener of *C. ternata*, HBK., now cult. for ornament, is

**C. dumósa**, GRAY, l. c. Much branched, very leafy, 3 to 6 feet high, acrid-aromatic: branches glandular-pustulate: leaflets 3 to 9, narrowly linear, longer than the petioles (the larger 2 inches long), their margins as if crenately denticulate by coarse glands: petals a third to half inch long: carpels almost separate at maturity, usually only 2 or 3 fertile, ovoid, and with short conical cusp; seed with a deciduous caruncle? (or attached portion of endocarp). — *Astrophyllum dumosum*, Torr. Pacif. R. Rep. ii. 161, & Bot. Mex. Bound. 42. — Rocky hills, W. borders of Texas (first coll. by Wright, without flowers or fruit) and New Mexico to S. Arizona, Bigelow, Schott, Henry, and fine specimens by Pringle. (Adj. Mex. Palmer.)

**3. HELIÉTTA**, Tulasne. (*Dr. Hélie*, a writer on the toxic properties of Rue.) — Ann. Sci. Nat. ser. 3, vii. 280; Benth. & Hook. Gen. i. 301. ? *Picrella*, Baill. Adansonia, x. 149, t. 10. — Two<sup>1</sup> S. American and the following species: —

**H. parvifolia**, BENTH. Shrub or small tree, glabrous, with slender branches: leaves opposite, palmately trifoliate; leaflets cuneate-obovate, obtuse, not petiolulate, entire, minutely pellucid-punctate, commonly inch long and middle one larger; petiole slightly margined: flowers 4-merous, very small, in terminal and upper axillary cymes, short-pedicelled: petals white: mature carpels 3 lines long, oblong, the broadly obovate veiny and rather coriaceous wing 4 lines long and broad. — Benth. in Hook. Ic. t. 1385; Wats. Proc. Am. Acad. xvii. 335.<sup>2</sup> *Ptelea parvifolia*, Gray, quoad Hemsl. Biol. Centr.-Am. Bot. i. 170, excl. fruit. — Hills near Ringgold, S. W. Texas, Havard. (Adj. Mex., Coahuila, Monclova to Monterey, Berlandier, Gregg, Palmer, Pringle.)

**4. PTÉLEA**, L. HOP-TREE, WAFER-ASH, &c. (Greek name of the elm, transferred to this genus on account of similarity of the fruit.) — Shrubs or small trees (N. American and Mexican); with bitter bark and fruit (the samaræ used in brewing as a substitute for hops), alternate and pellucid-dotted trifoliate leaves, and rather small greenish-white flowers in loose terminal cymes; fl. summer. — Syst. Nat. ed. 1, & Gen. no. 78; Adr. Juss. Mém. Rut. t. 26 (42); Gray, Gen. Ill. ii. 149, t. 157.

**P. PENTÁNDRA**, Benth. (not DC.), Pl. Hartw. 14, is apparently sterile *Rhus Toxicodendron*. There are probably only two genuine species (these very variable and not well distinguishable) and an outlying anomalous one, viz. —

**P. ÁPTERA**, Parry. (Proc. Davenp. Acad. iv. 39, & Bull. Torr. Club, xi. 10.<sup>3</sup>) A shrub with small leaves (leaflets less than inch long, obovate, subsessile), few-flowered clusters, and a nucumentaceous cartilaginous and turgid fruit (occasionally tricarpellary, half to two thirds inch long), pustulate-glandular, bordered with a very narrow wing, or sometimes wingless! — All Saints Bay, northern part of Lower California, Parry, Orcutt. So it may be found on the U. S. boundary.

**P. trifoliáta**, L. Tall shrub or low tree, strong-scented: leaves puberulent when young, commonly glabrate; leaflets membranaceous, ovate, mostly acuminate, absolutely serrulate or entire (2 to 4 inches long), the lateral sessile and roundish or barely acute and terminal one cuneate-attenuate at base: flowers usually 4-merous: full-grown samara an inch or less

<sup>1</sup> A third S. American species has since been added.

<sup>2</sup> Add Sargent, Silv. i. 81, t. 35.

<sup>3</sup> For further notes on and figure of this species, see Gard. & For. iii. 332, f. 45.

broad, orbicular or round-oval, rarely notched at either end. — Spec. i. 118 (Dill. Elth. t. 122); Lam. Ill. t. 84; Nouv. Duham. i. t. 57; Torr. & Gray, Fl. i. 215; Gray, Gen. Ill. ii. 150, t. 157.<sup>1</sup> *P. pentandra*, & *P. podocarpa*, DC. Prodr. ii. 83? *P. viticifolia*, Salisb. Prodr. 68. — W. New York, Canadian shore of Lake Erie, to Minnesota, south to Florida and Texas. (Mex.)

**Var. mollis**, TORR. & GRAY. Puberulent, smaller-leaved: leaflets at maturity sericeous-tomentose beneath or rarely glabrate, less pointed, seldom over 2 inches long: samara half to three fourths inch long, often retuse at base and apex. — Fl. i. 680. *P. mollis*, Curtis, Am. Jour. Sci. ser. 2, vii. 406.<sup>2</sup> — Texas to S. Colorado and Arizona; also (?) Wilmington, N. C.

**P. Baldwinii**, TORR. & GRAY, l. c. 215. Pleasant-scented (*Lindheimer*), or sometimes unpleasant (*Brewer*), glabrous or early glabrate: leaflets chartaceo-membranaceous, oval to oblong-lanceolate or obovate-spatulate, obtuse or some acute or slightly acuminate, an inch or two long, all contracted and terminal one attenuate at base: samara orbicular or oblate, more commonly emarginate at both ends, half to two thirds inch in diameter. Founded on depauperate flowering specimen. — *P. angustifolia*, Benth. Pl. Hartw. 9 (flowering specimens); Gray, Pl. Fendl. 28; Wats. Bot. King Exp. 50; Brew. & Wats. Bot. Calif. i. 97.<sup>3</sup> — E. Florida, *Baldwin*, *Rugel*, and Texas to Northern California and southward; common in Arizona. (Mex.) Various forms, some too near the preceding; others pass into

**Var. parvifolia**, GRAY. Leaflets less than inch long, spatulate or oblong-lanceolate: samara barely half inch in diameter. — Gray in Patterson, Check-list, 1892, 18. *P. parvifolia*, Gray in Hemsl. Biol. Centr.-Am. Bot. i. 170, as to pl. *Gregg*, Buenavista, and fruit described. — St. George, S. Utah, and Arizona, *Palmer*. (Mex., *Gregg*, *Palmer*.)

**5. XANTHÓXYLUM**, L. as *Zanthoxylum*. PRICKLY ASH, TOOTHACHE-TREE. (Name composed of *ξανθός*, yellow, and *ξύλον*, wood, apparently originated by Plukenet, whose first species was a Fustic, and this accounts for the name "*Yellow-wood*," a quality which seems not to be marked in any W. Indian species, and does not occur in the N. American. The original faulty form of *Zanthoxylum* has been continued by most classical botanists; but, as Miller very early wrote *Xanthoxylum* and nearly a dozen authors have followed him, including Smith, Sprengle, and Lindley, and as the correction of the initial letter in this case will, happily, give little inconvenience in indexes, it is best to adopt it.) — Bitter and pungent aromatic trees or shrubs (largely tropical and subtropical); with alternate mostly imparipinnate leaves, often prickly stems and stalks, and small white or greenish flowers in cymes or fascicles, produced in spring. — Hort. Cliff. 487, & Gen. ed. 5, no. 335; Gray, Gen. Ill. ii. 147, t. 156; Benth. & Hook. Gen. i. 297; Triana & Planch. Ann. Sci. Nat. ser. 5, xiv. 308. — Our few species represent almost as many sections.

§ 1. Perianth simple, 5-merous: flowers in umbelliform sessile fascicles from axils of deciduous and sometimes abruptly pinnate leaves; the rhachis wingless. — *Zanthoxylum*, Colden ex L.

**X. Americánum**, MILL. (PRICKLY ASH.) Shrub or very small tree, with short prickles in pairs occupying the position of stipules, and commonly some slender ones on the petioles, flowering along the naked branches just before the leaves of the season develop: leaves

<sup>1</sup> Add Sargent, Silv. i. 76, t. 33, 34.

<sup>2</sup> Add syn. *P. ? tomentosa*, Raf. Fl. Ludov. 108.

<sup>3</sup> Add syn. *P. crenulata*, Greene, Pittonia, i. 216, apparently a mere form thoroughly confluent with the Texano-Mexican plant which also often has crenulate leaves. Prof. Greene's description of the odors of the two forms is quite at variance with the accounts of the above mentioned collectors who have made notes upon the subject. It is probable that the odor varies considerably in different individuals even in the same locality. *P. trifoliata*, var. *angustifolia*, Jones, Proc. Calif. Acad. Sci. ser. 2, v. 629.

pubescent, 5-9-foliolate; leaflets oval or oblong-ovate, entire or nearly so, pale; petals (as the perianth-segments may be called, being alternate with the stamens) pubescent at tip: carpels 5, or fewer ripening, with slender connivent styles, stipitate. — Dict. ed. 8; Torr. & Gray, Fl. i. 214; Gray, Gen. Ill. l. c. *X. Clava-Herculis*, Lam. Dict. ii. 38 (excl. syn.), & Ill. t. 811. *X. fraxinifolium*, Marsh. Arb. 167. *X. fraxineum*, Willd. Berl. Baum. 544, & Spec. iv. 757; Nouv. Duham. vii. 2, t. 3; Bigel. Med. Bot. iii. 156, t. 59; Hook. Fl. Bor.-Am. i. 118.<sup>1</sup> *X. ramiflorum*, Michx. Fl. ii. 235. *X. mite*, Willd. Enum. 1013, form wanting prickles. *X. tricarpum*, Hook. l. c., not Michx. — Canada to Minnesota, and southward to Virginia and E. Kansas.<sup>2</sup>

§ 2. Perianth complete: flowers 4-merous, in axillary and sessile short spikes. — *Fagara*, L. Syst. Nat. ed. 10, 897. (*Fagara Pterota*, P. Browne, Jam. t. 5, f. 1, but *Pterota*, p. 146.)

**X. Pteróta**, HBK. (BASTARD IRON-WOOD.) Tortuous shrub or small tree, with curved stipular prickles, or sometimes unarmed, glabrous, evergreen: leaves 7-11-foliolate; leaflets (half inch to near inch long) obovate, more or less crenate, the few dots mostly near the notches; rhachis and petiole winged or margined: carpels 1 or 2, stipitate. — Nov. Gen. & Spec. vi. 3; DC. Prodr. i. 725; Torr. & Gray, Fl. i. 680; Nutt. Sylv. iii. t. 84.<sup>3</sup> *Schinus Fagara*, L. Spec. i. 389. *Fagara Pterota*, L. Amœn. Acad. v. 393, & Spec. ed. 2, i. 172. *F. lentiscifolia*, Willd. Enum. i. 165; Griseb. Fl. W. Ind. 137. — Florida and Texas. (Mex. to Brazil.)

§ 3. Perianth complete: flowers 5-merous, in terminal cymes, following the leaves: these in ours deciduous. — *Zanthoxylum*, Catesb. Car. i. 26, t. 26; L. Hort. Cliff. 487.

**X. Clava-Hérculis**, L. (TOOTHACHE-TREE,<sup>4</sup> PEPPER-WOOD, SEA ASH, WILD ORANGE.) Small tree, the bark studded with stout conical warty prickles, glabrous: prickles of the branches and petioles scattered and straight: leaves 7-17-foliolate, orange-scented; leaflets chartaceo-membranaceous, ovate-lanceolate, often acuminate, unequal-sided, crenate-serrulate, mostly with conspicuous gland-dots at the notches: flowers in an ample compound cyme: carpels mostly 3 or 2 or in fruit solitary, obscurely or not at all stipitate. — Spec. i. 270 (Catesb. Car. i. 26, t. 26, bad, the fruit borne on a branch with sterile flowers!); Triana & Planch. Ann. Sci. Nat. ser. 5, xiv. 317; Wats. Bibl. Index, 155;<sup>5</sup> not Lam., nor DC., nor Griseb. *X. fraxinifolium*, Walt. Car. 243. *X. Carolinianum*, Lam. Dict. ii. 39, & Ill. t. 811, f. 1; Torr. & Gray, Fl. i. 214; Nutt. Sylv. iii. 8, t. 83. *X. aromaticum*, Willd. Spec. iv. 755 (excl. syn.); Jacq. f. Eclog. i. 103, t. 70. *X. tricarpum*, Michx. Fl. ii. 235; DC. Prodr. i. 726. *X. Catesbianum*, Raf. Med. Fl. ii. 114. *Fagara fraxinifolia*, Lam. Ill. i. 334.<sup>6</sup> *Kampmania fraxinifolia*, Raf. Med. Rep. hex. 2, v. 352. — Near the coast, S. Virginia to Florida and Texas, also S. Arkansas. Passes into

**Var. fruticósum**, GRAY. Commonly a mere shrub, sometimes a tree, young branchlets and stalks usually pubescent: leaflets 5 to 11 (according to Nuttall even 17), ovate or oval, less unequal-sided, some obtuse, becoming thin-coriaceous: carpels 2, sometimes 3. — Proc. Am. Acad. xxiii. 225. *X. macrophyllum*, Nutt. Sylv. iii. 10, but leaves usually small. *X. alveolatum*, Shuttl. in distr. pl. Rugel, no. 71. *X. hirsutum*, Buckl. Proc. Acad. Philad. 1861, 450, & 1870, 136, the pubescence when present minute.<sup>7</sup> — Arkansas (where the other form also grows) to Texas; a similar form on Atlantic Coast.

**X.\* Texánum**, BUCKLEY.<sup>8</sup> Shrub, somewhat aromatic, wholly unarmed: branches with roughish cortex and prominent lenticels: leaves 3-foliolate; leaflets rather small, ovate-

<sup>1</sup> Add Engler in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 4, 115.

<sup>2</sup> And Indian Territory, *Carleton*, acc. to Holzinger, Contrib. U. S. Nat. Herb. i. 204.

<sup>3</sup> Add Engler in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 4, 117, and syn. *X. Fagara*, Sargent, Gard. & For. iii. 186, & Silv. i. 73, t. 32.

<sup>4</sup> The name *Hercules Club* in the S. States is commonly given to the stems of *Aralia spinosa*.

<sup>5</sup> Add Sargent, Silv. i. 67, t. 29.

<sup>6</sup> Add syn. *F. Caroliniana*, Engler, l. c. 117.

<sup>7</sup> Add syn. *X. Tweedii*, Engler, l. c. 115.

<sup>8</sup> This species was not mentioned in Dr. Gray's manuscript, although Dr. Palmer's plant evidently belonging to it was referred to *X. Clava-Herculis*, var. *fruticosum*.

oblong, rounded or very obtuse at each end, glabrous: flowers in small terminal corymbose panicles. — Bull. Torr. Club, x. 90. *X. Clava-Herculis*, var., Wats. Proc. Am. Acad. xvii. 335. — S. W. Texas, near Corpus Christi, *Buckley*; also at Lamar, Aransas Co., on Copano Bay, *Palmer*, no. 2125. Perhaps only an extreme form of the preceding variety, which approaches it through a host of intermediates.

- X.\* flávum**, VAHL.<sup>1</sup> (SATIN-WOOD.) Tree unarmed, young shoots and foliage minutely stellular-pubescent and canescent, early glabrate: leaflets oblong-ovate or oblong, distinctly petiolulate, irregularly and sometimes obscurely crenulate and with numerous small glands along the margins, in age subcoriaceous and shining, minutely reticulated; those of sterile branches 7 to 11 and mostly acute or acuminate, 2 or 3 inches long; those near the fertile paniculate cymes 5 to 7 (rarely reduced even to one) obtuse or barely acute: flowers sometimes 4-merous, white or yellowish: carpels 2 to 4 with very short and cohering styles, in fruit rather short-stipitate. — Eclog. Am. iii. 48. *X. cribrorum*, Spreng. Syst. i. 946. ? *X. Elephantiasis*, Macf. Fl. Jam. 193. *X. Floridanum*, Nutt. Sylv. iii. 14, t. 85; Chapm. Fl. 66. *X. Caribeum*, Wats. Bibl. Index, 155, not Lam. *X. Caribeum*, var. *Floridanum*, Gray, Proc. Am. Acad. xxiii. 225. *Fagara flava*, Krug & Urban in Engl. Jahrb. xxi. 571. — Keys of S. Florida, *Blodgett*, *Curtiss*, *Sargent*. (W. Ind.) The specimens lack the angularity and thickening or wartiness of peduncles and their divisions of the W. Indian *X. Caribeum* and of *X. Elephantiasis*, Macf. (which is like ours unarmed), nor are these glabrous.

§ 4. Perianth complete: flowers 3-merous, in terminal cymes: leaves coriaceous, mostly dotted only along the margins, and there sometimes obsoletely or obscurely. — *Tobinia*, Desv. in Hamilton, Prodr. Fl. Ind. Occ. 56; Griseb. Abh. Gött. Ges. vii. 189.

- X.\* coriáceum**, A. RICH.<sup>2</sup> Shrub, unarmed or with some small and sparse acicular prickles, very glabrous: leaflets 4 to 8, more or less obovate (1 to 3 inches long) obtuse or retuse or sometimes more notched, shining especially above, transversely veiny and reticulated: flowers in dense cymes: carpels 2 or 3, not stipitate. — Fl. Cub. 326, t. 34; Walp. Rep. ii. 825, not i. 521. *X. emarginatum*, Wright. & Sauv. Fl. Cub. 19; Sargent, Silv. i. 65, note; not Sw. acc. to Urban. *Fagara coriacea*, Krug & Urban in Engl. Jahrb. xxi. 591. — Miami, S. Florida, *Garber*.

6. **CNEORÍDIUM**, Hook. f. (Like *Cneorum*, a S. European and N. African genus.) — Benth. & Hook. Gen. i. 312; Brew. & Wats. Bot. Calif. i. 97; Gray, Proc. Am. Acad. xxiii. 223. *Pitavia* § *Gastrostyla*, Torr. Bot. Mex. Bound. 43. — Single species.

- C. dumósum**, Hook. f. l. c. Low shrub, much branched, Rue-scented and somewhat balsamic, glabrous: leaves opposite, crowded, spatulate-linear, sessile, obtuse, about inch long, entire, nearly veinless (except midrib), opaque and subcoriaceous (pungent in taste), evidently glandular-dotted especially the lower surface and margins: peduncles axillary and terminal, short, 1-3-flowered: petals white, 2 lines long, widely spreading, often sparingly glandular-punctate: fruit 2 or 3 lines in diameter, obscurely stipitate or sessile; the epicarp sparsely glandular-punctate. — *Pitavia dumosa*, Nutt. in Torr. & Gray, Fl. i. 215. — Coast of S. California, at and near San Diego; fl. spring; first coll. by *Nuttall*. (Lower Calif., *Pringle*.)

7. **AMÝRIS**, P. Browne. TORCH-WOOD, ROSE-WOOD. (‘A intensive and μύρον, balsamic juice, which the trees yield.) — Small trees or shrubs (Tropical American), with translucent-dotted 1-5-foliate leaves, heavy and very resinous

<sup>1</sup> The name and synonymy of this species have been altered in the light of Professor Urban’s recent critical work upon the group (see Engl. Jahrb. xxi. 571). It seems best, however, to retain the genus *Xanthoxylum* in its comprehensive sense, as interpreted by Dr. Gray.

<sup>2</sup> The nearly related *X. emarginatum*, Sw., of Jamaica, to which Dr. Gray referred this plant, appears to be distinct, as pointed out by Urban, l. c. 590-592, since it has ovate rather than obovate leaves and (acc. to Urban) smoother fruit.

fragrant wood, small and white paniculate-cymose flowers, and small oily-aromatic drupes. — Jam. 208; Jacq. Stirp. Am. 107; L. Gen. ed. 6, no. 473; Benth. & Hook. Gen. i. 327; Triana & Planch. Ann. Sci. Nat. ser. 5, xiv. 321; Urban, in Engl. Jahrb. xxi. 595 et seq. [Revised by B. L. ROBINSON.]

**A.\* elemifera**, L. Shrub or small tree, quite glabrous or with minute pulverulent pubescence upon the branchlets and inflorescence: foliage Rue-scented; leaflets 3 (rarely reduced to 1), ovate, obtuse or acute or acuminate (one or two inches long), shining, prominently many-veined and reticulated, all petiolulate: disk present or rudimentary or obsolete: fruit truly globose. — Syst. Nat. ed. 10, 1000, & Spec. ed. 2, i. 495 (excl. syn. Plum. and hab. Carolina); Triana & Planch. Ann. Sci. Nat. ser. 5, xiv. 324; Urban, l. c. 601. *A. maritima*, Jacq. Enum. Pl. Carib. 19 (1760) & Stirp. Am. 107; L. Spec. ed. 2, i. 496; Gray, Proc. Am. Acad. xxiii. 226. Sargent, Silv. i. 85, t. 36; Urban, l. c. 603. *A. sylvatica*, DC. Prodr. ii. 81; Sargent, U. S. 10th Census, ix. 33; not Jacq. *A. floridana*, Nutt. Am. Jour. Sci. v. 294; not (?) Sylv. ii. t. 78, which as to oval fruit is rather of the following species. *A. maritima*, var. *angustifolia*, Gray, Proc. Am. Acad. xxiii. 226, form only. — Coast and keys of S. Florida. (W. Ind.) Prof. Urban separates *A. maritima* on the presence of a disk and the total absence of minute and variable pubescence, — differences which in this group appear to have little weight and to lead to artificial distinctions.

**A.\* balsamifera**, L. Shrub or small tree with habit of the last, but leaflets 3 to 5, larger, ovate-lanceolate, more attenuate-acuminate, 2 to 3½ inches long: fruit decidedly elongated, oval or obovate in outline, somewhat stiped at the base. — Syst. Nat. ed. 10, 1000, & Spec. ed. 2, i. 496 (excl. syn. Sloane); Urban, l. c. 604. ? *A. floridana*, Nutt. Sylv. ii. t. 78 (as to form of fruit but scarcely as to leaves). *A. maritima*, Gray, Proc. Am. Acad. xxiii. 226, in small part. — Miami, S. Florida, Garber, in fl. May, and fr. June, 1877. (W. Ind., S. Am.)

**A. parvifolia**, GRAY. Low shrub, glabrous: leaflets rhombic-ovate or narrower, obtuse, dull, inconspicuously reticulated, irregularly crenate or crenulate, half inch to inch long, lateral ones (and sometimes the terminal) short-petiolulate or subsessile: flowers small. — Proc. Am. Acad. xxiii. 226. — S. Texas, banks of Rio Grande near its mouth, Sargent. (North Mex., Eaton & Edwards, Pringle.)

**8. CÍTRUS**, L. ORANGE, &c. (Ancient name of Citron-tree.) — Tropical-Asian spinescent trees or shrubs, with bright green and somewhat coriaceous unifoliate leaves, commonly winged petiole, and mostly white (or outside purplish) sweet-scented axillary flowers. — Syst. Nat. ed. 1, & Gen. no. 605. — The Lemon, Lime, Citron, and various kinds of Orange familiar in cultivation; one variety of the last completely naturalized in Florida. [Revised by L. H. BAILEY.]

**C.\* AURÁNTIUM**, L., var. **VULGÁRIS**, Wight. & Arn. (SOUR and BITTER ORANGES.) Glabrous: petiole distinctly winged: fruit small, orange-colored, oblate, with rugose and very aromatic rind, the pulp bitter-sweet or bitter and sour. — Prodr. Fl. Ind. i. 97. Var. *Bigaradia*, Brandis, For. Fl. 53. *C. vulgaris*, Risso, Ann. Mus. Paris, xx. 190; DC. Prodr. i. 539; Nutt. Sylv. ii. 106, t. 76. *C. Bigaradia*, Loisel. in Nouv. Duham. vii. 99. — A spontaneous form of the orange, likely a reversion from cultivated varieties and thoroughly naturalized in Florida from an unknown period. (Similar run-wild forms in many parts of the world.)

## ORDER XXXIV. SIMARUBACEÆ.

By A. GRAY.

Trees and shrubs, with the general characters of *Rutaceæ Xanthoxyleæ*, except that the leaves are dotless and the pervading principle pure bitterness without



aroma, balsam, or resin, and the fruit always indehiscent. Two anomalous Arizono-Mexican genera are appended.

**TRIBE I. SURIANÆ.** Carpels entirely distinct, neither ovaries nor styles united. Flowers perfect. (*Cneoridium* would belong here except for the glandular-punctate foliage and rutaceous odor.)

1. **SURIANA.** Calyx 5-parted, persistent. Petals 5, imbricated in the bud, unguiculate. Stamens 10, with slender filaments, those opposite the petals shorter or sometimes wanting. Disk obscure or adnate to base of calyx. Carpels 5, opposite the petals; ovaries globular, hairy, with 2 collateral ascending campylotropous ovules; styles filiform; stigma capitate. Fruit akeniform; embryo horseshoe-shaped; cotyledons thick, oblong, incumbent.

**TRIBE II. SIMARUBÆ.** Carpels (1-ovuled) united only at base or by their styles, in fruit becoming distinct and forming

\* Samaras : exotic.

2. **AILANTHUS.** Flowers polygamo-diœcious; the ♀ with smaller mostly sterile stamens; ♂ with only a rudiment of pistil. Calyx small, 5-parted. Petals 5, oblong, valvate-induplicate in bud, or the tips imbricated. Stamens borne on the base of a 10-crenate disk, in sterile flowers 10, with oval or oblong anthers, in fertile flowers sometimes fewer and with small or abortive anthers. Carpels 2 to 5, distinct (but the medial styles connate; the thickened stigmas divergent), in fruit becoming linear-oblong samaras bearing the rounded seed at the middle of the thin and veiny ventrally emarginate wing; albumen little; cotyledons orbicular.

\* \* Drupes.

3. **SIMARUBA.** Flowers diœcious. Calyx short, 5-toothed. Petals 5, imbricated in the bud, connivent below, widely spreading above. Stamens 10, borne on a hemispherical disk or torus (in fertile plant only rudimentary); filaments with scale-like appendage at base inside. Carpels 5, slightly cohering, with styles united into one and a 5-lobed stigma. Drupes 1 to 5, not stipitate; embryo with thick and fleshy cotyledons and retracted radicle. Leaves pinnate.
4. **CASTELA.** Flowers polygamo-diœcious, 4-merous. Calyx 4-parted, small. Petals 4, oblong, imbricated in the bud. Stamens 8, inserted under an 8-crenate disk; those of fertile flowers smaller and commonly imperfect; filaments short, not appendiculate. Carpels of fertile flowers 4; styles short, united below, revolute and introrsely stigmatose above. Drupes small, subsessile, with thin flesh and crustaceous endocarp; seed globose-ovate, with little albumen; cotyledons orbicular, plano-convex, not enclosing the short radicle. Leaves simple.
5. **HOLACANTHA.** Flowers diœcious. Calyx 5-8-parted. Petals 7 or 8, obovate-spatulate, imbricated in the bud. Stamens 12 to 16 in sterile flowers, their subulate filaments hairy-tufted at base, 6 to 8, and with small imperfect anthers in the fertile. Disk annular, crenulate. Carpels 6 to 10, lightly cohering around a low conical axis; styles divergent, terminal, subulate, above introrsely stigmatose. Drupes small and dry, stellately divergent, sessile, ovoid, tardily separating from the conical fissile axis; embryo amygdaloid, in thin albumen; radicle nearly retracted within the base of the obovate flat cotyledons. Leaves reduced to mere scales on grown plants.

**TRIBE III. PICRAMNIÆ.** Carpels consolidated into a 2-5-celled ovary; their styles more or less united.

\* Genuine.

6. **PICRAMNIA.** Flowers diœcious. Calyx 3-5-cleft. Petals 3 to 5, narrow. Stamens as many as petals and opposite them; filaments slender, naked; in fertile flowers reduced to vestiges. Ovary 2-3-celled, with a pair of ovules in each cell. Fruit an olive-shaped 1-seeded berry; no albumen; embryo nearly entire. Leaves imparipinnate.

\* \* Anomalous, of uncertain affinity, green-thorny shrubs with habit of *Holacantha*: flowers hermaphrodite: no obvious hypogynous disk: anthers ovate.

7. **KOEBERLINIA.** Sepals 4, small, deciduous. Petals 4, convolute-imbricate in the bud, deciduous. Stamens 8; filaments thickened in the middle, subulate-attenuate. Ovary ovoid,

short-stipitate, 2-celled, tapering into the subulate style; stigma terminal, obtuse; ovules numerous in each cell, on central placenta, horizontal or descending, anatropous. Fruit a globular small berry, becoming dry, 2-celled; cells by abortion 1-2-seeded; seed circinate-cochleate, with crustaceous testa; embryo annular, in a very thin stratum of albumen; cotyledons semiterete; radicle ascending.

8. **CANOTIA**. Calyx small, 5-lobed, imbricated in the bud, persistent. Petals 5, imbricated in the bud, oblong, enlarging in anthesis, deciduous. Stamens 5, alternate with the petals; filaments filiform, naked, persistent; anthers apiculate. Ovary ovoid, with a solid base or gynobase, above with 5 small cells (opposite the petals) and about 6 amphitropous ovules in each cell; style persistent, elongating; stigma truncate, 5-crenate. Fruit drupaceous-capsular, oblong-ovoid, pointed with the subulate indurated style; thin fleshy epicarp at length dry, persistent on the woody and thicker endocarp, in age dehiscent above through the persistent style into 10 short and slender-tipped valves; no columella; seeds solitary or a pair in each cell; nucleus oval or oblong with a close subcoriaceous coat, below the insertion produced into a membranaceous wing; embryo straight in a thin stratum of fleshy albumen; cotyledons oblong, flat; radicle short, *inferior*.

1. **SURIÁNA**, Plum. (*D. Surian*, a French physician.) — Nov. Gen. 37, t. 40; L. Gen. no. 852; Lam. Ill. t. 389; Benth. & Hook. Gen. i. 313; Baill. Hist. Pl. iv. 427, 511, f. 526-529. — Single species.

**S. marítima**, L. Shrub a yard or two high, soft-pubescent, thickly branched: leaves linear-spatulate, alternate, entire, thickish and veinless, much crowded on the branches: flowers solitary or few and short-peduncled in terminal clusters: sepals ovate, acuminate, equalling the yellow petals, 3 lines long. — Spec. i. 284 (Sloane, Jam. ii. 29, t. 162, f. 4; Pluk. Alm. t. 241, f. 5); DC. Prodr. ii. 91. — Sea-shore, Florida. (Most tropical coasts.)

2. **AILÁNTHUS**, Desf. **AILANTUS-TREE**, CHINESE SUMACH, &c. (*Ailanto*, said to be native name of Chinese species, and to mean *Tree of Heaven*. Name often corrected to *Ailantus*, but it was published in the other form.) — Mém. Acad. Sci. Par. 1786, 265, t. 8.

**A. GLANDULÓsus**, Desf. l. c. Tall tree, of rapid growth, bitter bark, and somewhat ill-scented foliage, *not* glandular: leaves very large, pinnately 13-27-foliolate; leaflets oblong-ovate, acuminate, entire or with a few irregular coarse teeth: flowers in panicles, in early summer, yellowish white, very ill-scented, especially the sterile: keys 2 inches long. — L'Her. Stürp. Am. t. 84. — Much planted as a shade tree, and often self-sown, especially in or near eastern towns, becoming naturalized southward. (Nat. from China.)

3. **SIMARÚBA**, Aubl. BITTER-WOOD. (Supposed native name.) — Tropical American trees, with very bitter bark, alternate abruptly pinnate leaves on naked petioles, and rather small white flowers in terminal and axillary compound panicles. — Pl. Guian. ii. 859, t. 331, 332 (*Simarouba*); Benth. & Hook. Gen. i. 309; Engler in Mart. Fl. Bras. xii. pt. 2, 222, t. 45.

**S. glaúca**, DC. (PARADISE-TREE.) Tree 30 to 50 feet high, glabrous: leaflets 7 to 12, coriaceous, shining above, pale and glaucescent beneath, obovate-oblong, commonly retuse, beneath transversely veined from a prominent midrib: anthers linear-oblong; short appendage to the filament densely villous: drupes olive-shaped, almost inch long, scarlet. — Ann. Mus. Par. xvii. 323, & Prodr. i. 733; Chapm. Fl. 67; Nutt. Sylv. iii. 20, t. 87 (poor); Engler, l. c. 224.<sup>1</sup> *S. medicinalis*, Endl. Mediz. 528, &c. *Quassia Simaruba*, Wright, Trans. Edinb. Roy. Soc. ii. 73, t. 1, 2. — Keys of S. Florida. (W. Ind. to Brazil.)

4. **CÁSTELA**, Turpin. (*René Castel*, wrote a poem upon plants.) — Spinose shrubs (of subtropical American coasts), with small and entire alternate leaves of coriaceous texture, and small flowers solitary or fascicled in their axils. Wood

<sup>1</sup> Add Sargent, Silv. i. 91, t. 38, 39.

and bark very bitter. — Ann. Mus. Par. vii. 78, t. 5; Planch. Lond. Jour. Bot. v. 567; Gray, Gen. Ill. ii. 153, t. 158.

**C. Nicholsöni**, Hook. A rigid and very spiny low shrub, tomentulose-canescens, except the upper face of the leaves: these lance-linear to oblong-spatulate, from retuse to mucronate or apiculate, very coriaceous, veinless above, obscurely transversely veined beneath, quarter to half inch long, with mostly revolute margins: flowers saffron-colored, very short-pedicelled: drupes red, a quarter or third inch long. — Bot. Misc. i. 271, t. 55; Torr. & Gray, Fl. i. 680; Planch. l. c. 566; Gray, l. c. *C. erecta*, Griseb. Fl. W. Ind. 140, in part, not Turp., which is green and glabrous. — Coast of Texas.<sup>1</sup> (Antigua, Mex., &c.)

**5. HOLACÁNTHA**, Gray. (Ὅλος, complete, ἀκανθα, thorn, the naked branches all thorn-like.) — Pl. Thurb. 310; Torr. Bot. Mex. Bound. 45, t. 8; Benth. & Hook. Gen. i. 310. — Single species.

**H. Emöryi**, GRAY, l. c. Rigid shrub, 5 to 10 feet high, with bitter wood, the young parts canescently pubescent, much branched, the terete long and naked branchlets tapering into spines: leaves in seedlings alternate, lanceolate or linear, half inch long, thickish, entire or repand or with a pair of basal lobes (a small spine in most axils); in grown plants mostly reduced to small ovate or subulate green scales, and these deciduous: flowers glomerate on spinescent branchlets, subsessile, canescent outside, white within: drupes soon dry and nut-like, quarter inch long. — Arid plains of S. Arizona; first coll. by Emory, and figured without name by Engelmann (Emory, Rep. 158, no. 14).

**6. PICRÁMNIA**, Swartz. (Πικρός, bitter, θάμνος, shrub.) — Tropical American shrubs with bitter wood, alternate imparipinnate leaves, and small greenish flowers more or less glomerate in long and slender pendulous spikes or racemes. — Prodr. Veg. Ind. 27, & Fl. Ind. Occ. i. 217, t. 4; Benth. & Hook. Gen. i. 315.

**P. pentándra**, SWARTZ. Leaflets 5 to 9, ovate-oblong, acuminate, glabrous, shining above: petals and stamens 5: stigmas 2, sessile, diverging: berries rounded at both ends, reddish, turning black. — Fl. Ind. Occ. i. 220, t. 4; A. Rich. Fl. Cub. 379; Griseb. Fl. W. Ind. 140. — Forests of S. Florida, Garber, Curtiss.

**7. KOEBERLÍNIA**, Zucc. (*C. L. Koeberlin*, a German amateur botanist.) — Zucc. Abh. Akad. München, i. 358, & Flora, 1832, pt. 2, Beibl. 74; Gray, Pl. Wright. i. 30. — Single species.

**K. spinósa**, Zucc. ll. cc. Leafless shrub or small tree: branches slender and green-barked, rigid but rush-like, spine-tipped, either alternate or opposite, and subtended by minute and subulate glabrous scales: flowers small, in umbelliform lateral fascicles, white or whitish: berries red, not over three lines in diameter, soon dry. — Benth. Pl. Hartw. 35; Torr. Bot. Mex. Bound. 42.<sup>2</sup> — S. Texas, on and near the Rio Grande, to S. Arizona. (Mex.)

**8. CANÓTIA**, Torr. (Native Mexican name.) — Pacif. R. Rep. iv. 68; Gray, Bot. Ives Rep. 15, & Proc. Am. Acad. xii. 159; Brew. & Wats. Bot. Calif. i. 190; Rothrock in Wheeler, Rep. vi. 81, t. 1.<sup>3</sup> — Single species.

**C. holacántha**, TORR. l. c. A glabrous and green-branched shrub or low tree (sometimes 20 to 30 feet high with trunk at base a foot in diameter): branches slender, rush-like, mostly spiny-tipped, not very rigid: wood and bark not bitter: leaves so far as known reduced to minute alternate scales, and these deciduous: flowers in small fascicles or panicles, globular in the bud: petals greenish white, 2 lines long: fruit an inch long. — Plains, hillsides, and cañons of Arizona;<sup>4</sup> first coll. by Emory, then in fruit by Bigelow, in flower by Palmer, Rothrock, and Pringle.

<sup>1</sup> Ascending the Rio Grande as far as Eagle Pass, acc. to Coulter, Contrib. U. S. Nat. Herb. ii. 55.

<sup>2</sup> Add Sargent, Silv. i. 93, t. 40.

<sup>3</sup> Add Sargent, l. c. 87, t. 37.

<sup>4</sup> Also on the Providence Mts., S. E. California, Cooper, acc. to Brew. & Wats. Bot. Calif. i. 190.

## ORDER XXXV. BURSERACEÆ.

By A. GRAY.

Trees or shrubs (all tropical or subtropical), with alternate and pinnately compound leaves, no stipules, and small regular flowers, like *Rutaceæ* and *Simarubaceæ* except that the foliage is destitute of pellucid or glandular dots and there is no particular bitterness, but the wood and bark are resiniferous (the juice yielding myrrh, copal, and various balsams). Ovary 2–5-celled, with a pair of collateral pendulous anatropous or amphitropous ovules in each cell (micropyle superior). Fruit drupaceous or the epicarp valvular-dehiscent; seeds solitary, without albumen; embryo with thin contortuplicate cotyledons. Represented on southern borders only by

1. **BURSERA**, Jacq. (*J. Burser*, a botanist of the 16th century.)—Flowers polygamous, 3–5-merous. Calyx small. Petals ovate or oblong, inserted on the base of annular hypogynous disk, imbricate or induplicate in the bud, above widely spreading. Stamens 6 to 10. Ovary ovoid, 3-celled; style very short; stigma 3-lobed. Fruit globular or trigonous, by abortion mostly 1-celled and 1-seeded; fleshy or coriaceous epicarp 2–3-valved and falling away from the bony endocarp. — Jacq. acc. to L. Spec. ed. 2, i. 471, & Stirp. Am. 94, t. 65 (*Burseria*); L. Gen. ed. 6, no. 440; Engler in Mart. Fl. Bras. xii. pt. 2, 251, & DC. Monogr. Phan. iv. 36. — American trees or shrubs, some of them copaliferous, with pinnately compound leaves, small and white or yellowish mostly panicle or fascicled flowers, and small drupes.

**B. gummífera**, L. (GUMBO LIMBO, MASTIC-TREE.) Resiniferous tree, with spongy wood and reddish bark which exfoliates in thin layers (whence the name *W. Ind. Birch-tree*), glabrous: leaflets 3 to 9, ovate or oblong, acuminate, thinnish, petiolulate (2 or 3 inches long); common petiole slender: flowers in lateral panicles from the base of leafy shoots of the season, commonly 5-merous: fruit only quarter inch long; the brownish husk falling in 3 valves from the white and triangular persistent nut. — Spec. ed. 2, i. 471 (Sloane, Jam. t. 199; Catesb. Car. i. t. 30); Lam. Ill. t. 256; Nutt. Sylv. ii. 117, t. 79; Chapm. Fl. 68; Engler in DC. Monogr. Phan. iv. 39. *Pistacia Sinaruba*, L. Spec. ii. 1026.<sup>1</sup> — Coast and keys of S. Florida.<sup>2</sup> (*W. Ind.* to Venezuela.)

**B. microphýlla**, GRAY. Tortuous shrub or small tree, with trunk 4 to 6 inches in diameter, densely branched, glabrous: leaves mostly crowded at summit of branchlets, 11–33-foliolate; leaflets linear-oblong, obtuse, thickish, 2 or 3 lines long, sessile on the narrowly margined rhachis: peduncles short, 2–4-flowered, terminating the branchlets: flowers 5-merous: petals more or less induplicate in the bud: drupes small, ovoid; cotyledons very contortuplicate, biterminately dissected into linear lobes. — Proc. Am. Acad. v. 155, & xvii. 230; Engler, l. c. 47, 537. — Rocky hills near Maricopa, S. Arizona, Parry, Pringle. (Lower Calif., *Xantus*, Palmer; Mex., *Palmer*.)

**B. HINDSIANA**, Benth. & Hook. acc. to Wats. Bibl. Index, 157, & Engler, l. c. 58 (*Elaphrium*, Benth. Bot. Sulph. 10), which is unifoliolate, and var. *RHOIFÓLIA*, Engler, l. c., which is trifoliolate, are of Lower California. The latter form was collected by Pringle in N. W. Sonora, near the Gulf of California, and may probably occur in S. W. Arizona.

<sup>1</sup> Add syn. *B. Sinaruba*, Sargent, Gard. & For. iii. 260, & Silv. i. 97, t. 41, 42.

<sup>2</sup> On the eastern coast as far north as Cape Canaveral, acc. to Sargent, l. c.

ORDER XXXVI. ANACARDIACEÆ.

By A. GRAY.

Shrubs or trees (of temperate and largely of tropical countries), with resinous juice, alternate dotless leaves and no stipules. Flowers small and regular, mostly 5-merous, symmetrical except as to number of carpels. Calyx and corolla imbricated or valvate in the bud. Stamens as many as petals and alternate with them, or sometimes twice as many, inserted with the petals outside of or on a hypogynous or subperigynous disk. Ovary mainly 1-celled but with 2 or 3 styles or stigmas (in the Mango simple, in the Hog Plums 3-5-celled), and a solitary anatropous ovule. Fruit almost always drupaceous; seed with large embryo and little or no albumen; the flat or plano-convex cotyledons in ours accumbent on the radicle. — Represented only by the polymorphous and wide-spread genus *Rhus*, except as to the following.

*PISTÁCIA MEXICÁNA*, HBK., being unknown as to flowers, is more probably a *Rhus* (as below placed) than a solitary American member of an Old World genus.

*VEÁTCHIA CEDROSÉNSIS*, Gray, Proc. Am. Acad. xx. 290, of the islands off Lower California (*Rhus Veatchiana*, Kellogg), is the type of a peculiar genus with accrescent scarious petals and utricular fruit.<sup>1</sup>

*SCHÍNUS MÓLLE*, L., the well-known PEPPER-TREE or CHILI PEPPER, native of Chili and Peru, long ago widely distributed and extending to the U. S. borders, is much planted as an ornamental tree in S. California.

*SPÓNDIAS LÚTEA*, L., the West Indian HOG PLUM, may have effected a lodgment on the Keys of Florida, as its nut-like 5-celled putamen is occasionally found on the beaches.

1. **RHÚS**, Tourn. SUMACH, &c. (The ancient Greek and Latin name of the S. European species.) — Flowers polygamous or diœcious, seldom truly perfect, small, white, greenish, or rarely yellow rose-color. Calyx small, 5-parted. Petals 5, imbricated in the bud. Stamens 5. Ovule on a funiculus which rises from the base of the cell. Embryo with a short radicle accumbent. — Inst. 611, t. 381; L. Gen. no. 241; DC. Prodr. ii. 66; Gray, Gen. Ill. ii. 157, t. 159, 160; Benth. & Hook. Gen. i. 418, excl. *Lithræa*. *Rhus*, *Cotinus*, & *Toxicodendron*, Tourn. Inst. 610, 611; Engler in DC. Monogr. Phan. iv., also *Metopium*, P. Br. Jam. 177. — Trees or shrubs of varied habit, all with resinous and often milky juice, in some poisonous (even the effluvium) to the skin; bark and foliage of the true Sumachs abounding in tannin, and therefore valuable in leather-dressing.

§ 1. **CÓTINUS**, DC. Dry and smooth drupe in its growth becoming very gibbous, the remains of the styles therefore deeply lateral: flowers in ample loose panicles, polygamous; pedicels elongating after flowering and becoming plumose-villous: leaves simple and entire. — Prodr. ii. 67. *Cotinus*, Tourn. Inst. 610; Engler, l. c. 349, t. 12.

<sup>1</sup> This species has subsequently been identified by Mr. T. S. Brandegee, Proc. Calif. Acad. Sci. ser. 2, ii. 140, with the problematic *Schinus? discolor* of Benth. Bot. Sulph. 11, t. 9, and redescribed as *Veatchia discolor*.

**R. cotinoides**, NUTT. (AMERICAN SMOKE-TREE, CHITTAM-WOOD.) Tree 25 to 40 feet high, with soft and light orange-colored wood, glabrous or nearly so: leaves thin and membranaceous, oval, with mostly acute or narrowed base, 3 to 6 inches long: flowers (greenish yellow) and fruit as in *R. Cotinus*. — Nutt. in Torr. & Gray, Fl. i. 217, as synonym; Chapm. Fl. 70; C. Mohr, Proc. Acad. Philad. 1881, 217; Sargent, U. S. 10th Census, ix. 52. *R. Cotinus*, Nutt. Trav. Arkansas, 177. *R. Cotinus*? Torr. & Gray, Fl. i. 216.<sup>1</sup> *Cotinus Americanus*, Nutt. Sylv. iii. 1, t. 81.<sup>2</sup> — Wooded calcareous banks, on Grand River, a tributary of the Arkansas (in the Indian Territory), Nuttall, also N. Alabama,<sup>3</sup> in the mountains, Buckley, Nevius, Mohr; rare and local.

§ 2. **METÓPIUM**. Drupe symmetrical, glabrous and with thin chartaceous and smooth putamen; style very short and undivided; stigma 3-lobed: flowers in ample loose panicles, perfect or barely polygamous: leaves pinnate. — *Metopium*, P. Br. Jam. 177, t. 13, f. 3; Engler, l. c. 367, t. 13, f. 32–38.

**R. Metópium**, L. (JAMAICA SUMACH, POISON-WOOD, but hardly poisonous.) Low tree, glabrous: leaves usually 5-foliolate; leaflets long-petiolulate, ovate, with rounded or subcordate base, from obtuse or emarginate to abruptly acuminate, entire (or undulate-margined), shining above, 2 to 4 inches long: fruit obovoid or oblong, scarlet when ripe. — Syst. Nat. ed. 10, 964, Amoen. Acad. v. 395, & Spec. ed. 2, i. 381 (P. Br. l. c., Sloane, Jam. ii. t. 199, f. 3); Descourt. Fl. Ant. ii. t. 79; Chapm. Fl. 69.<sup>4</sup> *Metopium Linnæi*, Engler, l. c. — S. Florida along the coast and on the keys. (W. Ind.)

§ 3. **RHÚS** proper. Drupe symmetrical or nearly so, with crustaceous or bony putamen; short styles and stigmas distinct or partly united: flowers mostly polygamous, in some diœcious: leaves (turning red in autumn) and inflorescence various.

\* **TOXICODÉNDRON**. Drupes dun-colored or whitish, the thin and almost always glabrous epicarp at length falling away from the granular-waxy mesocarp, this traversed by copious longitudinal or partly reticulating fibres in one or two series and more persisting around the dull and somewhat rugose or undulate stone (putamen): leaves deciduous, pinnately 3–several-foliolate: flowers in axillary open panicles: whole plants glabrous or glabrate, occasionally pubescent, the juice and effluvium acrid-poisonous; fl. summer. — *Toxicodendron*, Tourn. Inst. 610; Mill. Dict. ed. 8. *Rhus* § *Toxicodendron*, Gray, Man. eds. 2–5; DC., and Engler, in part. (*R. trichocarpa*, Miq., is of this section, notwithstanding the hirtellous drupe: a Japanese form of *R. Toxicodendron* has the same anomaly in a less degree.)

† Leaves trifoliolate: panicles short: stems in same species sometimes erect but low, sometimes climbing (even to the tops of trees) by multitudinous rootlets (never “volute”). — **POISON VINES**.

**R. Toxicodéndron**, L. (POISON IVY, POISON OAK.) Glabrous, or more commonly with young foliage and often the adult more or less pubescent, or villous-bearded on midrib and veins beneath: leaflets variously ovate, all or some acuminate (2 to 5 inches long), entire or angulate-dentate or sinuate or 3–5-lobed, lateral ones short-petiolulate: panicles almost always shorter than the petioles: drupes 2 or 3 lines in diameter; waxy mesocarp multicostate when dry, the outer circle of fibres being much impressed. — Michx. Fl. i. 183; Pursh, Fl. i. 205; Sims, Bot. Mag. t. 1806 (“*a. vulgare*”); Nouv. Duham. ii. t. 48; Torr. & Gray, Fl. i. 218; Emerson, Trees & Shrubs Mass. ed. 2, ii. 577, with plate; Engler, l. c. 393, excl. var. *R. Toxicodendron*, & *R. radicans*, L. Spec. i. 266, & ed. 2, i. 381 (Cornuti, Canad. f. 97; Dill. Elth. t. 291), & various authors.<sup>5</sup> In general the high climbing plants have the

<sup>1</sup> Add syn. *R. Americanus*, Sudworth, Bull. Torr. Club, xix. 80.

<sup>2</sup> Add Sargent, Silv. iii. 3, t. 98, 99. *C. cotinoides*, Britton, Mem. Torr. Club, v. 216.

<sup>3</sup> Also mountains of E. Tennessee, and near Medina River, W. Texas, *Reverchon*, acc. to Sargent, l. c.

<sup>4</sup> Add Sargent, Silv. iii. 13, t. 100, 101.

<sup>5</sup> A noteworthy form from the Keys of Florida (where coll. in fruit by *Blodgett*) has been called *R. Blodgettii* by Kearney, Bull. Torr. Club, xxi. 486. It differs in its somewhat smaller drupes and

more entire leaves and answer to *R. radicans*, L. *R. verrucosa*, Scheele, Linnæa, xxi. 592, the mesocarp described for the surface of the drupe. *Toxicodendron vulgare*, *pubescens*, *crenatum*,<sup>1</sup> *volubilis*, & *serratum*, Mill. Dict. ed. 8. (Varieties indiscriminate: a Japanese one, coll. Maximowicz, has hispidulous fruit!) — Moist or shady ground; Nova Scotia to Florida, west to Brit. Columbia, Oregon, and Arizona. (Bermuda, Mex., Japan.)

**R. diversiloba**, TORR. & GRAY. (POISON OAK, YEARD.) Leaflets oblong or oval or somewhat obovate, with rounded or very obtuse apex, varying from entire to subpinnatifid (1 to 3 inches long); lateral ones subsessile: panicles surpassing the petioles not rarely equalling the leaves: otherwise as the preceding. — Fl. i. 218; Lindl. Bot. Reg. xxxi. t. 38; Brew. & Wats. Bot. Calif. i. 110. *R. lobata*, Hook. Fl. Bor.-Am. i. 127, t. 46, not Poir. *R. Toxicodendron*, var. *diversiloba*, Engler, l. c. 395. — Common throughout California, north to the borders of Washington, where probably it passes into the preceding.

+ + Leaves pinnate: panicles slender: stems never rooting or climbing. — VARNISH TREES.

**R. venenata**, DC. (POISON DOGWOOD, POISON ELDER, POISON SUMACH.) Arborescent shrub, glabrous, or almost so: leaves 7-13-foliolate, with reddish petiole; leaflets membranaceous, oblong or oval, acuminate, entire, acute at base and somewhat petiolulate, pale beneath, 2 or 3 inches long: panicles narrow: drupes small, the stone broader than long, obtusely sulcate longitudinally. — Prodr. ii. 68; Hook. Fl. Bor.-Am. i. 126; Torr. & Gray, Fl. i. 218, 681; Emerson, l. c., with plate; Engler, l. c. 397.<sup>2</sup> *R. Vernix*, L. Spec. i. 265,<sup>3</sup> except as to syn. Kämpf., whence however the name (Dill. Elth. t. 292; Pluk. Alm. t. 145, f. 1); Marsh. Arb. 130; Lam. Ill. t. 207, f. 2; Bigel. Med. Bot. i. 96, t. 10. — Wooded swamps, Northern New England and Canada to Minnesota, south to Georgia<sup>4</sup> and W. Louisiana.

\* \* MALÓSSMA, Nutt. Drupes whitish, very small, smooth; the mesocarp a thin granular-waxy layer without fibres; the obscurely didymous stone smooth and bony: leaves simple, thin-coriaceous: flowers polygamous, very numerous in an ample terminal panicle: petals slightly imbricated in the bud: plant apparently innocuous.

**R. laurina**, Nutt. Shrub, very leafy, evergreen, exhaling odor of bitter almonds: leaves oblong, verging to lanceolate, entire, acute or obtuse, mucronate, pinnately veiny, 3 or 4 inches long, rounded at base, rather long-petioled: flowers very small, white: drupes a line or hardly two lines in diameter. — Nutt. in Torr. & Gray, Fl. i. 219; Brew. & Wats. l. c. 111; Engler, l. c. 393. *Lithrea laurina*, Walp. Rep. i. 551; Torr. Pacif. R. Rep. iv. 73, & Bot. Mex. Bound. 44, t. 7. — S. California in valleys near the coast, from Santa Barbara to San Diego<sup>5</sup> and islands; first coll. by Nuttall.

\* \* \* SÚMAC. Drupes red, sour, and the epicarp clothed with acid secreting hairs; the mesocarp thin fleshy and not ceriferous, its delicate fibres coherent rather with the epicarp and freely separating from the smooth and even stone: no poisonous qualities, except possibly in *R. pumila*. — § *Sumac* in part, & *Lobadium* (Raf.), DC. Prodr. ii. 67, 72. § *Trichocarpæ*, Engler, l. c. 376, excl. *R. trichocarpa*.

+ True SUMACHS: leaves pinnately plurifoliolate, deciduous or in one species subsupersistent, the leaflets sessile: polygamous (or diœcious) flowers and crimson fruit in a dense and sessile terminal thyrsus or with smaller ones in axils of uppermost leaves; bracts minute, thin and deciduous: erect shrubs or small trees, with large leaves and stout branches, orange or yellow wood, bark and especially foliage astringent (rich in tannin) and used in tanning; fl. summer.

++ Rhachis between the leaflets naked.

its smaller thicker less pubescent leaflets, — distinctions of doubtful value in a plant so near the widely distributed and polymorphous *R. Toxicodendron*. Similar specimens from W. Florida, *Rugel*, and Texas, *Lindheimer*, are in some regards transitions to the typical form.

<sup>1</sup> *T. crenatum*, Mill. l. c., probably was *R. Canadensis*, Marsh.

<sup>2</sup> Add Millsbaugh, Med. Pl. i. 37, t. 37.

<sup>3</sup> Add Sargent, l. c. 23, t. 107, 108.

<sup>4</sup> Florida, *Rugel*.

<sup>5</sup> Also extending far southward into Lower Calif., acc. to Brandegee.

**R. glábra**, L.<sup>1</sup> (SMOOTH SUMACH.) Shrub 3 to 15 feet high, glabrous at least up to the inflorescence: leaflets mostly broadly lanceolate, acuminate, sharply serrate (2 or 3 inches long), bright green above, glaucous-white beneath: fruit of the next or shorter-haired (leaflets also sometimes lacinate.<sup>2</sup>) — Spec. i. 265 (Dill. Elth. t. 243); Lam. Ill. t. 207, f. 1; Marsh. Arb. 128 (but there are no varieties with "scarlet flowers"); Torr. & Gray, Fl. i. 217; Gray, Gen. Ill. ii. t. 159; Emerson, l. c. ii. 572, with plate. *R. Canadensis*, Mill. Dict. ed. 8. *R. elegans*, Ait. Kew. i. 366. — Open dry ground, Canada to W. Florida and Texas, west to Brit. Columbia, E. Oregon, and mountains of Arizona.

**R. týphina**, L. (COMMON OR STAG-HORN SUMACH.) Tall shrub or small tree with spreading branches, these with petioles and inflorescence densely velvety-villous: leaflets lanceolate, acuminate, sharply serrate (2 to 4 inches long), thin, pale or whitish beneath, more or less pubescent: fruit in a large and very dense crimson thyse; the velvety-hispid drupes sharply acid. (Varies rarely with lacinate-dissected leaves or confluent leaflets, when it is *Datisca hirta*, L. Spec. ii. 1037.) — Cent. Pl. ii. 14, Amœn. Acad. iv. 311, & Spec. ed. 2, i. 380; Marsh. Arb. 129; Nouv. Duham. ii. t. 47; Torr. & Gray, l. c.; Emerson, l. c. with plate.<sup>3</sup> *R. hypselodendron*, Mœnch, Meth. 73. *R. viridiflora*, Poir. Dict. vii. 504.<sup>4</sup> — Fertile dry soil, New Brunswick<sup>5</sup> to Minnesota, and along the mountains southward to Georgia and Mississippi. Apparently hybridizes with *R. glabra*.

**R. púmila**, MICHX. Shrub one to three feet high, with procumbent base, soft-pubescent: leaflets fewer, oval or oblong, commonly obtuse, strongly and unequally serrate, velvety beneath (2 or 3 inches long): thyse more open.<sup>6</sup> — Fl. i. 182; Pursh, Fl. i. 204; Torr. & Gray, Fl. i. 217; Curtis, Cat. N. Car. 93; not Meerb.<sup>7</sup> — Pine woods and barrens, middle upper country, N. Carolina to Georgia; first coll. by Michaux.

++ ++ Rhachis margined or winged between the firmer and coriaceous leaflets: copious copalline juice from the stems: drupes with very short and fine pubescence.

**R. copallína**, L. (DWARF SUMACH.) Low shrub with running subterranean shoots, or southward arborescent and 10 to 30 feet high, soft-pubescent or puberulent when young: leaflets 9 to 23, oblong-ovate or oblong or oblong-lanceolate, from obtuse to acuminate, entire or coarsely few-toothed, more or less inequilateral, the upper face at length shining; the purple rhachis below narrowly and between upper pairs of leaflets more broadly wing-margined: thyse comparatively open: flowers yellowish-tinged. — Spec. i. 266; Marsh. Arb. 128; Lam. Ill. t. 207, f. 3; Jacq. Hort. Schoenb. iii. 50, t. 341; Torr. & Gray, Fl. i. 217; Engler, l. c. 383, with vars. — Sterile and dry ground, but also in sandy bottom lands, New England and adjacent Canada<sup>8</sup> to Minnesota, south to Florida, and Texas.

**Var. leucántha**, DC. Leaflets lanceolate, not rarely falcate, mostly quite entire: flowers white. — Prodr. ii. 68; Gray, Pl. Lindh. pt. 2, 158. *R. leucantha*, Jacq. l. c. t. 342. *R. copallina*, var. *lanceolata*, Gray, Pl. Lindh. pt. 2, 158.<sup>9</sup> — Dry sandy soil and limestone bluffs, Texas to Florida. (Cuba.)

+ + LOBÁDIUM. Leaves pinnate or palmate or simple: flowers sessile or nearly so and subtended by squameous chartaceous or coriaceous concave bracts within which is a

<sup>1</sup> A species very closely allied to (if not merely a low and greener form of) *R. glabra* is *R. CAROLINIÁNA*, W. W. Ashe, Bot. Gaz. xx. 548, t. 37, "growing in old fields and low woods" of Central N. Carolina. The species appears to be unrepresented in the larger American herbaria, and an application to its author has thus far secured neither the gift nor loan of authentic specimens.

<sup>2</sup> Var. *LACINIÁTA*, Carrière, Rev. Hort. 1863, 7.

<sup>3</sup> Add Sargent, l. c. 15, t. 102, 103.

<sup>4</sup> Add syn. *R. hirta*, Sudworth, Bull. Torr. Club, xix. 81, not Harv.

<sup>5</sup> Nova Scotia, acc. to Macoun.

<sup>6</sup> There has long been a doubt concerning the poisonous qualities of this species, and recent evidence is also very conflicting. While Sargent, Gard. & For. viii. 404, asserts its extreme virulence, Ashe, Bot. Gaz. xx. 549, states that the berries are innocuous, being greedily eaten by negro children without ill effects.

<sup>7</sup> Add syn. *R. Michauxii*, Sargent, l. c. viii. 404, f. 55.

<sup>8</sup> Also at Lansdowne, Ont., Young, acc. to J. M. Macoun. Species said to be very rare in Canada. Add lit. Sargent, Silv. iii. 19, t. 104, 105.

<sup>9</sup> Add Sargent, l. c. 20, t. 106.



pair of transverse bractlets; inflorescence of short and at first commonly amentiform spikes, either solitary or thyrsoid-glomerate, or more loosely paniculate: disk commonly lobed: drupes viscid-pubescent: erect shrubs.

++ Evergreen, with rigid coriaceous pinnate leaves, wingless rachis, rather open paniculate inflorescence, and white or rose-colored barely polygamous flowers.

**R. virens**, LINDL. Shrub, 4 to 12 feet high, glabrous or mostly young parts soft-puberulent: leaflets 3 to 9, ovate or oblong, inch or more long, entire, shining above, slightly petiolulate: panicles mostly shorter than the leaves: drupes 4 or 5 lines in diameter. — Lindl. in Gray, Pl. Lindh. pt. 2, 159 (Jan. 1850); Gray, pl. Wright. i. 31, ii. 27. *R. sempervirens*, Scheele, Linnæa, xxiii. 556 (1850?); Engler, l. c. 390, excl. var. — W. & S. Texas (first coll. by Berlandier) to S. Arizona; fl. autumn, or also in summer. (Mex., first coll. by Th. Coulter.)

++ ++ Evergreen, with very rigid coriaceous and mostly simple leaves, more glomerate and bracteate inflorescence, and rose-colored or white polygamous flowers. — *Styphonia*, Nutt. in Torr. & Gray, Fl. i. 220.

**R. integrifolia**, BENTH. & HOOK. Shrub, 2 to 6 feet high, or southward a small tree, very leafy: leaves oval, very obtuse at both ends or acutish at base, entire or variably spinulose-denticulate, inch or two long, dark green and shining above, and with transverse veins in dry state prominulous, short-petioled, occasionally a longer petiole bearing 3 similar leaflets, the lateral ones sessile and smaller: inflorescence and young parts cinereous or canescently puberulent: bracts and similar but thinner bractlets orbicular: sepals oval-orbicular, thin-chartaceous, and somewhat scarious-margined, glabrous or glabrate, ciliolate: drupes half inch in diameter, very viscid and acid. — Benth. & Hook. acc. to Wats. Cat. Pl. Wheeler Rep. 7, & Proc. Am. Acad. xx. 358 (Brew. & Wats, Bot. Calif. i. 110, in part); Engler, l. c. 387, in part.<sup>1</sup> *Styphonia integrifolia*, & *S. serrata*, Nutt. in Torr. & Gray, Fl. i. 220, & Sylv. iii. 4, 6, t. 62. — Cliffs on the sea-shore, S. California and islands, Los Angeles Co.<sup>2</sup> to San Diego, first coll. by Nuttall. Fruit or its excretion used for acidulous drinks. (Lower Calif.)

**R. ovata**, WATSON. Shrub, more glabrous: leaves larger and more lucid (2 or 3 inches long and petiole half to three fourths inch long), ovate or subcordate, mostly entire and acuminate or acute: bracts and calyx as in preceding but more glabrate, the latter hardly at all ciliolate: drupes a third inch in diameter (the viscid acid secretion becoming a sweet manna-like incrustation, Orcutt, W. Am. Scient. iii. 46). — Proc. Am. Acad. xx. 358, but flowers white and pink, not "pale yellow." *R. integrifolia*, Engler, l. c., in part. *Styphonia serrata*, Torr. Pacif. R. Rep. vii. t. 2 (excl. a separate leaf), & Bot. Mex. Bound. 44, mainly. — Mountains of S. California, from Santa Barbara<sup>3</sup> to San Diego, and S. W. Arizona, probably first coll. by Th. Coulter. (Lower Calif.)

**R. LÉNTII**, Kellogg, Proc. Calif. Acad. Sci. ii. 16, & plate in Hesperian (November, 1859, acc. to Mrs. Curran), reprinted in Bull. Calif. Acad. Sci. i., is an allied species of Cedros Island, with very large fruit. *R. Hindsiana*, Engler, l. c. 388, can hardly be the same if it has ovate acute bracts and leaves less obtuse at base.

++ ++ ++ Deciduous-leaved shrubs: flowers polygamo-dicæious, in solitary or small-clustered spikes or heads which are formed in summer or autumn and develop in spring before the leaves. — § *Lobadium*, Torr. & Gray, Fl. i. 219. *Lobadium*, Raf. Am. Monthly Mag. iv. 357.

**R. Canadensis**, MARSH. Shrub with spreading branches, 3 to 7 feet high, with bark and foliage not unpleasantly scented: leaves membranaceous, 3-foliate, soft-pubescent when young, commonly glabrate at maturity; leaflets rhombic-obovate or ovate, the terminal one cuneate-attenuate at base but sessile or nearly so, sometimes 3-cleft, all coarsely or sinuately toothed or incised, 1 to 3 inches long: flowers honey-yellow: drupes as large as peas. — Arb. 129 (1785, and adequately characterized). *R. aromatica* (the pubescent), & *R. sua-*

<sup>1</sup> Add Sargent, Silv. iii. 27, t. 109.

<sup>2</sup> Northwestward to Santa Barbara, Dr. Antisell.

<sup>3</sup> Also (acc. to Brandege) upon the Santa Barbara Islands, where inclining to be arboreous.

*veolens* (the more glabrous form), Ait. Kew. i. 367, 368. *R. aromatica*, Michx. Fl. i. 184; Turp. Ann. Mus. Par. v. 445, t. 30; Torr. & Gray, l. c.; Gray, Gen. Ill. ii. 160, t. 160; Engler, l. c. 385, excl. var.  $\gamma$ . *Betula triphylla*, Thunb. Diss. Betul. 12, t. 1, f. 2, acc. to Swartz, Adnot. 25.<sup>1</sup> *Turpinia pubescens*, & *T. glabra*, Raf. Med. Rep. hex. 2, v. 352, & Desv. Jour. Bot. ii. 170 (1809). — Dry rocky banks, N. W. New England and adjacent Canada to Minnesota and Saskatchewan, south to Kentucky and Arkansas,<sup>2</sup> passing into the following forms.

**Var. mollis**, GRAY. Leaves and young shoots densely velvety-tomentose, but otherwise as the following. — Gray in Patterson, Check-list, 1892, 21. *R. trilobata*, var. (*molliter tomentosa*), Gray, Pl. Wright. ii. 27. *R. trilobata*, var. *pilosissima*, Engler, l. c. 386. — New Mexico,<sup>3</sup> &c., Fendler, Wright, &c.

**Var. trilobáta**, GRAY. Glabrous or early glabrate: leaves smaller; leaflets usually half inch to inch long, obovate-cuneate, crenately few-lobed or incised, mainly at summit. — Gray in Coulter, Contrib. U. S. Nat. Herb. ii. 68. *R. aromatica*, var. *trilobata*, Gray, Am. Jour. Sci. ser. 2, xxxiii. 408; Wats. Bot. King Exp. 53; Brew. & Wats. Bot. Calif. i. 110. *R. trilobata*, Nutt. in Torr. & Gray, Fl. i. 219; Gray, Pl. Lindh. pt. 2, 159, Pl. Wright. i. 31, ii. 27, &c. *R. trilobata*, var. *glaberrima*, Engelm. l. c. — Rocky bluffs and poor soil, Dakota to Texas,<sup>4</sup> and west to California and Oregon.

**Var.\* simplicifólia**, GREENE. Like the last, but leaves all or mainly simple, round-cordate, crenate-lobulate or some deeply 3-cleft. — Bull. Torr. Club, xvii. 13. — Cañons of N. Arizona, Greene; Cantillas Mountains, on the borders of Lower California, Orcutt.

**Var.\* quináta**, JEPSON (under *R. trilobata*). Terminal leaflet deeply 3-fid, the segments approaching in size the crenate or incised lateral leaflets, thus rendering the leaves apparently 5-foliate. — Erythea, i. 141. — Napa Co., Calif., Jepson.

**R. microphýlla**, ENGELM. Tall shrub with verrucose branches, puberulent or glabrous: leaves subcoriaceous, pinnately 7-9-foliate; leaflets a quarter to barely half inch long, oblong, entire, veinless, sometimes silky-pubescent beneath, not shining; rhachis winged between the pairs: flowers white, small, in heads or oblong spikes: fruit nearly of the preceding. — Engelm. in Gray, Pl. Wright. i. 31, & ii. 27; Torr. Bot. Mex. Bound. 44; Engler, l. c. 387. — Margin of thickets and rocky hills, S. & W. Texas to S. Arizona, Wright, Lindheimer, Reverchon. (Mex., Schaffner, Palmer, Pringle, &c.)

\* \* \* \* PISTACIOIDES. Drupes glabrous and with smooth even stone; aromatic pulp neither acid nor ceriferous.

**R. Mexicána**, GRAY. Shrub or small tree, glabrous (in age): leaves crowded at summit of slender branchlets, deciduous; leaflets 9 to 17, subcoriaceous, oblong, obtuse, very unequal-sided, mucronate, somewhat shining above, obscurely veined (half inch or more long): rhachis narrowly margined: panicles axillary, much shorter than the leaves: flowers and bracts unknown: drupes spicately sessile or subsessile on the few branches of the panicle, naked (calyx and bracts deciduous), globular, with thin epicarp and mesocarp (the latter said to be resinous), not fibrous, adherent to the lenticular thin-osseous stone. (Taste of drupe rather of *Schinus*, but the stone and insertion of seed as in *Rhus*, and foliage, &c. not unlike *R. microphylla*.) — Gray in Patterson, Check-list, 1892, 21. *Pistacia Mexicana*, HBK. Nov. Gen. & Spec. vii. 22, t. 608; Torr. Bot. Mex. Bound. 44. — S. W. Texas, on the Rio Grande, Bigelow. (Mex. in northern parts, Gregg, Parry, and Palmer.)

<sup>1</sup> Add syn. *Lobadium amentaceum*, Raf. Am. Monthly Mag. iv. (1819), 358.

<sup>2</sup> Florida, Chapman.

<sup>3</sup> Also in Arizona on the Gila River, Rusby, and at Ft. Verde, Mearns.

<sup>4</sup> Nebraska, Clements, Rydberg; Kansas, Shear, Dorman; Ft. Towson, Arkansas, Dr. Edwards; Georgia, Small; also northward into Brit. America, Assiniboia, Alberta, Macoun.

## ORDER XXXVII. MELIACEÆ.

BY A. GRAY.

Mainly tropical trees or shrubs, with hard wood; characterized in general by dotless alternate and pinnate leaves, no stipules, paniculate inflorescence, and perfect mostly 5-merous small and regular flowers. Sepals mostly imbricated and petals imbricated or convolute in the bud. Stamens monadelphous, often to such a degree that the anthers (never more than double the petals) are enclosed within the mouth of the tube; anthers 2-celled, introrsely dehiscent. Ovary with mostly as many cells as petals, its base surrounded by an annular or cup-shaped disk; styles and stigmas combined into one; ovules anatropous, pendulous. Embryo large. — Sparingly represented by one exotic and one barely indigenous tree.

1. **MELIA.** Petals 5 or 6, narrowly spatulate, spreading. Stamen-tube cylindrical, with 10-12-toothed orifice and as many included sessile anthers. Ovary with a pair of superposed ovules in each cell. Drupe 5-6-celled or by abortion 1-celled, with thin flesh and a single seed in each cell of the bony putamen; embryo in thin fleshy albumen.
2. **SWIETENIA.** Petals 5, oval, spreading. Stamen-tube somewhat urn-shaped, 10-toothed; anthers as many, in the sinuses. Ovary 5-celled, many-ovuled on axile placenta. Capsule 5-celled, septically 5-valved from the base upward; valves thick, sometimes bilamellar; axis thick, 5-angled; seeds numerous, downwardly imbricated, above with broad wing much longer than the body; embryo transverse, conferruminate with the fleshy albumen; radicle very short.

1. **MÉLIA, L.** (Greek name for the Ash-tree, transferred to this genus by Linnæus.) — Gen. no. 357. — Asiatic trees, the following species now widely dispersed.

**M. AZÉDARACH, L.** (PRIDE OF INDIA, CHINA-TREE.) Tree 30 to 40 feet high, fast growing, nearly glabrous: leaves twice pinnate; leaflets ovate or oblong, acuminate, serrate: flowers in loose panicles from upper axils, lilac, fragrant, produced in spring: drupes globose, half inch in diameter, yellowish. — Spec. i. 384. — Planted as a shade tree and naturalized in S. Atlantic States.<sup>1</sup> (Persia to China, whence introd.)

2. **SWIETÉNIA, Jacq.** MAHOGANY. (*Dr. Gerard van Swieten* of Leyden, in the 18th century.) — Enum. Pl. Carib. 4, & Stirp. Am. 127; L. Gen. ed. 6, 209. — The principal species is

**S. Mahagóni, Jacq.** (MAHOGANY-TREE.) A noble tree, with hard reddish brown wood, very glabrous: leaves abruptly pinnate; leaflets 6 to 12, petiolulate, oblong-ovate and unequal-sided, somewhat falcate, acuminate, entire, coriaceous: flowers greenish yellow, in short axillary panicles: capsule oval, 3 inches long. — Enum. Pl. Carib. 20, & Stirp. Am. 127; L. Spec. ed. 2, i. 548 (Catesb. Car. ii. t. 81); Cav. Diss. t. 209; Hook. Bot. Misc. i. 21, t. 16, 17.<sup>2</sup> *S. Mahogoni*, Nutt. Sylv. ii. 99, t. 75; Chapm. Fl. 62. — Keys of S. Florida. (W. Ind., Mex., Centr. Am., &c.)

<sup>1</sup> Also much planted and (acc. to Coulter) "extensively naturalized in Central and Southern Texas."

<sup>2</sup> Add lit. and syn. Sargent, Silv. i. 100, t. 43, 44. *Cedrus Mahogani*, Mill. Dict. ed. 8, no. 2.

## ORDER XXXVIII. AQUIFOLIACEÆ.

BY W. TRELEASE.

Shrubs or small trees. Leaves alternate, simple, entire, crenulate, or pungently toothed, petioled, with minute often persistent stipules. Flowers solitary or few in the axils, or in small axillary cymes, small, greenish, diœcious by abortion, 4-9-merous (in ours), without disk. Calyx minute, with triangular frequently persistent imbricate segments. Petals sometimes connate at base, imbricate, not hooded. Stamens as many as and alternate with the petals; anthers short, 2-celled, introrse, innate on short filaments. Pistil compound; ovary 4-8-celled, slightly lobed, superior; ovules suspended, 1 in each cell; style short or wanting; stigmas nearly confluent. Fruit drupaceous, with as many indehiscent stones as carpels; seeds not arillate, with abundant fleshy albumen; embryo small, straight, with plane cotyledons.

1. **ILEX.** Flowers 4-9-merous. Calyx present and persistent in both fertile and sterile flowers. Corolla slightly gamopetalous, with oblong obtuse lobes. Stamens adnate to the base of the corolla.
2. **NEMOPANTHUS.** Flowers 4-5-merous. Calyx often obsolete, especially in the fertile flowers. Petals distinct, linear, acute. Stamens free.

1. **ÍLEX, L. HOLLY.** (Classical name of the Holly Oak.) — Shrubs or small trees with evident though small pointed stipules. — Gen. no. 91; Benth. & Hook. Gen. i. 356; Maximowicz, Mém. Acad. St. Pétersb. ser. 7, xxix. no. 3, 14; Baill. Hist. Pl. xi. 211; Trelease, Trans. St. Louis Acad. v. 345; Sargent, Silv. i. 103; Kronfeld in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 186. — Mainly of warmer regions, especially of the New World.

\* Flowers 4-merous: drupe red or occasionally yellow; nutlets prominently few-ribbed on the sides and back; leaves coriaceous, evergreen. — § *Aquifolium*.

- I. **opáca, Ait. (AMERICAN HOLLY.)** Arborescent: young twigs sparingly velvety-pubescent: leaves elliptical to obovate, 2 to 4 inches long and about half as broad, pungently acuminate, mostly spinosely dentate, at least above, and often crisped, dull, the petiole (3 lines long) and upper surface of the midrib somewhat puberulent: sterile cymes 3-9-flowered, half inch to an inch long; the fertile mostly 1-3-flowered and half as long; the puberulent peduncle 2-bracted at or below the middle: calyx-segments acute, ciliate: drupe spheroidal or ovoid, 4 or 5 lines long; stigma broad and sessile. — Kew. i. 169; Poir. Suppl. iii. 65; Michx. f. Hist. Arb. Am. ii. 191, t. 11; Raf. Med. Bot. ii. 7, t. 53; Emerson, Trees & Shrubs Mass. ed. 2, ii. 385, with plate; Mellichamp, Bull. Torr. Club, viii. 112; Maximowicz, l. c. 29; Trelease, l. c. 345; Sargent, Silv. i. 107, t. 45. *I. quercifolia*, Meerburgh, Afbeeld. Zelds. Gew. t. 5; Dippel, Handb. Laubholzkunde, ii. 504. *Ageria opaca*, Raf. Sylv. Tellur. 47. — Massachusetts to Florida and Texas, chiefly near the coast, and up the Mississippi Valley to S. E. Missouri and Kentucky.
- I. **Cassíne, L. (DAHOON HOLLY.)** Arborescent: young twigs and often the lower surface of the leaves, at least along the midrib, puberulent: leaves elliptical to obovate-oblong, mostly oblanceolate, 2 to 3 inches long, narrower, obtuse to mucronulate, entire or remotely low-serrate above, cuneate into petioles 4 to 6 lines long, upper surface glossy: fertile cymes mostly 3-flowered and 3-fruited: drupe subglobose, 2 to 3 lines in diameter. — Spec. i. 125, in part; Willd. Hort. Berol. i. t. 31; Kerner, Oekonom. Pflanzen. t. 65; Löseney, Bot. Centralbl. xlvii. 163; Sargent, Silv. i. 109, t. 46; Dippel, l. c. 506, f. 242. *I. Dahoon*, Walt. Car. 241; Maximowicz, l. c. 26; Trelease, l. c. 345. *I. Cassine*, var. *latifolia*, Ait. Kew. i.

170. *I. cassinoides*, Link, Enum. i. 148. *I. laurifolia*, Nutt. Am. Jour. Sci. v. 289. *Ageria palustris*, Raf. Sylv. Tellur. 47. *A. obovata*, Raf. l. c. 48. *A. heterophylla*, Raf. l. c. — North Carolina, Curtis, to Florida. (Mex., W. Ind.) With oblanceolate leaves 1 to 3 inches long and scarcely over 6 lines wide, and sometimes 8 or 10 drupes on a naked shoot, it is var. *ANGUSTIFOLIA*, Willd. (Spec. i. 709; Sargent, Silv. i. 110, t. 46, f. 8; *I. angustifolia*, Willd. Enum. 172; *I. ligustrina*, Ell. Sk. ii. 680; ? *I. Watsoniana*, Spach, Hist. Veg. ii. 429), of about the range, scarcely to be maintained, and merging into

Var. *myrtifolia*, SARGENT. Leaves crowded, very narrowly elliptical, revolute, less than an inch long, mucronate, mostly entire and glabrous: drupes mostly solitary and short-stalked. — Gard. & For. ii. 616, & Silv. i. 110, t. 47. *I. myrtifolia*, Walt. Car. 241; Nouv. Duham. i. 10, t. 4; Maximowicz, l. c. 26, 31. *I. Dahoon*, var. *myrtifolia*, Chapm. Fl. 269; Trelease, l. c. 346. *I. rosmarinifolia*, Lam. Ill. i. 356. *I. ligustrifolia*, Don, Syst. ii. 19. — South Carolina to Florida and Alabama.

- I. vomitoria**, AIT. (CASSENA, YAUPON.) Occasionally arborescent: twigs, petioles, and occasionally pedicels puberulent: leaves elliptical, about an inch long, very obtuse or emarginate, coarsely crenate-serrate with a deciduous gland at each sinus, rather glossy; petioles 1 to 2 lines long: sterile cymes 3–9-flowered, with a short common peduncle (4 lines long); the fertile sessile, 1–3-flowered: calyx-segments rounded, scarcely ciliate: drupe globose, 2 or 3 lines in diameter, on pedicel of equal length, contracted below the stigma. — Kew. i. 170; Sargent, Silv. i. 111, t. 48; Dippel, l. c. 508. *I. Cassine*, Walt. Car. 241; Maximowicz, l. c. 22; Trelease, l. c. 346; Hale, U. S. Dep. Agr. Bot. Div. Bull. 14. *I. Cassine*, β, L. Spec. i. 125. *I. Cassena*, Michx. Fl. ii. 229. *I. ligustrina*, Jacq. Collect. iv. 105, & Ic. Rar. ii. 9, t. 310. *I. Floridana*, Lam. Ill. i. 356. *I. religiosa*, Bart. Fl. Virg. 66. *I. (Emetila) ramulosa*, Raf. Sylv. Tellur. 45. *I. Caroliniana*, Lösener, Bot. Centralbl. xlvii. 163. *Cassine Peragua*, L. Mant. ii. 220, in part. *C. Caroliniana*, Lam. Dict. i. 652. *C. ramulosa*, Raf. Fl. Lud. 110. *Hierophyllus Cassine*, Raf. Med. Bot. ii. 8. *Ageria Cassena*, Raf. Sylv. Tellur. 47. — North Carolina to Florida and Texas, northward to Arkansas.

\* \* Flowers 4–6-merous: drupe red or purple; nutlets as in the last: leaves deciduous. — § *Prinoides*.

+ Cymes 1-flowered, bractless: leaves frequently crowded on short spurs.

++ Leaves oblanceolate.

- I. decidua**, WALT. Subarborescent: twigs glabrous, almost white in winter: leaves oblanceolate or narrowly obovate, 2 or occasionally 3 inches long, acuminate to mostly obtuse or emarginate, crenate-serrulate, cuneate into a short mostly puberulent petiole, narrowly grooved along the midrib above and the other veins often somewhat impressed, pubescent beneath, at least along the midrib: flowers appearing with the leaves: sterile pedicels 3 to 6 lines long: calyx-segments obtuse to acute, not ciliate: drupe depressed-globose, about 3 lines in diameter, scarcely exceeded by the pedicel; style usually very short, occasionally half line long. — Car. 241; Maximowicz, l. c. 30; Trelease, l. c. 346; Sargent, Silv. i. 113, t. 49; Dippel, l. c. 510. *I. prinoides*, Ait. Kew. i. 169. *I. æstivalis*, Lam. Dict. iii. 147. *I. Prionites*, Willd. Enum. Suppl. 8. *Prinos deciduus*, DC. Prodr. ii. 16. — North Carolina to Kansas, southward to the Gulf.

++ ++ Leaves lanceolate to ovate or obovate.

= Fruiting pedicels 10 or 12 lines long.

- I. longipes**, CHAPM. Large shrub: leaves thin, elliptical to broadly lanceolate, about 3 inches long, emarginate or obtuse to blunt-pointed, low-serrate or crenate, especially above, the base mostly acute, sparingly ciliate with short thick hairs or slightly pubescent along the impressed midrib on one or both surfaces, otherwise glabrous; petioles 3 or 4 lines long: sterile pedicels 6 to 8 lines long: drupe globose, about 4 lines in diameter, its filiform pedicel nearly an inch long: otherwise similar to the preceding. — Chapm. in Trelease, l. c. 346; Trelease, Gard. & For. iii. 344, 345, f. 46. — North Carolina, Buckley, to Tennessee, Gittinger, south to Georgia, Chapman, Alabama, Buckley, and Louisiana, Drummond.

= = Fruiting pedicels less than half inch long: three closely related species perhaps scarcely separable.

- I. ambigua**, CHAPM. Scarcely arboreous: twigs cherry-like, with large lenticels, glabrous or somewhat puberulous: leaves rather broadly lanceolate, elliptical, ovate, or obovate, three

fourths inch to 2 inches long, mostly acuminate, sparingly low-serrate or biserrate, gradually acute or cuneate at base, the deeply grooved petiole (1 to 3 lines long) and the upper surface along the midrib mostly pubescent: calyx-segments rounded in fertile flowers, ciliate: drupe subglobose, about 3 lines in diameter, with sessile stigma; the pedicel a half shorter. — Fl. 269; Maximowicz, l. c. 30; Trelease, l. c. 347. *Cassine Caroliniana*, Walt. Fl. 242. *Prinos ambiguus*, Michx. Fl. ii. 236. *Synstima acuminata*, Raf. l. c. 49. *S. ambigua*, Raf. ex Wats. Bibl. Index, 157. *Nemopanthes ambigua*, Wood, Class-Book, ed. of 1861, 497. — North Carolina to Florida and Texas, north to Arkansas, *Fendler*. Exceptionally the surface of the leaves is sparingly puberulent, especially beneath. A form from Tampa, Florida, *Garber*, with the small leaves glabrous and very firm, is var. *CORIACEA*, Trelease, l. c. 347.

- I. mollis**, GRAY. Scarcely arboreous, at first softly gray-downy, the twigs and often upper surface of the leaves at length glabrate: leaves thin, lanceolate to mostly broadly ovate,  $1\frac{1}{2}$  to 4 inches long: otherwise very close to the next, and somewhat intermediate between it and the preceding. — Man. ed. 5, 306; Maximowicz, l. c. 30; Trelease, l. c. 347. *I. dubia*, Britt. Sterns & Poggenb. Prel. Cat. N. Y. 11. *I. montana*, var. *mollis*, Britton, Bull. Torr. Club, xvii. 313. *I. monticola*, var. *mollis*, Britton, Mem. Torr. Club, v. 217. *Prinos dubius*, Don, Syst. ii. 20. — Blair and Carbon Counties, Pennsylvania, to North and South Carolina and Georgia, in the mountains.

- I. monticola**, GRAY. Occasionally arboreous, glabrous except for the veins of the leaves, especially above: leaves thin, lanceolate to ovate, 2 to 6 inches long, mostly acuminate, rather coarsely serrate; the base acute to rounded; petioles 3 to 6 lines long: calyx-segments subacute, more or less ciliate: drupe slightly elongated and usually with an evident style: otherwise resembling *I. ambigua*, from which it is most readily separable by the larger size of the leaves. — Man. ed. 2, 264; Maximowicz, l. c. 30; Trelease, l. c. 347; Sargent, Silv. i. 115, t. 50; Dippel, l. c. 511, f. 246. *I. montana*, Torr. & Gray in Gray, Man. 276. *I. Amelanchier*, var. *monticola*, Wood, Bot. & Fl. 208. — Pennsylvania to Tennessee, N. Carolina, and N. Alabama, in the mountains.

+ + Sterile cymes several-flowered from a common peduncle.

- I. Amelanchier**, M. A. CURTIS. Low shrub, more or less persistently soft-pubescent throughout: leaves thin, elliptical,  $1\frac{1}{2}$  to 3 inches long, subacute, minutely and inconspicuously serrulate, acute or rounded at base, rugose-veiny beneath; petioles 3 to exceptionally 8 lines long: calyx-segments acute, scarcely ciliate: drupe globose, about 5 lines in diameter, dull, as in *Nemopanthes*; the slender bractless pedicels 3 to 9 lines long. — Curtis in Chapm. Fl. 270; Sargent, Gard. & For. ii. 40, f. 88; Trelease, l. c. 347. — Society Hill, South Carolina, *Curtis*, and Covington, Louisiana, *Drummond*.

\* \* \* Flowers mostly 6–9-merous: nutlets not ribbed. — § *Prinos*.

+ Leaves evergreen, coriaceous, slightly revolute, dotted beneath; the midrib elevated on both surfaces: fruit black.

- I. glabra**, GRAY. (INKBERRY.) Shrub: young twigs somewhat angled when dry, finely velvety: leaves cuneately elliptical to oblanceolate, 1 to 2 inches long, mostly obtuse, crenately 2–6-toothed near the apex, minutely puberulent on the midrib above; the velvety petiole 2 to 3 lines long: staminate and sometimes fertile peduncles several-flowered, bracteate, often velvety: calyx-segments from narrow and acute to broad and rather blunt, often more or less ciliate: drupe subglobose, 2 to 3 lines in diameter; the pedicel of equal length; stigma nearly or quite sessile. — Man. ed. 2, 264; Maximowicz, l. c. 26; Trelease, l. c. 347. *Prinos glaber*, L. Spec. i. 330; Lam. Ill. t. 255, f. 2; Nouv. Duham. iii. 215, t. 54; Lodd. Bot. Cab. t. 450. *Winterlia triflora*, Manch. Meth. 74. *Ennept myricoides*, Raf. Sylv. Tellur. 52. — Massachusetts to Florida and Louisiana, in the vicinity of the coast.

- I. coriacea**, CHAPM. Tall shrub: young twigs somewhat viscidly puberulent: leaves glossy above, elliptical or obovate to oblanceolate, 2 or 3 inches long, acute to acuminate, entire or usually with several low but sharp serratures on each side, often velvety on the midrib above, acutely tapering into a petiole 2 to 4 lines long: peduncles 1-flowered, bractless, glabrous: drupe about as in the last, but the style often more prominent and the pedicel somewhat longer. — Fl. 270. *I. lucida*, Torr. & Gray in Wats. Bibl. Index, 159; Maximowicz, l. c. 26; Trelease, l. c. 348. *Prinos lucidus*, Ait. Kew. i. 478. *P. coriaceus*, Pursh, Fl. i. 221. *P. atomarius*, Nutt. Gen. i. 213. *Ennept coriacea*, Raf. Sylv. Tellur. 52. *E. atomaria*, Raf. l. c. — North Carolina to Florida and around the coast to Louisiana.

+ + Leaves deciduous, thinner, not punctate: fruit subglobose, with sessile stigma, red or exceptionally yellow, mostly exceeding the pedicels.

**I. verticillata**, GRAY. (BLACK ALDER, WINTERBERRY.) Tall loosely branched shrub, often somewhat pubescent throughout when young: leaves lanceolate, oblanceolate, or obovate,  $1\frac{1}{2}$  to 3 or rarely 4 inches long, mostly acuminate, rather coarsely serrate or biserrate, veiny, usually loosely pubescent especially beneath, acute at base; the downy petiole 3 to 6 lines long: sterile cymes fascicled, mostly short and 3-flowered; the fertile 1-3-flowered from a very short bibracteate peduncle; peduncles and pedicels mostly glabrous or glabrescent: calyx-segments mostly obtuse, ciliate and often loosely pubescent: drupe often slightly elongated, 3 lines in diameter. — Man. ed. 2, 264; Maximowicz, l. c. 30; Trelease, l. c. 348; Dippel, l. c. 513; Millspaugh, Med. Pl. i. t. 106. *Prinos verticillatus*, L. Spec. i. 330; Lam. Ill. t. 255, f. 1; Bigel. Med. Bot. iii. 141, t. 56; Barton, Fl. Med. t. 17; Guimp. Otto & Hayne, Abbild. Holzpfl. t. 56. *P. padifolius*, Willd. Enum. 394. *P. confertus*, Mönch, Meth. 481. *P. Gronovii*, Michx. Fl. ii. 236. — Canada to the Great Lakes, south to S. Carolina, Illinois, and Alabama. (Japan.) A northeastern form with ample lanceolate or oblanceolate thin leaves, less pubescent and less veiny than usual, is var. *TENUIFOLIA*, Torr. Fl. N. & Midd. States, 338. A northern form with the leaves smaller and more obovate than usual is var. *PADIFOLIA*, Torr. & Gray in Wats. Bibl. Index, 160. The original *Prinos padifolius*, Willd. Enum. 394, is scarcely more than the common form of *I. verticillata*.

**I. lævigata**, GRAY. Lower rather compact shrub: twigs glabrous: leaves rather narrowly lanceolate, mostly  $1\frac{1}{2}$  to 2 inches long, acute at both ends or subacuminate, low-serrulate, at length veiny, glabrous or with a few persistent soft long hairs beneath, especially along the midrib; the glabrous or somewhat pubescent petiole 2 to 5 lines long: sterile flowers solitary on bractless glabrous filiform pedicels often half inch or more long, or occasionally in peduncled umbels of 3; the fertile solitary on shorter pedicels: calyx-segments mostly acute, not pubescent but sometimes ciliate: drupe depressed-globose, usually 4 or 5 lines in diameter. — Man. ed. 2, 264; Maximowicz, l. c. 30; Trelease, l. c. 348; Dippel, l. c. 513; Sargent, Gard. & For. iv. 220, f. 39. *Prinos lævigatus*, Pursh, Fl. i. 220. — Massachusetts to New Jersey and Pennsylvania.

*I. lanceolata*, Chapm. l. c. 270, Trelease, l. c. 348, is a doubtful species. *Prinos lanceolata*, Hill, Veg. Syst. xvi. 57, t. 61, from the fascicled leaves might be taken for a poorly drawn *I. decidua*.

**2. NEMOPÁNTHUS**, Raf. MOUNTAIN HOLLY. (Name from νῆμα, thread, πούς, foot, and ἄνθος, flower, from the filiform peduncles.) — Shrub with nearly exstipulate leaves. — Am. Monthly Mag. ii. 176, iv. 357, & Am. Jour. Sci. i. 377. *Nemopanthus*, Raf. Jour. Phys. lxxxix. 96; Benth. & Hook. Gen. i. 357; Baill. Hist. Pl. xi. 219; Trelease, Trans. St. Louis Acad. v. 349; Kronfeld in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 188. *Nuttallia*, DC. Rapp. Jard. Genève. 1821, 44. *Ilicioides*, Dumont-Cour. Bot. Cult. iv. 127. — A single species.

**N. fasciculáris**, Raf. Glabrous or nearly so: leaves often fascicled on spurs, mostly 1 to  $1\frac{1}{2}$  inches long, elliptical, more or less acute at both ends, mucronate, entire or very low-serrulate, thin but firm, finely reticulate-veiny, as in *Vaccinium*; the petiole about 4 lines long: pedicels solitary or clustered, simple or the staminate exceptionally in 3's from a peduncle of equal length, 6 to 14 lines long: flowers scarcely expanding over 2 lines: drupe red, dull, ovoid, styleless, about 3 lines in diameter, on a filiform suberect pedicel; nutlets obscurely somewhat ribbed on the back. — Am. Monthly Mag. iv. 357. *Nemopanthus fascicularis*, Raf. Jour. Phys. lxxxix. 97. *N. Canadensis*, DC. Mém. Soc. Genève. i. 450, & Pl. Rar. Genève. 8, t. 3; Trelease, l. c. 349. *Ilex Canadensis*, Michx. Fl. ii. 229, t. 49. *I. delicatula*, Barton, Fl. Virg. 67. *Prinos integrifolius*, Ell. Sk. ii. 706. *P. longipes*, Raf. Sylv. Tellur. 50. *Nuttallia Canadensis*, DC. Rapp. Jard. Genève. 1821, 44. *Vaccinium mucronatum*, L. Spec. i. 350. *Ilicioides mucronata*, Britton, Mem. Torr. Club, v. 217. — Newfoundland to New Jersey, Ohio, and the Great Lakes.

## ORDER XXXIX. CYRILLACEÆ.

By A. GRAY.

Shrubs or small trees with essentially regular perfect flowers, 5-parted or 5-divided calyx and 5, or rarely 4, imbricated or convolute hypogynous sessile or shortly unguiculate petals. Calyx-segments sometimes unequal. Hypogynous stamens 5, alternating with the petals, or 10 in 2 often unequal series, the inner stamens, i. e. those opposite the petals, being shorter; anthers bilocular, fixed by the middle, introrse, longitudinally or apically dehiscent; pollen very fine, simple. Ovary 2-5-celled; cells 1-4-ovuled. Fruit in *Cliftonia* and *Costæa* indehiscent, in *Cyrilla* very tardily dehiscent or at least at maturity separable septicidally into two parts. Leaves alternate, exstipulate, thickish, entire, cuneate-obovate or oblanceolate. A small order of the S. Atlantic States, the West Indies, and the northern part of S. America, related probably most closely to the *Aquifoliaceæ*, but also through the W. Indian genus *Costæa* exhibiting affinities to the *Ericaceæ*.

1. **CYRILLA.** Calyx 5-parted, persistent; the lobes ovate or triangular, acute, imbricated in æstivation. Petals 5, distinct, much longer than the calyx, sessile, the axis thickened toward the base inside, imbricate or convolute in æstivation, spreading in anthesis, deciduous. Stamens 5, inserted with the petals underneath the disk; filaments subulate; anthers oblong or subsagittate, deeply cleft at the base; the cells opening longitudinally; pollen globose-triangular with angles projecting and rounded, nearly as in the *Onagraceæ*. Disk hypogynous, entire, adnate to the base of the ovary, sometimes obscure. Ovary ovoid, 2-celled, rarely 3-celled, with 2 or 3 anatropous or half-anatropous ovules suspended from the apex of each cell on a filiform pendulous placenta (the rhaphe dorsal); style persistent, very short; stigmas 2, rarely 3, short. Fruit a small and dry 2-celled drupe, cellular-corky at maturity when readily septicidal into two pyrenæ; the cells small and 1-seeded; testa thin and membranaceous, conformed to the nucleus; embryo cylindrical, at the micropylar end of the fleshy albumen, and about a quarter of its length; cotyledons small and terete; radicle superior.
2. **CLIFTONIA.** Calyx very small, 5-lobed, rarely 4-8-lobed, persistent. Petals 5 (rarely 4 to 8), distinct, roundish-obovate with the base contracted into a short claw, strongly imbricated in æstivation, deciduous. Stamens twice as many as the petals and inserted with them; those opposite the petals commonly shorter; filaments dilated below the middle, the dilated portion terminating in 2 short and rounded teeth or lobes; anthers didymous; the cells longitudinally dehiscent; pollen globular and with 3 projecting rounded angles (nearly as in *Cyrilla*). Disk as in *Cyrilla*. Ovary ovoid-conical, 3-4-celled, with a single linear and anatropous ovule suspended from the summit of each cell; the rhaphe dorsal; style none; stigma thick, 3-4-lobed. Fruit dry and cellular-corky, 3-4-angled, the angles extended into narrow wings, 3-4-celled; seeds solitary, filling the small cells, oblong, with a thin testa, conformed to the nucleus; embryo in the axis of the fleshy albumen, of nearly its length; cotyledons very small; radicle long and slender, superior.

1. **CYRILLA**, Garden. (*Dominico Cyrillo*, professor of medicine at Naples, murdered in 1799, the author of the now very rare Pl. Rar. Reg. Neap.) — Leaves glabrous, reticulate-veiny: flowers small, white, crowded in long and dense virgate racemes which are usually fascicled in the axils of the preceding year! bracts and adnate bractlets subulate, persistent. — Garden in L. Mant. i. 5;



Jacq. Coll. i. 162, & Ic. Rar. t. 47; Michx. Fl. i. 157; Planch. Lond. Jour. Bot. v. 254. — A small genus, perhaps best regarded as a variable monotype of remarkable range.

**C. racemiflora**, L. l. c. 50. Shrub 10 to 12 feet high: leaves cuneate-oblong or oblanceolate, manifestly reticulated upon both sides, 1 to 3 inches long: sepals triangular: petals oblong, acutish, contiguous at their broad bases: fruit scarcely more than a line long, dry at maturity, inclined to separate into two parts. — Walt. Car. 103; Jacq. l. c.; Ell. Sk. i. 294; Nutt. Sylv. ii. 96, t. 74.<sup>1</sup> *C. Caroliniana*, Michx. Fl. i. 158. *C. parvifolia*, Shutt. Bot. Zeit. iii. 221, a small-leaved variety.<sup>2</sup> *Itea Cyrilla*, Swartz, Prodr. 50, & Obs. t. 4, f. 1; L'Her. Stirp. t. 66; Willd. Spec. i. 1146. — Sandy and wet pine woods, N. Carolina<sup>3</sup> to Florida and westward near the Gulf to Hardin Co., Texas, *Nealley*; fl. June. (W. Ind. ?, Northern S. Am. ?) Linnaeus wrongly described the fruit as a 2-valved many-seeded capsule and the petals as longitudinally villous inside.

**2. CLIFTÓNIA**, Banks. TITI, BUCKWHEAT-TREE. (*Francis Clifton*, a London physician, who travelled in Jamaica, where he died, 1736.) — Leaves coriaceous, scarcely reticulated. Flowers white or rose-colored in nodding racemes terminating the branches of the preceding year. Bracts minute, caducous; bractlets none. — Banks in Gært. f. Fruct. iii. 246, t. 225; Endl. Gen. 1413; Planch. l. c. 255. *Mylocaryum*, Willd. Enum. 454, in note. *Mylocarium*, Ell. Sk. i. 508. *Walteriana*, Fras. in Endl. Gen. 1413. — A monotype of the S. E. United States.

**C. nítida**, GÆRTN. f. l. c. 247. A shrub or small tree, 8 to 15 feet high, glabrous: leaves obovate-oblong, 1 to 1½ inches long, shining above, pale or glaucous beneath, evergreen: racemes dense, 1 to 2 (to 4) inches long: petals 2 to 3 lines long: fruit 4 lines long. — *C. ligustrina*, Sims in Spreng. Syst. ii. 316; Nutt. Sylv. ii. 92, t. 73. *Mylocaryum ligustrinum*, Willd. l. c.; Sims, Bot. Mag. t. 1625; Lindl. Veg. Kingd. 445, f. 309. *Mylocarium ligustrinum*, Pursh, Fl. i. 302, t. 14; Ell. Sk. i. 508.<sup>4</sup> — Pine-barren swamps, S. Carolina to Alabama<sup>5</sup> and Florida; fl. March. A plant of obscure affinities, exhibiting not one of the distinguishing characters of the *Malpighiaceæ*, to which Nuttall referred it.

## ORDER XL. OLACINÆ.

BY A. GRAY.

Mostly tropical trees or shrubs, with alternate simple leaves, no stipules, and regular flowers. Petals hypogynous, valvate in the bud and sometimes united into a tube, and with the stamens inserted on the outside or margin of the disk; the latter of same number as and opposite the petals or twice as many. Ovary 1-celled or 2–5-celled only at base, whence rises a placental axile column (in the manner of *Santalaceæ*), bearing on its apex 2 to 4 pendulous anatropous ovules with dorsal raphe (i. e. micropyle next the placenta); style only one with ter-

<sup>1</sup> Add lit. Sargent, Silv. ii. 3, t. 51.

<sup>2</sup> Add syn. *C. racemosa*, Loud. Arb. iv. 2577, f. 2503. *C. polystachia*, *parvifolia*, & *fuscata*, Raf. Aut. Bot. 8. *Andromeda plumata*, "Bart. Cat." Marsh. Arb. 9.

<sup>3</sup> S. E. Virginia, *Heller*.

<sup>4</sup> Add syn. *Ptelea monophylla*, Lam. Ill. i. 336. *Walteriana Caroliniensis*, Cat. Hort. Fraser, 3. *Cliftonia monophylla*, Britton, Bull. Torr. Club, xvi. 310; Sargent, Silv. ii. 7, t. 52.

<sup>5</sup> Westward to E. Louisiana, acc. to Sargent, l. c.

minal undivided stigma. Fruit a 1-celled 1-seeded drupe; seed with a simple thin coat, becoming spuriously erect by placental adhesion; embryo minute at apex of fleshy albumen.

1. **XIMENIA**. Calyx small, 4-5-toothed, persistent, not enlarging. Petals 4 or 5, narrow, the whole inner face densely bearded. Stamens 8 or 10, with filiform filaments and linear anthers. Ovary conical, 3-5-celled at base. Drupe naked.
2. **SCHŒPFIA**. Calyx small, 2-6-dentate or entire, at length deciduous or obsolete. Petals 4 to 6, united into a tubular or campanulate corolla, the free tips reflexed in anthesis. Stamens as many as the lobes; filiform filaments adnate to the tube of the corolla; a little fascicle of hairs behind each; anthers short. Hypogynous disk cupulate, adnate to lower half of the partly 3-celled ovary, in fruit becoming fleshy and adnate, investing all but the summit of the small drupe.

1. **XIMÉNIA**, Plum. (*Father Francis Ximenes*, early missionary to W. Indies, &c.) — Shrubs and low trees, often spinescent, with entire glabrous leaves, commonly becoming vertical by a twist of the petiole, and fragrant whitish flowers in sessile or short-peduncled axillary clusters: the fruit edible. — Nov. Gen. 6, t. 21; L. Gen. no. 902.

**X. Americana**, L. (MOUNTAIN PLUM of W. Ind., HOG PLUM, WILD LIME.) Very glabrous: trunk 10 to 15 feet high, with very hard and tough wood: leaves oblong, mucronate from retuse apex, 2 inches long: flowers usually 4-merous: petals 5 lines long, yellowish or greenish-white with the dense beard becoming rusty: fruit the size of a small plum, acidulous. — Spec. ii. 1193; Descourt. Fl. Ant. ii. t. 132; Chapm. Fl. 61; Engler in Mart. Fl. Bras. xii. pt. 2, 9, t. 2. *X. multiflora*, Jacq. Stirp. Am. 106, t. 177. — S. Florida.<sup>1</sup> (W. Ind. to Brazil, S. Pacif. Ids. to Africa.)

*X. RAMOSÍSSIMA*, Shuttl. in distr. pl. Rugel, no. 87, is *Bumelia angustifolia*, Nutt. Sylv. iii. 38, t. 93; corolla and stamens fallen.

2. **SCHŒPFIA**, Schreb. (*Dr. J. D. Schæpf*, surgeon of Hessian troops sent to America in 1777, who published "*Materia Medica Americana*." — Shrubs or small trees, with leaves not unlike those of *Ximenia*, or thinner, and similar inflorescence. — Gen. 129; A. DC. Prodr. xiv. 622; Griseb. Fl. W. Ind. 310; Engler, l. c. 34, t. 7, no. 4. *Codonium*, Vahl, Skrivt. Natur. Selsk. Kjøb. ii. pt. 1, 206. *Diplocalyx*, A. Rich. Fl. Cub. ii. 81, t. 54.

**S. Schréberi**, Gmel. Tall shrub, glabrous: leaves ovate or ovate-lanceolate, mostly oblique and obtusely acuminate, about 2 inches long: peduncles very short, bearing 2 or 3 sessile flowers: corolla yellow, short-campanulate, about 2 lines long; its ovate lobes a third or nearly half the length of the tube (minutely puberulent or glabrous): drupe ovoid, 4 or 5 lines long. — Syst. 376 (1791); Lam. Ill. ii. 51. *S. Americana*, Willd. Spec. i. 996. *S. arborescens*, Rœm. & Schult. Syst. v. 160; DC. Prodr. iv. 319, xiv. 622; Chapm. Fl. ed. 2, 611. *S. arborescens*, & *S. Marchii*, Griseb. Fl. W. Ind. 310. *S. chrysophylloides*, Planch. Ann. Sci. Nat. ser. 4, ii. 261, founded on *Diplocalyx chrysophylloides*, A. Rich. Fl. Cub. ii. 81, t. 54. *Codonium arborescens*, Vahl, Skrivt. Natur. Selsk. Kjøb. ii. pt. 1, 207, t. 6, & Symb. Bot. iii. 36 (1794). — S. Florida, *Chapman*, *Palmer* (outside of corolla and inside of lobes minutely puberulent), *Garber* (with corolla glabrous or lobes obsoletely puberulent, the *S. chrysophylloides*); the forms evidently of one species. (W. Ind., Mex.)

<sup>1</sup> As far north as Lake Co., Central Peninsular Florida, *Nash*.

## ORDER XLI. CELASTRACEÆ.

BY W. TRELEASE.

Woody plants, sometimes spinose or climbing. Leaves alternate or opposite, simple, not lobed, entire or serrate, not glandular-punctate, with minute or frequently abortive stipules. Flowers commonly in reduced axillary cymes, rarely subpanicked, small, often greenish, perfect or diœcious by abortion, 4-5-merous, with a conspicuous disk often surrounding the base of the ovary. Calyx deeply parted, with imbricate persistent segments. Petals distinct, inserted below the free margin of the disk, not hooded. Stamens mostly as many as the petals and alternate with them (fewer in *Hippocratea*, and mostly of double the number in *Glossopetalon*), distinct, commonly inserted on or beneath the margin of the disk; anthers short, rounded, 2-celled, introrse, versatile on short filaments. Pistil mostly compound; ovary 1-5-celled, scarcely lobed, free from the calyx but sometimes more or less invested by the disk; ovules 1 to 10, variously situated; style mostly short or wanting; stigmas 1 to 5, capitate, lateral or rarely expanded, mostly short. Fruit capsular (then loculicidal, with the septa adhering to the valves), drupaceous or winged, 1-few-seeded; seeds mostly arillate or carunculate, albuminous except in *Maytenus* and *Hippocratea*; embryo with flat cotyledons. — Represented in our flora by two very distinct tribes, sometimes treated as orders.

TRIBE I. CELASTREÆ. Stamens mostly 4 or 5, inserted on or below the margin of the disk. Fruit and seeds not winged in our genera.

\* Stamens as many as the petals or sepals.

+ Fruit loculicidal: ovary nearly or quite immersed in the disk: leaves normally opposite.

1. **EUONYMUS**. Flowers seemingly perfect but really polygamo-triœcious, 4-5-merous. Style mostly short, terminal; ovary 3-5-celled, with 2 to 10 ovules in each cell. Capsule lobed, coriaceous, often magenta-colored, with usually a single large seed in each cell; seed enclosed in a scarlet or orange aril.
2. **PACHISTIMA**. Flowers perfect, 4-merous. Style short, at length commonly unilateral; ovary 2-celled, with 2 erect ovules in each cell. Capsule not lobed, small, oblong, 2-edged, usually 1-seeded and commonly unilateral by abortion; seed with a pale lacerate aril at base.

+ + Fruit loculicidal: leaves alternate.

3. **CELASTRUS**. Flowers subdiœcious, 5-merous. Anthers oval, mucronate. Ovary free, usually 3-4-celled, with 2 erect ovules in each cell. Seed enclosed in a crimson aril.
4. **MAYTENUS**. Flowers polygamo-diœcious, 4-5-merous. Anthers round-cordate. Ovary confluent with the disk below, usually 3-4-celled, with a single erect ovule in each cell. Seed exalbuminous, with a red aril open above.

+ + + Fruit dry or drupaceous, indehiscent: leaves mostly alternate.

5. **GYMINDA**. Flowers diœcious, 4-merous. Stamens erect. Stigma sessile, terminal; ovary partly immersed in the disk, 2(-4?)-celled, with a suspended ovule in each cell. Drupe spheroidal; seed almost without aril.

6. **RHACOMA**. Flowers mostly perfect, 4-5-merous. Stamens outcurving. Style slender, at length somewhat unilateral; ovary partly immersed in the disk, 1-2-celled, with an erect ovule in each cell. Drupe obovoid; seed sometimes with aril.
7. **SCHÆFFERIA**. Flowers diœcious, 4-merous. Style terminal, 2-cleft; stigma with 4 often large and incised or fimbriate divisions; ovary free from the disk, 2-celled, with an erect ovule in each cell. Drupe spheroidal, somewhat flattened; seed without aril.
8. **MORTONIA**. Flowers perfect, 5-merous. Style terminal, 5-lobed; ovary free from the disk, 5-celled, with 2 erect ovules in each cell. Fruit dry, oblong, fluted, 1-celled by abortion; seed solitary, filling the ovary, without aril.

\* \* Stamens twice as many as (or at least more numerous than) the petals or sepals: fruit coriaceous, at most tardily dehiscent: leaves alternate.

9. **GLOSSOPETALON**. Flowers perfect, 4-6-merous. Stigma sessile, slightly notched; ovary free from the disk, 1-celled, with 2 basal anatropous ovules. Fruit follicular, striate; seeds 1 or 2, minutely arillate or carunculate at base.

TRIBE II. HIPPOCRATEÆ. Stamens mostly 3, inserted on or within the disk, usually adnate to the ovary below. Seeds exalbuminous.

10. **HIPPOCRATEA**. Flowers perfect, 5-merous. Style short, terminal, somewhat 3-lobed; ovary 3-celled, with several ovules in each cell. Capsule 3-lobed, the segments separate and wing-like above, the outer half of each falling away, each cell with several flat seeds winged at one end.

1. **EUONYMUS**, Tourn. SPINDLE TREE. (Name from *εὖ*, good, and *ὄνομα*, name, by antithesis, because the foliage was supposed to be poisonous to cattle.) — Shrubs or small trees with more or less square or 4-angled glabrous twigs, opposite usually serrulate pinnately veined mostly ample and deciduous leaves with minute or abortive stipules, and cymose (or by abortion solitary) axillary flowers. — Inst. 617, t. 388; L. Gen. no. 79; Torr. & Gray, Fl. i. 257; Gray, Gen. III. ii. 187, t. 171; Benth. & Hook. Gen. i. 360; Baill. Hist. Pl. vi. 1, 30; Trelease, Trans. St. Louis Acad. v. 351, 353; Lösener in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 199. — Mostly of the temperate or higher Asiatic regions, the European species few, some also in the Malay Islands.

\* Fruit tuberculate, rather shallow-lobed: corolla greenish or reddish yellow, 5-merous: ovules horizontal, 4 to 10 in each cell: winter buds rather small (1 or 2 lines long).

**E. Americanus**, L. (STRAWBERRY BUSH.) Large shrub: leaves ovate or broadly lanceolate, rounded to acute at base, acuminate, crenate-serrulate, glabrous or a little pubescent toward the base of the principal veins,  $1\frac{1}{2}$  to 3 inches long, nearly sessile; the petioles a line long or less: peduncles scarcely an inch long, 1-3-flowered: sepals round, entire: petals mostly clawed and not meeting: fruit very rough. — Spec. i. 197; Nouv. Duham. iii. 26, t. 9; Pursh, Fl. i. 168; Lodd. Bot. Cab. t. 1322; Don, Syst. ii. 5; Loud. Arb. ii. 499, f. 168, 169; Torr. & Gray, Fl. i. 258; Torr. Fl. N. Y. i. 142, t. 19; Baill. Bull. Soc. Bot. Fr. v. 315, & Hist. Pl. vi. 2; Trelease, l. c. 353; Dippel, Handb. Laubholzkunde, ii. 492, f. 236. *E. sempervirens*, Marsh. Arb. 44. *E. alternifolius*, Mœnch, Meth. 71. *E. muricatus*, Raf. New Fl. Am. iii. 59. — New Jersey to Florida, Eastern Texas, and Kentucky.

**Var. angustifolius**, Wood. Similar to the type, but the leaves lanceolate to elliptical, less than half inch wide, somewhat falcate. — Bot. & Fl. 76; Trelease, l. c. 353. *E. angustifolius*, Pursh, Fl. i. 168; Don, Syst. ii. 5; Torr. & Gray, Fl. i. 258; Baill. Bull. Soc. Bot. Fr. v. 315. — Kentucky to Florida. In its extreme form appearing quite distinct, but passing into the type by numerous intermediate specimens, chiefly from the middle range of the species, pertaining to *E. Americanus*,  $\beta$ , Torr. & Gray, Fl. i. 258.

**Var. sarmentosus**, Nutt. Low, rooting, with erect branches: leaves variously lanceolate, acute: otherwise about as in the type. — Gen. i. 154; Torr. & Gray, Fl. i. 258; Trelease, l. c. 353. *E. sarmentosus*, Don, Syst. ii. 5. — Southwestern range of the species.

**E. obovátus**, Nutt. About a foot high, with prostrate rooting stems and erect nearly simple shoots: leaves mostly obovate, cuneate, usually very obtuse; the petioles often 2 lines long: peduncles mostly 2-3-flowered; flowers expanding about 3 lines: petals approximated: fruit less tuberculate: otherwise resembling the preceding. — Gen. i. 155; Don, Syst. ii. 5; Zabel, Gartenfl. xxxviii. 638; Gard. & For. ix. 384, f. 51. *E. Americanus*, DC., Torr. & Gray, Fl. i. 258. *E. Americanus*, var. *obovatus*, Torr. & Gray acc. to Gray, Gen. III. ii. 188, t. 171; Trelease, l. c. 353. — Canada, in the region of the Great Lakes, to Illinois and Kentucky.

\* \* Fruit not tuberculate: ovules 2 in each cell.

+ Flowers 4-merous: ovules ascending, with introrse rhaphe: fruit deeply lobed: winter buds small, as in the last: Atlantic species.

**E. atropurpúreus**, Jacq. (BURNING BUSH, WAHOO.) At length becoming a small tree: leaves elliptical or somewhat ovate, acute at base, acuminate, minutely serrulate or biserrulate, mostly puberulent beneath, 2 to 4 inches long, on slightly margined petioles 3 to 9 lines long: peduncles 1 to 2 inches long, twice or thrice dichotomous, usually 7-15-flowered: petals obovate, brown-purple, with pale margin: style very short. — Hort. Vind. ii. 55, t. 120; Pursh, Fl. i. 168; Don, Syst. ii. 5; Loud. Arb. ii. 499, f. 167; Torr. & Gray, Fl. i. 257; Baill. Bull. Soc. Bot. Fr. v. 314, & Hist. Pl. vi. 2; Millsbaugh, Med. Pl. i. t. 42; Trelease, l. c. 353; Sargent, Silv. ii. 11, t. 53; Dippel, l. c. 490, f. 235. *E. Carolinensis*, Marsh. Arb. 43. — New York to the Yellowstone, south to Northern Texas; also in Florida, *Rugel*. Unassigned names, perhaps pertaining to this species, are *E. acuminatus*, *E. cuneatus*, and *E. heterophyllus*, Raf. New Fl. Am. iii. 59.

**E. EUROPÆUS**, L. (SPINDLE TREE.) Leaves rather small, more finely serrulate to nearly entire, glabrous: peduncles shorter: flowers and fruits fewer and more clustered: petals greenish white: ovary conically prolonged into an evident style: otherwise like the last. — Spec. i. 197; Reichenb. Ic. Fl. Germ. vi. t. 309, f. 5134; Ett. & Pok. Physiotypia Pl. Austr. v. t. 463; Britt. Sterns & Poggenb. Prelim. Cat. N. Y. 11; Trelease, l. c. 353. — Persistent in old gardens about eastern cities. (Intro. from Eu.)

+ + Flowers 5-merous, purple: ovules descending, with extrorse rhaphe: fruit not deeply lobed: winter buds large (2 to 5 lines long): glabrous species of the Pacific coast.

**E. occidentális**, Nutt. A large shrub: winter buds 2 to 3 lines long: twigs whitened: leaves ovate or elliptical to lanceolate, subcordate to mostly acute at base, acute or acuminate, irregularly serrulate or biserrulate,  $1\frac{1}{2}$  to 3 inches long, on petioles 2 to 4 lines long: peduncles an inch long, 1-3-flowered. — Nutt. in Torr. Pac. R. Rep. iv. 74; Trelease, l. c. 354. *E. atropurpureus*, var.  $\beta$ ? Torr. & Gray, Fl. i. 258. — Oregon to Southern California, and Carson City, Nevada, *Anderson*.

**E. Parishii**, TRELEASE, l. c. Weak but rather large shrub: winter buds 3 to 5 lines long: leaves elliptic-ovate to obovate, gradually cuneate or abruptly contracted and cuneate at base, obtuse or blunt-pointed, finely crenate-serrulate: peduncles 2 inches long, 3-7-flowered: flowers somewhat smaller than in the last, to which the species is closely related. — San Jacinto Mountain, California, *Parish*.

**2. PACHÍSTIMA**, Raf. (Name said to be from *παχύς*, thick, and *στίγμα*, stigma, from the slightly enlarged stigma.) — Low shrubs with squarish minutely verrucose twigs, opposite crenulate or serrulate coriaceous 1-nerved rather small evergreen leaves with minute stipules, and few-flowered axillary cymes shorter than the leaves. Am. Monthly Mag. ii. 176. *Pachystima*, Benth. & Hook. Gen. i. 361; Baill. l. c. 30; Trelease, Trans. St. Louis Acad. v. 352, 354; Lösener in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 211. *Oreophila*, Nutt. in Torr. & Gray, Fl. i. 258. — Confined to the mountains of the United States and Mexico.

**P. Myrsinites**, Raf. A foot or two high, spreading: leaves often on the same plant from broadly elliptical to oblong-ovate or subspatulate, slightly revolute, nearly entire or crenulate to sharply serrulate above, obtuse, 6 to exceptionally 20 lines long, the base rounded or

cuneate: peduncles and pedicels about a line long, the former 1- to mostly 3-flowered: fruit narrowly ovoid, 4 lines long. — Am. Monthly Mag. ii. 176, & Sylv. Tellur. 42; Gray, Proc. Am. Acad. viii. 378, 624; Trelease, l. c. 354. *Ilex*? *Myrsinites*, Pursh, Fl. i. 119. *Myginda myrtifolia*, Nutt. Gen. i. 109; Hook. Fl. Bor.-Am. i. 120, t. 41. *Oreophila myrtifolia*, Nutt. in Torr. & Gray, Fl. i. 259. — Brit. Columbia to California, New Mexico, and Colorado. (Northern Mex.)

**P. Cánbyi**, GRAY. Trailing and rooting, the branches a span or two high: leaves narrowly elliptical or exceptionally obovate, slightly revolute, 5 to 10 lines long, the upper half serrulate, obtuse, the base rounded or subcuneate: peduncles and pedicels filiform, frequently 2 lines long: otherwise similar to the preceding. — Proc. Am. Acad. viii. 623; Meehan, Native Flowers, ser. 1, i. 173, t. 44; Chapm. Fl. ed. 2, 613; Trelease, l. c. 354. — Mountains of Virginia. A specimen, unquestionably of this species, labelled Jacksonville, Florida, *Brendel*.

**3. CELÁSTRUS**, L. STAFF-TREE. (An ancient Greek name, of uncertain application.) — Twining shrubs with terete glabrous stems, alternate serrate pinnately veined ample petioled deciduous leaves with very minute stipules, and rather ample terminal and often axillary somewhat pedunculate panicles or racemes, drooping in fruit. — Gen. no. 168; Torr. & Gray, Fl. i. 257; Gray, Gen. Ill. ii. 185, t. 170; Benth. & Hook. Gen. i. 364; Baill. Hist. Pl. vi. 36; Trelease, Trans. St. Louis Acad. v. 352, 354; Lösener in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 205. — Mostly of India and Eastern Asia, also reaching Australia and Madagascar.

**C. scândens**, L. (SHRUBBY OR CLIMBING BITTER-SWEET.) Climbing to a considerable height: the leaves more or less 2-ranked from torsion of the stem, ovate or exceptionally obovate to ovate-lanceolate, acute at base, acuminate, low-serrate or crenate-serrate, glabrous, 2 to 4 inches long: pedicels articulated below the middle: fruit 6 lines in diameter, orange, when dehiscent exposing the very showy crimson aril. — Spec. i. 196; Gärtn. Fruct. ii. 85, t. 95; Schk. Handb. i. 153, t. 47; Nouv. Duham. vi. 110, t. 33; Loud. Arb. ii. 502, f. 171; Torr. & Gray, Fl. i. 257, 685; Gray, Gen. Ill. ii. 186, t. 170; Schnizl. Ic. iv. t. 236, f. 1, 12-14, 27; Emerson, Trees & Shrubs Mass. ed. 2, ii. 545, with plate; Trelease, l. c. 354; Dippel, l. c. 482; Lösener, l. c. 191, f. 117 E. *C. bullatus*, L. Spec. i. 196. *Euonymoides scandens*, Mönch, Meth. 70. — Canada and New England to South Dakota and New Mexico.

**4. MÁYTENUS**, Mol. (Name from the Chilian word *mayten*.) — Shrubs with terete glabrous twigs, alternate mostly entire evergreen leaves with minute and evanescent stipules, and reduced few-flowered axillary cymes shorter than the leaves. — Mol. acc. to Juss. Gen. 449; Benth. & Hook. Gen. i. 364; Griseb. Cat. Pl. Cub. 53; Lösener in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 205, & Engl. Jahrb. xv. Beibl. no. 38, 6. *Haenkea*, Ruiz & Pav. Prodr. 36, t. 6. *Tricerna*, Liebm. Vidensk. Meddel. 1853, 97. *Monteverdia*, A. Rich. Fl. Cub. i. 346. — Of the tropical or subtropical American region.

**M. phyllanthoides**, BENTH. Rather large shrub: leaves pale, thick, dull, obovate, acute at base, very obtuse or somewhat emarginate, entire or slightly repand above, glabrous, an inch long, the petiole about a line long: flowers very short-stalked: capsule 4 to 6 lines long, contracted at base or substipitate, deep red, somewhat glaucous. — Bot. Sulph. 54; Torr. Bot. Mex. Bound. 47; Gray, Proc. Am. Acad., v. 155; Chapm. Fl. 77; Hemsl. Biol. Centr.-Am. Bot. i. 189; Trelease, l. c. 355. *Tricerna crassifolium*, Liebm. Vidensk. Meddel. 1853, 98. — Cape Sable, Pumpkin Key, Cedar Keys, and Key West, Florida. (Mex., Lower Calif.)

**5. GYMÍNDA**, Sargent. (Name by transposition from *Myginda*.) — Shrub or small tree with more or less 4-angled glabrous twigs, opposite nearly entire

firm short-petioled leaves, and axillary few-flowered cymes shorter than the leaves. — Gard. & For. iv. 4, & Silv. ii. 13; Lösener in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 217. *Myginda* § *Gyminda*, Griseb. Cat. Pl. Cub. 55. — A single subtropical American species.

**G. Grisebáchii**, SARGENT. Leaves thick, pale, obovate, tapering to a very short petiole, rounded above, crenulate to entire, glabrous, 1 to 2 inches long; inflorescence glabrous, commonly shorter than the leaves, few-flowered, the lateral pedicels stout and divergent: flowers greenish white: drupe 1-2-seeded, 2 to 4 lines long, bluish black. — Gard. & For. iv. 4, & Silv. ii. 14, t. 54. *Myginda integrifolia*, HBK. Nov. Gen. & Spec. vii. 66; DC. Prodr. ii. 13; Griseb. l. c.; Sargent, Bot. Gaz. xi. 314, & Gard. & For. ii. 352; Trelease, l. c. 356; not Lam. *M. pallens*, Sargent, U. S. 10th Census, ix. 38, not Sm. *M. ? latifolia*, Chapm. Fl. 76; Trelease, l. c. 356; not Swartz. — Florida Keys. (W. Ind.)

**6. RHÁCOMA**, L. (A name of Pliny for the rhubarb; the application to the present genus not clear.) — Shrubs of various habit, ours with square or 4-lined glabrous or slightly downy twigs, rather small opposite entire to spiny-margined leaves with minute stipules, and small axillary downy cymes. — Syst. Nat. ed. 10, 896, & Gen. ed. 6, no. 144; Lösener in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 217. *Myginda*, Jacq. Enum. Pl. Carib. 1 (*Mycinda*), 12; L. Gen. ed. 6, no. 178. — Of the tropical and subtropical American region.

\* Leaves pungently dentate.

**R. ilicifolia**, TRELEASE, n. comb. Low shrub, glabrate or puberulent: leaves thin but firm: veiny, ovate, acute at both ends, 6 to 9 lines long; inflorescence shorter than the leaves: flowers red: drupe 2 or 3 lines long, 1-celled. — *Myginda ilicifolia*, Poir. Dict. iv. 396; Trelease, l. c. 355. — Everglades and keys of Florida. (W. Ind.) The toothing of the leaves is much shallower than in Cuban specimens referred here, our plant being nearest to *M. aquifolia*, Griseb., as represented by Wright, no. 2210.

\* \* Leaves not at all pungent.

**R. Crossopétalum**, L. Small shrub, glabrate or slightly downy: leaves rather thin, ovate or elliptical to mostly obovate, tapering to the short petiole, obtuse or emarginate, sometimes mucronate, shallowly crenate-serrate, less than an inch long: pedicels slender, ascending, shorter than the leaves: flowers dark red: drupe 2 to 3 lines long, red, 1-2-celled. — Syst. Nat. ed. 10, 896, & Amœn. Acad. v. 393. *Myginda Rhacoma*, Sw. Fl. Ind. Occ. i. 340; Griseb. Fl. W. Ind. 146; Chapm. Fl. 75; Trelease, l. c. *M. pallens*, Trelease, l. c. (when with 2-celled fruit). — Subtropical Florida and Florida Keys. (W. Ind.)

**7. SCHÆFFÉRIA**, Jacq. (Named after *J. C. Schæffer*, a German naturalist of the last century.) — Shrubs with glabrous closely ribbed sometimes spinescent twigs, alternate firm rugose-veiny entire subsessile glabrous leaves, often fascicled on spurs, with setaceous or abortive stipules, and small few-flowered fascicles axillary or seeming as if terminal on the spurs. — Enum. Pl. Carib. 10, & Stirp. Am. 259; Benth. & Hook. Gen. i. 367; Trelease, l. c. 356; Sargent, Silv. ii. 15; Lösener in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 219. — Of the West Indian and Mexican region.

**S. frutescens**, Jacq. Small tree with rather slender zigzag green twigs: leaves elliptical to spatulate-elliptical, acute at base, at length 1 to 2 inches long, the apex variously acute or mucronate: pedicels about 3 lines long: drupe 2 lines long, red, mammillated, shortly beaked. — Enum. Pl. Carib. 33, & Stirp. Am. 259; Lam. Ill. iii. 402, t. 809; Trelease, l. c. 356; Sargent, Silv. ii. 17, t. 55. *S. completa*, Sw. Fl. Ind. Occ. i. 327, t. 7, f. A (Sloane, Jam. ii. t. 209, f. 1). *S. buxifolia*, Nutt. Sylv. ii. 42, t. 56. — Metacombe Key and Key West, Florida. (W. Ind.)

**S. cuneifolia**, GRAY. Shrub, with rigid somewhat spiny gray twigs: leaves spatulate-cuneate, rounded or emarginate at apex, half inch long: pedicels a line long or less: drupe flattened and grooved: otherwise resembling the last. — Pl. Wright. i. 35, ii. 29; Torr. Bot. Mex. Bound. 47; Trelease, l. c. 356. — New Mexico and W. Texas. (Mex.)

**8. MORTÓNIA**, Gray. (Named for *Dr. S. G. Morton*, an American naturalist of the first half of the present century.) — Mostly intricately branched shrubs with subterete often hispid twigs, very thick alternate small entire 1-nerved revolute leaves with abortive stipules, and small cymes in the upper axils mostly aggregated into a small terminal panicle. — Pl. Wright. i. 34, ii. 28; Benth. & Hook. Gen. i. 368; Trelease, Trans. St. Louis Acad. v. 356; Lösener in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 218. — Of the Texano-Mexican region.

\* Leaves elliptical, short.

**M. sempervirens**, GRAY. Leaves obtuse to subacute, entire, revolute, glabrous, smooth, 2 to 3 lines long, very short-petioled: peduncles a line or two long, with 2 obtuse bracts close to the flower: fruit oblong, 3 lines long, abruptly beaked. — Pl. Wright. i. 35, t. 4, ii. 28; Torr. Bot. Mex. Bound. 47; Trelease, l. c. — W. Texas, Wright, Bigelow.

**M. scabrëlla**, GRAY. Divaricately branched: twigs hispidulous: leaves obtuse to stout-pointed, papillate-roughened, about 3 lines long: otherwise like the last. — Pl. Wright. ii. 28; Torr. Bot. Mex. Bound. 47; Trelease, l. c.; Lösener in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 218, f. 127. — Arizona to S. W. Texas, along the Mexican line. A rather large form, with large flower-clusters and leaves half inch long, is var. *UTAHENSIS*, Coville, in herb., from Utah and Nevada.

\* \* Leaves oblong-spatulate.

**M. Grëggii**, GRAY. Twigs puberulent: leaves mucronate or acuminate, glabrous, minutely punctate, half inch to inch long and 2 lines wide, tapering to a short petiole: fruit shorter, stout. — Pl. Wright. i. 35; Torr. Bot. Mex. Bound. 47; Wats. Proc. Am. Acad. xvii. 336; Trelease, l. c. — Northern Mexico, perhaps extending into the United States. *M. effusa*, Turcz. Bull. Soc. Nat. Mosc. xxxi. 453, based on Berlandier's collections, if separable, differs in its thinner and rather broader less revolute leaves. The other Mexican species, *M. Palmeri*, Hemsl. Diagn. Pl. Nov. pars alt. 24, frequently confounded with *M. Grëggii*, if really separable, differs in its narrower leaves, which are half inch long, a line wide, very thick, and more revolute.

**9. GLOSSOPÉTALON**, Gray. (Named from γλῶσσα, tongue, and πέταλον, petal, because of the shape of these members.) — Small shrubs with angled green nearly or quite glabrous often spinescent twigs, small entire alternate leaves with setaceous stipules adnate to the dilated often red or purple base of the petioles, and subsolitary axillary flowers shorter than the leaves. — Pl. Wright. ii. 29, t. 12, f. B; Baill. Hist. Pl. vi. 42. *Glossopetalum*, Benth. & Hook. Gen. i. 368; Lösener in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 219; not Schreber. *Forsellesia*, Greene, Erythea, i. 206. — Of the Western Mountain region.

**G. spinëscens**, GRAY. Low intricately branched spinescent shrub: leaves glaucous, glabrous to puberulent, oblanceolate, tapering to a petiole about 1 line long that is gradually dilated below and often with minute setaceous adnate stipules, acute, 3 or 4 lines long, and about a line wide: pedicels equalling the leaves: flowers mostly 5-merous: stamens 10: fruit ovoid, usually curved to one side, acute, finely striate. — Pl. Wright. ii. 29, t. 12, f. B; Pl. Thurb. 299, & Proc. Am. Acad. xi. 73; Torr. Bot. Mex. Bound. 47, & Pac. R. Rep. iv. 74; Brew. & Wats. Bot. Calif. i. 109; Lösener, l. c. 219, f. 128. *Forsellesia spinëscens*, Greene, l. c. 206. — Snake River, Oregon, *Cusick*, to W. Texas, and the Mojave Desert, California, *Parish*.



**Var. meionándrum**, TRELEASE, n. comb. Stamens 5 to 7: otherwise very like the type. — *G. meionandrum*, Koehne, Gartenfl. xliii. 237, f. 52. — S. Colorado, *Purpus*.

**G. Nevadénse**, GRAY. Usually minutely puberulent: leaves elliptical, a little longer than in the last, 2 or 3 lines wide, the broad stipuliferous base abrupt: flowers 4-merous: stamens 8. — Proc. Am. Acad. xi. 73; Brew. & Wats. Bot. Calif. i. 109. *Forsellesia Nevadensis*, Greene, l. c. 206. — Washoe County, Nevada.

**10. HIPPOCRATÉA**, L. (Named for *Hippocrates*, the Greek physician and naturalist.) — Climbing shrubs with prehensile twigs, opposite crenate ample short-petioled deciduous leaves with minute stipules, and flowers in small dichotomous axillary cymes. — Syst. Nat. ed. 1, & Gen. no. 908; Benth. & Hook. Gen. i. 369; Peyritsch in Mart. Fl. Bras. xi. pt. 1, 127; Baill. Hist. Pl. vi. 45; Lösener, l. c. 226. — Mostly of the tropics of both continents.

**H. ováta**, LAM. Climbing to a considerable height: leaves thin, elliptic-ovate, obtuse or blunt-pointed, glabrous,  $1\frac{1}{2}$  to  $2\frac{1}{2}$  inches long; the petioles 2 or 3 lines long: flowers almost sessile, somewhat rusty-pubescent: valves of capsule  $1\frac{1}{2}$  inches long, elliptical, obtuse, closely parallel-veined. — Ill. i. 100, t. 28; Trelease, l. c. 357; Lösener, l. c. f. 130, *a-d*. — Everglades and Keys of Florida. (W. Ind.)

## ORDER XLII. RHAMNACEÆ.

BY W. TRELEASE.

Woody plants, sometimes spinose or climbing. Leaves alternate or opposite, simple, not lobed, or slightly lobed in some forms of *Condalia*, entire, denticulate or serrate, not glandular-punctate (but sometimes with surface glands below), with small or caducous stipules. Flowers in reduced axillary cymes or occasionally subspicate or thyrsoïd, small, mostly greenish, perfect or occasionally diœcious by abortion (in some species of *Rhamnus* and *Gouania*), 4-5-merous, with a conspicuous disk lining a short calyx-tube and sometimes aduate to the ovary. Calyx-segments valvate, usually cristate down the inner face, often deciduous. Petals distinct, inserted on the calyx near the margin of the disk, or in some genera wanting, short-clawed, hooded or with incurved margins. Stamens as many as and alternate with the calyx-lobes, hence in front of and mostly embraced by the petals when these are present, distinct, inserted at or below the margin of the disk; anthers short, versatile, 2-celled, on more or less elongated filaments. Pistil compound, 2-3-celled, or 1-celled by abortion, sometimes lobed; ovules anatropous, 1 or rarely 2 in each cell; style evident, terminal, mostly notched or lobed, with lateral stigmas. Fruit drupaceous, sometimes dry at maturity, or septicidally capsular, the cocci or segments 1-seeded and frequently indehiscent; seeds not arillate, generally with scanty oily albumen; embryo straight (somewhat curved in *Reynosa*), usually with broad occasionally green cotyledons. — The tribes readily separable, but the genera often scarcely distinguishable by technical characters alone, though usually differing in habit, inflorescence, or venation of leaves.

**TRIBE I. ZIZYPHEÆ.** Lobes of calyx deciduous (except in one section of *Condalia*); disk lining the shallow calyx-tube, nearly or quite free from the ovary.

Fruit drupaceous, mostly fleshy and often edible, with a single 1-4-celled stone enclosing as many seeds, or 1-seeded by abortion; seed-coats membranaceous.

\* Embryo relatively large; albumen not ruminated.

— A single ovule in each cell.

1. **CONDALIA.** Apetalous or with hooded clawed petals. Style notched or somewhat 2-3-lobed, its base persisting on the incompletely 2-celled fruit.
2. **RHAMNIDIUM.** Apetalous (in our species). Style 2-lobed, its base persisting on the 1-celled fruit.
3. **MICRORHAMNUS.** Petals hooded, clawed. Style notched, disarticulating close to the small 1-celled fruit.
4. **BERCHEMIA.** Petals acute, with incurved margins, clawless. Style slightly 2-lobed, deciduous close to the elongated 2-celled fruit.

— — Two ovules in each cell.

5. **KARWINSKIA.** Petals hooded, very short-clawed. Style slightly 2-3-lobed, forming a beak on the 2- or incompletely 4-celled fruit.

\* \* Embryo small, within copious ruminated albumen.

6. **REYNOSIA.** Apetalous. Style somewhat 2-lobed, its base persistent on the large 1-celled fruit.

**TRIBE II. RHAMNEÆ.** Lobes of calyx deciduous (except in *Sageretia* and one species of *Colubrina*); disk lining the calyx-tube, or both adherent to the ovary. Fruit drupaceous or becoming dry, enclosing 2 to 4 nutlets or cocci; seed-coats mostly hard.

\* Fruit fleshy, free from the calyx.

7. **SAGERETIA.** Calyx shallow. Petals hooded and clawed. Style short, 3-lobed.
8. **RHAMNUS.** Tube of calyx rather deep. Petals small and clawless, or wanting. Style rather elongated, 2-lobed.

\* \* Fruit becoming nearly or quite dry, partly inferior.

9. **CEANOTHUS.** Calyx-lobes petaloid. Petals large for the order, hooded and long-clawed, often spreading away from the stamens. Style mostly elongated and 3-lobed. Inflorescence usually compound and thyrsoïd.
10. **COLUBRINA.** Calyx not petaloid. Petals small, sessile, surrounding the stamens. Flowers in small axillary umbels.

**TRIBE III. COLLETIÆ.** Lobes of calyx persistent; disk lining the cup-shaped calyx-tube, mostly investing, but free from, the lower half of the ovary. Fruit dry, enclosing 3 cocci.

11. **ADOLPHIA.** Petals hooded. Style short, notched. Anthers introrsely dehiscent by an arcuate line.

**TRIBE IV. GOUANIEÆ.** Lobes of calyx persistent, the often star-shaped disk joining its tube to the entire surface of the ovary. Fruit dry, 3-winged.

12. **GOUANIA.** Petals hooded. Fruit separating through the wings into 3 indehiscent 2-winged segments.

1. **CONDÁLIA**, Cav. (Named in honor of *Antonio Condal*, a Spanish physician, who accompanied Læffling on his journey up the Orinoco.) — Shrubs or trees with mostly divaricate and often spiny twigs, alternate mostly entire sometimes 3-nerved rather small leaves with minute stipules, and sessile or short-peduncled umbel-like axillary cymes. — *An. Hist. Nat. Madrid*, i. 39; *Brongn. Mém. Rhamn.* 48, & *Ann. Sci. Nat.* x. 355; *Gray, Gen. Ill.* ii. 171, t. 164; *Benth. & Hook. Gen.* i. 376; *Baill. Hist. Pl.* vi. 82; *Trelease, Trans. St. Louis Acad.* v.

361; Weberbauer in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 404 (including *Zizyphus* of writers on North American botany). — Of the warmer regions of the New World.

\* Apetalous: sepals persistent: placenta 1; styles slightly 2-3-lobed. — § *Eucondalia*.

**C. obovâta**, Hook. Small tree, velvety-pubescent or at length glabrate, the somewhat angled twigs with white flaking epidermis: leaves drying brown or black above, at length glabrous, spatulate to obovate, long-cuneate, mostly mucronate and entire, minutely subrevolute, short-petioled, 6 to 12 lines long: flowers very short-stalked: drupe subglobose, 2 to 3 lines in diameter; the short stout style disarticulating at about the middle; stigma 3-lobed. — Ic. t. 287; Torr. & Gray, Fl. i. 685; Gray, Gen. III. ii. 172, t. 164; Trelease, l. c. 361; Sargent, Silv. ii. 25, t. 57; Weberbauer, l. c. — Central and S. Texas. (Mex.)

**C. Mexicâna**, Schlecht. In aspect somewhat intermediate between the preceding and following, mostly persistently dingy-velvety: leaves short-villose, obovate or oblanceolate, acute below, almost sessile, about 3 lines long: flowers nearly sessile: drupe ellipsoidal, 2 to 3 lines long; style short, disarticulating at about the middle. — Linnæa, xv. 471; Trelease, l. c. 362. — S. Arizona. (Mex.) Specimens from San Julio Cañon, Lower Calif., Brandegee, have elongated fruit 3 lines long, and large obovate mucronate to deeply emarginate long-decurrent glabrous leaves, as in the preceding, but pass into the type through Mexican specimens, Gregg, no. 795.

**C. spathulâta**, Gray. Shrub, mostly velvety, the twigs reddish with pruinose incrustations: leaves typically smaller, narrowly spatulate, cuneate, acute to emarginate, green on both sides, glabrous or velvety, thick, with few broad veins, very short-petioled, 3 to scarcely 6 lines long: pedicels a line long: drupe obliquely ovoid, 2 lines long, the slender style disarticulating near the end; stigma 2-lobed. — Pl. Wright, i. 32, ii. 27; Torr. Bot. Mex. Bound. 47; Trelease, l. c. 362; Weberbauer, l. c. — S. W. Texas to Mesquite, California, Parish, no. 793. (Mex.)

\* \* Petals present: sepals deciduous: placenta 2; style bifid. *Zizyphus* of most writers on North American botany. — § *Condaliopsis*.

+ Umbels on a short peduncle: calyx fleshy: drupe beakless, with a thin-walled stone.

**C. obtusifolia**, Weberbauer, l. c. Mostly rigid and spinose, somewhat pubescent to glabrate, the angled twigs with pruinose flaking epidermis: leaves sometimes glabrescent, typically thin and green, spatulate to elliptical or ovate-deltoid on long shoots, acute to emarginate, entire or the broader forms unequally and coarsely serrate or almost lobed, 3 to 12 lines long, mostly 3-nerved: peduncle and pedicels each about a line long, mostly villose, like the calyx: drupe subglobose, 4 lines in diameter. — *Rhamnus* ? *obtusifolius*, Hook. in Torr. & Gray, Fl. i. 685; Scheele, Linnæa, xxi. 595. *Zizyphus obtusifolia*, Gray, Gen. III. ii. 170, t. 163, & Pl. Lindh. pt. 2, 168; Trelease, l. c. 362. *Paliurus Texanus*, Scheele, Linnæa, xxi. 594. — S. Texas. (Northern Mex.)

**C. lycioides**, Weberbauer, l. c. Very rigid and spinose, the striate zigzag twigs whitened: leaves subglabrous, rather thin, pale, oblong or occasionally ovate, obtuse or emarginate, usually entire, 6 lines long or less: drupes as in the last or somewhat elongated. — *Zizyphus lycioides*, Gray, Pl. Lindh. pt. 2, 168; Trelease, l. c. 363. — S. W. Texas. (Mex.)

**Var. canescens**, Trelease, n. comb. More hairy, with green-gray twigs, the mostly tomentose leaves thicker and usually broader, elliptical to ovate-deltoid, entire, denticulate or somewhat 3-lobed. — *Zizyphus lycioides*, var. *canescens*, Gray in Rothrock, Wheeler Rep. vi. 82; Trelease, l. c. 363. — S. E. Arizona to Mammoth Tank, California, Pringle & Parish, no. 1181. (Lower Calif.) In aspect of foliage connecting this species with the preceding.

+ + Umbels sessile: calyx-segments thinner, less keeled within: drupe larger, beaked, nearly dry, with a thick-walled hard and bony kernel.

**C. Párryi**, Weberbauer, l. c. Flexuously much branched and slender-spiny, glabrous throughout: twigs less sulcate, scarcely incrustated: leaves mostly fascicled, green, glossy, at length firm, reticulate-veiny, obovate to elliptical, 4 to 6 lines long, tapering to slender petioles of equal length: pedicels very slender, 2 or 3 lines long, becoming twice as long and

recurved in fruit : drupe ovoid, 7 lines long. — *Zizyphus Parryi*, Torr. Bot. Mex. Bound. 46; Brew. & Wat. Bot. Calif. i. 99; Trelease, l. c.; Kellogg, W. Am. Sci. vii. 64, fig. — S. California. (Lower Calif. and adj. ids.)

**2. RHAMNIDIUM**, Reiss. (Name from *ράμνος*, the buckthorn, and *εἶδος*, form.) — Shrubs or small trees with thornless twigs often roughened by prominent lenticels, mostly subopposite firm entire pinnately veined medium-sized leaves with minute stipules, and short-peduncled axillary cymes. — Reiss. in Mart. Fl. Bras. xi. pt. 1, 94; Benth. & Hook. Gen. i. 378; Baill. Hist. Pl. vi. 74; Sargent, Silv. ii. 27. — Of the tropical American region, ours from the West Indies and differing from the representative Brazilian species in its apetalous flowers, firmer stone, etc.

**R. ferreum**, SARGENT. (BLACK IRON-WOOD.) Small tree : twigs somewhat velvety : leaves broadly elliptical, emarginate and mucronate, entire or wavy, minutely subrevolute, thin but coriaceous, glossy above, glabrous except for the short petiole and upper surface of midrib, paler beneath, drying very dark, 12 to 18 lines long : peduncle a line long, short-forked, the pedicels becoming 2 or 3 lines long in fruit : drupe globose-ovoid ; style short, forked nearly to the middle. — Gard. & For. iv. 16, & Silv. ii. 29, t. 58. *Rhamnus ferreus*, Vahl, Symb. pt. 3, 41, t. 58. *Myginda integrifolia*, Lam. Dict. iv. 396. *Zizyphus emarginatus*, Sw. Fl. Ind. Occ. iii. 1954. *Ceanothus ferreus*, DC. Prodr. ii. 30. *Scutia ferrea*, Brongn. Mém. Rhamn. 56, & Ann. Sci. Nat. x. 363. *Condalia ferrea*, Griseb. Fl. W. Ind. 100; Gray, Bot. Gaz. iv. 208; Chapm. Fl. ed. 2, 612; Eggers, Bull. U. S. Nat. Mus. no. 13, 40; Trelease, l. c. 362. *Sarcophalus ? ferreus*, Weberbauer, l. c. 405. — S. Florida and Florida Keys. (W. Ind.)

**3. MICRORHAMNUS**, Gray. (Name from *μικρός*, small, and *ράμνος*, the buckthorn, because of the minute leaves.) — Small intricately branched very spiny shrub with alternate fascicled entire 1-nerved small heath-like revolute leaves with minute stipules, and solitary axillary flowers. — Pl. Wright. i. 33; Benth. & Hook. Gen. i. 376; Trelease, Trans. St. Louis Acad. v. 360, 363; Weberbauer in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 405. — A single species.

**M. ericoïdes**, GRAY. Glabrous or exceptionally minutely puberulent : leaves elliptical, acute, revolute to the broad midrib, the enclosed grooves densely short-tomentose, 1 to 3 lines long, sessile ; stipules broadly triangular, ciliate ; pedicels about a line long : drupe oblong, 3 or 4 lines long, the slender style disarticulating from its abruptly pointed summit. — Pl. Wright. i. 34, ii. 28; Torr. & Gray, Pacif. R. Rep. ii. 162; Trelease, l. c. 363. — W. Texas. (Northern Mex.)

**4. BERCHÉMIA**, Neck. (Name of unknown derivation, but supposed to be personal.) — Shrubs or small trees (ours twining) with spineless twigs, alternate thin entire pinnately veined ample slender-petioled leaves, minute stipules, and rather loose more or less leafy terminal panicles. — Elem. Bot. ii. 122; Brongn. Mém. Rhamn. 49, & Ann. Sci. Nat. x. 356; Gray, Gen. Ill. ii. 173; Benth. & Hook. Gen. i. 377; Baill. Hist. Pl. vi. 78; Trelease, Trans. St. Louis Acad. v. 360, 363; Weberbauer in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 405. *Oenoplea*, Hedw. f. Gen. i. 151. *Oenophia*, Schult. Syst. v. 332. — Of the Asiatic region, one species African, and ours peculiar to Eastern North America.

**B. volúbilis**, DC. (SUPPLE JACK.) Climbing over trees to a great height, glabrous throughout : leaves ovate, acute or narrowly acuminate-cuspidate, undulate and slightly revolute, an inch or two long : drupe blue, ellipsoidal, 4 lines long, the style deciduous near the base. — Prodr. ii. 22; Brongn. Mém. Rhamn. 50, & Ann. Sci. Nat. x. 357; Torr. & Gray,

Fl. i. 260, 685; Loudon, Arb. ii. 528, f. 196; Gray, Gen. III. ii. 174, t. 165; Trelease, l. c. 363. *B. scandens*, Trelease, l. c. 364; Britton, Mem. Torr. Club, v. 220; Weberbauer, l. c. 406, f. 199 D-G. *Rhamnus scandens*, Hill, Hort. Kew. 453, t. 20, & Veg. Syst. xiv. 64, t. 17. *R. volubilis*, L. f. Suppl. 152; Jacq. Ic. Rar. ii. 12, t. 336; L'Her. Sert. Angl. 5. *Zizyphus volubilis*, Willd. Spec. i. 1102. — Virginia to Central Texas and Florida.

**5. KARWÍNSKIA**, Zucc. (Named in honor of *Baron Karwinsky*, a Bavarian traveller.) — Shrubs or small trees with spineless branches, mostly subopposite entire pinnately veined black-punctate ample rather thin leaves with minute stipules, and flowers in short-peduncled axillary clusters. — Abh. Akad. München, i. 349; Benth. & Hook. Gen. i. 377; Baill. Hist. Pl. vi. 75; Trelease, Trans. St. Louis Acad. v. 360, 364; Weberbauer in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 405. — Of the Mexican region.

**K. Humboldtiana**, Zucc. l. c. 353. Shrub or small tree: twigs glabrescent: leaves nearly as in *Berchemia*, elliptic-ovate, rounded or subcordate at base, obtuse, mucronate or long-acute, entire or undulate, mostly glabrous, slightly paler and with some small black glandular dots beneath, 1 to 3 inches long, their slender petioles usually about one third as long, but sometimes greatly reduced: peduncle a line long or less, few-flowered; pedicels of equal length, both elongating in fruit: drupe ovoid, apiculate, 6 lines long; style articulated near the top. — Brew. & Wats. Bot. Calif. i. 100; Trelease, l. c. 364. *K. glandulosa*, Zucc. l. c. 351, t. 16, & Flora, xv. pt. 2, Beibl. 71. *K. affinis*, Schlecht. Linnæa, xv. 460. *K. bini-flora*, Schlecht. l. c. *Rhamnus umbellatus*, Cav. Ic. vi. 2, t. 504. *R. Humboldtianus*, Røem. & Schult. Syst. v. 295; HBK. Nov. Gen. & Spec. vii. 52, t. 618. — Southwestern border of Texas. (Mex., Lower Calif.)

**6. REYNÓSIA**, Griseb. (Named for *Dr. Alvaro Reynoso*, a Cuban chemist of the middle of the present century.) — Shrubs or small trees with thornless twigs, mostly opposite coriaceous entire pinnately veined medium-sized evergreen leaves with minute stipules, and sessile axillary umbels. — Cat. Pl. Cub. 33; Eggers, Vidensk. Meddel. 1877, 173; Trelease, Trans. St. Louis Acad. v. 360, 364; Sargent, Silv. ii. 19; Weberbauer in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 405. — Of the West Indian region.

**R. latifolia**, GRISEB. l. c. 34. Small tree, glabrous or the twigs at first slightly puberulent: leaves broadly elliptical, spatulate-oblong, or obovate, rounded at both ends, emarginate and commonly mucronate, entire, slightly revolute, very thick, often paler or reddish beneath and with a thick midrib, finely reticulate, 6 to 18 lines long, on short thick petioles: flowers appearing with the new leaves: pedicels from 2 becoming 4 lines long: fruit ellipsoidal, 6 lines long, short-beaked. — Eggers, Vidensk. Meddel. 1877, 173, t. 2, & Bull. U. S. Nat. Mus. no. 13, 40; Gray, Bot. Gaz. iv. 208; Chapm. Fl. ed. 2, 612; Trelease, l. c. 364; Sargent, Silv. ii. 21, t. 56, & Gard. & For. iv. 15. — Miami and the Keys of Florida. (Bahamas, W. Ind.)

**7. SAGERÉTIA**, Brongn. (Named for *Augustin Sageret*, a French horticulturist and vegetable physiologist.) — Trailing, scrambling, or spreading shrubs with spiny divaricate twigs, mostly obliquely opposite often serrulate pinnately veined glossy leaves of medium size with minute stipules, and nearly sessile flowers forming interrupted axillary spikes often aggregated into rigid compound clusters at ends of the branches. — Mém. Rhamn. 52, & Ann. Sci. Nat. x. 359; Gray, Gen. III. ii. 175; Benth. & Hook. Gen. i. 379; Baill. Hist. Pl. vi. 79; Trelease, Trans. St. Louis Acad. v. 361, 367; Weberbauer in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 408. — Mostly of the Asiatic region.

**S. Michaúxii**, BRONGN. Trailing or scrambling: twigs somewhat angled, becoming terete, at first tomentose: leaves ovate, mostly cordate, acute or acuminate, somewhat mucronate, incurved-serrulate or on lax shoots sharply serrate; the larger about  $1\frac{1}{2}$  inches long, their tomentose petioles 1 or 2 lines long; veins beneath and occasionally the surface somewhat tomentose: inflorescence at length ample, loose, leafless above, terminating the upper branches, the lower spikes spreading from the axils of the uppermost foliar leaves: flowers very fragrant: fruit 4 lines long, sessile. — Mém. Rhamn. 53, & Ann. Sci. Nat. x. 360; Torr. & Gray, Fl. i. 263; Gray, Gen. III. ii. 176, t. 166; Wats. Proc. Am. Acad. xx. 358; Trelease, l. c. 367. *Rhamnus minutiflorus*, Michx. Fl. i. 154; Nutt. Gen. i. 152; Pursh, Fl. i. 166; Ell. Sk. i. 289; DC. Prodr. ii. 27. *Afarca parviflora*, Raf. Silv. Tellur. 30. *Segregatia Michauxii*, Wood, Class-Book, ed. of 1861, 292. — South Carolina to Alabama, around the coast.

**S. Wrightii**, WATSON. Shrubby, as much as ten feet high: leaves elliptical or obovate, not cordate, glabrescent, half inch to nearly an inch long: inflorescence often simpler, with mostly short lateral branches. — Proc. Am. Acad. xx. 358; Trelease, l. c. 367. — W. Texas to the Sta. Rita Mountains of Arizona. (Northern Mex., Lower Calif.)

**8. RHÁMNUS**, Tourn. BUCKTHORN. (*Ράμνος*, the ancient Greek name of the Buckthorn.) — Shrubs or small trees, mostly spineless, with alternate, obliquely opposite or opposite, entire to serrulate or pungently toothed pinnately veined mostly thin and ample leaves with often lanceolate but caducous stipules, and small sometimes diœcious flowers solitary in the lower axils or in sessile or peduncled axillary umbels. — Inst. 593, t. 366; L. Gen. no. 165; Brongn. Mém. Rhamn. 53, & Ann. Sc. Nat. x. 362; Gray, Gen. III. ii. 179; Benth. & Hook. Gen. i. 377; Baill. Hist. Pl. vi. 74; Trelease, Trans. St. Louis Acad. v. 361, 365; Sargent, Silv. ii. 31; Weberbauer in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 409. — Includes *Frangula*, sometimes kept apart. Cosmopolitan but chiefly of the north-temperate zone.

\* Flowers mostly polygamo-diœcious, appearing nearly with the leaves, without a common peduncle: seeds grooved down the back (except in *R. alnifolia*), the rhaphe lying in the groove; cotyledons relatively thin, curved with the seed: winter buds scaly.

+ Leaves firm though rather thin, evergreen, often pungently toothed: flowers 4-merous: fruit red, the mostly 2 cocci widely dehiscent on the inner angle.

**R. crócea**, NUTT. Spreading shrub or rarely arborescent, with rather red bark: twigs divaricate, puberulent or glabrescent, often ending in blunt spines: leaves alternate or fascicled, glossy, mostly bronzed beneath, glabrous or somewhat puberulent on the petiole and midrib beneath, nearly round to broadly ovate or elliptical, emarginate to mucronate-acuminate, glandular-dentate or bidenticulate, 3 to 12 lines, their petioles 1 or 2 lines long: flowers mostly apetalous: fruit 2 or 3 lines long: pedicels at length 1 to 2 or exceptionally 3 lines long. — Nutt. in Torr. & Gray, Fl. i. 261; Jour. Hort. Soc. London, vi. 217, with fig.; Wats. Cat. Pl. Wheeler, 7, & Proc. Am. Acad. xi. 114; Brew. & Wats. Bot. Calif. i. 100; M. K. Curran, Proc. Calif. Acad. Sci. ser. 2, i. 251; Trelease, l. c. 365; Sargent, Gard. & For. ii. 364, & Silv. ii. 33, t. 59. *R. ilicifolia*, Kell. Proc. Calif. Acad. Sci. ii. 37. — California, from Mariposa County southward, chiefly in the Coast Range. (Lower Calif.)

**Var. insuláris**, SARGENT, is an arborescent form differing in its gray bark, larger less toothed leaves, longer flowers and fruit (commonly 3 lines long), and said to flower six weeks later than the ordinary form. — Gard. & For. ii. 364, & Silv. ii. 34, t. 60. *R. insularis*, Greene, Bull. Calif. Acad. Sci. ii. 392, & Pittonia, i. 201. *R. pirifolia*, Greene, Pittonia, iii. 15. — Islands of California and Lower California from Sta. Barbara southward, also about San Diego.

**Var. pilósa**, TRELEASE, is a form with the mostly larger, toothed leaves, and the inflorescence, strikingly gray-velvety. — Proc. Calif. Acad. Sci. ser. 2, i. 251, & Trans. St. Louis Acad. v. 365; Sargent, Silv. ii. 33. — San Diego County, California, passing into the type through Arizona specimens, *Palmer, Jones*.

+ + Leaves deciduous, never pungent : fruit becoming nearly black ; cocci at most tardily dehiscent.

++ Petals present : flowers mostly 4-merous.

= Long shoots ending in spines : leaves subopposite.

**R. CATHARTICA**, L. Becoming a small rough-barked tree with glabrous mottled twigs : leaves broadly elliptical to subovate, somewhat acute at base, often blunt-pointed, crenulate or serrulate, more or less pubescent on the veins beneath (some of the veins running to the apex), 1 to 2 inches long, on slender petioles : flowers appearing shortly after the leaves, mostly solitary in the lower axils : pedicels glabrous, 3 or 4 lines long : carpels 3 or 4 : groove of seed deep and narrow. — Spec. i. 193 ; Brongn. Mém. Rhamn. 76, t. 2, f. 4 ; Torr. & Gray, Fl. i. 261 ; Nutt. Silv. ii. 53 ; Millspaugh, Med. Pl. i. t. 41 ; Trelease, l. c. 365. — A hedge plant, escaping somewhat in the East, said to be abundant in Virginia, *Canby*. (Introd. from Old World.)

= = Not spinose : leaves 4-ranked in interrupted decussate pairs, or on leaders uniformly distributed.

**R. lanceolata**, PURSH. Tall shrub : the gray branchlets puberulent or glabrate : leaves lanceolate or ovate-lanceolate, rounded or acute at base, from rounded becoming blunt-pointed when grown, minutely incurved-serrulate, finely pinnately veined, from golden-puberulent becoming mostly glabrous at least above, 1 to 3 inches long, short-petioled : flowers appearing with the leaves, 2 or 3 in each of the lower axils : pedicels at length glabrescent, 1 to 3 lines long : carpels 2 : seed with a broad open groove. — Fl. i. 166 ; Torr. & Gray, Fl. i. 261 ; Gray, Gen. III. ii. 180, t. 168 ; Trelease, l. c. 365 ; Greene, Erythea, iv. 85. *R. Shortii*, Nutt. Jour. Acad. Philad. vii. 91. *R. parvifolius*, Torr. & Gray, l. c. 262. *R. Smithii*, Greene, Pittonia, iii. 17, & Erythea, iv. 134. — Pennsylvania to Colorado, Central Texas, and Alabama.

++ ++ Apetalous : flowers 5-merous : seeds scarcely grooved : twigs not spinose.

**R. alnifolia**, L'HER. Low shrub : the gray or mottled branches mostly puberulent : leaves elliptical, obtuse to mostly acuminate, more coarsely incurved-serrate or biserrate, with coarse upcurved veins, soon glabrate except for some veins, 1 to mostly 4 inches long : flowers appearing nearly with the leaves, solitary or 2 or 3 together in the lower axils : pedicels glabrate, 1 to 4 lines long : carpels 3 : seed flat, with flat thin cotyledons. — Sert. Angl. 5 ; Guimp. Otto & Hayne, Abbild. Holzart. 77, t. 61 ; Hook. Fl. Bor.-Am. i. 122, t. 42 ; Torr. & Gray, Fl. i. 262 ; Gray, Gen. III. ii. 180 ; Brew. & Wats. Bot. Calif. i. 100 ; Trelease, l. c. 366 ; Greene, Erythea, iv. 86. *R. franguloides*, Michx. Fl. i. 153 ; Pursh, Fl. i. 166. *Girtanneria alnifolia*, & *G. franguloides*, Raf. Sylv. Tellur. 28. — Swamps, Maine to Brit. Columbia, south to New Jersey in the East, and in the West to Wyoming, Oregon, and the mountains of Northern California.

\* \* Flowers mostly perfect, appearing after the leaves, most of the umbels pedunculate : fruit becoming nearly black ; cocci at most tardily dehiscent ; seeds notched at base, not grooved, with lateral rhapshe ; cotyledons thick and fleshy : winter buds naked, hairy : leaves alternate. — § *Frangula*.

**R. Caroliniána**, WALT. Tall shrub or small tree with more or less puberulent gray or reddish often mottled twigs : leaves oblong-elliptical, mostly acute or acuminate, minutely revolute, entire to remotely and obscurely low-serrate or crenulate, coarsely pinnately veined and sometimes with conspicuous transverse connecting veinlets, puberulent below or glabrescent, 2 to 5 inches long, firm, sometimes glossy, short-petioled, deciduous : peduncle 1 to 4 lines long, not exceeding the petioles ; pedicels 2 or 3 lines long, both usually hairy : flowers 5-merous : carpels 3. — Car. 101 ; Torr. & Gray, Fl. i. 262 ; Nutt. Sylv. ii. 50, t. 59 ; Trelease, l. c. 366 ; Sargent, Silv. ii. 35, t. 61 ; Greene, Erythea, iv. 135. *Frangula fragilis*, Raf. Fl. Ludov. 97. *F. Caroliniana*, Gray, Gen. III. ii. 178, t. 167. *Sarcophalus Carolinianus*, Raf. Sylv. Tellur. 29. — Missouri to North Carolina, Florida, and Texas.

**R. FRÁNGULA**, L. Small tree : leaves broadly elliptical to mostly obovate, frequently acuminate, usually cuneately narrowed at base, entire or very minutely denticulate, about 2 inches long, thin, very slender-petioled : pedicels usually inserted directly on the stem : otherwise resembling the preceding species. — Spec. i. 193 ; Greene, Erythea, iv. 136 ; Pollard, Bot.

Gaz. xxi. 235. — Established in swamps at New Durham and Secaucus, N. J., and on Long Island, N. Y. (Intro. from Eu.)

**R. Purshiana**, DC. Small or medium-sized tree with somewhat yellow-pubescent often greenish gray (or reddish?) twigs: leaves broadly elliptical, rounded or slightly cordate at base, very obtuse to abruptly blunt-pointed, slightly if at all revolute, often undulate, irregularly and closely spreading-serrulate or denticulate, coarsely pinnately veined and mostly with evident transverse veinlets (the midrib broad and usually pale as seen from the upper surface), usually persistently short-villous beneath and on the veins above, 2 to 6 inches long, rather thin, deciduous; the short petioles downy: peduncles 4 to 15 lines long, at least the upper longer than the petioles; pedicels 2 or 3 lines long: flowers 5-merous: carpels 3. — Prodr. ii. 25; Hook. Fl. Bor.-Am. i. 123, t. 43; Torr. & Gray, Fl. i. 262; Brew. & Wats. Bot. Calif. i. 101; Trelease, l. c. 366; Sargent, Gard. & For. iv. 75, & Silv. ii. 37, t. 63, in part; Rusby, Druggists' Bull. iv. 334, f. 1, 8. *Cardiolepis obtusa*, Raf. Sylv. Tellur. 28. *Frangula Purshiana*, Coop. Smithson. Rep. 1858, 259. — Northern Idaho to Brit. Columbia, Washington, Oregon, and, in less characteristic form, the Sierras of Northern California. A form from Placer County, California, *Carpenter*, with obovoid cuneate leaves 3 to 5 inches long, is *R. anonæfolia*, Greene, Pittonia, iii. 16. — A form approaching the next, with elliptical obtuse coriaceous leaves about 2 inches long, with midrib exposed above and the inflorescence reaching to the middle of the blade, is *R. occidentalis*, Howell, Pacif. Coast Pl. 1887; Greene, Pittonia, ii. 15; Rusby, l. c. 335, f. 6, 7; *R. Californica*, K. Brandegee, Zoe, i. 241, from Waldo County, Oregon, *Howell*.

**R. Californica**, Eschs. Tall shrub or exceptionally arborescent, with somewhat tomentose green to purple twigs: leaves elliptical, mostly rounded at base, obtuse to subacute, mostly a little revolute, entire, serrulate, or denticulate, prominently pinnately veined (the midrib a mere sunken often granular impressed line as seen from above), glabrate or short-tomentose on the veins beneath, often somewhat glossy below, 1 to 3 or rarely 4 or 5 inches long, evergreen in the warmer districts and then often reticulated; the short petioles tomentulose: peduncles 2 to 8 lines long, not commonly much exceeding the petioles; pedicels 1 to 3 lines long, both glabrous or puberulent: flowers 4-5-merous: fruit subglobose; the cocci mostly 2, large and usually not attenuated at base. — Mém. Acad. St. Pétersb. ser. 6, x. 285; Torr. & Gray, Fl. i. 263; Brew. & Wats. Bot. Calif. i. 101; Trelease, l. c. 366; M. K. Curran, Proc. Calif. Acad. Sci. ser. 2, i. 252; K. Brandegee, Zoe, i. 240; Rusby, l. c. 335, f. 2, 3, 9. *R. oleifolius*, Hook. Fl. Bor.-Am. i. 123, t. 44; Torr. & Gray, Fl. i. 260; Rev. Hort. 1874, 354, f. 47. *R. laurifolius*, Nutt. in Torr. & Gray, Fl. i. 260. *R. leucodermis*, Nutt. l. c. 261. *R. Purshiana*, Sargent, Silv. ii. 37, t. 62, in part. *Endotropis oleifolia*, Raf. Sylv. Tellur. 31. *Perfonon laurifolium*, Raf. l. c. 29. *Frangula Californica*, Gray, Gen. III. ii. 178. — Throughout California. A form with large elliptical leaves sometimes over 5 inches long, from Mendocino, *Bolander*, and Pasadena, *Brandegee*, approaches the preceding.

**Var. betulæfólia**, TRELEASE, n. comb. A form approaching the preceding species, with thin elliptical minutely serrulate obtuse or bluntly acuminate leaves about 4 inches long. — *R. betulæfolia*, Greene, Pittonia, iii. 16. — Guadalupe Mountains, Texas, *Havard*, and Mogollon Mountains, New Mexico, *Rusby*.

**Var. rúbra**, TRELEASE, l. c. 367. A scarcely separable form with slender glabrous red twigs, oblong-lanceolate or very narrowly obovate thin deciduous nearly glabrate leaves scarcely 2 inches long, with the midrib often more visible above, and mostly obovoid fruit with the cocci attenuate below. — *R. rubra*, Greene, Pittonia, i. 68, 160. *R. Purshiana*, Sargent, Silv. ii. t. 63, f. 3. — Eastern slope of the Sierras (Truckee and the Upper Sacramento).

**Var. tomentélla**, BREW. & WATS. With tomentose reddish twigs, revolute mostly entire evergreen leaves persistently yellow-tomentose below, and peduncles commonly exceeding the petioles. — Bot. Calif. i. 101; Trelease, l. c. 367. *R. tomentella*, Benth. Pl. Hartw. 303; Rusby, Druggists' Bull. iv. 335, f. 4, 5; K. Brandegee, Zoe, i. 244. *R. Purshiana*, var. *tomentella*, Sargent, Silv. ii. 39, t. 63, f. 2. — Extends from Southern California to Arizona and New Mexico, and is connected with the type of the species by occasional specimens from more northern parts of its range, Brownsville, *Hill*, Sta. Cruz Mountains and Alta, *Brandegee*.



**9. CEANÓTHUS, L.** NEW JERSEY TEA, CALIFORNIA LILAC. (Κεάνωθος, a name applied by Theophrastus to some prickly plant, and transferred to this genus by Linnæus.) — Shrubs or rarely small trees with often divaricate sometimes spiny twigs, alternate or opposite frequently serrate 3-nerved or pinnately veined usually ample leaves with minute or spongy-thickened stipules, and small but showy white, blue, or purplish flowers in often long-peduncled dense axillary or terminal clusters. — Act. Soc. Upsal. 1741, 77, & Gen. ed. 6, no. 267; Brongn. Mém. Rhamn. 62, & Ann. Sci. Nat. x. 369; Gray, Gen. III. ii. 181; Benth. & Hook. Gen. i. 378; Wats. Proc. Am. Acad. x. 333; Baill. Hist. Pl. vi. 80; Trelease, Proc. Calif. Acad. Sci. ser. 2, i. 106, & Trans. St. Louis Acad. v. 361; Parry, Proc. Davenp. Acad. v. 162, 185; K. Brandegee, Proc. Calif. Acad. Sci. ser. 2, iv. 174; Weberbauer in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 412. — Chiefly of the Western United States, a few in Mexico and the Atlantic States.

\* Leaves alternate, not pungent, entire or mostly glandular-toothed; stipules thin and mostly fugacious: fruit sometimes keeled or crested on the back of the carpels, but without dorsal horns. — *Euceanothus*.

+ 1. Leaves ample in all but the last, thin, 3-nerved, toothed, deciduous: twigs subterete, neither rigidly divaricate nor spinose: inflorescence rather simple and mostly compact, at the ends of leafless or nearly leafless peduncles: flowers white: fruit about 2 lines in diameter.

++ Peduncles often rather stout, usually from lateral buds of the old wood.

**C. sanguineus, PURSH.** Tall shrub, with purple or reddish glabrous twigs: leaves broadly elliptical, varying to ovate obovate or orbicular, rounded or cordulate at base, very obtuse, paler beneath, soon glabrous or with a few long hairs on the veins beneath, serrate, 1 to 3 inches long, their frequently somewhat villous petioles about a third as long: peduncles 4 or 5 inches long, pale, fugaciously villous, floriferous on the upper half or occasionally bearing scattered corymbs from the base up: capsules obovoid, somewhat lobed at top, nearly smooth and crestless. — Fl. i. 167; Nutt. Gen. i. 153; Torr. & Gray, Fl. i. 265, in part; Hook. Fl. Bor.-Am. i. 125; Wats. Proc. Am. Acad. x. 334; Trelease, Proc. Calif. Acad. Sci. ser. 2, i. 107, 114; Parry, Proc. Davenp. Acad. v. 168; K. Brandegee, Proc. Calif. Acad. Sci. ser. 2, iv. 180. *C. oreoganus*, Nutt. in Torr. & Gray, Fl. i. 265; Hook. Bot. Mag. t. 5177. — Brit. Columbia to N. California, Yreka, Greene, and Idaho.

++ ++ Peduncles slender, from leafy shoots of the present season.

**C. ovátus, DESF.** Low shrub, with at length brownish or purplish tomentose or puberulent glabrescent twigs: leaves rather narrowly elliptical, rounded or mostly acute at base, obtuse to acute, scarcely paler beneath, becoming glabrous and glossy, crenate-serrulate, 1 to 2 inches long; their petioles mostly 2 or 3 lines long: flowers in a single often short-peduncled corymb terminating the branch, or a few additional similar or longer-peduncled clusters from the upper leaf-axils: capsules nearly globose, somewhat lobed at top, smooth and crestless. — Hist. Arbr. & Arbris. ii. 381; Wats. l. c.; Trelease, l. c. 108; Parry, l. c.; K. Brandegee, l. c. 179, 180. *C. ovalis*, Bigel. Fl. Bost. ed. 2, 92; Torr. & Gray, Fl. i. 265, 686; Torr. Fl. N. Y. i. 145, t. 20. *C. glandulosus*, Raf. New Fl. Am. iii. 57. — New England to Manitoba, Colorado, Texas, and Alabama. In the Southwest the larger leaves are not infrequently ovate, but deep green on both surfaces and of the texture usual in *C. ovatus*.

**Var. pubescens, TORR. & GRAY.** Persistently dingy villous-tomentose: the dull leaves usually very broadly elliptical: inflorescence of two or three corymbs near the top of the often more elongated peduncle. — Torr. & Gray, acc. to Wats. Bibl. Index, 166; Trelease, l. c. 108. *C. mollissimus*, Torr. in Frémont, Rep. 88. — Western limits of the species. Approaching the next.

**C. Americanus, L.** (NEW JERSEY TEA.) Low shrub with green or at length dull purplish tomentose, puberulent or glabrous twigs: leaves ovate, rounded at base, or rounded to

the lateral nerves and then abruptly cuneate, obtuse to mostly acute or somewhat acuminate, paler beneath, dull, sparingly pubescent to dingy-tomentose, finely and irregularly serrate,  $1\frac{1}{2}$  to 3 inches long; their pubescent or glabrate petioles 3 to 6 lines long: flower-clusters from several of the upper axils as well as terminal; the long ascending peduncles naked or 1-2-leaved above, somewhat thyrsoidly branched: capsules globose, little lobed, somewhat roughened and crested. — Spec. i. 195; Lam. Ill. t. 129, f. 1; Schk. Handb. i. 152, t. 46; Sims, Bot. Mag. t. 1479; Nouv. Duham. vi. t. 31; Torr. & Gray, Fl. i. 264; Gray, Gen. Ill. ii. 182, t. 169; Wats. Proc. Am. Acad. x. 333; Trelease, l. c. 108; Parry, l. c. 168; K. Brandegee, l. c. 179. *C. trinervus*, Moench, Meth. 651. *C. tardiflorus*, Hornem. Hort. Hafn. 230. *C. perennis*, Pursh, Fl. i. 167. *C. herbaceus*, Raf. Med. Rep. hex. 2, v. 360. *C. officinalis*, Raf. Med. Bot. ii. 205. — Canada to the Great Lakes, S. Carolina, Louisiana, and Texas. The western form commonly with firmer more tomentose leaves and more upright peduncles, and in some specimens scarcely separable from the preceding variety. The lowermost leaves are frequently elliptical and more coarsely toothed than the upper.

**Var. intermedius**, TRELEASE, n. comb. Low shrub with slender branches: leaves ovate to ovate-lanceolate, mostly less than an inch long, short-petioled: peduncles very slender, mostly numerous; the small often subsimple inflorescence at their ends: otherwise as in the type. — *C. intermedius*, Pursh, Fl. i. 167. — Tennessee (acc. to Pursh) and S. Carolina, Goose Creek, *Hexamer & Maier*, to Louisiana, New Orleans, *Drummond*, no. 73, and Florida.

**C. serpyllifolius**, NUTT. Low decumbent shrub, with reddish finely puberulent twigs. leaves elliptic-ovate, crenate-serrulate, coarsely appressed-hairy on the veins, 3 or 4 lines long and 1 to 3 lines wide: peduncles elongated, naked except at base of the few-flowered corymb. — Gen. i. 154; Torr. & Gray, Fl. i. 266; Chapm. Fl. 74; Wats. Proc. Am. Acad. x. 335; Trelease, l. c. 108; Parry, l. c. 172. *C. microphyllus*, var. *serpyllifolius*, Wood, Class-Book, ed. of 1861, 291. *C. microphyllus*, K. Brandegee, l. c. 180, in part. — S. Florida, *Nuttall*. Closely allied to *C. Americanus*, var. *intermedius*, from which it differs chiefly in size.

+ 2. Leaves very small (1 or 2 lines long), 3-nerved, finely glandular-toothed: twigs terete, slender, neither rigidly divaricate nor spinose: inflorescence small, nearly simple, corymbose or subracemose, terminal and usually sessile on many of the branches; flowers white: fruit about 2 lines in diameter.

**C. microphyllus**, MICHX. Low spreading shrub, with green or at length reddish nearly glabrous branches and numerous ascending very slender twigs: leaves minute, often fascicled, obovate or elliptical, sparsely and fugaciously short-strigose below, very short-petioled: peduncles not over 4 lines long, often leafy throughout or at the very top, the corymb half inch in diameter: capsules little lobed, smooth and crestless. — Fl. i. 154; Nutt. Gen. i. 154; Torr. & Gray, Fl. i. 266; Chapm. Fl. 74; Wats. Proc. Am. Acad. x. 335; Trelease, l. c. 107; Parry, l. c. 172; K. Brandegee, l. c. 180. — Florida, mainly in sandy barrens.

+ 3. Leaves ample, firm, 3-nerved, closely dentate-serrate: twigs slightly angled or terete, neither glaucous nor spinose: inflorescence ample, compound.

**C. velutinus**, DOUGL. Large shrub: twigs olive, buff, or at length brown, puberulent, terete: leaves broadly elliptical, mostly subcordate to the lateral nerves near the base, thence cuneate, very obtuse, dark green, glabrous and usually heavily varnished above, minutely canescent beneath, 2 or 3 inches long; their stout petioles often 8 lines long: peduncles somewhat angled, minutely and rather sparingly puberulent: flowers white: capsules subglobose, 2 to  $2\frac{1}{2}$  lines in diameter, deeply lobed at top, smooth or minutely roughened, nearly crestless. — Dougl. in Hook. Fl. Bor.-Am. i. 125, t. 45; Hook. Bot. Mag. t. 5165; Torr. & Gray, Fl. i. 265; Wats. l. c. 334; Trelease, l. c. 110; Parry, l. c. 169; K. Brandegee, l. c. 189. — Mountains from the Columbia River to Central California, Nevada, Colorado, and the Dakotas. Strongly cinnamon-scented.

**Var. lævigatus**, TORR. & GRAY. Subarborescent: leaves glabrous, light green and somewhat glaucous below: inflorescence mostly more ample and compound: capsules globose, 3 lines in diameter, less lobed, smooth, somewhat crested. — Fl. i. 686; Wats. Bibl. Index, 167; Trelease, l. c. 110. *C. lævigatus*, Dougl. in Hook. Fl. Bor.-Am. i. 125; Davy, Gard. Chron. ser. 3, xx. 363. — Mountains of California, Mendocino Co., *Kellogg*, Napa Co., *Brandegee*, Humboldt Co., *Rattan*.

**C. arbóreus**, GREENE. Small tree, with at first angled gray-puberulent at length glabrescent reddish and glossy twigs: leaves elliptic-ovate, subcordate or rounded at base, or abruptly short-cuneate along the lateral nerves, mostly obtuse to subacute, dark green, dull and glabrate or microscopically downy above, densely but microscopically white-tomentose beneath,  $1\frac{1}{2}$  to 3 inches long; their stout canescent petioles 4 lines long: peduncles canescent: flowers pale blue: capsules subglobose or depressed, 4 lines in diameter, scarcely lobed, wrinkled, strongly cristate. — Bull. Calif. Acad. Sci. ii. 144; Trelease, l. c. 110, 115; Parry, l. c. 169, 187; Brandegee, Proc. Calif. Acad. Sci. ser. 2, i. 208; K. Brandegee, l. c. 192. *C. velutinus*, var. *arboreus*, Sargent, Gard. & For. ii. 364, & Silv. ii. 45, t. 65. — Islands off the Californian coast, Sta. Cruz, Greene, Sta. Catalina, Nuttall, Lyon, Davidson, Brandegee, Fritchey, Mrs. Trask.

+ 4. Leaves medium-sized, rather thin, normally entire: inflorescence compound, elongated, on few-leaved branches: fruit 2 to 3 lines in diameter.

++ Twigs slightly angled when young, neither rigidly divaricate nor spinose: leaves deciduous, at least the largest 3-nerved, mostly obtuse: inflorescence commonly rather dense.

**C. parvifolius**, TRELEASE. Slender and low, with olive glabrous flexible twigs: leaves elliptical, acute at base, mostly mucronulate, glabrous, 4 to 8 lines long: inflorescence oblong, subsimple, about an inch long; the naked peduncle 2 or 3 inches long: flowers blue: capsules  $2\frac{1}{2}$  lines in diameter, nearly smooth and crestless. — Proc. Calif. Acad. Sci. ser. 2, i. 110. *C. integerrimus*, var. ? *parviflorus*, Wats. Proc. Am. Acad. x. 334. *C. integerrimus*, var. ? *parvifolius*, Wats. Bot. Calif. i. 102; K. Brandegee, l. c. 183. *C. integerrimus*, Parry, l. c. 172, in part. — California, in the Yosemite region.

**C. Andersóni**, PARRY. Tall shrub, with green or at length purplish glabrescent twigs: leaves narrowly elliptical or elliptic-oblong, mostly acute at base, usually very obtuse, often mucronulate, half inch to inch long: inflorescence from narrow to quite broad, 2 (when simple) to 4 inches (when compound) long, or in fruit double this length, equalled by the often nearly leafless at length rather stout peduncles: flowers white: capsules nearly globose, 2 lines in diameter, lobed, smooth and crestless. — Proc. Davenp. Acad. v. 172. *C. integerrimus*, K. Brandegee, l. c. 181, in part. — Sta. Cruz Mountains, California.

**C. integerrimus**, HOOK. & ARN. Tall shrub with green or at length somewhat brown glabrescent sometimes irregularly and sparingly low-verrucose rather stiff twigs: leaves broadly elliptical to ovate, rounded at base, sometimes acute, somewhat loosely hairy above at least when young, lighter green and glabrescent or with a few soft hairs beneath, 1 to 3 inches long, their very slender somewhat long-hairy petioles 3 or 4 lines long: inflorescence 3 or 4 to 6 or 7 inches long, 1 to 4 inches thick: flowers blue varying to white: capsules subpyriform,  $2\frac{1}{2}$  to 3 lines in diameter, somewhat lobed at top, nearly smooth, and with low but broad deeply dorsal evanescent crests. — Bot. Beech. 329; Torr. & Gray, Fl. i. 686; Wats. l. c. 334; Trelease, l. c. 109; Parry, l. c. 172, in part; K. Brandegee, l. c. 181, in part. *C. Californicus*, Kellogg, Proc. Calif. Acad. Sci. i. 55. *C. Nevadensis*, Kellogg, l. c. ii. 152, f. 45. *C. thyrsiflorus*, var. *macrothyrus*, Torr. Bot. Wilkes Exped. 263. — Kikitat Co., Washington, Suksdorf, to the Yosemite region, California; S. E. Arizona, Smart, Lemmon, Palmer. No characters have as yet been detected by which the specimens from Arizona can be separated, although far out of the usual range of the species.

++ ++ Twigs usually angled, often twisted: leaves evergreen, rather firm or even coriaceous, most of them obscurely if at all 3-nerved: inflorescence lax.

**C. Palmeri**, TRELEASE. Twigs green, glabrous, exceptionally glaucescent, neither rigidly divaricate nor spinose: leaves elliptical or elliptic-lanceolate, rounded or subacute at base, obtuse or emarginate, green, slightly glaucous on the lower surface, firm but rather thin, soon nearly or quite glabrous, 1 to  $1\frac{1}{2}$  inches long, their slender petioles 2 to 4 lines long: inflorescence 2 to 3 or at length 6 inches long, the stout peduncle few-leaved below: flowers white: capsules about 3 lines in diameter, somewhat roughened and narrowly crested. — Proc. Calif. Acad. Sci. ser. 2, i. 109. *C. integerrimus*, Parry, l. c. 172, in part. — San Diego Co., California, about Cuimaca, Palmer, Orcutt, Brandegee.

**C. spinósus**, NUTT. Tall shrub or almost arborescent, with at length cinnamon-brown more or less divaricate sparingly slender-spiny glabrous twigs: leaves elliptical (on vigorous

shoots occasionally ovate, 3-nerved, and serrate or dentate), rounded or subacute at base, very obtuse to emarginate, drying brown above, clear green beneath, coriaceous, soon nearly or quite glabrous, about an inch long, their glabrous or appressed-pubescent petioles 2 to 4 lines long: peduncles 1 to 2 or 3 inches long, from the upper axils, floriferous for nearly their whole length, aggregated into a large thyrus (5 or 6 inches long and half as thick), the upper part of which is quite leafless: flowers pale blue: capsules depressed, about 3 lines in diameter, scarcely lobed, smooth, crestless. — Nutt. in Torr. & Gray, Fl. i. 267; Wats. l. c. 337; Trelease, l. c. 109; Parry, l. c. 172; K. Brandegee, l. c. 185, excl. var. — California, in the Middle Coast Range.

+ 5. Leaves medium-sized or in *C. incanus* rather large, often thick, evergreen, 3-nerved, sparingly serrulate or occasionally entire: inflorescence mostly compound, ample in the first: twigs terete, frequently pruinose, often very divergent and rigid, some of them ending in firm spines.

**C. divaricatus**, Nutt. Tall shrub, almost arborescent, with olive glabrous or variously puberulent mostly very glaucous twigs: leaves ovate, the broader often slightly cordate, obtuse or subacute, glabrous and glaucous to gray-tomentose, the upper surface mostly darker, 4 to 10 lines long, short-petioled: inflorescence glabrate or velvety, mostly narrowly oblong, dense, 2 to 3 inches long: flowers usually pale blue: capsules smooth, 2 to 2½ lines long, not lobed, scarcely crested. — Nutt. in Torr. & Gray, Fl. i. 266, 686; Wats. l. c. 336; Trelease, l. c. 111; Parry, l. c. 168. *C. oliganthus*, var. *hirsutus*, K. Brandegee, l. c. 197, in part. — California, chiefly in the Southern Coast Range. (Lower Calif.) Along water-courses at low altitudes, not forming thickets. The typical form, about Santa Barbara and perhaps in San Diego Co., has the leaves gray-tomentose beneath and with a few marginal serratures. A commoner form, with entire thick mostly glabrous very glaucous leaves and often nearly white flowers, is var. *eglandulosus*, Torr. Pacif. R. Rep. iv. 75 (*C. eglandulosus*, Trelease, l. c. 110; *C. spinosus*, var. *Palmeri*, K. Brandegee, l. c. 185, in large part). The latter form passes to the inconstant var. *grösse-serratus*, Torr. l. c., Trelease, l. c. 111, with rather thick coarsely serrate-dentate leaves, especially on suckers and vigorous shoots, and sometimes deep blue flowers. A few specimens of the species from Tehachapi, with more ample inflorescence than usual and flowers seemingly white, may perhaps be crossed with *C. integerrimus*, and what seems to be a hybrid with *C. spinosus* occurs about Santa Barbara, Hubby, and in the San Bernardino Mts., Parry, Engelmann.

**C. cordulatus**, Kellogg. Low flat-topped shrub, with olive or brownish mostly puberulent somewhat glaucous twigs: leaves elliptical to nearly round, sometimes cordate, very obtuse, mostly denticulate especially near the apex, scarcely 6 lines long, green, or gray-puberulent beneath, the darker upper surface microscopically tomentulose to usually nearly glabrous, the slender closely tomentulose petioles 1 or 2 lines long: inflorescence minutely velvety, about an inch long, rather loose: flowers white: capsules about 2 lines in diameter, soon smooth, slightly crested, evidently lobed at top. — Proc. Calif. Acad. Sci. ii. 124, f. 39; Wats. l. c. 337; Trelease, l. c. 111; Parry, l. c. 168; K. Brandegee, l. c. 187. — S. W. Oregon to S. California, chiefly in the Northern Sierras. (Lower Calif.) In dry soil, often at higher altitudes than the last, forming thickets. Varying in foliage toward *C. incanus*, the more tomentose Oregon specimens, with more elliptical leaves, perhaps separable. Specimens from Mt. Shasta, Brandegee, no. 8, have the fruit somewhat verrucose, as in *C. incanus*.

**C. gláber**, Trelease, n. comb. Small shrub with slender reddish at first sparsely and minutely puberulent rather closely soft-verrucose twigs: leaves broadly ovate, 1 to 1½ inches long, rounded or subcordate at base, very obtuse, the margin serrulate or denticulate, the dull but slightly waxen upper surface drying dark, both faces with a few minute soft hairs: the petioles about 3 lines long: inflorescence sparingly puberulent, 2½ inches long: the rather few flowers white: capsules 2 to 2½ lines in diameter, deeply indented, nearly crestless, smooth. — *C. sorediatus*, var. *glabra*, Wats. Bot. King Exp. 51. *C. cordulatus* × *velutinus*, K. Brandegee, l. c. 188. — East Humboldt Mts. of N. Nevada, Watson, no. 212, and apparently Placer Co., California, Brandegee, no. 9.

**C. incánus**, Torr. & Gray. Tall shrub, with at length olive or reddish puberulent or glabrous very glaucous twigs: leaves because of their size seeming thin for the group, ellip-

tical to ovate, rounded at base and sometimes slightly cuneate along the strong lateral nerves, very obtuse, usually entire or nearly so, microscopically tomentulose to glabrescent and dull above, minutely tomentulose-canescens beneath, 1 to occasionally  $2\frac{1}{2}$  inches long, their slender slightly villous petioles sometimes half inch long: inflorescence finely velvety, the short dense axillary clusters scarcely peduncled and aggregated into a rather dense thyrsus 2 to 3 inches long: flowers white: capsules  $2\frac{1}{2}$  lines in diameter, depressed, verrucosely roughened, shallowly lobed at top. — Fl. i. 265; Wats. l. c. 336; Trelease, l. c. 110; Parry, l. c. 168; K. Brandegee, l. c. 187. — California, in the Middle Coast Range region. In foliage and inflorescence smaller specimens approach *C. cordulatus*, while larger ones recall the thicker-leaved *C. velutinus*.

**C. Féndleri**, GRAY. Low and dense often prostrate shrub, with greenish very canescent sometimes glaucous slender twigs; the spines slender and sharp: leaves elliptical, rounded or subacute at both ends, finely denticulate-serrulate or nearly entire, thin, green and sparingly appressed-silky upon the upper surface, densely but microscopically gray-tomentulose beneath, half inch to occasionally an inch long, their slender petioles 2 or 3 lines long: inflorescence very short, mostly few-flowered: flowers white: capsules 2 lines in diameter, smooth, somewhat acutely keeled at first, scarcely lobed at top. — Pl. Fendl. 29; Wats. l. c. 337; Trelease, l. c. 111; Parry, l. c. 168; K. Brandegee, l. c. 189. — S. Dakota, Bull Springs, *Rydberg*, no. 590, to New Mexico and Arizona. (Northern Mex.) With nearly glabrous green twigs, red spines, and small broad leaves, it is var. *viridis*, Gray in Trelease, l. c. 111, of S. E. Arizona, *Lemmon, Greene, Touney*. With leaves thicker, broadly elliptical, rounded at both ends, finely tomentose on both surfaces and with veins very prominent beneath, it is var. *venosus*, Trelease, n. var., which closely resembles some small-leaved Oregon specimens referred to *C. cordulatus*, and occurs in Texas, Limpia Mts. *Havard*, and Arizona, Ft. Whipple, *Coues & Palmer*, Sta. Catalina Mts., *Lemmon*. (Northern Mex.) Specimens somewhat resembling *C. ovatus* occur in Colorado, *Parry*, 1864, Coal Creek, *Brandegee*, 1881.

— 6. Leaves medium sized or small, firm but rather thin, nearly all 3-nerved; the margin conspicuously glanduliferous rather than toothed: inflorescence subsimple, oblong, moderately large: twigs terete, usually intricately branched and occasionally rigid but scarcely spinose or pruinose.

**C. tomentosus**, PARRY. Medium-sized shrub, with slender gray or reddish at first tomentose mostly densely verrucose twigs: leaves elliptical to usually round-ovate, commonly rounded at base and apex, very conspicuously glanduliferous on the margin, dull microscopically velvety and drying dark on the upper surface, densely brown- or commonly white-tomentose beneath, 4 to 10 lines long (on suckers, and usually in the San Bernardino form, 1 to  $1\frac{1}{2}$  inches long and nearly as wide, and very coarsely dentate), short-petioled: inflorescence loosely tomentose, 1 or 2 inches long; flowers deep blue or exceptionally white: capsules 2 lines in diameter, somewhat depressed, smooth, slightly crested, evidently lobed. — Parry, l. c. 190. *C. oliganthus*, var. *tomentosus*, K. Brandegee, l. c. 198. *C. azareus*, Kellogg, Proc. Calif. Acad. Sci. i. 55. *C. sorediatus*, Trelease, l. c. 111, in part; Parry, l. c. 169. — California, from the Sierras of Amador Co. to San Diego. (Lower Calif.) Apparently uncommon in the middle region.

**C. sorediatus**, HOOK. & ARN. Rather low densely branched shrub, with olive or at length purplish minutely tomentose and somewhat villous sparingly and finely red-warty commonly very rigid twigs: leaves narrowly ovate to elliptic-lanceolate, rounded at base, frequently acute, 4 to 10 lines long; the margin about as in the last; the convex upper surface mostly at first with a few rather short hairs, soon glabrescent, dull but looking as if waxed; lower surface darker green or gray and minutely appressed-silky; the short petioles (like the principal veins beneath) appressed-hairy: inflorescence nearly as in the last or smaller, at first loosely villous: flowers deep blue: capsules globose, 2 lines in diameter, smooth or somewhat wrinkled, neither crested nor deeply lobed. — Bot. Beech. 328; Torr. & Gray, Fl. i. 686, in part; Wats, l. c. 336, in part; Trelease, l. c. 111, in part; Parry, l. c. 189. *C. intricatus*, Parry, l. c. 168. *C. oliganthus*, var. *hirsutus*, K. Brandegee, l. c. 197, in part. — California, Mendocino Co. to Santa Barbara. Somewhat aberrant specimens from San Diego Co., *Orcutt*.

**C. hirsútus**, Nutt. Tall shrub or small tree: twigs olive, gray, or somewhat reddish, irregularly but densely villous, more or less red-verrucose, rather flexible: leaves ovate to broadly elliptical, rounded or the larger cordate at base, obtuse to typically acute, half inch to 2 inches long, rather short-petioled, the upper surface drying darker, conspicuously beset with scattered appressed rather long hairs, the green or occasionally glaucescent lower surface loosely hirsute, especially along the veins: inflorescence loosely puberulent-villous, 1 or 2 inches long, rather loose, subsessile: flowers deep blue to purplish: capsules somewhat depressed,  $2\frac{1}{2}$  to 3 lines in diameter, generally smooth, strongly crested, not conspicuously lobed. — Nutt. in Torr. & Gray, Fl. i. 266; Wats. l. c. 336, in part; Trelease, l. c. 111, in part; Parry, l. c. 169. *C. oliganthus*, Nutt. l. c. 266; K. Brandegee, l. c. 196, in part. — Coast Range of Central California. The narrower-leaved form, which often has a smaller inflorescence, is *C. oliganthus*, Nutt., which can hardly be separated. The species appears to hybridize with *C. spinosus* and the preceding species.

**Var. Orcúttii**, TRELEASE, n. comb. Flowers paler blue: fruit strongly rugose and loosely villous: otherwise like the type. — *C. Orcuttii*, Parry, Proc. Davenp. Acad. v. 193. *C. oliganthus*, K. Brandegee, l. c. 196, in part. — San Diego Co., California, *Orcutt*, Brandegee.

+ 7. Leaves medium-sized or small, mostly thin, not 3-nerved or some of them with a pair of strong sub-basal lateral veins; the flat margin minutely glanduliferous: inflorescence as in the preceding group, but rather smaller, sometimes subglobose: flowers deep blue: twigs terete, not spiny, pruinose in only one species.

**C. diversifólius**, KELLOGG. Low and trailing, with green to reddish flexible irregularly very villous sparingly verrucose twigs: leaves thin and flexible, broadly elliptical, rounded or mostly acute at base, obtuse or subacute, with the pubescence of the last on the upper surface, but pale, often whitened and more or less loosely tomentose-villous beneath, short-petioled,  $\frac{1}{2}$  to  $1\frac{1}{2}$  inches long, commonly (as in others of this section) with axillary fascicles of smaller size: inflorescence about half inch long, elongating in fruit, with a peduncle of thrice its length: capsules slightly pyriform, 2 lines in diameter, very smooth, somewhat evanescently crested, slightly lobed. — Proc. Calif. Acad. Sci. i. 58; K. Brandegee, l. c. 200. *C. hirsutus*, Trelease, l. c. 111, in part. *C. decumbens*, Wats. Proc. Am. Acad. x. 335; Trelease, l. c. 112; Parry, l. c. 168. — California, Sierras of the Yosemite region.

**C. Lemmóni**, PARRY. Low, spreading, but not decumbent, with gray or buff pruinose at first tomentose slightly verrucose rigid twigs: leaves thicker, firm, elliptical, rounded or subacute at both ends, 3 to 10 lines long, very short-petioled, finely appressed-pubescent to nearly glabrous and dull waxy above, the lighter green to glaucous loosely villous lower surface at length prominently reticulated: inflorescence about as in the last, but often shorter-peduncled, exceptionally 3 inches long and somewhat thyrsoid: capsules as in the last, but more strongly crested. — Proc. Davenp. Acad. v. 192. *C. diversifolius*, var. *foliosus*, K. Brandegee, l. c. 201, in part. *C. decumbens*, of other writers, in part. — N. Central California, Lake and Butte Counties, &c.

**C. foliósus**, PARRY. Rather low densely branched shrub: twigs greenish, gray, or reddish, slender but rather rigid, at first velvety or villous and mostly little verrucose: leaves thin but rather firm, broadly elliptical, 2 to 6 (or the primary 10) lines long, mostly acute at base, with obtuse or occasionally acute apex, on the darker upper surface with finer appressed pubescence than in the last or glabrescent, appearing as if waxed, paler and often glaucous beneath, with a few appressed coarse hairs along the veins: inflorescence scarcely half inch long, becoming twice that length, little surpassed by the loosely villous peduncles: capsules depressed, scarcely 2 lines in diameter, smooth, rather strongly crested, conspicuously lobed. — Proc. Davenp. Acad. v. 172; Davy, Gard. Chron. ser. 3, xx. 363. *C. diversifolius*, var. *foliosus*, K. Brandegee, l. c. 201, excl. syn. *C. dentatus*, Trelease, l. c. 112, in part. — California, from the vicinity of San Francisco to Mendocino Co. What seems to be this species also from Cuimaca, Parish, no. 423.

+ 8. Leaves medium-sized or small, firm, usually not 3-nerved; the upper surface strongly glandular-papillate throughout or near the revolute glanduliferous margin: inflorescence and twigs about as in the preceding group: flowers deep blue or exceptionally varying to white.

- C. dentatus**, TORR. & GRAY. Rather low densely branched shrub, with gray or red-brown at first very villous-tomentose slightly verrucose rigid twigs: leaves elliptical, rounded at both ends, or appearing retuse from the infolding of the apex, 2 to 6 lines long, papillate only on and near the margin; the darker waxy upper surface loosely hairy, lighter and coarsely spreading-hairy beneath: inflorescence subglobose, very tomentose; the peduncle with reduced leaves: capsules globose or somewhat depressed, 2 lines in diameter, smooth, slightly crested, scarcely lobed. — Fl. i. 268; Planch. Fl. Serres, vi. 103, t. 567, f. 2; Morren, Belg. Hort. iii. 101, t. 16, f. 2; Torr. Bot. Mex. Bound. 46, t. 10; Trelease, l. c. 112, in part; Parry, l. c. 190; K. Brandegee, l. c. 202. *C. papillosus*, var. *dentatus*, Parry, l. c. 170. — California, in the Santa Cruz Coast Range. With very numerous and dense scarcely peduncled flower-clusters, it is var. *FLORIBUNDUS*, Trelease, n. comb.; *C. floribundus*, Hook. Bot. Mag. t. 4806, Lem. Ill. Hort. vii. t. 238, which has been regarded as a hybrid with *C. thyrsiflorus*. With nearly round leaves having the veins deeply impressed on the upper surface, it is var. *IMPRÉSSUS*, Trelease, n. comb.; *C. impressus*, Trelease, Proc. Calif. Acad. Sci. ser. 2, i. 112; from Sta. Barbara County, Sta. Barbara, Miss Plummer, Sta. Maria, Jared.
- C. papillosus**, TORR. & GRAY. Habit of the last, with at first densely yellowish villous-tomentose slightly verrucose twigs: leaves elliptical to narrowly oblong, rounded or slightly cordate at base, from 2 inches to more commonly 1 inch or less long (then short-petioled); the dark waxy upper surface slightly villous and irregularly and rather closely glandular-papillate, like the margin; the paler lower surface loosely and densely villous: inflorescence more oblong, about 1 inch long, very villous, the peduncles of like length: capsules as in the last, rather less than 2 lines in diameter. — Fl. i. 268; Hook. Ic. t. 272, & Bot. Mag. t. 4815; Planch. Fl. Serres, vi. 103, t. 567, f. 1; Paxt. Fl. Gard. i. 74, f. 50, & Baines ed. i. 70, f. 48; Morren, Belg. Hort. iii. 101, t. 16, f. 1; Trelease, l. c. 112; Parry, l. c. 170, excl. vars. *C. dentatus*, var. *papillosus*, K. Brandegee, l. c. 203. — California, Santa Cruz Mts. Too near the last in some forms, but typically very distinct. It appears to hybridize with *C. thyrsiflorus*.
- + 9. Leaves medium-sized, 3-nerved (the lateral nerves sometimes closely marginal and then concealed), finely toothed, more or less revolute; the surface not papillate: inflorescence ample, forming a compound thyrus: flowers deep blue: twigs strongly angled, neither rigidly divaricate, spinose, nor pruinose.
- C. Parryi**, TRELEASE. Rather large spreading shrub, with green or red-brown at first loosely and softly tomentose rather abundantly verrucose twigs: leaves elliptical, or the largest occasionally somewhat ovate, rounded at base, obtuse, glabrous above, lighter green and densely cobwebby beneath, half inch to 2 inches long, on short cobwebby petioles: inflorescence rather narrow, 3 or 4 inches long; the few-leaved peduncles of like length: capsules globose, 2 lines in diameter, sometimes slightly crested and wrinkled. — Proc. Calif. Acad. Sci. ser. 2, i. 109; Parry, l. c. 170; Davy, Gard. Chron. ser. 3, xx. 363. *C. integerrimus*, var. *Parryi*, K. Brandegee, l. c. 183. — California, Napa and Sonoma Counties. Also in herb. Gray, as from Humboldt Co., Bolander, no. 6572, bis.
- C. thyrsiflorus**, ESCHS. From a small prostrate shrub in exposed places becoming a small tree with green or at length deep brown nearly glabrous scarcely verrucose twigs: leaves elliptical, acute at base, obtuse, glabrous except for a few appressed rather coarse hairs along the very prominent veins beneath, drying brown, about an inch long, on short hairy petioles: inflorescence mostly about 3 inches long, oblong, at length usually thyrusoid, mostly long-peduncled with leaves subtending one or two of the lower fascicles, somewhat loosely hairy to nearly glabrous: flowers varying to white: capsules globose, 2 lines in diameter, smooth, not crested, little lobed. — Mém. Acad. St. Pétersb. ser. 6, x. 285; Lindl. Bot. Reg. xxx. t. 38; Nutt. Sylv. ii. 44, t. 57; Wats. l. c. 334; Trelease, l. c. 108; Parry, l. c. 170; K. Brandegee, l. c. 191; Davy, Gard. Chron. ser. 3, xx. 363, f. 65. *C. bicolor*, Raf. New Fl. Am. iii. 57. ? *C. elegans*, Lem. Ill. Hort. vii. t. 268. — Near the coast, Oregon, Curry Co., Howell, to California, Monterey Bay. Hybridizing with *C. dentatus*? (= *C. Lobbianus*, Hook. Bot. Mag. t. 4810, or by error 4811, Planch. Fl. Serres, x. 125, t. 1016), *C. papillosus*, *C. sordidatus*, *C. foliosus*, and possibly *C. rigidus* (= *C. Veitchianus*, Hook. Bot. Mag. t. 5127, known only in cultivation).
- Var. griseus**, TRELEASE, n. var. Leaves more broadly ovate, about an inch long and

three fourths as wide, revolutely dentate, microscopically gray-tomentulose beneath: otherwise scarcely separable from the type. — California, apparently confined to the vicinity of Monterey.

\* \* Leaves opposite and pungently toothed in many species; stipule-bases persistent, thick and corky or spongy: fruit frequently with strong horns as well as crests: flowers in compact umbels, usually little surpassing the leaves. — *Cerastes*.

+ Leaves alternate (exceptionally a few in pairs in the first): flowers white: capsules globose or depressed.

**C. macrocárpus**, NUTT. Rather large shrub, with reddish or gray at first appressed-pubescent rather loose and flexuous twigs: leaves spatulate or obovate, cuneate, obtuse to emarginate, glabrous and dull above, microscopically canescent beneath, 6 to 9 lines long or exceptionally somewhat larger, short-petioled, the slightly revolute margin entire or exceptionally a little denticulate: capsules 4 to 6 lines in diameter, laterally horned, the apical crests very low, scarcely lobed. — Nutt. in Torr. & Gray, Fl. i. 267; Greene, Bull. Calif. Acad. Sci. i. 80; Trelease, l. c. 114. *C. megacarpus*, Nutt. Sylv. ii. 46; Parry, l. c. 174. *C. cuneatus*, Wats. l. c. 338, in part. *C. cuneatus*, var. *macrocarpus*, K. Brandegee, l. c. 205. — California, about Sta. Barbara and Monterey and on the islands of Sta. Cruz, Greene, with nearly hornless fruit, and Sta. Catalina, Brandegee, with variable phyllotaxis.

**C. verrucósus**, NUTT. Rather low shrub, with gray or brown glabrate to loosely dingy-tomentose slender twigs: leaves round-obovate, cuneate or rounded at base, obtuse to mostly deeply oboordate, usually denticulate along the sides, nearly glabrous, 2 to 6 lines long, very short-petioled; stipules horizontal, at length very large and wart-like: capsules about 3 lines in diameter, neither crested nor horned, scarcely lobed. — Nutt. in Torr. & Gray, Fl. i. 267; Greene, l. c. 81; Trelease, l. c. 114, 117; Parry, l. c. 174; K. Brandegee, l. c. 206. *C. rigidus*, Torr. Bot. Mex. Bound. t. 9. — California, Sta. Barbara, Nuttall in herb. Gray, and San Diego Counties, apparently not recently collected north of San Diego Co. (Lower Calif.)

+ + Leaves opposite.

+ + Flowers white: erect or spreading rigidly branched shrubs, with entire or nearly entire leaves except in the last two species and in hybrids.

**C. cuneátus**, NUTT. At length a tall rigidly much branched shrub, with usually gray minutely tomentulose twigs: leaves spatulate to obovate-cuneate, mostly obtuse, entire, microscopically tomentulose beneath, 3 to 10 lines long, extremely short-stalked: capsules slightly oblong, 2½ lines in diameter, with three conspicuous erect horns near the top. — Nutt. in Torr. & Gray, Fl. i. 267; Jour. Hort. Soc. Lond. vi. 220, fig.; Morren, Belg. Hort. viii. 170, t. 44; Wats. Bibl. Index, 164, in part; Trelease, l. c. 113; Parry, l. c. 174; K. Brandegee, l. c. 204. — Oregon, Nuttall, Howell, through California. (Lower Calif., Pringle.) Leaves occur rarely as much as 1 inch wide, and on suckers they sometimes show a few teeth. Appears to hybridize with *C. crassifolius* (? = *C. vestitus*, Greene, Pittonia, ii. 101), *C. prostratus* (when nearer *C. cuneatus*, = *C. connivens*, Greene, Pittonia, ii. 16, when nearer *C. prostratus* = *C. pumilus*, Greene, Erythea, i. 149), *C. rigidus* (= *C. cuneatus*, var. *ramulosus*, Greene, Man. Bay-Reg. 77), and *C. pinetorum*.

**C. Gréggii**, GRAY. Low intricately and rigidly much branched shrub: twigs with olive, gray, or occasionally brown, at first closely gray- or rusty-tomentose: leaves elliptical, mostly acute at both ends, often with one or two small teeth on each side, 3 to 5 lines long, very short-petioled; the lower surface sometimes concealed by tomentum: capsules slightly oblong, 2 lines in diameter, small-horned from about the middle. — Pl. Wright. ii. 28; Wats. Proc. Am. Acad. x. 338; Trelease, l. c. 113; Parry, l. c. 174. *C. verrucosus*, var. *Greggii*, K. Brandegee, l. c. 208. — S. Utah, Palmer, Bishop, to W. Texas, Wright, Thurber, Havard. (Mex., where it passes into a form with more spatulate larger leaves very white-tomentose beneath.)

**C. crassifólius**, TORR. Tall shrub, with gray or brown white- or rusty-tomentose twigs: leaves thick, elliptic-obovate, cuneate or rounded at base, obtuse, somewhat revolute, pungently dentate, half inch to somewhat over an inch long; the upper surface minutely roughened, at length glabrous and green, the lower surface densely tomentose; the stout petioles



2 lines long; stipules very large: capsules subglobose, 4 lines in diameter, with thick exocarp and three stout suberect horns near the top. — Pacif. R. Rep. iv. 75, & Bot. Mex. Bound. 46, t. 11; Wats. l. c. 338; Trelease, l. c. 113; Parry, l. c. 173. *C. verrucosus*, var. *crassifolius*, K. Brandegee, l. c. 208. — California, in the Middle and Southern Coast Range.

- C. perpléxans**, TRELEASE, n. sp. Related to the preceding; the gray or red twigs closely tomentose, becoming glabrous and glossy: leaves very thick, subelliptical, mostly acute, not revolute, entire or mostly pungently low-toothed, from minutely gray-velvety on both sides becoming nearly glabrous, 6 to 12 lines long, the upper surface frequently concave; the stout petioles 2 lines long: capsules globose, about 3 lines in diameter, with thin smooth flesh, the three small dorsal horns spreading. — S. W. California; Arizona, Yampai Valley, Bigelow. (Lower Calif. and Guadalupe Isl.)

++ ++ Flowers blue or purple, only exceptionally white: leaves toothed, at least near the apex.

- C. rigidus**, NUTT. Medium-sized rigidly intricate shrub, with green or brownish at first loosely tomentose 2-lined twigs: leaves firm but rather thin, obovate, cuneate, obtuse to obcordate, 2 to 6 lines long, nearly sessile, the upper half finely dentate, soon nearly glabrous on both sides, the lower surface little paler: capsules nearly as in *C. cuneatus* but a little larger. — Nutt. in Torr. & Gray, Fl. i. 268; Jour. Hort. Soc. Lond. v. 197, fig.; Hook. Bot. Mag. t. 4664; Paxt. Fl. Gard. i. 74, f. 51, & Baines ed. i. 70, f. 49; Morren, Belg. Hort. iii. 102, t. 16, f. 3-5; Wats. l. c. 339, in part; Trelease, l. c. 113; Parry, l. c. 173. *C. verrucosus*, Hook. Bot. Mag. t. 4660. *C. verrucosus*, var. *rigidus*, K. Brandegee, l. c. 207. — California, from above San Francisco to Monterey. In shape and size of leaves very similar to *C. verrucosus*.

**Var. grandifolius**, TORR. Leaves from thick to quite thin, at length glabrate on both sides becoming an inch or more long: capsules globose, about 3 lines in diameter, with three stout somewhat dorsal horns. — Pacif. R. Rep. iv. 75; Trelease, l. c. 113. *C. crassifolius*, var. *glabratus*, Gray in Bolander, Cat. 8. *C. verrucosus*, var. *grandifolius*, K. Brandegee, l. c. 207. — California, Mendocino Co., Bolander, no. 4713, Brandegee, no. 82, Bigelow.

- C. pinetorum**, COVILLE. Low but erect densely branched shrub: twigs gray, brown, or reddish, stout, divaricate, at first appressed-puberulent: leaves elliptical, very thick, abrupt at both ends, often folded along the midrib or crisped, soon glabrescent except between the veins beneath, 6 to 8 lines long, very short-petioled, the margin somewhat revolute, coarsely pungently dentate, like holly leaves: flowers often white: capsules oblong, 3 to 4 lines in diameter, with strong suberect horns near the apex and low intermediate crests. — Contrib. U. S. Nat. Herb. iv. 80. *C. prostratus*, var. *pinetorum*, K. Brandegee, l. c. 211. *C. Jepsonii*, Greene, Man. Bay-Reg. 78. — California, from Lake Co. to Mt. Tamalpais and Tulare Co. (the original locality).

- C. prostratus**, BENTH. Procumbent and rooting, with somewhat compressed frequently bright red at first often appressed-hairy twigs: leaves thick and firm, obovate or spatulate, cuneate, flat or sometimes revolute, pungently several-toothed above, one to three of the teeth mostly apical, at first often minutely silky, about half inch long, short-petioled: flowers blue: capsules slightly elongated, 3 or 4 lines in diameter, with thick often red flesh, three large wrinkled horns somewhat spreading from near the apex, and low intermediate crests. — Pl. Hartw. 302; Wats. l. c. 339, in part; Trelease, l. c. 113, 116, in part; Parry, l. c. 173; K. Brandegee, l. c. 209. — Klikitat Co., Washington; Humboldt Co. and the Sierra region of California, and W. Nevada, Carson, Anderson, Washoe Mts., Watson. *C. rugosus*, Greene, Fl. Francis. 88, from near Truckee, Calif., has been held to be a hybrid of which this species or *C. cuneatus* is one parent, and *C. velutinus* the other.

**Var. divérgens**, K. BRANDEGEE. Low spreading or scrambling shrub, with at first tomentose slender but rigid twigs: leaves obovate-spatulate, very thick, cuneate, somewhat revolute and crisped, pungently dentate, more or less persistently loosely white-hairy, about half inch long, nearly sessile: capsules rounder than in the type, about 3 lines in diameter, with smaller more lateral horns. — Proc. Calif. Acad. Sci. ser. 2, iv. 210. *C. divergens*, Parry, l. c. 173. — California, Napa to Santa Cruz Counties.

10. **COLUBRÍNA**, Rich. (Name from Latin *Coluber*, a serpent, the application uncertain.) — Shrubs or trees with often rigidly divaricate but scarcely spiny twigs, alternate entire or denticulate pinnately veined or 3-nerved small to ample leaves (frequently glanduliferous beneath and with mostly small stipules), and tomentose inconspicuous flowers in sessile or pedunculate axillary umbels. — Rich. in Brongn. Mém. Rhamn. 61, & Ann. Sci. Nat. x. 368; Benth. & Hook. Gen. i. 379; Grisebach, Fl. W. Ind. 100; Baill. Hist. Pl. vi. 77; Trelease, Trans. St. Louis Acad. v. 361, 368; Sargent, Silv. ii. 47; Weberbauer in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 415. — Warmer American region; one species tropical in the Old World.

\* Leaves medium-sized or usually rather small, some of them denticulate: common peduncle very short or wanting: calyx-segments tardily and incompletely deciduous: fruit short-beaked by the persistent style.

**C. Texénsis**, GRAY. Large shrub: branches mostly rigidly divaricate, zigzag, terete, gray-tomentose or glabrescent and whitened: leaves elliptical to spatulate-obovate, cuneate to rounded at base, obtuse, acute or mucronate, often 3-nerved, glabrescent, scarcely an inch long; their petioles about 2 lines long: fruit 4 lines in diameter, often solitary, on mostly reflexed pedicels of about the same length. — Pl. Lindh. pt. 2, 169, & Pl. Wright. i. 33; Torr. Bot. Mex. Bound. 47; Trelease, l. c. 368. *Rhamnus*? *Texensis*, Torr. & Gray, Fl. i. 263. *R. Drummondii*, Young, Fl. Tex. 204. — Central Texas and southward. (Mex.)

\* \* Leaves ample, entire, elliptical to ovate-lanceolate: common peduncle evident: calyx-segments soon falling: styles deciduous at base.

**C. ferruginósa**, BRONGN. Scarcely arborescent, at first densely red-tomentose: twigs lax, nearly terete, gray to reddish brown: leaves firm, more or less 3-nerved near the margin, somewhat glossy above, 1 or 2 to at length 4 or 5 inches long: the lower surface more persistently red-hairy and with a submarginal series of smooth glands, and frequently several additional glandular spots: cymes densely red-tomentose even in fruit: capsules 2 to 4 lines in diameter, little grooved, more clustered than in our other species; pedicels rather stout, the longer becoming 4 or 5 lines in length. — Mém. Rhamn. 62, t. 4, f. 3, & Ann. Sci. Nat. x. 369; Griseb. Fl. W. Ind. 100; Trelease, l. c. 369. *C. ferruginea*, Brongn. Mém. Rhamn. 77, & Ann. Sc. Nat. x. 384 (by error). *C. Americana*, Nutt. Sylv. ii. 47, t. 58; Chapm. Fl. 74. *Rhamnus colubrinus*, Jacq. Hort. Vind. iii. t. 50. *R. ferrugineus*, Nutt. Jour. Acad. Philad. vii. 90; Torr. & Gray, Fl. i. 263. *Ceanothus colubrinus*, Lam. III. ii. 90. *Perfonon*? *ferrugineum*, Raf. Sylv. Tellur. 29. *Marcorella colubrina*, Raf. l. c. 31. — S. Florida and Florida Keys. (W. Ind.)

**C. reclináta**, BRONGN. A large tree, the old trunks deeply fissured: twigs slender, sulcate, soon glabrous: leaves not at all 3-nerved, thinner, glabrate, not rusty, scarcely 3 inches long, with a few submarginal glands beneath: inflorescence becoming glabrous: fruit about as in the last. — Mém. Rhamn. 62, & Ann. Sci. Nat. x. 369; Griseb. Fl. W. Ind. 101; Eggers, Bull. U. S. Nat. Mus. no. 13, 40; Trelease, l. c. 368; Sargent, Silv. ii. 49, t. 66. *Ceanothus reclinatus*, L'Her. Ser. 6. *Rhamnus elliptica*, Ait. Kew. i. 265; Swartz, Prodr. 50. *Zizyphus Domingensis*, Nouv. Duham. iii. 56. *Diplisca elliptica*, Raf. l. c. — S. Florida and Florida Keys. (W. Ind.)

11. **ADÓLPHIA**, Meisn. (Named for *Adolphe Brongniart*, a French botanist of the early half of the century, and monographer of the order.) — Shrubs with divaricate spine-tipped opposite twigs articulated with the stem, small mostly caducous leaves, and inconspicuous flowers in sparse axillary clusters. — Gen. i. 70, ii. 50; Benth. & Hook. Gen. i. 384; Baill. Hist. Pl. vi. 90; Trelease, Trans. St. Louis Acad. v. 361, 369; Weberbauer in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 423. — Of the warmer American region; perhaps scarcely separable from *Colletia*.

**A. infesta**, MEISN. Mostly puberulent or somewhat retrorsely short-villous, 3 to 5 feet high: branchlets all spinose, short, nearly straight, spreading nearly at right angles, 4-ranked or distichous; leaves 1 to 5 lines long, 1-nerved, lanceolate or oblong, acute or obtuse and mucronate, entire or low-serrate: fruiting pedicels rather stout, 2 lines long: capsule 2 lines in diameter, globose, deeply 3-grooved, crowned by a short beak (half line long) formed of the base of the style. — Gen. ii. 50; Wats. Proc. Am. Acad. xi. 126; Brew. & Wats. Bot. Calif. i. 101; Gray, Pl. Wright. i. 34, ii. 28; Trelease, l. c. 369. *Ceanothus infestus*, HBK. Nov. Gen. & Spec. vii. 61, t. 614. *Colletia infesta*, Brongn. Mém. Rhamn. 59, & Ann. Sci. Nat. x. 366. *C. (?) multiflora*, DC. Prodr. ii. 29. *C. ? disperma*, DC. Prodr. ii. 29. *Colubrina infesta*, Schlecht. Linnæa, xv. 468. — W. Texas. (Mex.)

**A. Califórnica**, WATSON. Lower: branchlets often curved, less spinose, the lateral spines shorter: leaves broadly spatulate to obovate, mostly mucronate and entire, 1 or 2 lines long: style deciduous close to the fruit: otherwise similar to the preceding. — Proc. Am. Acad. xi. 126; Brew. & Wats. Bot. Calif. i. 101; Trelease, l. c. 369. — San Diego County, California. (Lower Calif.)

**12. GOUÁNIA**, Jacq. (Named for *Antoine Gouan*, professor of botany at Montpellier in the latter part of the last century.) — Shrubs or trees, often climbing by prehensile spreading twigs, and with alternate coarsely glandular-serrate often 3-nerved ample leaves with small stipules, and small flowers loosely fasciated along the slender naked ends of the branches. — Stirp. Am. 263; L. Gen. ed. 6, no. 1157; Brongn. Mém. Rhamn. 71, & Ann. Sci. Nat. x. 378; Benth. & Hook. Gen. i. 385; Baill. Hist. Pl. vi. 83; Trelease, Trans. St. Louis Acad. v. 361, 369; Weberbauer in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 425. — Chiefly of the tropical American region.

**G. Domingénsis**, L. Twigs angled, loosely hairy to glabrate: leaves elliptic-ovate, acute to subcordate at base, acuminate, 1 to 3 inches long, glabrescent or persistently hairy along the veins, the coarse teeth commonly ending in cup-shaped glands: inflorescence short-villous rather than tomentose: fruit glabrous, 3 lines long and 4 broad, notched at top and bottom. — Spec. ed. 2, ii. 1663; DC. Prodr. ii. 39; Brongn. Mém. Rhamn. 73; Griseb. Fl. W. Ind. 101; Chapm. Fl. 75; Trelease, l. c. 369; Weberbauer, l. c. 425, f. 208. — S. Florida and Florida Keys. (W. Ind., Mex.)

## ORDER XLIII. VITACEÆ.

By L. H. BAILEY.<sup>1</sup>

Alternate-leaved woody plants with acidulous watery juice, climbing by tendrils opposite the leaves (the stem being sympodial) or rarely wanting tendrils and erect. Base of petiole enlarged and articulated at insertion, commonly more or less stipulate. Flowers small, paniculate-cymose, commonly polygamous, 4–5-merous, with short hypogynous and scarcely lobed calyx. Petals valvate in the bud and deciduous. Hypogynous stamens as many as petals and opposite them. Ovary usually girt with or its base adnate to a nectariferous disk or with glands alternate with the stamens, 2-celled, with a pair of collateral anatropous ovules erect from the base of each cell; style terminal; undivided, or hardly any, and stigma depressed. Fruit a berry, containing 1 to 4 bony seeds; embryo

<sup>1</sup> Ordinal and technical generic characters by A. Gray.

minute, at the base of very hard albumen. (Characterized without reference to *Leea*, which makes a transition to *Meliaceæ*.)

\* Nectariferous disk or glands surrounding the ovary or its base, and at least partly free from it: plants climbing by the prehension and coiling of naked-tipped tendrils.

1. **VITIS.** Flowers polygamo-dioecious (i. e. some individuals perfect and fertile, others sterile with at most rudimentary ovary), 5-merous. Corolla calyptrately caducous, the petals in anthesis cast off from the base while cohering by their tips. Hypogynous disk of 5 nectariferous glands alternate with stamens. Style short and thick, or conical. Berry pulpy; seeds pyriform, with contracted beak-like base. Leaves simple in ours.

2. **CISSUS.** Flowers perfect or sometimes polygamous, 4-merous or several 5-merous. Petals expanding in anthesis. Disk annular or cupular, girding the base of the ovary and below adherent to it, the margins or summit free. Berry inedible, mostly with scanty pulp; seeds usually obovate-trigonus. Leaves simple or ternately compound.

\* \* No distinct disk or free nectariferous glands, but a nectariferous and wholly confluent thickening of the base of the ovary, or even this obsolete: plants climbing, mostly by adhesion of dilated and disciform tips of the tendril-branches.

3. **AMPELOPSIS.** Flowers perfect or rarely sub-polygamous, 5-merous. Petals expanding in anthesis. Seeds trigonus-obovate, beakless. Leaves palmately compound.

1. **VÍTIS**, Tourn. VINE, GRAPE-VINE. (The classical Latin name.) — A widespread genus in the North Temperate Zone, richest in species in North America. The species undergo marked adaptations to local conditions, and several of them hybridize freely, so that the study of them is perplexing; and the difficulty is increased by the fact that the foliage varies in character on different parts of the plant, and herbarium material cannot properly represent the fruit. The large viticultural interests of North America, outside of the hot-houses and the Pacific Slope and Mexico, have been developed within the century from the native species of grapes (chiefly *Vitis Labrusca* and *V. æstivalis*) and their hybrids with the Old World wine-grape (*Vitis vinifera*). The last is almost exclusively grown in California, and is sometimes inclined to be spontaneous. It has rounded and thinnish notched and more or less lobed leaves which are either glabrous or arachnoid-tomentose beneath, intermittent tendrils, and pulp of the fruit cohering with the skin. — Inst. 613; L. Gen. no. 161; DC. Prodr. i. 633; Torr. & Gray, Fl. i. 242; Gray, Gen. Ill. ii. 163; Planch. in DC. Monogr. Phaner. v. 321.

§ 1. **MUSCADÍNIA**, Planch. l. c. 324. Bark bearing prominent lenticels, never shredding: nodes without diaphragms: tendrils simple: flower-clusters small and not much elongated: seeds oval or oblong, without a distinct stipe-like beak. — *Puncticulosis*, Munson, Wild Grapes N. A. 8, 14.

**V. rotundifolia**, Michx. (MUSCADINE, SOUTHERN FOX GRAPE, BULLACE or BULLIT or BULL GRAPE.) Vine with hard warty wood, running rampantly even 60 to 100 feet over bushes and trees, and in the shade often sending down dichotomous aerial roots: leaves rather small to medium (2 to 6 inches long), dense in texture and glabrous both sides (sometimes pubescent along the veins beneath), cordate-ovate and not lobed, mostly with a prominent and sometimes an acuminate point (but somewhat contracted above the termination of the two main side veins), the under surface finely reticulated between the veins, the teeth and the apex angular, coarse and acute, the basal sinus shallow, broad and edentate; petiole slender and (like the young growth) fine-scurfy, about the length of the leaf-blade: tendrils (or flower-clusters) discontinuous, every third node being bare; fruit-bearing clusters

smaller than the sterile ones, and ripening from 3 to 20 grapes in a nearly globular bunch; berries falling from the cluster when ripe, spherical or nearly so and large (half inch to inch in diameter), with very thick and tough skin and a tough musky flesh, dull purple in color without bloom (in the Scuppernong variety silvery amber-green), ripe in summer and early autumn; seeds  $\frac{1}{4}$  to  $\frac{3}{8}$  inch long, shaped something like a coffee berry. — Fl. ii. 231; Millardet, Vignes Am. 233; Planch. l. c. 362; Munson, Trans. Am. Hort. Soc. iii. 138, Proc. Am. Pom. Soc. xx. 97, Wild Grapes N. A. 14, Gard. & For. iii. 474, Am. Gard. xii. 661, & Rev. Vit. vi. 425, f. 64, 65; Britton in Bailey, Am. Gard. xiv. 353; Foëx, Vitic. 29; Viala & Ravaz, Vignes Am. 47. *V. taurina*, Bartram, Med. Rep. hex. 2, i. 22. *V. vulpina*, Am. Auth.; Torr. & Gray, Fl. i. 245; Engelm. Bushberg Cat. ed. 3, 19; not L. *V. vulpina*, var. *rotundifolia*, Regel, Act. Hort. Petrop. ii. 394. *V. muscadina*, *angulata*, *verrucosa*, *peltata*, & *Floridana*, Raf. Am. Man. Grape Vines, 16, 17, are evidently (from the very poor descriptions) only forms of this species. — River banks, swamps, and rich woodlands and thickets, S. Delaware, *Commons*, to N. Florida and west to Kansas and Texas.

**V. Munsoniána**, SIMPSON. (MUSTANG GRAPE of Florida, BIRD or EVERBEARING GRAPE.) Very slender grower, preferring to run on the ground or over low bushes, more nearly evergreen than the last, flowering more or less continuously: leaves smaller, thinner, and more shining, more nearly circular in outline and less prominently pointed; the teeth broader in proportion to the blade and more open or spreading: clusters larger and more thyrs-like; berries a half smaller than in the last and often more numerous, shining black, with a more tender pulp, acid juice, no muskiness, and thinner skin; seeds half smaller than in the last. — J. H. Simpson in Munson, Addr. on Am. Grapes, Lansing, 1886, 5 (being a reprint and revision of a paper in Proc. Am. Pom. Soc. xx., in which this grape is referred to *V. Floridana*, Raf.); Munson, Proc. Soc. Prom. Agr. Sci. 1887, 59, Wild Grapes N. A. 14, Gard. & For. iii. 475, Am. Gard. xii. 661, & Rev. Vit. vi. 427; Planch. l. c. 615; Foëx, Vitic. 30. — Dry woods and sands, Florida, at Jacksonville, Lake City, and southwards, apparently the only grape on the reef keys. (Also in the Bahamas.) Difficult to distinguish from *V. rotundifolia* in herbarium specimens, but distinct in the field.

§ 2. ΕΥΨΥΤΙΣ, Planch. Bark without distinct lenticels, on the old wood separating in long thin strips and fibres: nodes provided with diaphragms: tendrils forked; flower-clusters mostly large and elongated: seeds pyriform. — Vignes Am. 102, & in DC. Monogr. Phaner. v. 322.

\* GREEN-LEAVED GRAPES, mostly marked at maturity by absence of prominent white, rusty, or blue tomentum or scurf or conspicuous bloom on the leaves beneath (under surface sometimes thinly pubescent, or minute patches of floccose wool in the axils of the veins, or perhaps even cobwebby); the foliage mostly thin: tendrils intermittent, i. e., every third joint bearing no tendrils (or inflorescence). *V. cinerea* and *V. Arizona* are partial exceptions and might be looked for in \* \*.

+ *Vulpina*-like grapes, characterized by thin light or bright green mostly glossy leaves (which are generally glabrous below at maturity save perhaps in the axils of the veins and in *V. Champini*) with a long or at least a prominent point and usually long and large sharp teeth or the edges even jagged.

++ Leaves broader than long, with truncate-oblique base (*V. Treleasei* might be sought here).

**V. rupéstris**, SCHEELÉ. (SAND, SUGAR, ROCK, BUSH, or MOUNTAIN GRAPE.) Shrub 2 to 6 feet high, or sometimes slightly climbing, the tendrils few or even none, diaphragms plane and rather thin: leaves reniform to reniform-ovate (about 3 to 4 inches wide and two thirds as high), rather thick, smooth and glabrous on both surfaces at maturity, marked by a characteristic light glaucescent tint, the sides turned up so as to expose much of the under surface, the base only rarely cut into a well marked sinus, the margins very coarsely angle-toothed, the boldly rounded top bearing a short abrupt point and sometimes two lateral teeth enlarged and suggesting lobes: stamens in fertile flowers recurved laterally or rarely ascending, those in the sterile flowers ascending: cluster small, slender, open and branched; berries small ( $\frac{1}{4}$  to  $\frac{1}{2}$  inch in diameter), purple-black and somewhat glaucous, pleasant-tasted, ripe in late summer; seeds small and broad. — Linnaea, xxi. 591; Planch. in DC. Monogr. Phaner. v. 346; Millardet, Vignes Am. 179, t. 18, 22; Engelm. Bushberg

Cat. ed. 3, 18; Munson, Trans. Am. Hort. Soc. iii. 132, Proc. Am. Pom. Soc. xx. 97, Wild Grapes N. A. 9, Gard. & For. iii. 474, Am. Gard. xii. 659, & Rev. Vit. iii. 159; Foëx, Vitic. 45; Viala & Ravaz, Vignes Am. 102. — Sandy banks, low hills and mountains, District of Columbia and S. Pennsylvania to Tennessee, Missouri, and S. W. Texas.

**Var. dissécta**, EGGER, in herb., is a form with more ovate leaves and very long teeth, and a strong tendency towards irregular lobing. — Missouri.

++ ++ Leaves ovate in outline, with a mostly well marked sinus.

= Diaphragms (in the nodes) thin: young shoots not red: leaves not deeply lobed.

**V. monticola**, BUCKLEY. (SWEET MOUNTAIN GRAPE.) A slender trailing or climbing plant (reaching 20 to 30 feet in height) with very long and slender branches, the young growth angled and floccose (sometimes glabrous), the diaphragms plane and rather thin: leaves small and thin (rarely reaching 4 inches in width and generally from 2 to 3 inches high), cordate-ovate to triangular-ovate, with the basal sinus ranging from nearly truncate-oblique to normally inverted-U-shaped, rather dark green but glossy above and grayish green below, when young more or less pubescent or even arachnoid below, the blade either prominently notched on either upper margin or almost lobed, the point acute and often prolonged, margins irregularly notched with smaller teeth than in *V. rupestris*: clusters short and broad, much branched; berries medium or small (averaging about  $\frac{1}{2}$  inch in diameter), black or light colored, seedy, sweet; seeds large (about  $\frac{1}{2}$  inch long) and broad. — Pat. Off. Rep. 1861, 485, Proc. Acad. Philad. 1861, 450, & 1870, 136; Planch. l. c. 367; Munson, Wild Grapes N. A. 13, Gard. & For. iii. 475, Am. Gard. xii. 586, Rev. Vit. iii. 81, & v. 166, f. 54, 55; Foëx, Vitic. 44; Viala & Ravaz, Vignes Am. 123. *V. Texana*, Munson, Proc. Soc. Prom. Agr. Sci. 1887, 59. *V. Foezeana*, Planch. l. c. 616. — Limestone hills in S. W. Texas. This species has been the subject of much misunderstanding. Buckley's description seems to be confused, but his specimens of *V. monticola* (in herb. Acad. Philad.) are clearly the small-leaved and glabrous species here designated. See, also, Viala, "Une Mission Viticole en Amérique," 1889, 67; and *V. Berlandieri*, below.

**V. vulpina**, L. (RIVERBANK OR FROST GRAPE.) A vigorous tall-climbing plant, with a bright green cast to the foliage, normally glabrous young shoots, large stipules, and plane very thin diaphragms: leaves thin, medium to large, cordate-ovate, with a broad but usually an evident sinus, mostly showing a tendency (which is sometimes pronounced) to 3 lobes, generally glabrous and bright green below, but the veins and their angles often pubescent, the margins variously deeply and irregularly toothed and sometimes cut, the teeth and the long point prominently acute: fertile flowers bearing reclining or curved stamens, and the sterile ones long and erect or ascending stamens: clusters medium to large on short peduncles, branched (often very compound), the flowers sweet-scented; berries small (less than  $\frac{1}{2}$  inch in diameter), purple-black with a heavy blue bloom, sour and usually austere, generally ripening late (even after frost); seeds rather small and distinctly pyriform. — Spec. i. 203, in part (see Britton in Bailey, Am. Gard. xiv. 353); Bailey, Am. Gard. xiv. 353, with plate; Rusby, Mem. Torr. Club, v. 221; Munson, Rev. Vit. iii. 161. *V. riparia*, Michx. Fl. ii. 231; Sims, Bot. Mag. t. 2429; Torr. & Gray, Fl. i. 244; Planch. l. c. 352; Millardet, Vignes Am. 159, t. 18, 19, 23; Engelm. Bull. Torr. Club, vi. 233, & Bushberg Cat. ed. 3, 18; Munson, Trans. Am. Hort. Soc. iii. 131, Proc. Am. Pom. Soc. xx. 97, Wild Grapes N. A. 9, Gard. & For. iii. 474, & Am. Gard. xii. 659; Foëx, Vitic. 49; Viala & Ravaz, Vignes Am. 132. *V. serotina*, Bartram, Med. Rep. hex. 2, i. 22. *V. odoratissima*, Donn, Hort. Cantab. ed. 6, 62. ? *V. Illinoensis*, & *V. Missouriensis*, Prince, Vine, 184, 185. ? *V. tenuifolia*, LeConte, Proc. Acad. Philad. vi. 271, & Flora, 1853, 707. *V. cordifolia*, var. *riparia*, Gray, Man. ed. 5, 113. *V. vulpina*, var. *riparia*, Regel, Act. Hort. Petrop. ii. 395. — New Brunswick, acc. to Macoun, to N. Dakota, Kansas, and Colorado, and south to W. Virginia, Missouri, and N. W. Texas; the commonest grape in the Northern States west of New England, particularly abundant along streams. Variable in the flavor and maturity of the fruit. Forms with petioles and under surfaces of leaves pubescent sometimes occur. Occasionally hybridizes with *V. Labrusca* eastward, the hybrid being known by the tomentose young shoots and unfolding leaves, and the darker foliage which is marked with rusty tomentum along the veins of the less jagged leaves.

**Var. præcox**, BAILEY, n. comb., is the JUNE GRAPE of Missouri, the little sweet fruits ripening in July. — *V. riparia*, var. *præcox*, Engelm. acc. to Bailey, Am. Gard. xiv. 353.

**V. Treleasei**, MUNSON, in herb. Plant shrubby and much branched, climbing little, the small and mostly short (generally shorter than the leaves) tendrils deciduous the first year unless finding support, internodes short, the diaphragms twice thicker (about  $\frac{1}{8}$  inch) than in *V. vulpina* and shallow-biconcave: stipules less than one quarter as large as in *V. vulpina*; leaves large and green, very broad-ovate or even reniform-ovate (often wider than long), thin, glabrous and shining on both surfaces, the basal sinus very broad and open and making no distinct angle with the petiole, the margin unequally notch-toothed (not jagged as in *V. vulpina*) and indistinctly 3-lobed, the apex much shorter than in *V. vulpina*: fertile flowers with very short recurved stamens, sterile with ascending stamens: cluster small (2 to 3 inches long); the berries  $\frac{1}{2}$  inch or less thick, black with a thin bloom, ripening three weeks later than *V. vulpina* when grown in the same place, thin-skinned; pulp juicy and sweet; seeds small. — Brewster County, S. W. Texas, *E. L. Gage*, and New Mexico to Bradshaw Mountains, Arizona. Little known, and possibly a dry-country form of *V. vulpina*. In habit it suggests *V. Arizonica*, var. *glabra*, from which it is distinguished, among other things, by its decidedly earlier flowering and larger leaves with coarser teeth and less pointed apex.

**V. Longii**, PRINCE. Differs from vigorous forms of *V. vulpina* in having floccose or pubescent young growth: leaves decidedly more circular in outline with more angular teeth and duller in color, often distinctly pubescent beneath: stamens in fertile flowers short and weak and laterally reflexed, those in sterile flowers long and strong: seeds larger. — Vine, 184 (1830). *V. Solonis*, Planch. Vignes Am. 119, & in DC. Monogr. Phaner. v. 354; Engelm. Bushberg Cat. ed. 3, 18; Munson, Wild Grapes N. A. 9, Am. Gard. xii. 660, & Rev. Vit. iii. 159; Foëx, Vitic. 121; Viala & Ravaz, Vignes Am. 202. *V. Nuevo-Mexicana*, Lemmon in Munson, Trans. Am. Hort. Soc. iii. 132; Munson, Wine & Fruit Gr. vii. 85 (1885), Proc. Am. Pom. Soc. xx. 97, & Proc. Soc. Prom. Agr. Sci. 1887, 59. — N. W. Texas and New Mexico. Regarded by French authors as a hybrid, the species *V. rupestris*, *vulpina*, *candicans*, and *cordifolia* having been suggested as its probable parents. It is variable in character. In most of its forms it would be taken for a compound of *V. rupestris* and *V. vulpina*, but the latter species is not known to occur in most of its range. It was very likely originally a hybrid between *V. rupestris* (which it sometimes closely resembles in herbarium specimens save for its woolliness) and some tomentose species (possibly with *V. Arizonica* or *V. Doaniana*), but it is now so widely distributed and grows so far removed from its supposed parents and occurs in such great quantity in certain areas, that for taxonomic purposes it must be kept distinct. It is not unlikely that it has originated at different places as the product of unlike hybridizations. Late French writers designate the jagged-leaved forms as *V. Solonis*, and the dentate forms as *V. Nuevo-Mexicana*. This interesting grape was found some thirty years ago by Engelmann in the Botanic Garden of Berlin under the name of *Vitis Solonis*, without history. Engelmann guesses (Bushberg Cat. ed. 3, 18) the name to be a corruption of "Long's." It is probable that the plant was sent to European gardens as *Vitis Longii* — very likely from Prince's nursery — and the name was misread on the label. The original name, which was duly published by Prince with description, may now be restored.

**Var. microspërma**, BAILEY, n. comb. (*V. Solonis*, var. *microspërma*, Munson, Rev. Vit. iii. 160), is a very vigorous and small-seeded form, which is very resistant to drought. — Red River, N. Texas.

**V. Champini**, PLANCH. Probably a hybrid of *V. rupestris* or *V. Berlandieri* and *V. candicans*, bearing medium to large reniform or reniform-cordate leaves which are variously pubescent or cobwebby but become glabrous, the growing tips mostly white-tomentose: berries very large and excellent. — Jour. Vigne Am. vi. 22, ix. 192, & in DC. Monogr. Phaner. v. 327; Munson, Trans. Am. Hort. Soc. iii. 137 (as hybrid), Proc. Am. Pom. Soc. xx. 97, Wild Grapes N. A. 11, Gard. & For. iii. 474, Am. Gard. xii. 661, t. opp. p. 579, & Rev. Vit. iii. 81; Foëx, Vitic. 118; Viala & Ravaz, Vignes Am. 192. — S. W. Texas. In some places associated with *V. candicans*, *Berlandieri*, and *monticola* only, and in others with the above and *V. rupestris*. Often found composing dense thickets.

= = Diaphragms very thick and strong: young shoots bright red: leaves often strongly lobed.

**V. palmáta**, VAHL. (RED OR CAT GRAPE.) A slender but strong-growing vine, with small long-jointed angled red glabrous herb-like shoots and red petioles; leaves small to

medium, ovate-acuminate, dark green and glossy, sometimes indistinctly pubescent on the nerves below, the sinus obtuse, the blade either nearly continuous in outline or (commonly) prominently lobed or even parted, coarsely notched: stamens in the sterile flowers long and erect: clusters loose and long-peduncled, branched; the flowers opening late; berries small and late ( $\frac{1}{4}$  to  $\frac{3}{8}$  inch in diameter), black without bloom, with little juice and commonly containing but a single seed, which is large and broad. — Symb. iii. 42; DC. Prodr. i. 635; Engelm. Bushberg Cat. ed. 3, 17, & Bot. Gaz. viii. 254; Munson, Trans. Am. Hort. Soc. iii. 133, & Proc. Am. Pom. Soc. xx. 97; Sargent, Gard. & For. ii. 340, f. 118. *V. monosperma*, Michx. Journ. 124. *V. rubra*, Michx. acc. to Planch. in DC. Monogr. Phaner. v. 354; Millardet, Vignes Am. 223; Munson, Wild Grapes N. A. 13, Am. Gard. xii. 586, & Rev. Vit. v. 165; Foëx, Vitic. 48; Viala & Ravaz, Vignes Am. 145. *V. riparia*, var. *palmata*, Planch. l. c. 352. — A handsome plant; Illinois and Missouri to Louisiana and Texas.

+ + *Cordifolia*-like grapes, with thickish and dull-colored or grayish green leaves often holding some close dull pubescence below at maturity (and the shoots and leaves nearly always more or less pubescent when young), the teeth mostly short or at least not deep-cut, the point mostly triangular and conspicuous.

+ + Plant strong and climbing, with stout persistent tendrils.

= Young shoots terete, and glabrous or very soon becoming so.

#### V. cordifolia, MICHX. (TRUE FROST GRAPE, CHICKEN, RACCOON, or WINTER GRAPE.)

One of the most vigorous of American vines, climbing to the tops of the tallest trees, and sometimes making a trunk 1 or 2 feet in diameter: internodes long; the diaphragms thick and strong: petioles long; leaves long-cordate, triangular-cordate with a rounded base, or cordate-ovate, undivided but sometimes very indistinctly 3-lobed or 3-angled, the basal sinus rather deep and narrow and normally acute, the margin with large angular acute teeth of different sizes and the point long and acute, the upper surface glossy and the lower bright green and either becoming perfectly glabrous or bearing some close and fine inconspicuous grayish pubescence on the veins: stamens erect in the sterile flowers and short reflexed-curved in the fertile ones: clusters long and very many-flowered, most of the pedicels branched or at least bearing a cluster of flowers; berries numerous and small (about  $\frac{3}{8}$  inch in diameter), in a loose bunch, black and only very slightly glaucous, late and persistent, with a thick skin and little pulp, becoming edible after frost; seeds medium and broad. — Fl. ii. 231; Pursh, Fl. i. 169; DC. Prodr. i. 634; Torr. & Gray, Fl. i. 244; Engelm. Am. Nat. ii. 321, ix. 269, Bull. Torr. Club, vi. 233, & Bushberg Cat. ed. 3, 17; Planch. l. c. 350; Millardet, Vignes Am. 169, t. 18, 19, 23; Munson, Trans. Am. Hort. Soc. iii. 133, Proc. Am. Pom. Soc. xx. 97, Wild Grapes N. A. 13, Gard. & For. iii. 474, Am. Gard. xii. 586, & Rev. Vit. v. 165; Foëx, Vitic. 41; Britton in Bailey, Am. Gard. xiv. 353; Viala & Ravaz, Vignes, Am. 93. *V. pullaria*, LeConte, Proc. Acad. Philad. vi. 273, & Flora 1853, 708. *V. vulpina*, var. *cordifolia*, Regel, Act. Hort. Petrop. ii. 394. — In thickets and along streams from Pennsylvania (and probably S. New York) to E. Kansas and southwards to Florida and Texas.

**Var. foetida**, ENGELM., has fetidly aromatic berries, and grows in the Mississippi Valley. — Am. Nat. ii. 321.

**Var. sempervirens**, MUNSON. A glossy-leaved form holding its foliage very late in the season: leaves sometimes suggesting forms of *V. palmata*. — Rev. Vit. v. 165, f. 53. — S. Florida.

**Var. Hélleri**, BAILEY, n. var. Leaves more circular (i. e., lacking the long point), and the teeth round-obtuse and ending in a short mucro. — Kerr County, S. Texas, 1600 to 2000 feet, Heller, no. 1750.

= = Young shoots angled, and covered the first year with tomentum or wool.

**V. Baileyána**, MUNSON. (POSSUM GRAPE.) Less vigorous climber than *V. cordifolia*, rather slender, with short internodes and very many short side shoots: petioles shorter and often pubescent; leaves frequently smaller, the larger ones shortly but distinctly 3-lobed (lobes mostly pointed and much spreading), bright green but not shining above and gray below and pubescent at maturity only on the veins, the point only rarely prolonged and often mucous, the teeth comparatively small and notch-like and not prominently acute, sinus more open: floral organs very small; the stamens reflexed in the fertile flowers:



pedicels short, making the bunch very compact: berries about the size of *V. cordifolia*, black and nearly or quite bloomless, late; seed small and notched on top. — *Vitis Baileyana* (a leaflet issued June 20, 1893), & Rev. Vit. vi. 421; Rusby, Mem. Torr. Club, v. 220. *V. Virginiana*, Munson, Wild Grapes N. A. 14, Gard. & For. iii. 475, & Am. Gard. xii. 659, not Lam. — Mountain valleys, 800 to 3000 feet altitude, Southwestern Virginia and adjacent West Virginia and Western North Carolina, Tennessee and N. Georgia; also at common levels in the uplands of West-central Georgia. The eastern counterpart of *V. Berlandieri*.

**V. Berlandieri**, PLANCH. (MOUNTAIN, SPANISH, FALL, OR WINTER GRAPE.) A stocky moderately climbing vine, with mostly short internodes and rather thick diaphragms: leaves medium-large, broadly cordate-ovate or cordate-orbicular (frequently as broad as long), glabrous and glossy above, covered at first with gray pubescence below but becoming glabrous and even glossy except on the veins, the sinus mostly inverted-U-shaped in outline but often acute at the point of insertion of the petiole, the margin distinctly angled above or shortly 3-lobed and marked by rather large open notch-like acute teeth of varying size, the apex mostly pronounced and triangular-pointed: stamens long and ascending in the sterile flowers, laterally recurved in the fertile ones: clusters compact and compound, mostly strongly shouldered, bearing numerous medium to small ( $\frac{1}{4}$  inch or less in diameter) purple and slightly glaucous very late berries which are juicy and pleasant-tasted; seed (frequently only 1) medium to small. — Compt. Rend. Acad. Sci. Paris, xci. 425-428, Jour. Vigne Am. 1880, 318, & in DC. Monogr. Phaner. v. 341; Foëx, Vitic. 42; Munson, Gard. & For. iii. 475, Wild Grapes N. A. 14, Am. Gard. xii. 659, Rev. Vit. iii. 81, & vi. 422, f. 62; Viala & Ravaz, Vignes Am. 71. *V. monticola*, Engelm. Bushberg Cat. ed. 3, 15; Millardet, Vignes Am. 199, t. 21; Munson, Trans. Am. Hort. Soc. iii. 134, & Proc. Am. Pom. Soc. xx. 97; not Buckley. *V. aestivalis*, var. *monticola*, Engelm. Am. Nat. ii. 321. — Limestone soils along streams and hills, S. W. Texas. Well marked by the gray-veined under surface of the leaves. (Adj. Mex.)

**V. cinerea**, ENGELM. (SWEET WINTER GRAPE.) Climbing high, with medium to long internodes and thick and strong diaphragms: leaves large, broadly cordate-ovate to triangular-cordate-ovate (generally longer than broad), the sinus mostly wide and obtuse, the margin small-notched (teeth much smaller than in *V. Berlandieri*) or sometimes almost entire, mostly distinctly and divaricately 3-angled or shortly 3-lobed towards the apex, the triangular apex large and prominent, the upper surface cobwebby when young but becoming dull dark green (not glossy), the under surface remaining ash-gray or dun-gray webby-pubescent: stamens in sterile flowers long, slender and ascending, in the fertile ones short, and laterally recurved: cluster mostly loose and often straggling, containing many small black berries, these only slightly if at all glaucous, ripening very late, and after frost becoming sweet and pleasant; seeds small to medium. — Bushberg Cat. ed. 3, 16; Planch. l. c. 343; Millardet, Vignes Am. 193, t. 18, 20, 24; Munson, Trans. Am. Hort. Soc. iii. 133, Proc. Am. Pom. Soc. xx. 97, Wild Grapes N. A. 14, Gard. & For. iii. 475, Am. Gard. xii. 659, & Rev. Vit. vi. 423, f. 63; Foëx, Vitic. 39; Viala & Ravaz, Vignes Am. 99. *V. aestivalis*, var. ? *cinerea*, Engelm. in Gray, Man. ed. 5, 679. — Along streams, mostly in limy soils, Central Illinois to Kansas and Texas; also N. Florida. Readily distinguished from *V. aestivalis* by the triangular-topped sharply 3-lobed ash-gray leaves and the gray tomentum of the young growth. (Mex.)

**Var. Floridána**, MUNSON. Growing tips rusty-tomentose, as are sometimes the veins on the under sides of the leaves: cluster longer-peduncled and more compound. — Wild Grapes N. A. 14, Gard. & For. iii. 474, & Rev. Vit. vi. 424. — Manatee Co., Florida, and apparently also in Arkansas; not unlikely a compound with *V. aestivalis*, but the leaves have the characteristic shape of *V. cinerea*. Not to be confounded with any form of *V. Caribæa*, DC., because of the lobed triangular-topped leaves and much larger teeth.

**Var. canescens**, BAILEY, n. comb. A form with rounded or heart-like leaves, the upper half of the leaf lacking the triangular and 3-lobed shape of the type. — *V. aestivalis*, var. *canescens*, Engelm. Am. Nat. ii. 321, *fide spec. in herb.* Gray. — St. Louis, Missouri, Engelmann, Eggert, and S. Illinois, Schneck, to Texas, Wright, and Curtiss no. 453 a, in part.

++ ++ Plant scarcely climbing, the tendrils perishing if failing to find support.

**V. Arizónica**, ENGELM. (CAÑON GRAPE.) Plant weak, much branched, with short internodes and thick diaphragms, branchlets angled: leaves mostly small, cordate-ovate and

with a prominent triangular-pointed apex, the sinus broad or the base of the blade even truncate, the teeth many and small and pointed or mucronate, the margin either continuous or very indistinctly 3-lobed (or sometimes prominently lobed on young growths), the leaves and shoots white-woolly when young, but becoming nearly glabrous with age: stamens ascending in sterile flowers and recurved in the fertile ones: bunches small and compound, not greatly, if at all, exceeding the leaves, bearing 20 to 40 small black berries of pleasant taste; seeds 2 to 3, medium size. — Am. Nat. ii. 321, ix. 268, & Bushberg Cat. ed. 3, 16; Planch. l. c. 340; Millardet, Vignes Am. 229; Munson, Trans. Am. Hort. Soc. iii. 132, Proc. Am. Pom. Soc. xx. 97, Wild Grapes N. A. 10, Gard. & For. iii. 474, & Am. Gard. xii. 660; Foëx, Vitic. 48; Viala & Ravaz, Vignes Am. 131. *V. Arizonensis* [Parry], Rep. Dept. Agric. 1870, 416. *V. aestivalis*, var. ? Gray, Pl. Wright. ii. 27; Torr. Pac. R. Rep. vii. 9. — Along river banks, W. Texas to New Mexico and Arizona, mostly south of the 35th parallel, to S. E. California. (Northern Mex.)

**Var. glabra**, MUNSON. Plant glabrous, with glossy and mostly thinner and larger leaves. — Wild Grapes N. A. 10, Gard. & For. iii. 474, & Am. Gard. xii. 660. — In mountain gulches and cañons, with the species and ranging northwards into S. Utah. Readily distinguished from *V. monticola* by its triangular-pointed and small-toothed leaves.

+ + + Orbicular-scallop-leaved species of the Pacific Coast.

**V. Californica**, BENTH. A vigorous species, tall-climbing upon trees but making bushy clumps when not finding support, the nodes large and diaphragms rather thin: leaves mostly round-reniform (the broader ones the shape of a horse's hoof-print), rather thin, either glabrous and glossy or (more commonly) cottony-canescens until half grown and usually remaining plainly pubescent below, the sinus ranging from very narrow and deep to broad and open, the margins varying (on the same vine) from finely blunt-toothed to coarsely scallop-toothed (the latter a characteristic feature), the upper portion of the blade either perfectly continuous and rounded or sometimes indistinctly 3-lobed and terminating in a very short apex: bunches medium, mostly long-peduncled and forked, the numerous small berries glaucous-white, seedy and dry but of fair flavor; seed large ( $\frac{1}{4}$  to  $\frac{5}{16}$  inch long), prominently pyriform. — Bot. Sulph. 10; Torr. Bot. Mex. Bound. 45; Buckley, Pat. Off. Rep. 1861, 483; Brew. & Wats. Bot. Calif. i. 105, mostly; Engelm. Bushberg Cat. ed. 3, 15; Planch. l. c. 339; Millardet, Vignes Am. 226; Munson, Trans. Am. Hort. Soc. iii. 137, Proc. Am. Pom. Soc. xx. 97, Wild Grapes N. A. 10, Gard. & For. iii. 474, 475, & Am. Gard. xii. 660; Foëx, Vitic. 32; Viala & Ravaz, Vignes Am. 57. *V. Caribæa*, Torr. & Gray, Fl. i. 683, not DC. — Along streams in Central and N. California and S. Oregon. Leaves becoming handsomely colored and mottled in fall.

\* \* COLORED-LEAVED GRAPES, marked by thick or at least firm foliage, the leaves prominently rusty or white-tomentose or glaucous-blue below. *V. cinerea*, *V. Arizonica*, and possibly *V. Californica* may be sought here; and late-gathered forms of *V. bicolor* may be looked for in \*.

+ Leaves only flocculent or cobwebby or glaucous below when fully grown (i. e., not covered with a thick dense felt-like tomentum, except sometimes in *V. Doaniana*).

+ + White-tipped grapes, comprising species with the ends of the growing shoots and the under surfaces of the leaves whitish or gray.

**V. Girdiána**, MUNSON. (VALLEY GRAPE.) Strong climbing vine, with thick diaphragms: leaves medium to large and rather thin, broadly cordate-ovate, with a rather deep and narrow sinus and nearly continuous or obscurely 3-lobed outline (sometimes markedly 3-lobed on young shoots), the teeth many and small and acute, the apex short-triangular or almost none, the under surface remaining closely ashy-tomentose: clusters large and very compound, each one dividing into three or four nearly equal sections, which are in turn shouldered and thyrses-like; berries small, black and slightly glaucous, the skin thin but tough, pulp finally becoming sweet; seeds medium in size, pyriform. — Proc. Soc. Prom. Agr. Sci. 1887, 59, Wild Grapes N. A. 10, Gard. & For. iii. 474, & Am. Gard. xii. 660. — S. California, south of the 36th parallel. Differs from *V. Californica* in the more pubescent shoots and foliage, smaller and sharp teeth, decompound clusters, smaller less glaucous berries, and smaller seeds. Shoots of *V. Californica* often bear leaves with small and mucous teeth, and such specimens without the flower-clusters are difficult to distinguish from this species. Some

of the forms which have been referred to *V. Girdiana* are evidently hybrids with the wine-grape, *V. vinifera*; and at best the plant is imperfectly understood and its merits as a species are yet to be determined.

**V. Doaniána**, MUNSON. Plant vigorous, climbing high or remaining bushy if failing to find support, with short internodes and rather thin diaphragms: leaves bluish green in cast, mostly large, thick and firm, cordate-ovate or round-ovate in outline, bearing a prominent triangular apex, the sinus either deep or shallow, the margins with very large angular notch-like teeth and more or less prominent lobes, the under surface usually remaining densely pubescent and the upper surface more or less floccose: cluster medium to small, bearing large ( $\frac{5}{8}$  inch and less in diameter) black glaucous berries of excellent quality; seeds large ( $\frac{1}{4}$  to  $\frac{3}{8}$  inch long), distinctly pyriform. — Wild Grapes N. A. 9, Gard. & For. iii. 474, Am. Gard. xii. 660, & Rev. Vit. iii. 160; Viala & Ravaz, Vignes Am. 204 (considering it a hybrid of *V. candicans* and the *V. Longii* group); Sears, Gard. & For. ix. 454, f. 59. — Chiefly in N. W. Texas, but ranging from Greer Co., Oklahoma, to beyond the Pecos River in New Mexico. The species varies greatly in pubescence, some specimens being very nearly glabrous at maturity and others densely white-tomentose. The plant would pass at once as a hybrid of *V. vulpina* and *V. candicans* except that the former does not often occur in its range. It is very likely a hybrid, however, and *V. candicans* seems to be one of the parents.

++ ++ Rusty-tipped grapes, comprising the æstivalian group, the unfolding leaves and (except in *V. bicolor*) the young shoots distinctly ferruginous, and the mature leaves either rusty or bluish below, or sometimes becoming green in *V. bicolor*.

**V. æstivâlis**, MICHX. (SUMMER, BUNCH, or PIGEON GRAPE.) Strong tall-climbing vine, with medium-short internodes, thick diaphragms, and often pubescent petioles: leaves mostly large, thinnish at first but becoming rather thick, ovate-cordate to round-cordate in outline, the sinus either deep (the basal lobes often overlapping) or broad and open, the limb always lobed or prominently angled, the lobes either 3 or 5, in the latter case the lobal sinuses usually enlarged and rounded at the extremity, the apex of the leaf broadly and often obtusely triangular, the upper surface dull and becoming glabrous and the under surface retaining a covering of copious rusty or red-brown pubescence which clings to the veins and draws together in many small tufty masses: stamens in fertile flowers reflexed and laterally bent: clusters mostly long and long-peduncled, not greatly branched or even nearly simple (mostly interrupted when in flower), bearing small ( $\frac{1}{8}$  inch or less in diameter) black glaucous berries, which have a tough skin and a pulp ranging from dryish and astringent to juicy and sweet; seeds medium size ( $\frac{1}{4}$  inch or less long), two to four. — Fl. ii. 230; DC. Prodr. i. 634; Torr. & Gray, Fl. i. 244; Engelm. Am. Nat. ii. 321, & Bushberg Cat. ed. 3, 16; Planch. l. c. 334; Millardet, Vignes Am. 185, t. 20, 23; Munson, Trans. Am. Hort. Soc. iii. 134, Proc. Am. Pom. Soc. xx. 97, Wild Grapes N. A. 12, Gard. & For. iii. 474, 475, Am. Gard. xii. 584, & Rev. Vit. v. 164; Britton in Bailey, Am. Gard. xiv. 353; Foëx, Vitic. 37; Viala & Ravaz, Vignes Am. 69. *V. sylvestris, occidentalis, & Americana*, Bartram, Med. Rep. hex. 2, i. 21, 23. *V. Nortoni*, Prince, Vine, 186. *V. Labrusca*, var. *æstivalis*, Regel, Act. Hort. Petrop. ii. 396. *V. bracteata*, & *V. araneosus*, LeConte, Proc. Acad. Philad. vi. 271, 272, & Flora, 1853, 708. (There are specimens in herb. Acad. Philad. labelled *V. araneosus*, as if LeConte's type, but there is no proof that they are his type. These specimens are *V. cinerea*, which is not known to occur in "the upper parts of Georgia," to which *V. araneosus* is credited; moreover, the "more or less ferruginous" leaves belong to *V. æstivalis* rather than to *V. cinerea*.) — Chemung Co., New York (*T. F. Lucy*), and Long Island to Central Florida (*Nash*, no. 525, *Bailey*), and westward through Southern Pennsylvania to the Mississippi and Missouri. A marked type among American grapes, being readily distinguished from other species by the reddish fuzz of the under sides of the leaves. Most of the tomentose-leaved species have been at one time or another confounded with it, but when allowed to stand by itself, it is not a difficult species to understand.

**Var. gláuca**, BAILEY, n. comb. Leaves (and mature wood) glaucous-blue on the body beneath, but the veins rusty: berries and seeds larger. — *V. Linccumii*, var. *glauca*, Munson, Wild Grapes N. A. 12, Gard. & For. iii. 474, Am. Gard. xii. 585, & Rev. Vit. v. 159. — S. W. Missouri to N. Texas. Much like *V. bicolor*, but leaves thicker and more pubescent below, and tips of shoots rusty-tomentose.

**Var. Linsecómii**, MUNSON. (POST-OAK, PINE-WOOD, or TURKEY GRAPE.) More stocky than *V. æstivalis*, climbing high upon trees but forming a bushy clump when not finding support: leaves densely tomentose or velvety below: berries large ( $\frac{1}{2}$  to  $\frac{3}{4}$  inch in diameter), black and glaucous, mostly palatable; seeds mostly much larger than in *V. æstivalis* (often  $\frac{3}{8}$  inch long).—Proc. Am. Pom. Soc. xx. 97. *V. diversifolia*, Prince, Vine, 183, not Wall. *V. Linsecómii*, Buckley, Pat. Off. Rep. 1861, 485, Proc. Acad. Philad. 1861, 451, & 1870, 136; Planch. l. c. 338; Millardet, Vignes Am. 211, t. 21; Munson, Wild Grapes N. A. 12, Gard. & For. iii. 474, 475, Am. Gard. xii. 585, & Rev. Vit. v. 159; Foëx, Vitic. 36; Viala & Ravaz, Vignes Am. 66.—High post-oak (*Quercus stellata*) lands, S. W. Missouri to N. Texas and E. Louisiana. Very likely derived from the *æstivalis* type through adaptation to dry soils and climates. Perhaps worth recognition as a geographical species.

**Var. Bourquiniana**, BAILEY, n. comb. A domestic offshoot, represented in such cultivated varieties as Herbemont and Le Noir, differing from *V. æstivalis* in its mostly thinner leaves which (like the young shoots) are only slightly red-brown below, the pubescence mostly cinereous or dun-colored or the under surface sometimes blue-green: berries large and juicy, black or amber-colored.—*V. Bourquiniana*, Munson, Wild Grapes N. A. 12, Gard. & For. iii. 474, Am. Gard. xii. 584, & Rev. Vit. v. 159; Viala & Ravaz, Vignes Am. 237 (considering it a *vinifera-æstivalis* hybrid).—A mixed type, some of it probably a direct amelioration of *V. æstivalis*, and some hybridized with the wine-grape (*V. vinifera*). Much cultivated south.

**V. bicolor**, LeCONTE. (BLUE GRAPE, or SUMMER GRAPE of the North.) A strong high-climbing vine, with mostly long internodes and thick diaphragms, the young growth and canes generally perfectly glabrous and mostly (but not always) glaucous-blue, tendrils and petioles very long: leaves large, round-cordate-ovate in outline, glabrous and dull above and very heavily glaucous-blue below, but losing the bloom and becoming dull green very late in the season, those on the young growth deeply 3-5-lobed and on the older growths shallowly 3-lobed, the basal sinus running from deep to shallow, the margins mostly shallow-toothed or sinuate-toothed (at least not so prominently notch-toothed as in *V. æstivalis*): cluster mostly long and nearly simple (sometimes forked), generally with a long or prominent peduncle; the purple and densely glaucous berries of medium size ( $\frac{1}{2}$  inch or less in diameter), sour but pleasant-tasted when ripe (just before frost); seeds rather small.—Proc. Acad. Philad. vi. 272, & Flora, 1853, 708; Planch. in DC. Monogr. Phaner. v. 614; Munson, Wild Grapes N. A. 12, Gard. & For. iii. 474, Am. Gard. xii. 585, & Rev. Vit. v. 163; Foëx, Vitic. 37; Viala & Ravaz, Vignes Am. 68. *V. argentifolia*, Munson, Proc. Soc. Prom. Agr. Sci. 1887, 59.—Abundant northwards along streams and on banks, there taking the place of *V. æstivalis*. Ranges from New York and Illinois to the mountains of W. North Carolina, Bailey, and to W. Tennessee, Fendler. Well distinguished from *V. æstivalis* (at least in its northern forms) by the absence of rufous tomentum, the blue-glaucous small-toothed leaves, and long petioles and tendrils. It has been misunderstood because it loses its glaucous character in the fall.

**V. Caribæa**, DC. Climbing, with flocculent-woolly (or rarely almost glabrous) and striate shoots: tendrils rarely continuous: leaves cordate-ovate or even broader and mostly acuminate-pointed, sometimes obscurely angled above (but never lobed except now and then on young shoots), becoming glabrous above but generally remaining rufous-tomentose below, the margins set with very small mucro-tipped sinuate teeth: cluster long and long-peduncled, generally large and very compound; berry small and globose, purple; seed obovate, grooved on the dorsal side.—Prodr. i. 634; Griseb. Fl. W. Ind. 102; Planch. l. c. 330; Engelm. Bushberg Cat. ed. 3, 15.—A widely distributed and variable species in the American tropics, running into white-leaved forms (as in *V. Blancoi*, Munson). Little known in the United States; Louisiana, Hooker; Lake City, N. Florida, Nash, no. 2493; swamp, near Jacksonville, Florida, Curtiss, no. 4791.

+ — Leaves densely tomentose or felt-like beneath throughout the season, the covering white or rusty-white.

++ Tendrils intermittent (every third joint with neither tendril nor inflorescence opposite).

**V. cándicans**, ENGELM. (MUSTANG GRAPE.) Plant strong and high climbing with densely woolly young growth (which is generally rusty-tipped), and very thick diaphragms:

leaves medium in size and more or less poplar-like, ranging from reniform-ovate to cordate-ovate or triangular-ovate, dull above but very densely white-tomentose below and on the petioles, the basal sinus very broad and open or usually none whatever (the base of the leaf then nearly truncate), deeply 5-7-lobed (with enlarging rounded sinuses) on the strong shoots and more or less indistinctly lobed or only angled on the normal growths, the margins wavy or sinuate-toothed: stamens in the sterile flowers long and strong, those in the fertile flowers very short and laterally reflexed: cluster small, mostly branched, bearing a dozen to twenty large ( $\frac{3}{4}$  inch or less in diameter) purple or light-colored or even whitish berries, which have a thick skin and a very disagreeable fiery flavor; seeds large, pyriform. — Engelm. in Gray, Pl. Lindh. pt. 2, 166, Am. Nat. ii. 321, & Bushberg Cat. ed. 3, 15; Planch. l. c. 326; Munson, Trans. Am. Hort. Soc. iii. 137, Proc. Am. Pom. Soc. xx. 97, Wild Grapes N. A. 11, Gard. & For. iii. 474, & Am. Gard. xii. 661; Foëx, Vitic. 34; Viala & Ravaz, Vignes Am. 61. *V. Mustangensis*, Buckley, Pat. Off. Rep. 1861, 482, Proc. Acad. Philad. 1861, 451, & 1870, 136. *V. Labrusca*, var. *ficifolia*, Regel, Act. Hort. Petrop. ii. 396. — E. Texas, mostly on limestone soils.

**Var. coriacea**, BAILEY, n. comb. (LEATHER-LEAF or CALLOOSA GRAPE.) Differs from the species chiefly in bearing much smaller (about  $\frac{1}{2}$  inch in diameter) thinner-skinned and more edible grapes with mostly smaller seeds, and perhaps a less tendency to very deep lobing in the leaves on young shoots and possibly rather more marked rustiness on the young growths. — *V. coriacea*, Shuttl. distr. pl. Rugel (Chapm. Fl. S. States, 71); Planch. l. c. 345; Munson, Wild Grapes N. A. 11, Gard. & For. iii. 474, & Am. Gard. xii. 661; Foëx, Vitic. 34; Viala & Ravaz, Vignes Am. 61. *V. Caribæa*, Chapm. Fl. 71; Munson, Trans. Am. Hort. Soc. iii. 136; not DC. — Florida, chiefly southward, in which range various Texan plants reappear. The more agreeable quality of the fruit is probably the result of a more equable and moister climate.

**V. Simpsóni**, MUNSON. Distinguished by mostly much-cut leaves on the young shoots and comparatively thin large and large-toothed ones on the main shoots, rusty-white tomentum below and very prominently brown-tomentose young growths, — the character of the leaves and tomentum varying widely, the foliage sometimes becoming almost blue-green below. — Proc. Soc. Prom. Agr. Sci. 1887, 59, Wild Grapes N. A. 12, Gard. & For. iii. 474, Am. Gard. xii. 661 (said to be hybrid of *V. coriacea* and *V. cinerea*), & Rev. Vit. v. 164, f. 52; Viala & Ravaz, Vignes Am. 221 (calling it a hybrid of *V. cinerea* and *V. coriacea*). — Central Florida, Lake Co., Nash, no. 399; Manatee River, Rugel, no. 112, etc. This is likely a hybrid of *V. æstivalis* and *V. candicans*, var. *coriacea*. Some forms of it are very like *V. Labrusca*, and might be mistaken for that species.

++ ++ Tendrils mostly continuous (a tendril or inflorescence opposite every node).

**V. Labrusca**, L. (FOX GRAPE, SKUNK GRAPE.) A strong vine, climbing high on thickets and trees: young shoots tawny or fuscous with much scurfy down: leaves large and thick, strongly veined (especially beneath), broadly cordate-ovate, mostly obscurely 3-lobed towards the top (on strong growths the sinuses sometimes extending a third or even half the depth of the blade, and rounded and edentate at the bottom) or sometimes nearly continuous in outline and almost deltoid-ovate, the petiolar sinus mostly shallow and very open (ranging to narrow and half\* or more the length of the petiole), the margins shallowly scallop-toothed with mucro-pointed teeth (or sometimes almost entire), and the apex and lobes acute, the upper surface dull green and becoming glabrous but the lower surface densely covered with a tawny-white, dun-colored or red-brown tomentum: stamens long and erect in the sterile flowers and (in wild forms) short and recurved in the fertile ones: raceme short (berries usually less than 20 in wild types), generally simple or very nearly so, in anthesis about the length of the peduncle: berries large and nearly spherical, ranging from purple-black (the common color) to red-brown and amber-green, generally falling from the pedicel when ripe, variable in taste but mostly sweetish musky and sometimes slightly astringent, the skin thick and tough; seeds very large and thick. — Spec. i. 203, in part; Torr. & Gray, Fl. i. 244; Gray, Gen. III. ii. t. 161; Engelm. Bushberg Cat. ed. 3, 14; Millardet, Vignes Am. 219; Munson, Trans. Am. Hort. Soc. iii. 136, Proc. Am. Pom. Soc. xx. 97, & Rev. Vit. v. 157; Britton in Bailey, Am. Gard. xiv. 353; Viala & Ravaz, Vignes Am. 51. *V. vulpina*, Bartram, Med. Rep. hex. 2, i. 21, and other authors. *V. Blandi*, Prince, Vine, 177. *V. Labrusca*, var. *typica*, Regel, Act. Hort. Petrop. ii. 395. — New England and

southwards in the Alleghany region and highlands to West-central Georgia. Not known to occur west of E. New York in the North, but reported from S. Indiana, *Munson*. The parent of the greater part of American cultivated grapes. It is often confounded with *V. æstivalis* in the South, from which it is distinguished by the habitually continuous tendrils, the more felt-like leaves which are not floccose, and especially by the small-toothed leaves, very short clusters and large berries and seeds.

**2. CÍSSUS, L.**<sup>1</sup> (Κίσσός, Greek name of Ivy.) — A vast genus, mainly tropical, of various habit, the typical species 4-merous, some of the 5-merous species near to *Vitis*. — Amœn. Acad. i. ed. Holm. 389, ed. Lugd. Bat. 115, & Gen. ed. 5, no. 137. *Ampelopsis*, *Rhoicissus*, *Cissus*, etc., Planch. in DC. Monogr. Phaner. v. 453, 463, 470.

§ 1. Flowers mostly 5-merous and perfect: disk cupulate or at length explanate, with barely lobed or crenate border, its base coherent with that of the ovary: berries soon dry or with scanty pulp, inedible: tendrils in ours few, and mostly in the inflorescence: foliage, etc., not fleshy. — *Ampelopsis*, Raf., Planch., and partly Michx.

**C. Ampelópsis, PERS.** Nearly glabrous, moderately climbing: leaves simple (2 to 4 inches long), deltoid-subcordate or with truncate base, acutely serrate, acuminate, sometimes tricuspidate by obscure lateral lobes: cupulate disk as high as the ovary and free almost to base: style slender: berries bluish or greenish, mawkish, the size of peas. — Syn. i. 142; Pursh, Fl. i. 170; Torr. Fl. N. & Midd. States, 266. *Ampelopsis cordata*, Michx. Fl. i. 159; DC. Prodr. i. 633; Planch. l. c. 453. *A. cordifolia*, Raf. Med. Bot. ii. 122. *Vitis indivisa*, Willd. Berol. Baum. ii. 538; Torr. & Gray, Fl. i. 243. — Banks of streams, Virginia and Ohio to Illinois, south to Florida and Texas; fl. spring. (Mex.)

**C. stáns, PERS.** Glabrous or glabrate, erect, rarely with a few tendrils and somewhat climbing: leaves bipinnately compound; pinnæ and leaflets about 2 pairs and an odd one; leaflets ovate and cuneate-obovate, incisedly few-toothed: cymes shorter than the leaves: disk shorter than the ovary and largely adnate to it: style conical-subulate: berries dark purple; seeds with a prominent and oval dorsal chalaza. — Syn. i. 143; Pursh, l. c. *C. bipinnata*, Nutt. Gen. i. 144; Ell. Sk. i. 304. *Vitis arborea*, L. Spec. i. 203; Marsh. Arb. 164; Jacq. Hort. Schœnb. iv. 14, t. 428. *V. bipinnata*, Torr. & Gray, Fl. i. 243; Chapm. Fl. 70. *Ampelopsis bipinnata*, Michx. Fl. i. 160; DC. l. c.; Planch. l. c. 461. *Hedera arborea*, Walt. Car. 102. (*Cissus orientalis*, Lam., is a related species of Asia Minor, with 4-merous flowers.) — Banks of streams, Virginia to S. Illinois and Missouri, S. Florida, and Texas; fl. summer. (Mex., Cuba.)

§ 2. Flowers 4-merous and mostly perfect: disk cupulate, united with the base of the ovary, the margin 4-lobed: tendrils mostly strong: foliage in ours thick or even fleshy (detaching in drying). — *Cissus*, Planch.

\* Leaves 3-lobed or trifoliolate.

**C. ácida, L.** A low climber, with slender and striate somewhat succulent branches, glabrous: leaves trifid or trifoliolate; the leaflets or divisions broad-cuneate and sharp-toothed on top, rather small: flowers small, in corymb-like or umbel-like clusters: berry ovoid and mucronate, dark purple, with 1 or 2 large seeds, the pedicel recurved at maturity. — Spec. ed. 2, i. 170; DC. Prodr. i. 630; Griseb. Fl. W. Ind. 102; Planch. l. c. 534, in part. *Vitis ácida*, Chapm. Fl. 70. — Key West; also in Arizona, *Pringle*, no. 371, *Lemmon*, no. 533. (W. Ind., Mex.)

**C. incísa, DESMOUL.** Either slender or a strong climber, sometimes reaching 20 to 30 feet, with very fleshy stems, the tendrils sometimes penetrating the support like roots: leaves

<sup>1</sup> § 1 and *C. Ampelopsis* & *stans* by A. Gray.

pale green, 3-parted or trifoliolate, very fleshy; the divisions or leaflets wedge-ovate and mostly notched on the sides as well as on the top, and the middle one sometimes lobed: inflorescence umbelliform: berry obovoid, blackish, with 1 or 2 seeds, the pedicel strongly recurved. — Desmoul. in Durand, Monogr. Vit. 59; Planch. l. c. 535. *C. incisa*, var. *Rochæana*, Carr. Rev. Hort. lvi. 272, figs. *C. Rochæana*, Planch. Jour. Vigne Am. 1888, 102. *Vitis incisa*, Nutt. in Torr. & Gray, Fl. i. 243; Chapm. Fl. 70. *V. acida*, Planch. l. c., in part. — Arkansas and Texas; also Florida, St. Vincent's Isl. and Hillsboro River, Curtiss, no. 458, and probably southward. Leaves various. Not unlikely a geographical form of the last. Root sometimes tuberous-thickened.

\* \* Leaves not lobed.

**C. sicyoides**, L., var. **Floridána**, PLANCH. Climbing, with pilose striate branches: leaves ovate-oblong and often acuminate, subcordate at the base, strongly nerved, pubescent below (at least on the veins), the margin beset with small ascending mucronate teeth: inflorescence umbel-like and peduncled; berry nearly globular, black, 1-seeded. — Planch. in DC. Monogr. Phaner. v. 530. — S. Florida: Caloosahatchee River to Cape Sable, Curtiss, no. 457\*. A form in which the flowers are transformed (by the fungus *Ustilago Cissi*) into cigar-form bodies, the cluster becoming elongated, is *Spondylantha aphylla*, Presl. — Cape Romano, Florida, Curtiss, and the West Indies.

**3. AMPELÓPSIS**,<sup>1</sup> Michx., in part. (*Ἀμπελος*, the vine, *ὅψις*, likeness.) — E. North American and Asiatic woody climbers, with short and branched tendrils, their tips often with disk-like dilatations which adhere to impinging surfaces. Cymes not tendrilliferous. Flowers greenish, æstival. Leaves various. — Fl. i. 159, in part; Torr. & Gray, Fl. i. 245; Gray, Man. ed. 1–6, & Gen. Ill. ii. 165, t. 162. *Quinaria*, Raf. Am. Man. Vines (1830), 6, & Med. Bot. ii. 122. *Landukia* & *Parthenocissus*, Planch. in DC. Monogr. Phaner. v. 446, 447 (1887).

**A. TRICUSPIDATA**, Sieb. & Zucc. Fam. Nat. Fl. Jap. (Abh. Akad. München, iv.) i. 88 (the *A. Veitchii* of gardens), — a Japanese species, remarkable for its three forms of leaves, two of them simple, and the greater development of what answers to ovarian disk, — is in common cultivation as *Japanese Ivy*, *Japanese Creeper*, or *Boston Vine*. It promptly covers walls, attaching itself firmly by means of its very short disciferous tendrils. *A. heterophylla*, Blume (*Landukia Landuk*, Planch.) is a clear congener.

**A. quinquefolia**, MICHX. (VIRGINIA CREEPER, WOODBINE erroneously.) Tall vine, climbing by both disciferous tendrils and aerial rootlets, with warty and dark-colored canes: leaves palmately 3–7-foliate, but normally 5-foliate, the leaflets ovate or obovate to oblong-ovate, cuneate-obovate or even oblong-lanceolate, upon distinct petiolules, ranging from coarsely serrate to dentate, notched or even incised-dentate, mostly acuminate, generally glabrous or soon becoming so: cymes various but mostly broadly dichotomous, sometimes elongated and leafy: berries globular, the size of peas, purple with a dark blue bloom, the pulp thin and subacid. — Fl. i. 160; Hook. Fl. Bor.-Am. i. 114; Torr. & Gray, Fl. i. 245 (and var. *hirsuta*); Gray, Gen. Ill. ii. t. 162. *A. hederacea*, DC. Prodr. i. 633; Loud. Arb. i. 482, f. 146. *A. hirsuta*, Donn, Hort. Cantab. ed. 6, 62; DC. l. c. 633. *Vitis hederacea*, Ehrh. Beitr. vi. 85. *V. quinquefolia*, Lam. Ill. ii. 135. *Hedera quinquefolia*, L. Spec. i. 202. *Quinaria hederacea*, & *Q. hirsuta*, Raf. Med. Bot. ii. 122. *Cissus hederacea*, Pers. Syn. i. 143. *Parthenocissus quinquefolia* and vars. *typica*, *hirsuta*, & *laciniata*, Planch. in DC. Monogr. Phaner. v. 449. — Rich woods and banks, Quebec to Winnipeg and the Rocky Mountains, and to S. Florida, Texas, and New Mexico. (Cuba.)

**Var. vitácea**, KNERR. Aërial roots none, and tendrils little or not at all disciferous (the vine therefore not clinging well); the canes smoother: cymes rather more dichotomous and open: berries larger and earlier. — Bot. Gaz. xviii. 70. *Parthenocissus vitacea*, Hitchcock, Spring Fl. Manhattan, 26 (1894). — Michigan to Kansas.

<sup>1</sup> Remarks under genus, and account of *A. tricuspidata*, by A. Gray.

**Var. heptaphýlla**, GRAY, n. comb. Leaflets smaller, mostly 6 or 7, generally very strongly toothed or incised, the fruit clusters more or less pendulous. — *A. heptaphylla*, Buckley, Proc. Acad. Philad. 1861, 450, 1870, 136. — Texas.

**Var. pubescens**, BAILEY, n. comb. Leaflets grayish-pubescent below, mostly bluntly toothed, and inflorescence elongated. — *A. pubescens*, Schlecht. Linnæa, x. 251. *Vitis pubescens*, Miq. Ann. Mus. Bot. Lugd.-Bat. i. 90. — Occurs in Northern Mexico, and probably in our southwestern territory.

## ORDER XLIV. SAPINDACEÆ.

BY B. L. ROBINSON.

Trees, shrubs (very rarely herbs), or in warm countries lianas. Flowers regular or zygomorphous, in Suborder I perfect, in the other suborders often appearing perfect or polygamous, yet generally through reduction or suppression of one set of essential organs, monœcious or (in *Dodonæa* and rarely in *Acer*) diœcious. Calyx inferior, mostly (4-)5-parted or -divided; segments or sepals imbricated or rarely valvate in bud. Petals in regular flowers usually 5, in zygomorphous 4 (the posterior obsolete). Disk annular, crenate, or lobed, often glandular, in *Dodonæa* and sometimes in *Acer* obsolete. Stamens usually 8 or 10 (4 to  $\infty$ ), hypogynous or sometimes somewhat perigynous, mostly inserted within or upon (sometimes on the outer edge of) the disk; anthers introrse, 2-celled, dehiscent by longitudinal slits; filaments usually pubescent. Style simple or more or less deeply 2-3(-4)-cleft or -divided; ovary few (mostly 2-3)-celled; ovules solitary, geminate, or rarely more numerous in the cells, usually attached to the axis and ascending with rhaphe ventral. — A large and, as here taken, somewhat composite order. The principal and more typical suborder (*Sapindææ*) is chiefly tropical and includes a large number of genera, most of which are small or even monotypic. Two considerable genera, *Serjania* and *Paullinia*, woody climbers of Tropical America are noteworthy for the variety and complexity in the structure of their stems.

**SUBORDER I. STAPHYLINÆÆ.** Flowers perfect, regular. Sepals, petals, and stamens of the same number. Fruit (in ours) capsular, vesicular-inflated; seeds albuminous, several in each cell.

1. **STAPHYLEA.** Sepals concolorous with the petals, oblong, erect, imbricated in the bud. Disk fleshy. Carpels (2 to) 3; styles slender; stigmas capitate or subcapitate. Fruit bladder-like, with (2-)3-horned summit; seeds several and nearly horizontal, biserially arranged along the inner angle of each cell.

**SUBORDER II. ACERINÆÆ.** Flowers regular, polygamous, andromonœcious or androdicœcious or (in *Acer* § *Negundo*) diœcious. Petals (often wanting), when present, as many as the sepals. Fruit normally of 2 diverging carpellary samaroid more or less coherent nutlets, or (in certain foreign species) capsular with two samaroid valves. Trees and erect shrubs with opposite leaves.

2. **ACER.** Flowers polygamo-diœcious or diœcious, in lateral or terminal umbellate, racemose, or paniculate inflorescences. Petals usually about 5 and isomerous with the calyxlobes or wanting. Stamens more often anisomerous, in ♀ flowers reduced or (in § *Negundo*) wanting. Disk either intra- or extra-staminal, or bearing the stamens, mostly crenate or



lobed, rarely rudimentary or wanting. Styles 2, elongated, filiform, introrsely stigmatose. Nutlets 1-2-seeded, each surmounted by a mostly oblong-oblique obtuse veiny morphologically ascending or widely spreading dorsal wing, which is thickened and nerved on the outer margin; seeds horizontal or ascending, laterally compressed; embryo variously oriented, with thin elongated spirally coiled or irregularly folded cotyledons.

**SUBORDER III. DODONÆÆ.** Fruit (in ours) a septicidal 3(2-4)-winged capsule; seeds exalbuminous. Flowers regular, appearing polygamous, but by abortion dioecious. Petals, when present, of the same number as the calyx-lobes. Disk (in ours) obsolete. Erect shrubs; the American with simple alternate oblong or narrower leaves.

**3. DODONÆA.** Flowers small. Petals 0. Calyx 3-5-lobed. Stamens 5 to 8 or rarely more numerous; filaments short; anthers innate. Carpels 3 or 4; styles united to or nearly to the apex; ovary sharply angled, 3-4-celled; cells 2-ovuled; placenta on the axis; the upper ovule of each pair ascending, the lower pendulous.

**SUBORDER IV. SAPINDEÆ.** Flowers irregular or (in *Sapindus*) sub-regular, appearing polygamous, but not truly perfect. Sepals or calyx-lobes 4 or 5. Petals often of unequal number, the posterior one commonly reduced or absent. Disk present, variously developed. Fruit capsular, or more or less deeply divided into samaroid or rarely baccate carpellary lobes. Seeds exalbuminous. Leaves alternate, pinnately or ternately compound.

\* Fruit a 3-celled septicidal or septifragal capsule of mostly 3 samaroid carpels more or less coherent about the axis: flowers irregular: shrubby climbers.

**4. URVILLEA.** Sepals 5. Capsule papery, 3-angled and 3-winged, septicidal or septifragal; wings thin, of nearly equal breadth from the base to the summit. Leaves ternate. Otherwise as in the next.

**5. SERJANIA.** Flowers zygomorphous. Sepals 5 (or 4). Petals 4, appendaged. Stamens 8. Disk present, somewhat irregular, bearing 2 larger upper and 2 smaller lower glands. Fruit with 3 turgid at length separable seminiferous often reticulated or tomentulose lobes at the summit, each extended downward along the axis into a semi-ovate or very rarely semi-obovate or -oblanceolate wing. Inflorescences axillary and terminal, pedunculate and subtended by 2 or 3 recurved and coiling tendrils. Leaves mostly biternate.

\* \* Fruit a bladdery inflated loculicidal capsule: tendriferous herbaceous climber with biternate leaves. Ovules solitary in the cells.

**6. CARDIOSPERMUM.** Flowers zygomorphous. Sepals 5 or more commonly, by the union of 2 of them, reduced to 4, these broad and very obtuse, in two unequal pairs. Petals 4, alternating with the sepals, imbricated in the bud, each bearing from near the base an irregular somewhat unguiculate winglike or hooked appendage; the appendages of the upper petals being larger. Disk extra-stamineal, bearing opposite each of the upper petals a short and rounded or long-cornute gland. Stamens 8, deflexed. Seeds exarillate, black with light-colored scar.

\* \* \* Fruit of 1 to (rarely) 3 indehiscent baccate wingless rounded carpellary segments: flowers regular or nearly so (sepals often somewhat unequal): our species trees or erect shrubs.

+ Ovules solitary in the cells.

**7. SAPINDUS.** Sepals 5, obtuse, rarely petaloid. Petals usually of the same number, more or less pubescent, and bearing just above the short claw a villous or ciliated comb or appendage. Disk annular, commonly crenate, bearing the 8 (to 10) stamens. Seeds exarillate, with bony testa, black or nearly so.

+ + Ovules 2 in each cell, but fruit by abortion 1-celled, 1-seeded.

**8. EXOTHEA.** Calyx deeply 5-parted, tomentulose; segments rounded, imbricated, at length reflexed. Petals 5, unappendaged, slightly unguiculate. Ovary 2-celled; ovules a pair in each cell, collateral, somewhat pendulous. Fruit 1-celled, 1-seeded; embryo with very thick cotyledons and short radicle.

9. **HYPELATE.** Sepals 5, subglabrate, rounded, imbricated. Petals 5, unappendaged, sessile. Ovary 3-celled; ovules 2 in each cell, superposed, the upper ascending, the lower somewhat pendulous. Fruit 1-celled, 1-seeded; embryo with thin somewhat crumpled cotyledons incumbent upon a long radicle.

\* \* \* \* Fruit a coriaceous 3-valved loculicidal capsule: tree or erect shrub with pinnate leaves and showy zygomorphous flowers: ovary and capsule stipitate.

10. **UNGNADIA.** Calyx deeply 5-parted; segments imbricated in the bud. Petals mostly 4, obovate-spatulate, unguiculate, each with a bushy crest at the summit of the woolly-pubescent claw. Disk thin, obliquely developed, bearing the stamens and closely enveloping and adnate to the stipe-like base of the ovary. Stamens mostly 8, unequal, much exserted in the ♂ flowers, in the ♀ shorter than or about equalling the petals. Seeds by abortion solitary in the cells, brown, smooth and shining, carunculate-appendaged at the broad hilum.

**SUBORDER V. HIPPOCASTANÆ.** Flowers irregular, polygamous, showy. Sepals or calyx-lobes 5. Petals 5 (or 4), unguiculate. Leaves opposite, palmately 5-9-foliolate.

11. **ÆSCULUS.** Calyx cup-shaped or tubular, usually unequal and gibbous. Petals hypogynous, irregular, unappendaged. Stamens 5 to 8, usually 7, declined, exserted (at least in sterile flowers). Ovary 3-celled; cells each with a pair of superposed ovules. Fruit capsular, loculicidal; cells by abortion mostly only 1 or 2, and 1-seeded; the valves thick, coriaceous, often spinescent or spiny. Seeds large, brown, smooth and shining, with large dull white hilum.

1. **STAPHYLÉA, L.** **BLADDER-NUT.** (Σταφυλή, a bunch of grapes, referring to the clustered flowers and fruit. The name as first applied by Tournefort was *Staphylodendron*.) — Shrubs with opposite stipulate pinnate 3-7-foliolate leaves, nodding racemosely or cymosely paniculate white flowers, and strongly inflated 3 (or rarely 2)-lobed capsules. — Spec. i. 270; Lam. Ill. t. 210; Schk. Handb. t. 84; Deless. Ic. iii. t. 51; Gray, Gen. Ill. ii. 191, t. 172; Benth. & Hook. Gen. i. 412; Zabel, Gartenfl. xxxvii. 498-504, 527-531; Pax in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 260. *Staphylodendron*, Tourn. Inst. 616, t. 386. *Staphyllodendron*, Scop. Fl. Carn. ed. 2, i. 223. *Bumalda*, Thunb. Fl. Jap. 8. — A small genus of some eight species; one European, three or four Asiatic (often cult. for ornament and frequently hybridized), one Mexican, and the following.

**S. trifolia, L.** A neat shrub, 6 to 12 feet high, with green branchlets and 3-foliolate pubescent or glabrate leaves: leaflets ovate, sharply acuminate, finely serrate, paler beneath: sepals oblong, greenish white: petals a little longer, sub-unguiculate, with broad pubescent claws: stamens and pistil scarcely or not at all exserted: filaments pubescent: the 3-horned bladderly capsules  $1\frac{1}{2}$  to 2 inches long. — Spec. i. 270; Torr. Fl. N. Y. i. 139, t. 19; Gray, Gen. Ill. ii. 192, t. 172; Chapm. Fl. 77. *S. trifoliata*, Schmidt, Arb. ii. t. 81. *Staphylodendron trifoliatum*, Moench, Meth. 65. — Rich moist soil, Lower Canada to Minnesota and southward to North Carolina, Tennessee, and Missouri, *Bush*; common; fl. May; fr. June; autumnal flowers and fruit also occur. Zabel's vars. *typica* & *pauciflora* (the latter based apparently upon cult. pl.) are not clearly distinguishable in the specimens at hand.

**S. Bolánderi, GRAY.** Leaves glabrous, 3-foliolate; leaflets broadly ovate-oblong or suborbicular, scarcely acuminate, finely serrate, paler beneath, thickish (at least of firmer texture than in preceding): stamens and pistil much exserted nearly twice the length of the floral envelopes; filaments not always (as originally described) glabrous: fruit 15 to 18 lines in length, sharply 3-horned. — Proc. Am. Acad. x. 69; Brew. & Wats. Bot. Calif. i. 108; Sargent, Gard. & For. ii. 544, t. 142. — California, on McCloud's Fork, Shasta Co., *Bolander*, *Lemmon*; Fresno Co., *Parry*; also near Sequoia Mills (acc. to Brandegee); fl. April; fr. July; rare.

2. **ÁCER**, Tourn. **MAPLE**. (Classical Latin name for the maple.)—Trees or shrubs with firm white wood and copious saccharine sap. Leaves opposite, in ours palmately lobed or divided, except in § *Negundo*, where pinnate. Fruits with supernumerary carpels are frequent in many species.—Inst. 615, t. 386; L. Gen. no. 317; Gray, Gen. Ill. ii. 199, t. 174; Benth. & Hook. Gen. i. 409; Pax in Engl. Jahrb. vi. 287–374, vii. 177–272, xi. 72–83, & in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 269; Wesmael, Bull. Soc. Bot. Belg. xxix. 17–65. Sargent, Silv. ii. 79–113, t. 82–97; Schwerin, Gartenfl. xlii. 161, *et seq.*; Trelease, Rep. Mo. Bot. Gard. v. 88–106, t. 4–16 (showing also winter state); Beal, Sugar Maples of Centr. Mich. (reprint from Rep. Sec. Agric. Mich. xxxiii).—About seventy species, nearly confined to the N. Temperate Zone; more than half of them of E. Asia. In China and Japan the foliage of certain species shows remarkable departures from the stellate lobing so characteristic in most of our own maples. Not only do ovate or oblong pinnately veined leaves occur, but in some species pedately or sub-pinnately 3-foliolate leaves, wholly invalidating the foliar distinction of *Negundo*,—a group not well separable generically by the absence of the disk, this being in some cases obsolete in *Acer* proper.

A. **PLATANÓIDES**, L. Spec. ii. 1055, the **NORWAY MAPLE**, frequently planted as a shade tree and said to be occasionally self-sown, is of a section not represented in our flora, and may be recognized by its close dark *Tilia*-like bark, large 5-lobed sinuately sharp-toothed leaves, and very large fruit spreading 3 or 4 inches from tip to tip of the divaricate wings. (Cult. from Eu., Asia.)

§ 1. **SPICÁTA**, Pax (extended). Flowers polygamous, in racemes or racemiform panicles: both floral envelopes present; disk well developed.—Pax in Engl. Jahrb. vi. 326.

\* Petals narrow, much exceeding the short-ovate sepals: inflorescences at first erect or ascending.

A. **spicátum**, LAM. (**MOUNTAIN MAPLE**.) A shrub or small tree, seldom 25 feet in height, with thin smooth bark: branchlets tomentulose when young but soon quite glabrate: leaves rather small, of soft texture, with 3 principal acuminate lobes, and often two shorter ones near the cordate or subcordate base, rather sharply serrate-dentate, above glabrate, green, and with furrowed veins, the lower surface paler, tomentose or very tardily glabrate (except the tufted axils of the veins): flowers small and numerous in terminal slender-peduncled racemiform panicles; pedicels spreading, 3 to 5 lines in length at anthesis: petals spatulate, thrice the length of the pubescent sepals: stamens about 8, regular and symmetrical, or all more or less strongly deflexed: ♂ flowers with hairy rudimentary pistil: disk of nearly separate glands alternating with and somewhat external to the filaments: fruit at maturity about an inch broad; the outer margins of its divergent wings making an angle of about 90°.—Dict. ii. 381; Audubon, Birds Am. t. 134; Torr. & Gray, Fl. i. 246; Chapm. Fl. 80; Emerson, Trees & Shrubs Mass. ed. 2, ii. 567, with plate; Sargent, Silv. ii. 83, t. 82, 83; Gray, Pl. For. Trees N. A. t. 25. *A. Pensylvanicum*, Du Roi, Diss. 61; Wang. Nordam. Holzart. 82, t. 12, f. 30; not L. *A. parviflorum*, Ehrh. Beitr. iv. 25, vi. 40. *A. montanum*, Ait. Kew. iii. 435; Michx. Fl. ii. 253; Guimp. Otto & Hayne, Abbild. Holzart. 59, t. 48; Hook. Fl. Bor.-Am. i. 111.—Preferring rocky soil in open woods, Newfoundland, S. Labrador, and Nova Scotia to the mountains of N. Carolina and Georgia and northwest to Winnipeg, the Saskatchewan, and even the shores of Hudson Bay; fl., acc. to locality, May to July; fr. July, August. A variety in E. Asia has 5–9-lobed more deeply serrate leaves.

\* \* Petals and sepals rather broad, subequal in length: inflorescences drooping or pendulous.

+ Fruit glabrous: species of the Eastern States and Mississippi Valley.

**A. Pennsylvanicum**, L. (STRIPED MAPLE, MOOSEWOOD.) Shrub or small tree with smoothish longitudinally striped bark: leaves large, thin, dark green, glabrous above, scarcely paler and tawny pulverulent-puberulent beneath, finely, sharply and somewhat doubly serrate all around, rounded or somewhat cordate at the base; lobes 3 to 5 sharply or caudately acuminate; flowers large, rather few in the simple flexuous racemes; pedicels slender, scarcely spreading: petals pale green, obovate, slightly exceeding the oblong acutish sepals: filaments inserted outside the crenate disk: no rudimentary pistil in the ♂ flowers: fruit at maturity  $1\frac{1}{2}$  to 2 inches in breadth; the outer edges of the wings making a very obtuse angle. — Spec. ii. 1055 (as *Pennsylvanicum*); Michx. Fl. ii. 252; Torr. & Gray, Fl. i. 246; Gray, Gen. III. ii. 200, t. 174, f. 1-4; Emerson, l. c. 566, with plate; Sargent, Silv. ii. 85, t. 84, 85. *A. Canadense*, Marsh. Arb. 3. *A. striatum*, Du Roi, Diss. 58; Michx. f. Hist. Arb. Am. ii. 242, t. 17. — Shaded situations protected by other trees, Nova Scotia, New Brunswick, and Lower Canada to Minnesota and south to the mountains of Georgia; fl. May, June; fr. July, August. Several nearly related species in E. Asia.

+ + Body of fruit soft- or more or less arachnoid-tomentose at length glabrate: gerontogeous species frequently planted.

**A. PSEUDO-PLATANUS**, L. Spec. ii. 1054, the SYCAMORE MAPLE, with thickish 5-lobed bluntly serrate leaves dark green above and much paler beneath, is common in cultivation, and self-sown seedlings are sometimes found in parks, on lawns, &c., of cities. (Cult. from the Old World.)

+ + + Body of the fruit hirsute: species of the West.

**A. macrophyllum**, Pursh. A tall tree with thick rough and furrowed bark: younger parts with a milky juice: leaves large, of firm texture, deeply (3-5)-parted, at first soft-pubescent, later quite glabrate above and with only a microscopic puberulence beneath, reticulate-veiny; the lobes with 1 to 5 coarse irregular teeth, the margins otherwise entire: racemes rather many-flowered: anthers sagittate; filaments pubescent at the base, inserted above (within) the disk: fruit very large, wings (each 1 to 2 inches long) diverging mostly at an acute rarely obtuse angle; the body of the carpels large, upwardly bristly with stiff tawny hairs. — Fl. i. 267; Nutt. Sylv. ii. 77, t. 67 (by error numbered 68); Hook. Fl. Bor.-Am. i. 112, t. 38; Torr. & Gray, Fl. i. 246; Torr. Pacif. R. Rep. iv. 74, & Bot. Mex. Bound. 47; Brew. & Wats. Bot. Calif. i. 107; Sargent, Silv. ii. 89, t. 86, 87. *A. palmatum*, Raf. New Fl. Am. i. 48, not Thunb. — Preferring rich soil near streams, in the Sierra Nevada and on the Pacific Coast from Alaska to S. California; fl. April, May; fr. June to September. Specimens with 3-5-carpelled fruits have been found in Washington by *Suksdorf*.

§ 2. **GLÁBRA**, Pax. Flowers polygamous, with both calyx and corolla: inflorescence umbelliform or corymbose; pedicels slender: disk well developed. — Pax in Engl. Jahrb. vi. 327.

\* Petals flat, about equalling the sepals: leaves 3-5-lobed or palmately 3-foliolate.

**A. glábrum**, Torr. Shrub or small low-branching tree with smoothish bark: branchlets glabrous, light brown: leaves mostly rather small, glabrous except for a sparse tawny pulverulence more or less persistent especially upon the veins beneath, 3(-5)-lobed or often upon the same trees or branches 3-foliolate; lobes or leaflets unequally and somewhat incisely serrate, acute or obtusish: inner bud-scales lance-oblong, soft-pubescent on the upper surface, roseate, usually tipped with a rudimentary lamina: inflorescences few-flowered, in anthesis short, spreading or nodding: petals rather narrow, spatulate-oblong, veiny, about equalling the oblong sepals: stamens about 8, shorter than or barely equalling the floral envelopes; filaments borne in sockets of the disk: rudiment of pistil in ♂ flowers none: fruit strongly and irregularly rugose; wings diverging at an acute or right angle. — Ann. Lyc. N. Y. ii. 172; Torr. & Gray, Fl. i. 247, 684; Nutt. Sylv. ii. 86; Wats. Bot. King Exp. 52; Brew. & Wats. Bot. Calif. i. 107; Sargent, Silv. ii. 95, t. 89. *A. Douglasii*, Hook. Lond. Jour. Bot. vi. 77, t. 6. Var. *TRIPARTITUM*, Pax (in Engl. Jahrb. vii. 218; *A. tripartitum*, Nutt. in Torr. & Gray, Fl. i. 247, & Sylv. ii. 85, t. 71), is a form having leaves mostly although inconstantly 3-foliolate. — Rocky ground, in woods and along streams, mountains of Colorado, New Mexico, and Arizona, to S. Central California, Brit. Columbia, and

Alberta, *Macoun*; fl. May, June; fr. August, September. A species with strikingly variable foliage.

\* \* Petals cucullate, considerably shorter than the sepals: leaves mostly 7-9-lobed.

**A. circinatum**, PURSH. (VINE MAPLE.) A small tree or low spreading or even prostrate shrub, with smoothish brown bark: branchlets glabrous or very early glabrate: leaves of nearly orbicular outline, cordate or subtruncate at the base, and with 5 to 11 short ovate acute or acuminate, sharply serrate lobes, at first villous, at maturity quite glabrous except for a tuft of hairs on the upper surface at the very base where the principal nerves diverge: the inner bud-scales very large, 1 to 2 inches in length, broadly spatulate, soft-pubescent, usually rose-colored, somewhat persistent: flowers in nodding or pendulous subsessile or peduncled corymbs: sepals oblong, purple or red: petals small, greenish, ovate, acutish, with strongly inflexed margins: segments of the fruit very widely spreading or commonly divaricate. — Fl. i. 267; Nutt. Sylv. ii. 80, t. 68 (by error numbered 67); Torr. & Gray, Fl. i. 247; Hook. Fl. Bor.-Am. i. 112, t. 39; Brew. & Wats. Bot. Calif. i. 107; Sargent, Silv. ii. 93, t. 38. *A. virgatum*, Raf. New Fl. Am. i. 48. — Rich soil, by streams and in woodland, N. Central California to Brit. Columbia; fl. April, May.

§ 3. **RÚBRA**, Pax. Flowers appearing before the leaves, polygamous, monœcious, or diœcious, with or without petals; the ♂ flowers subsessile or short-pedicelled in capitate or subcapitate clusters; ♀ flowers in sessile umbels. disk rudimentary or obsolete: leaves simple, glaucous beneath. — Pax in Engl. Jahrb. vi. 326, & in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 326. — **SOFT MAPLES.**

\* Petals present nearly or quite equalling the almost distinct sepals.

**A. rubrum**, L. (RED or SCARLET MAPLE.) A tree mostly of small or medium size, but sometimes becoming 3 feet or more in diameter, and 80 to 100 feet in height: bark at length rather thick and deeply fissured, dark gray; the branchlets grayish brown, nearly or quite glabrous: leaves 3-5-lobed, usually rather small, cordate with a narrow sinus, or with rounded base, soon glabrate and bright green above, very pale and often with a somewhat persistent tomentum beneath; lobes triangular-ovate, acute or acuminate, rather evenly serrate, seldom incised: flowers usually red, rarely (in the formal var. *pallidiflorum*, Pax) dull or yellowish green, pedicellate, but in anthesis aggregated in close subcapitate umbels; these terminal on short branchlets or sessile in the upper axils of the last year's leaves: petals narrower than sepals: ovary nearly or quite glabrous; fruit long-pedicelled, pendulous, glabrous, usually red; carpels seldom exceeding an inch in length; wings when immature subparallel, later diverging at an acute or right angle. — Spec. ii. 1055; Ehrh. Beitr. iv. 23; Schmidt, Oestr. Baum. i. 10, t. 6; Michx. f. Hist. Arb. Am. ii. 210, t. 14; Wats. Dendr. Brit. ii. t. 169; Emerson, Trees & Shrubs Mass. ed. 2, ii. 551, with plate; Sargent, Silv. ii. 107, t. 94; Gray, Pl. For. Trees N. A. t. 20. ? *A. glaucum*, Marsh. Arb. 2. ? *A. Carolinianum*, Walt. Car. 251. *A. coccineum*, Michx. f. l. c. 203. *A. microphyllum*, & *A. semi-orbiculatum*, Pax in Engl. Jahrb. vii. 180, 181 (both treated as subspecies by Wesmael, l. c. 29), are founded on trivial differences chiefly of the very variable foliage. Vars. *eurubrum* (typical), *sanguineum*, & *clausum*, Pax, l. c. 181, 182, have scarcely a formal value. — Rich woodland, Newfoundland to Central Florida and Louisiana, northwest to Winnipeg, E. Dakota (acc. to Sargent), and Nebraska. A species of neat and attractive appearance at all seasons but in early autumn becoming (especially in the Eastern States) very conspicuous by its bright scarlet foliage. Sterile specimens of a noteworthy form with ovate-lanceolate serrate but scarcely lobed leaves, entire at the base, has been collected in Florida by Chapman. Toward the south and southwest the species passes into

**Var. Drummondii**, TORR. & GRAY. Leaves rather large for the species (often 4 to 5 inches in length and breadth) and rather more deeply 3-lobed, densely tomentose beneath: fruit decidedly larger than in the typical form; wings  $1\frac{1}{2}$  to  $1\frac{3}{4}$  or (acc. to Sargent) even 2 to  $2\frac{1}{2}$  inches in length. — Fl. i. 684 (*Drummondii* parenthetical but apparently used as a varietal name); Sargent, U. S. 10th Census, ix. 50, & Silv. ii. 109, t. 95. *A. Drummondii*, Hook. & Arn. Jour. Bot. i. 200; Nutt. Sylv. ii. 83, t. 70. *A. rubrum*, var.  $\gamma$ , Hook. & Arn. l. c. 199. ? *A. rubrum*, var. *tomentosum*, Pax in Engl. Jahrb. vii. 182. — Louisiana, where first collected by Drummond, and Texas, north to Missouri, where leaves become

nearly glabrate (coll. *Bush*), and occasional in the Eastern Gulf States to Georgia (acc. to Sargent).

\* \* Petals minute or more commonly none: calyx of the ♂ flowers a narrow turbinate cup, merely crenate-toothed.

**A. saccharinum**, L., not Wang. (SILVER MAPLE.) In favorable situations becoming a large tree 4 or 5 feet in diameter and 60 or 80, or even 100 feet in height: trunk dividing at no great height into 2 to several large ascending branches, the ultimate branchlets somewhat pendulous: bark of the trunk and large branches gray, cortex of the branchlets reddish brown, lucid: leaves at first silky-tomentose, then puberulous and soon quite glabrate, incisely 3-5-lobed, being cleft two thirds of the way to the base, green above, very pale and glaucous beneath except on the veins; lobes again rather deeply and somewhat doubly incised, the outer pair, when present, much smaller than the others: bud-scales small, ovate to oblong, tomentose on the margins: flowers small, greenish yellow, appearing much before the leaves: filaments of the ♂ flowers very slender, much exceeding the calyx: fruit large, carpels at full maturity 2 inches in length, at first tomentose, later nearly or quite glabrate; the body strongly and longitudinally nerved; one carpel usually abortive or empty. — Spec. ii. 1055; Koch, Hort. Dendr. 80; Sargent, Gard. & For. ii. 364, & Silv. ii. 103, t. 93. *A. dasycarpum*, Ehrh. Beitr. iv. 24; Pursh, Fl. i. 266; Nutt. Sylv. ii. 87; Ell. Sk. i. 449; Emerson, Trees & Shrubs Mass. ed. 2, ii. 556, with plate; Sargent, U. S. 10th Census, ix. 49; Pax in Engl. Jahrb. vii. 179. *A. rubrum mas*, Schmidt, Oestr. Baum. i. 11, t. 7. *A. rubrum*, var. *pallidum*, Ait. Kew. iii. 434. *A. eriocarpum*, Michx. Fl. ii. 253; Michx. f. Hist. Arb. Am. ii. 205, t. 13. The Linnæan description and the still extant authentic specimen leave no doubt whatever of the application of the Linnæan name, which, notwithstanding the regrettable displacement of Waugenheim's later homonym, is here used consistently with the laws of specific nomenclature followed in other parts of this work. In no system of nomenclature can such unfortunate changes be altogether avoided and the Kew Rule certainly leads to as few as any. It may be noted that the name *saccharinum*, as here applied, is not wholly inappropriate, since the present species is regularly tapped in some localities and yields a fair quantity of sugar. — Rich woods, especially on river bottoms (hence sometimes called "Intervale Maple"), New Brunswick and Lower Canada to Florida and northwest to Dakota (acc. to Sargent); fl. February to April; fr. May to June, sometimes adhering until August. An attractive and rapid growing shade-tree, much cultivated, but unfortunately short-lived and subject to injuries from insects and ice. The seedling var. *laciniatum*, Sargent, l. c. 105 (the *A. laciniatum Weirii* of horticulturists), also much planted in eastern cities, has still more deeply cleft leaves with very narrow and elongated segments.

§ 4. **SACCHARINA**, Pax. Flowers appearing with or a little before the leaves, monochlamydeous, andro-monœcious, pendulous on filiform pedicels; these in fasciculate-umbels; the fertile at the ends of the branchlets; the sterile mostly lateral: calyx united into a 5-toothed cup: divaricate segments of the fruit strongly connate, seldom separating until after falling; wings more or less spatulate, subparallel to almost divaricate: leaves simple, 3-5-lobed, with rounded sinuses; the lobes entire, undulate or coarsely sinuate-dentate. — Pax in Engl. Jahrb. vi. 328. — SUGAR MAPLES, HARD MAPLES.

\* Species of the Atlantic Slope and Mississippi Valley: calyx promptly deciduous.

— Chiefly Northern: large trees, with grayish or almost black bark.

**A. saccharum**, MARSH. (SUGAR MAPLE, ROCK MAPLE.) Tall tree, in favorable situations becoming 100 feet or more in height and 2 to 4 feet in diameter; wood firm, heavy, fine-grained, white; bark pale to rather deep gray, in some individuals remaining close and firm, in others at length scaling off in large irregular flakes: leaves mostly 5-lobed, cordate with shallow open basal sinus; lobes sinuately 1-3-toothed; upper surface green; the lower more or less whitened or glaucous, often tomentulose; petioles mostly glabrous or nearly so; stipules none: pedicels and yellowish green flowers villous: calyx campanulate, obtusely toothed: disk of sterile flowers surrounding the insertion of the filaments: keys early gla-

brate, highly variable (mostly  $1\frac{1}{4}$  to  $1\frac{1}{2}$  inches long, with wings usually subparallel or only moderately spreading), not as yet furnishing trustworthy diagnostic characters. — Arb. 4; Britton, Cat. Pl. N. J. 78; Trelease, l. c. 93, t. 4. *A. saccharinum*, Wang. Nordam. Holzart. 26, t. 11, f. 26; Nouv. Duham. iv. 29, t. 8; Michx. f. Hist. Arb. Am. ii. 218, t. 15; Torr. & Gray, Fl. i. 248; Gray, Gen. III. ii. 200, t. 174; Emerson, Trees & Shrubs Mass. ed. 2, ii. 558, with plate; Gray, Man. ed. 1-6; not L. *A. barbatum*, Michx. Fl. ii. 252, only in part (see Torr. & Gray, Fl. i. 684); Sargent, Gard. & For. ii. 364, & Silv. ii. 97, t. 90. *A. saccharophorum*, Koch, Dendr. i. 533. *A. saccharinum*, var. *pseudo-platinoides*, Pax in Engl. Jahrb. vii. 242. *A. palmifolium*, var. *pseudoplatanoides*, Schwerin, Gartenfl. xlii. 455, but probably not *A. palmifolium*, Borkh. — A well known and valuable forest tree, ranging from Newfoundland to the Lake of the Woods (acc. to Sargent), Nebraska, E. Texas, and the uplands of the S. Atlantic States, but at the South largely replaced by the nearly related species (or varieties) described below. The firm durable wood is much used in manufactures, the irregular grained varieties, "Curly and Bird's-eye Maples," being especially prized for cabinet work. This species also furnishes the largest amount of maple sugar and syrup. In New England and along the Great Lakes the foliage in autumn turns intense scarlet to deep crimson, while in the middle West the color varies from yellow to bright orange or claret which soon fades to brown. From Maine (*Fernald*) to Tennessee, Missouri, and Michigan occurs a sometimes well marked but not always separable form, the var. *BARBATUM*, Trelease (l. c. 94, t. 6; *A. Rugelii*, Pax in Engl. Jahrb. vii. 243; *A. saccharinum*, subsp. *Rugelii*, Wesm., l. c. 61; but probably no part of *A. barbatum*, Michx.), with mostly 3-lobed leaves (also pale beneath) of firm or at length chartaceo-coriaceous texture, and with lobes subentire. However, as Professor Beal has pointed out, such leaves sometimes occur upon the upper branches of trees which below have foliage of the typical form. Better marked is

**Var. *nigrum*, BRITTON.** (BLACK MAPLE.) Bark darker colored: leaves mostly large and limp, 3-5-lobed; lobes entire or nearly so; the basal sinus inclining to be closed by the approximate or even imbricated basal lobes; lower surface yellowish green, soft-downy, not glaucous, and scarcely paler than the upper: wings of the fruit variable, yet inclining to be more widely divergent. — Trans. N. Y. Acad. Sci. ix. 10. Trelease, l. c. 96, t. 7. *A. saccharinum*, Michx. Fl. ii. 252 (acc. to Gray), not L., nor Wang. *A. nigrum*, Michx. f. Hist. Arb. Am. ii. 238, t. 16; Bailey, Pop. Gard. iii. 24, & Bot. Gaz. xiii. 214. *A. saccharinum*, var. *nigrum*, Torr. & Gray, Fl. i. 248; Gray, Man. ed. 1-6. *A. barbatum*, var. *nigrum*, Sargent, Gard. & For. iv. 148, f. 27, & Silv. ii. 99, in part, but syn. *A. Rugelii* wrongly included and foliage on t. 91, if of this var., highly uncharacteristic, as will be seen on comparison with orig. plate of Michx. f. *A. palmifolium*, var. *concolor*, Schwerin, l. c. 457, f. 95, nos. 6, 7. — Montreal, *Jack*, and Vermont, *Robbins*, *Pringle*, to Minnesota, Arkansas, Kentucky, S. Virginia, and probably somewhat farther southward in the mountains; common and also valued as a lumber and sugar tree; in some places appearing very distinct from the type, in others passing into dubious intermediates. Conspicuous but inconstant foliaceous stipules are sometimes developed, especially westward.

— — Southern, mostly smaller sized: bark white.

**A. Floridanum, PAX.** A small tree (acc. to Chapman) or sometimes becoming 3 feet in diameter (acc. to Small), with "chalky-white" bark: leaves rather small, 2 or 3 inches in diameter, somewhat broader than long, divided about to the middle into 3 to 5 obtuse lobes with few and blunt teeth; base truncate or shallowly open-cordate; upper surface dark green-glabrous, and lucid; the lower more or less whitened and varying from puberulent to densely canescent-tomentose: flowers (acc. to Chapman) appearing before the leaves: keys variable but in most individuals much smaller than in *A. saccharum*; the seminiferous portion covered with sparse at length deciduous setous pubescence; wings mostly widely spreading. — Pax in Engl. Jahrb. vii. 243; Schwerin, l. c. 457; Trelease, l. c. 98, t. 8; Small, Bull. Torr. Club, xxiv. 64. *A. saccharinum*, var. *Floridanum*, Chapm. Fl. 81. *A. barbatum*, var. *Floridanum*, Sargent, Gard. & For. iv. 148, & Silv. ii. 100, t. 91. *A. saccharum*, var. *Floridanum*, Small & Heller, Mem. Torr. Club, iii. 24; Sudworth, Rep. U. S. Dep. Agric. 1892, 325. — Swamps and river banks, North Carolina to Florida, E. Texas, *Sargent*, and (acc. to Trelease) Arkansas. Very characteristic in its more typical form, yet near *A. grandidentatum* on the one hand and northward inclining to pass into *A. saccharum*, var. *barbatum*, Trelease.

**A. leucodérme**, SMALL. Tall shrub or small tree, becoming 25 feet high and 18 inches in diameter, commonly dividing near the base; bark close and white, not exfoliating: twigs dull red, soon becoming gray: leaves rather small as in the last, 3 (to somewhat 5)-lobed; lobes caudate-acuminate, coarsely and sinuately 1-3-toothed or undulate; upper surface dark dull green; lower surface yellowish green (not at all glaucous), velvety-tomentulose and exceedingly soft to the touch; base subtruncate or shallowly cordate with a narrow sinus: seminiferous part of the key sparingly setulose, at length glabrate; wings commonly but not always widely divergent, sometimes almost divaricate. — Bull. Torr. Club, xxii. 367, xxiv. 64. *A. Floridanum*, var. *acuminatum*, Trelease, l. c. 99, t. 11. — Walls of gorges, &c., North Carolina, Hunter, Small, to Florida and Louisiana, Hale.

\* \* Western species: leaves rather small, fully as broad as long; lobes coarsely and obtusely toothed or undulate: young branchlets rather deep glossy red: calyx tending to persist at the base of the young or even mature fruit.

**A. grandidentátum**, NUTT. Tall shrub or small tree with trunk seldom over a foot in diameter and branches covered with pale thin bark: leaves of rather firm texture, 2 or 3 inches in diameter, 3 (to somewhat 5)-lobed, above glabrous, often shining, pale green and finely reticulated, below paler (yet not canescent) and covered with a fine tomentum; lobes rarely subentire, more often undulate-dentate with large blunt teeth; base mostly cordate: filiform pedicels and obtusely 5-toothed campanulate calyx villous: wings 8 to 12 lines long, somewhat divergent; the body (at least when young) setulose. — Nutt. in Torr. & Gray, Fl. i. 247, & Sylv. ii. 82, t. 69; Wats. Bot. King Exp. 52; Trelease, l. c. 104, t. 13. *A. barbatum*, var. *grandidentatum*, Sargent, Silv. ii. 100, t. 92. — Wooded valleys in the Rocky Mts. from N. Montana, where first coll. by Nuttall, to Arizona and W. Texas. (Northern Mex., Palmer, Hartman.) A geographical species without very strong technical distinctions; rather rare and local. Although scarcely distinct from the Rock Maple of the East this species is by Pax and Wesmæel unaccountably referred to another section of the genus.

§ 5. **NEGÚNDO**, Koch. Flowers strictly diœcious, neither the ♂ nor ♀ with rudimentary organs of the other: disk obsolete: petals none: stamens 5, episepalous; anthers linear, appendaged or mucronate at the tip: leaves pinnately 3-7 (or even 9)-foliolate. — Dendr. i. 543. *Negundo*, Mœnch, Meth. 334. *Negundium*, Raf. in Desv. Jour. Bot. ii. 170 (1809).

**A. Negúndo**, L. (BOX ELDER.) A widely branched tree 30 to 50 rarely 75 feet in height, seldom more than 2 or 3 feet in diameter: bark light colored, considerably fissured but of close firm texture: branchlets and young shoots pale green turning brown, glabrous or covered with a very fine close puberulence: leaflets ovate-lanceolate, mostly acuminate, coarsely and unequally serrate-dentate from below the middle, light green above, somewhat paler and finely pubescent on the veins beneath; terminal leaflet always and lateral usually petiolulate: bud-scales villous: flowers small, green, on slender pedicels, drooping, the ♂ fascicled, the ♀ in somewhat elongated racemes: fruit cuneate at the base; carpels at maturity inch to inch and a half in length, with rather narrow body, a third to half the length of the broad incurved wing. — Spec. ii. 1056; Wang. Nordam. Holzart. 30, t. 12, f. 29; Michx. Fl. ii. 253; Guimp. Otto & Hayne, Abbild. Holzart. 118, t. 95; Sargent, Silv. ii. 111, t. 96. *A. (Negundo) fraxinifolium*, Nutt. Gen. i. 253. *Negundo aceroides*, Mœnch, Meth. 334; Torr. & Gray, Fl. i. 250; Gray, Gen. III. ii. 202, t. 175, & Man. ed. 1-6. *N. trifoliatum*, & *lobatum*, Raf. New Fl. Am. i. 48. *N. Negundo*, Karsten, Deutsch. Fl. 596. *Negundium fraxinifolium*, Raf. Med. Rep. hex. 2, v. 352. *Rulac Negundo*, Hitchcock, Spring Fl. Manhattan, 25. — A widely distributed tree, common especially westward, N. Vermont to Connecticut, Central New York, and Ontario south to Florida and across the continent to California. (Mex.) Passing into var. **TEXÁNUM**, Pax (in Engl. Jahrb. vii. 212, in great part; *A. Californicum*, var. *Texanum*, Pax, l. c. xi. 75), a form with tomentulose branchlets and somewhat more soft and copiously pubescent leaflets, occurring in Texas, Lindheimer, and a very similar northern form (ranging through Ontario and Assiniboia, Macoun, to Montana, Scribner) with hoary-tomentulose branchlets. Both of these forms serve to connect the type with

**Var. Califórnicum**, WESMÆEL. Bark "darker": branchlets tomentulose: leaves



3-foliate, covered, especially beneath, with a more or less pronounced and persistent tomentum; leaflets more coarsely toothed: fruit also tomentulose. — Bull. Soc. Bot. Belg. xxix. 43 (as subsp.); Sargent, Gard. & For. iv. 148. *A. Californicum*, Dietr. Syn. ii. 1283. *Negundo Californicum*, Torr. & Gray, Fl. i. 250, 684; Hook. & Arn. Bot. Beech. 327, t. 77; Nutt. Sylv. ii. 90, t. 72. *N. aceroides*, Torr. Pacif. R. Rep. iv. 74, &c., not Mœnch. *N. aceroides*, var. *Californicum*, Sargent, l. c. ii. 364. — River banks, &c., Central California, together with but much more common than a smoothish 3-foliate form indistinguishable from the type.

*A. SERRÁTUM*, Pax (in Engl. Jahrb. vi. 296 *et seq.*; *Negundo Mexicanum*, DC. Prodr. i. 596; *A. Mexicanum*, Pax, l. c. vii. 212, not Gray), is a nearly related species of S. Mexico and Centr. America, characterized by an even sharp serration of its caudate-acuminate leaflets. After applying the name *A. Mexicanum* to this species, notwithstanding the earlier use by Dr. Gray of the same combination for a species of *Acer* proper, Professor Pax appears to have confused the two, as he refers (in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 271) to an "*A. Mexicanum* (DC.) Gray."

3. *DODONÆA*, L., not Plum. (*Rembert Dodoens*, Flemish botanist, 1517(?) to 1585, archiater at the German imperial court, and author of the Cruydeboek.) — Shrubs and small trees with alternate oblanceolate to linear entire or (in Madagascar and Australia) toothed or pinnate leaves, commonly with glands emitting a viscous resinous or varnish-like exudation. Flowers diœcious, apetalous, anomalous in the obsolete disk. — Gen. no. 855; Lam. Ill. t. 304; Cav. Ic. t. 327; DC. Prodr. i. 616; Gray, Gen. Ill. ii. 217, t. 182; Benth. Fl. Austr. i. 472; Benth. & Hook. Gen. i. 410; Radlk. in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 356. *Empleurosma*, Bartl. in Lehm. Pl. Preiss. ii. 228. — A difficult and chiefly Australian genus, of which a single highly polymorphous and widely distributed species attains our southern borders.

*D. viscósa*, JACQ. Glabrous viscid shrub, 4 to 12 feet high: branchlets covered with reddish shredded bark: leaves very variable in breadth, entire, finely pinnately veined, cuneate to short petioles, resinous-dotted on both surfaces, scarcely paler beneath: flowers small, greenish, at length slender-pedicelled in short axillary or terminal racemes: capsules 6 to 10 lines broad, nearly as long, broadly 3-winged, notched at the apex and more or less cordate at the base: seeds dark-colored, only one maturing in each cell. — Enum. Pl. Carib. 19; L. Mant. ii. 228; DC. l. c.; Gray, l. c. *D. Burmanniana*, DC. l. c. *D. Schiediana*, Schlecht, Linnaea, xviii. 49; Torr. Bot. Mex. Bound. 48. — Very widely distributed in warm countries and in the Southern Hemisphere, variable but with ill-defined forms. The commoner more typical form (var. *VULGARIS*, Benth. l. c.) with leaves lanceolate, acute or acutish, and capsule mostly large with deep narrow notch at the summit, is common in Mexico and approaches the Lower Rio Grande, *Berlandier*, no. 2359. Within our limits are the following foliar varieties.

**Var. spatuláta**, BENTH. l. c. 476. Leaves oblong-spatulate, relatively broad, very obtuse, rounded, or often retuse and mucronulate at the apex: capsule of the type. — *D. spatulata*, Smith in Rees, Cycl. xii. — Sandy soil, Florida, on the Indian River, &c., Garber, Curtiss, Hassler. (W. Ind., Australia.) *D. nana*, Shuttl. ined., is a small-leaved form of this, Florida, coll. *Rugel*.

**Var. angustifolia**, BENTH. l. c. Leaves linear or nearly so, acutish, somewhat thicker and paler than in the other varieties: capsules mostly smaller and with shallower more open sinus at the summit. — *D. angustifolia*, L. f. Suppl. 218. — Sandy soil, near streams, Arizona, in Santa Catalina Mts., *Pringle*; Ft. Lowell, *Lemmon*; Mescal Mts., *Jones*; fl. February to September; fr. adhering nearly throughout the year. (Sonora, *Thurber*, *Hartman*; Chihuahua, *Palmer*; and widely distributed with the broader-leaved forms.)

4. *URVÍLLEA*, HBK. (*Rear Admiral J. S. C. Dumont d'Urville*, born 1790, commander of a French antarctic exploring expedition, 1837–1840.) —

Slender shrubby climbers of tropical and subtropical America, only the most common species (of § *Physelytron*, Radlk., with inflated fruit) entering our flora on the Mexican border. Stems usually 3- or 6-grooved. Leaves alternate, 3-foliolate. Flowers small, whitish, in ours borne in subsessile or slender-peduncled axillary spikes; these commonly tendril-bearing at the base of the floriferous portion. — Nov. Gen. & Spec. v. 105, t. 440; Benth. & Hook. Gen. i. 392; Radlk. Sitzungs. Kgl. Bayer. Akad. 1878, 263, & in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 305, f. 158. — A small group, closely related to the large tropical genera *Serjania* and *Paullinia*, and distinguished from them chiefly by character of fruit.

**U. ulmácea**, HBK. l. c. 106. Tomentose: leaflets ovate, acute or acuminate, rarely obtusish, rounded or subcordate at base, unequally or somewhat doubly serrate,  $1\frac{1}{2}$  to 2 inches long, an inch wide, paler beneath: flowers scarcely more than a line in diameter: the 3-winged fruit about 8 lines in length, half or two thirds as broad. — Radlk. ll. cc. *U. Mexicana*, Gray, Pl. Wright. i. 38; Torr. Bot. Mex. Bound. 48; Coulter, Contrib. U. S. Nat. Herb. ii. 64. *U. triphylla*, Poir. in Lam. Ill. iii. 604 (*U. Berteriana*, DC. Prodr. i. 602), is, *fide* Radlk., only a smooth form, but does not reach our limits. — Cameron and Hidalgo Counties, Texas (acc. to Coulter, l. c.); fl. acc. to location almost throughout the year, but chiefly in the winter months. (Mex., *Berlandier*, *Eaton & Edwards*, *Gregg*, *Thurber*, *Pringle*; Centr. Am., U. S. of Colombia, Trinidad.)

**5. SERJÁNIA**, Plum. (Dedicated by Plumier to *Philip Sergeant*, a French monk of the 17th century, "skilled in botany, more skilled in medicine.") — Woody climbers with alternate biternate or rarely pinnate leaves, and pedunculate thyrsoid-paniculate clusters of small flowers. Inflorescences commonly subtended by recurving tendrils at the summit of the peduncles. — Nov. Gen. 34; Juss. Ann. Mus. xxiii. 476; DC. Prodr. i. 602; Benth. & Hook. Gen. i. 393; Radlk. Monogr. Sap. Gat. *Serjania* (a detailed and masterly treatment), & in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 302. — The largest genus of the order; occurring throughout tropical and subtropical America, and especially noteworthy for the complex structure of its rope-like stems.

\* Fruit rather large, 1 to  $1\frac{1}{2}$  inches long, obtuse at base, nearly smooth at maturity; wings broad, abruptly contracted at the base.

**S. incisa**, Torr. Climbing, 4 to 6 feet in height: leaves 3-divided; divisions 3-5-foliolate; leaflets inch long, usually somewhat rhombic in outline, toothed; flowers in racemiform panicles (an inch in length excl. the slender spreading peduncles): wings of fruit a third inch broad. — Bot. Mex. Bound. 47; Radlk. Monogr. Serj. 267. *S.* ? aff. *S. racemosa*, Gray, Pl. Wright. i. 38. — On the Rio Grande, *Wright* (without fruit and hence doubtful); near Eagle Pass, Texas, *Havard*; a second specimen secured by the latter collector from near the mouth of the Pecos River is only in flower, but probably of this species. (Northern Mex., where first coll. in Coahuila by *Bigelow*.)

\* \* Fruit rather short, broadly 3-winged, and cordate at base, nearly or quite glabrous; wings rounded.

† Seeds not wholly filling the somewhat chartaceous and inflated cells.

**S. racemósa**, SCHUMACHER. Shrubby climber, finely and rather densely pubescent to smoothish: leaves mostly biternate, or with the terminal division pinnately 5-foliolate: leaflets rhombic-ovate, acute or obtusish, mucronate, few-toothed,  $1\frac{1}{4}$  to  $1\frac{1}{2}$  inches in length: panicles racemose-thyrsoid,  $1\frac{1}{2}$  to 2 inches long, solitary at the axils, but approximate and forming more or less pyramidal inflorescences at the ends of the branches: peduncles nearly equalling the inflorescences, tendriliferous at the summit: fruit 6 to 8 (to 10) lines long, broadest near the cordate base. — Skrivt. Natur. Selsk. Kjöb. iii. pt. 2, 127, t. 12, f. 3 (1794);

Willd. Spec. ii. 465; Benth. Pl. Hartw. 15; Radlk. Monogr. Serj. 264. — Rio Grande, Mex., *J. Eights*, and throughout Mexico. The specimen collected by *Eaton & Edwards* at Monterey and ascribed to this species by Dr. Gray (Pl. Wright. i. 38) appears to be *S. macrococca*, Radlk.

+ + Seeds nearly or quite filling the cells; these of firmer texture.

**S. brachycarpa**, GRAY. Closely related to the preceding but with leaflets mostly smaller (6 to 10 lines long), thicker, and more densely tomentose beneath: racemes in flower not an inch in length, in fruit somewhat more elongated: fruit 5 or 6 lines long, fully as broad at the deeply cordate base. — Gray in Radlk. Monogr. Serj. 259. — Corpus Christi Bay, S. Texas, *Palmer*. (Northern Mex. at Victoria, Tamaulipas, where first coll. by *Berlandier*.)

**6. CARDIOSPÉRMUM**, L. (*Καρδιά*, heart, and *σπέρμα*, seed.) — Slender herbaceous or (in warm countries) slightly woody climbers with or without tendrils. Leaves alternate, biternate; leaflets usually incised. Peduncles usually bearing two short recurving tendrils near the umbelliform clusters of small slender-pedicelled flowers. — Syst. Nat. ed. 1, & Gen. no. 332; Gaertn. Fruct. i. t. 79; Lam. Ill. t. 317; Gray, Gen. Ill. ii. 215, t. 181; Benth. & Hook. Gen. i. 393; Radlk. Sitzungs. Kgl. Bayer. Akad. 1878, 260, & in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 306. — A small but rather confused genus; the commoner species widely distributed and often cultivated.

**C. Halicácabum**, L. (BALLOON VINE, HEARTSEED.) A graceful herbaceous climber with annual root, slender angulate-furrowed stem and smoothish or moderately pubescent leaves: leaflets more or less distinctly petiolulate and cut-toothed: petals whitish, about 2 lines long: upper glands of the disk short-oblong, transverse: fruit subglobose or somewhat obovate, rather large, usually an inch to inch and half in diameter; seeds glabrous, black, but marked with a conspicuous white heart-shaped scar. — Spec. i. 366; Michx. Fl. i. 242; Torr. & Gray, Fl. i. 254; Gray, l. c.; Chapm. Fl. 79. — Preferring moist soil and climbing over low shrubbery; Gulf States from E. Florida, where spontaneous about dwellings, *Curtiss*, and S. Florida, where apparently indigenous (acc. to Chapman), west to Texas, where certainly so; fl. and fr. throughout summer and autumn. (Mex., S. Am., Afr., E. Ind.) Often cultivated. The southwestern form is somewhat more pubescent and has leaflets of slightly firmer texture, thus showing some transition to

**C. Coríndum**, L. Perennial, suffrutescent at base: leaves and stems soft-tomentose: upper glands of the disk short, oblong, somewhat obliquely placed: seeds with semicircular rather than heart-shaped scar. — Spec. ed. 2, i. 526; Radlk. Sitzungs. Kgl. Bayer. Akad. 1878, 261. *C. molle*, HBK. Nov. Gen. & Spec. v. 103; Coulter, Contrib. U. S. Nat. Herb. i. 33, & ii. 65. — Common in Mexico, at Tamaulipas, *Berlandier*, &c., and W. Texas, Presidio County, and mountains west of Pecos (acc. to Coulter, ll. cc.).

**C. microcárpum**, HBK. With habit of *C. Halicacabum*, but sometimes a little woody toward the base: flowers minute: petals a line or less in length: fruit depressed-obovoid, 8 to 10 lines in diameter; seeds with a broad lunate rather than heart-shaped scar. — Nov. Gen. & Spec. v. 104; Griseb. Fl. W. Ind. 122. *C. Halicacabum*, var. *microcarpum*, Bl. Rumphia, iii. 185; Radlk. l. c. — Centr. and S. Florida, at Key West, *Rugel*, and in clayey soil of "hammocks," near Eustis, *Nash*. (W. Ind., S. Am., Afr., Pacif. Ids.)

**7. SAPÍNDUS**, Tourn. (*Sapo*, soap, and *Indus*, Indian, from the qualities of the W. Indian *S. Saponaria*, the soap-berry.) — Tropical and subtropical trees and shrubs with yellow wood, alternate exstipitate abruptly (rarely odd) pinnate leaves and small whitish flowers in lateral or terminal racemes or panicles. Fruit baccate, usually of a single maturing carpel and globose or nearly so, less frequently 2- or even 3-lobed through the development of one or both of the other carpels; seeds solitary in the carpels, large, nearly globose, exalbumi-

nous, with bony testa. — Inst. 659, t. 440; L. Gen. no. 898; Lam. Ill. t. 307; Gray, Gen. Ill. ii. 213, t. 180; Radlk. Sitzungs. Kgl. Bayer. Akad. 1878, 265, 315, & in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 315; Sargent, Silv. ii. 67, t. 74-77. — Of a dozen species, widely dispersed in warm countries, the following of the § *Eusapindus*, Radlk., are constituents of our southern flora.

**S. Saponária**, L. (SOAP-BERRY.) A small tree with rough grayish bark: leaves large, 4-7-foliolate; leaflets oblong-lanceolate and acute to elliptic-ovate and obtusish, opposite or alternate, entire, of firm texture, glabrous veiny and lucid above, tomentulose beneath; rhachis usually interruptedly winged: petals about equalling the sepals, scarcely unguiculate, with rounded blade pubescent on the inner surface and ciliated: fruit lucid, 6 to 8 lines in diameter. — Spec. i. 367; Descourt. Fl. Antil. iv. 121, t. 261; Baill. Hist. Pl. v. 349, f. 353; Chapm. Fl. ed. 2, 613; Sargent, Silv. ii. 69, t. 74, 75 (but leaves seldom so regularly imparipinnate). — S. Florida and Keys. (W. Ind., S. Am.) Specimens coll. by Simpson show that the compound leaves are in some cases replaced by long oblong-lanceolate subsessile simple ones, which by various transitions pass on the same shoot to the compound.

**S. marginátus**, Willd. A larger tree: leaflets more numerous (7 to 13), lance-oblong, acuminate, often somewhat falcate, glabrous and lucid above, slightly paler and essentially glabrous except on the midnerve beneath, 2 to 5 inches long, a fourth to a third as broad; the upper usually subopposite, the lower mostly alternate upon the wingless narrowly margined or marginless rhachis: flowers white, often with a reddish tinge, borne in ample pyramidal panicles: petals short-clawed; the ovate obtuse blade ciliated and bearing near the base inside a 2-lobed villous scale: filaments villous: fruit yellow; the 1 or 2 maturing carpels large, becoming 8 lines in length, more or less distinctly carinate dorsally, somewhat oblong, not truly spherical, not drying black. — Enum. 432; Muhl. Cat. 41; DC. Prodr. i. 607; Torr. & Gray, Fl. i. 255, as to pl. Ga. & Fla.; Nutt. Sylv. ii. 72, t. 65, numbered by error 66 (very poor), in part; Chapm. Fl. 79 (excl. westward range); Sargent, Silv. ii. 71, as to southeastern plant. *S. Saponaria*, Michx. Fl. i. 242; Pursh, Fl. i. 274; Ell. Sk. i. 460; not L. (Lamarck's figure is poor and dubious, but probably is of this species.) *S. falcatus*, Raf. Med. Bot. ii. 261. *S. acuminata*, Raf. New Fl. Am. iii. 22. *S. Manatensis*, Shuttl. in distr. pl. Rugel, no. 115, & Radlk. Sitzungs. Kgl. Bayer. Akad. 1878, 318, 400; Nash. Bull. Torr. Club, xxiii. 102. — Lowlands of Florida, chiefly near the coast, formerly collected in Georgia and S. Carolina, but no specimens from north of Jacksonville, Fla., are in the larger Amer. herbaria. Acc. to Radlkofer's critical notes (l. c. 394) *S. marginatus*, Willd., appears to be only a form of *S. Saponaria*; but this view has an inherent improbability, since, both from description and assigned range, Willdenow's not very satisfactory type is much more likely to appertain to the present species, which extends to E. and N. Florida, and not to *S. Saponaria*, which as all available evidence indicates is confined to the shore and keys of S. Florida, where the flora has a much stronger W. Indian cast.

**S. Drummóndi**, Hook. & Arn. Similar to and long confused with the foregoing species: leaflets in general more numerous (8 to 19), narrower, lanceolate, 1½ to 3 inches long, more often falcate, taper-pointed, glabrous above, soft-pubescent or very tardily glabrate beneath; rhachis wingless: petals rhombic-lanceolate, strongly unguiculate, narrowed to an obtusish sometimes lacerate point; internal scale much as in the last: fruit of a single maturing carpel, truly globose, not at all carinate, yellow, drying black, somewhat smaller than in the last species. — Bot. Beech. 281, as to a. *S. marginatus*, Engelm. & Gray, Pl. Lindh. pt. 1, 33, pt. 2, 168; Gray, Gen. Ill. ii. 214 (as to western pl.), t. 180; Sargent, Silv. ii. 71, as to western pl. *S. acuminatus*, Wats. & Coulter in Gray, Man. ed. 6, 116, not Raf. — Hillsides, &c., Arkansas to W. Louisiana, westward to Kansas and Arizona. (Mex.) Known in Texas (where abundant) as "Wild China Tree" from a superficial likeness to *Melia Azedarach*.

**8. EXÓTHEA**, Macfadyen. (Ἐξωθέω, to eject, used in reference to the separation of this genus from the *Amyrideæ*, to which its author believed it nearly related.) — Trees with alternate exstipulate leaves. — Fl. Jam. i. 232; Endl. Gen. 1134; Radlk. in Durand, Ind. 81, Sitzungs. Kgl. Bayer. Akad. xx. 276, & in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 358; Sargent, Gard. & For. iv. 100,

& Silv. ii. 73, t. 78, 79. *Melicocca*, Juss. Mém. Mus. iii. 187, t. 5, in part. *Hypelate*, Cambessedes, *ibid.* xviii. 31, in part; Benth. & Hook. Gen. i. 408, in part. — Small subtropical genus consisting of one Mexican species, and the following.

**E. oblongifolia**, MACFADYEN, l. c. A handsome tree of moderate size, with hard dense but (acc. to Blodgett) brittle wood and reddish brown bark: leaves abruptly pinnate and normally 2-4-foliate, rarely 6-foliate or by abortion with an odd number of leaflets; these oblong or elliptical, obtuse or rounded at the apex, somewhat narrowed at the sessile base, thickish, glabrous, somewhat lucid above, 2 to 5 inches long,  $\frac{3}{4}$  to  $1\frac{1}{2}$  inches broad: common petiole and rhachis  $\frac{1}{2}$  to 2 inches in length: flowers many, white, in terminal sub-corymbose panicles, fragrant: buds on short pedicels and clove-shaped, tomentulose: bractlets minute, subulate: sepals and petals broadly ovate or suborbicular,  $1\frac{1}{2}$  to 2 lines in length; the former tomentulose, persistent and at last reflexed: fruit half inch in diameter, globose, changing from orange to purple, juicy at maturity, but with thin rind and large mahogany-colored papery-coated seed; cotyledons very thick, almost hemispherical. — Hook. Lond. Jour. Bot. iii. 226, t. 7. *E. paniculata*, Radlk. ll. cc.; Sargent, Silv. ii. 75, t. 78, 79. *Melicocca paniculata*, Juss. l. c.; Nutt. Sylv. ii. 74, t. 66. *Hypelate paniculata*, Cambessedes, l. c. 32; Hook. l. c. 227. *Sapindus lucidus*, Hamilton, acc. to Radlk. Sitzungsber. Kgl. Bayer. Akad. xx. 276. — E. and S. Florida and Keys, where first coll. by Blodgett; fl. January to April; fr. ripe about September. (Cuba, Jamaica, San Domingo.)

**9. HYPÉLATE**, P. Br. (Pliny's name for the Butcher's Broom, derived from *ὑπό*, under, and *ἐλάτη*, pine or fir, applied by Browne to this genus.) — Leaves palmately trifoliolate; leaflets glabrous, lucid, thickish and veiny, evergreen. Flowers in terminal or subterminal panicles. — Hist. Jam. 208; Swartz, Fl. Ind. Occ. ii. 655, t. 14; Deless. Ic. iii. 23, t. 39; Benth. & Hook. Gen. i. 408 (excl. *H. paniculata*); Sargent, Gard. & For. iv. 100, & Silv. ii. 77, t. 80, 81. — W. Indian monotype.

**H. trifoliata**, SWARTZ. (WHITE IRONWOOD.) A small and slender tree with smoothish bark: leaflets coriaceous, spatulate, or narrowly obovate, 1 to  $1\frac{1}{2}$  inches long, a third as broad, rounded or very obtuse at the apex, cuneate at the base; common petioles 8 to 18 lines in length, usually narrow-winged near the summit: flowers white,  $1\frac{1}{2}$  to 2 lines in diameter: petals and sepals subequal, nearly orbicular: fruit ovoid, sweetish, the size of a pea. — Prodr. 61; Chapm. Fl. 78; Sargent, ll. cc. *Amgris Hypelate*, A. Robinson in Lunan, Hort. Jam. i. 149. — S. Florida, on Umbrella Key and Upper Metacombe Key, Curtiss; fl. June, July; fr. September. (Cuba, Jamaica, Porto Rico.)

**10. UNGNÁDIA**, Endl. (Dedicated to *David von Ungnad*, Austrian ambassador to Constantinople, who in 1576 by sending seeds of the horse-chestnut to Vienna introduced that attractive tree into western cultivation.) — An ornamental shrub or small tree with reddish twigs, alternate and unequally pinnate exstipitate leaves, conspicuous irregular but bilaterally symmetrical rose-colored fasciated or somewhat corymbose flowers upon jointed pedicels. — Atakt. t. 36; Endl. & Fenzl, Nov. Stirp. 75; Gray, Gen. Ill. ii. 209, t. 178, 179; Benth. & Hook. Gen. i. 398; Radlk. in Engl. & Prantl, Nat. Pflauzenf. iii. Ab. 5, 365. — A southwestern monotype.

**U. speciosa**, ENDL. ll. cc. (MEXICAN BUCKEYE.) Young parts tomentulose: leaflets 2 to 3 pairs and an odd one, ovate-oblong, acuminate, obtusish or rounded at the base, serrate, at maturity 4 to 6 inches in length, a third to half as broad, glabrous above, pubescent or tomentulose beneath: fascicles lateral, sometimes crowded: flowers numerous, half inch in diameter: the long-stiped pendulous leathery capsule, when ripe, more than an inch in diameter, light-colored, with 3 rounded lobes and tipped with the pointed somewhat persistent

style; seeds smooth and shining, 5 lines in diameter, dark brown or black, but light-colored at the relatively large hilum. — Torr. & Gray, Fl. i. 253, 684; Gray, Pl. Lindh. pt. 2, 167, Pl. Wright. i. 38, & ii. 30; Torr. Bot. Mex. Bound. 48; Fl. Serres, x. 217, t. 1059; Schnizlein, Ic. t. 230 \*\*, f. 2; 8; Koch, Dendr. i. 515; Wats. Proc. Am. Acad. xvii. 337; Sargent, U. S. 10th Census, ix. 44, & Silv. ii. 65, t. 73. *U. heterophylla*, & *U. heptaphylla*, Scheele, Linnæa, xxi. 589, xxii. 352. — Rocky hills, Texas, where first collected by *Drummond*, to Organ Mts., New Mexico, *Wright*; fl. acc. to locality, March to May; fr. two months later. (Mex. southward at least to Nuevo Leon, *Palmer*.)

11. *ÆSCULUS*, L. HORSE-CHESTNUT, BUCKEYE. (Classical Latin name of an oak, presumably from *escare*, to eat, in allusion to edible acorns.) — Shrubs or trees of moderate size with opposite digitately or pedately divided exstipulate leaves. Long petioles enlarged at the base and, on falling, leaving large somewhat triangular scars upon the thick terete branchlets; the latter terminated in winter by large scaly leaf-buds. Leaflets large, narrowed at both ends and usually acuminate, serrate or very rarely entire. — Syst. Nat. ed. 2, 22 (as *Esculus*); Gray, Gen. III. ii. 205, t. 176, 177; Benth. & Hook. Gen. i. 398; Baill. Hist. Pl. v. 424; Sargent, Silv. ii. 51, t. 67-72; Pax in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 5, 275. *Hippocastanum*, Adans. Fam. ii. 383. *Pavia*, Poir. Dict. v. 93. *Macrothyrsus* & *Calothyrsus*, Spach, Ann. Sci. Nat. ser. 2, ii. 61, 62. — A group of 13 or 14 species of northern temperate and E. Ind. tropical regions. The related genus *Bellia* of Mex. & S. Am. with calyx divided nearly to the base and leaves 3-foliate may be regarded as distinct. *Æsculus* may be conveniently and naturally subdivided into sections as by Prof. Pax, l. c.

§ 1. *EUÆSCULUS*, Pax, l. c. Petals 4 (or 5), usually subequal in length; the upper pair with narrow spatulate blades, the lateral with rather broad blades, all exceeded by the stamens: calyx short, campanulate, essentially regular, 5-lobed: fruit (at least in its early state) muricate with weak or firmer spines.

*Æ. HIPPOCÁSTANUM*, L., the HORSE-CHESTNUT, a rapid growing ornamental shade tree of Greek origin, cult. since the 16th century, and deservedly popular for its attractive foliage and numerous showy thyrsoid panicles of white and pale yellow, or roseate-purple flowers produced in spring, is much planted (in several varieties) in cities. It may sometimes be self-sown, but shows little or no tendency toward naturalization.

*Æ. glábra*, WILLD. (OHIO OR FETID BUCKEYE.) A tree of small size, rarely 60 or 70 feet high: branchlets and petioles green, yellowish, or brownish, finely tomentulose when young; leaflets mostly 5, but not rarely more numerous, lance-oblong, oblanceolate, or less frequently obovate, sharply acuminate, finely and sharply serrate, scarcely pedate or quite sessile, pubescent upon and tufted in the axils of the veins and green upon both surfaces, scarcely paler beneath: thyrses ovate-oblong; the spreading branches each bearing upon the upper side a succession of about 6 short-pedicelled greenish yellow or straw-colored flowers: calyx (2 to) 3 or 4 lines long, pubescent: corolla little over half inch in length, pubescent; the blades even of the upper petals equalling or considerably exceeding the claws: fruit globose, spiny when young, and echinulate-roughened even in age. — Enum. 405; Pursh, Fl. i. 255; Guimp. Otto & Hayne, Abbild. Holzpfl. t. 24; Gray, Gen. III. ii. 207, t. 176, 177; Sargent, Silv. ii. 55, t. 67, 68; Gray, Pl. For. Trees N. A. t. 27. *Æ. pallida*, Willd. l. c. 406. *Æ. echinata*, Muhl. Cat. 38. *Æ. Ohioensis*, Michx. f. Hist. Arb. Am. iii. 242; DC. Prodr. i. 597; Lindl. Bot. Reg. xxiv. t. 51 (*Ohiotensis*). *Æ. muricata*, *ochroleuca*, *verrucosa*, & *alba*, Raf. Alsogr. 68, 69. *Pavia Ohioensis*, Michx. f. Sylv. ii. 111, t. 92. *P. pallida*, & *P. glabra*, Spach, Ann. Sci. Nat. ser. 2, ii. 54. *Æ.* (or *Pavia*) *carnea*, *rubicunda*, & *Watsoniana*, Hort., forms with prickly fruit but roseate or variegated flowers, are of uncertain (perhaps hybrid) origin, and not known out of cultivation. — Rich woods, along alluvial river

banks, &c., from W. Pennsylvania to Iowa, Kansas, Indian Territory, and southward; fl. April to June. Passes west of the Mississippi into

**Var. argûta**, ROBINSON, n. comb. A shrub or small tree without constant floral differences but with leaves mostly 6-7-foliolate and leaflets narrower, lanceolate, and generally more attenuate at both ends, sharply and somewhat doubly serrate, seemingly of somewhat firmer texture and with veinlets often prominulous. — *Æ. arguta*, Buckley, Proc. Acad. Philad. 1860, 443; Young, Fl. Tex. 209; Wats. Bibl. Index, 177. *Æ. glabra*, Gray in Hall, Pl. Tex. 5. — Mt. Pleasant, Iowa, *Mills*, to Missouri, *Bush*, Kansas, *Kellerman*, *Norton*, and Texas, *Buckley*, *Hall*. An imperfect specimen from Lampasas Co., Texas, *Munson*, having similar foliage but still narrower and more numerous leaflets (6 to 10) is said to have smooth fruit and may be distinct and of the following section.

§ 2. ΠΑΥΙΑ, Reichenb. Petals 4, very dissimilar, and at least the upper pair of them about equalling or usually exceeding the stamens. Calyx more tubular, 5-lobed, more or less distinctly gibbous or oblique at the base. — Nomencl. 198; Pax, l. c. 276. — Ohio and Mississippi Valleys, S. Atlantic and Gulf States.

**Æ. octândra**, MARSH. (SWEET BUCKEYE.) In favorable situations a tall tree with roughish gray-brown bark but sometimes (especially southward) flowering as a low shrub only 3 or 4 feet in height: leaves 5-foliolate; leaflets obovate, gradually or rarely abruptly acuminate, gradually narrowed to a subsessile or petiolulate base, finely sharply and somewhat doubly serrate or serrulate, green and glabrous above, paler and finely pubescent to somewhat flocculent-tomentulose beneath: flowers pale yellow, finely pubescent or granular, borne on the upper side of the spreading branches of an ovate short-peduncled thyrses; pedicels short and thick, in anthesis 1 to 3 lines in length: calyx tubular-campanulate, 5 to 6 lines in length: lateral petals nearly an inch in length, with broad ovate sometimes cordate or subcordate crisped blade about equalling the claw; the upper petals still longer, but with small blades much shorter than the elongated claws: stamens usually 7: smoothish fruit mottled, at first oblong or somewhat pear-shaped, at length subglobose. — Arb. 4; Sargent, Gard. & For. ii. 364, & Silv. ii. 59, t. 69, 70. *Æ. flava*, Ait. Kew. i. 494; Pursh, Fl. i. 255; Guimp. Otto & Hayne, l. c. 27, t. 23; Wats. Dendr. Brit. ii. 163, t. 163; Lodd. Bot. Cab. t. 1280; Gray, Man. ed. 1-6. *Æ. neglecta*, Lindl. Bot. Reg. t. 1009. *Pavia flava*, Moench, Meth. 66. *P. neglecta*, Don in Loud. Hort. Brit. i. 143. *P. fulva*, & *P. bicolor*, Raf. Alsogr. 74. *Paviana flava*, Raf. Fl. Ludov. 87. — Rich woods, W. Pennsylvania to S. Iowa and southward to Georgia and Texas. Runs into the following variety connecting with the next species.

**Var. hýbrida**, SARGENT. Shrubby or rarely arboreous with "paler bark": flowers flesh-colored, dull red, or purplish, on pedicels about 3 to 4 lines in length: calyx less inclined to be campanulate or inflated: leaflets more commonly flocculent-tomentulose beneath. — Silv. ii. 60. *Æ. Pavia*, Willd. Berl. Baum. 12, at least in part, not L. *Æ. hybrida*, DC. Hort. Monsp. 75. *Æ. discolor*, Pursh, Fl. i. 255, at least in part; Lindl. Bot. Reg. t. 310; Gray, Pl. For. Trees N. A. t. 30. *Æ. Pavia*, var. *discolor*, Torr. & Gray, Fl. i. 252. *Æ. flava*, var. *purpurascens*, Gray, Man. ed. 5, 118. *Pavia discolor*, Poir. Suppl. v. 769. *P. hybrida*, DC. Prodr. i. 598. *P. livida*, *mutabilis*, *versicolor*, & *lucida*, Spach, Ann. Sci. Nat. ser. 2, ii. 56, 57, 60. — Occurring with the type but especially southwestward. An aggregate of forms differing by trivial and inconstant characters of foliage, pubescence, and shade of flowers, and all more or less intermediate between the foregoing species and the following.

**Æ. Πάυια**, L. A neat shrub, 6 to 15 feet high, with slender branches: leaves 5-foliolate; leaflets much as in the last, but averaging somewhat longer (5 to 6 inches) and relatively narrower: flowers scarlet or crimson, slender, 1 to 1½ inches in length: pedicels slender, 4 to 8 lines long, tending to be aggregated or subfasciculate near the ends of the short branches of the thyrses; this oblong, 6 inches in length and raised on a peduncle 1 to 1½ inches long: calyx more slender and more decidedly tubular than in the preceding species, 6 to 8 lines long. — Spec. i. 344; Marsh. Arb. 5; Pursh, Fl. i. 254. Guimp. Otto & Hayne, l. c. t. 21; Bart. Bot. App. 28, t. 15, f. 3. Torr. & Gray, Fl. i. 252 (excl. var.); Chapm. Fl. 79. *Æ. humilis*, "Lod. Cat."; Lindl. Bot. Reg. t. 1018, hence *Pavia humilis*, Don in Loud. Hort. Brit. 143. *P. atropurpurea*, *Lindleyana*, *Willdenowiana*, (?) *intermedia*, & *Michiauxii*, Spach, Ann. Sci. Nat. ser. 2, ii. 58-61. — Low rich woods and also on dry hillsides through

the Southern States from Kentucky and W. Tennessee to N. Carolina and Florida; fl. March to April.

§ 3. *MACROTHÝRSUS*, Reichenb. l. c. Petals 4(-5), narrow, spatulate, subequal, much exceeded by the stamens. Calyx regular or nearly so, narrow, tubular, 5-toothed. Fruit smooth except for the persistent spine-like base of the style. — *Macrothyrsus*, Spach, l. c. 61. — S. Atlantic and Gulf States.

*Æ. parviflora*, WALT. A shrub, 5 to 10 feet high: leaves pedately 5(-7)-foliolate; leaflets large, obovate, finely serrate, sharply or even caudately acuminate, dark green and glabrous above, pale and tomentulose beneath: racemose panicle very long, slender, at first spike-like: calyx 3 lines in length, much exceeded by the narrow white petals, these in their turn much surpassed by the long filiform stamens (inch to inch and half in length): fruit small, globose, tipped with the sharp and somewhat persistent style. — Car. 128; Chapm. Fl. 80; Gray, Pl. For. Trees N. A. t. 31. *Æ. macrostachya*, Michx. Fl. i. 220; Jacq. Ec. i. 17, t. 9; Sims, Bot. Mag. t. 2118; Ell. Sk. i. 436; Colla, Hort. Ripul. t. 19; Guimp. Otto & Hayne, l. c. t. 26. — Upper country, Georgia, S. Carolina, and Alabama. An attractive species frequent in cultivation.

§ 4. *CALOTHÝRSUS*, Reichenb. l. c. Petals 4, subequal, much exceeded by the stamens. Calyx short, symmetrical at the base; limb 2-lipped and cleft somewhat more deeply upon one side; the lips entire or minutely 2-3-toothed. Fruit unarmed, at first (as well as the calyx) canescent-tomentulose, soon glabrate. Flowers relatively small and very numerous. — Pax, l. c. *Calothyrsus*, Spach, l. c. 62. — Pacific Slope.

*Æ. Californica*, NUTT. A tree of moderate height with purple branchlets: leaves 5-foliate; petioles stout, flattened or grooved above; leaflets glabrous upon both surfaces, and crenate-serrulate, oblong-lanceolate in outline, acutish to acuminate at the apex, but mostly abrupt or even subcordate at the base, paler and yellowish green beneath, the outside pair subsessile, or with short petiolules, the other three slender-stalked: petals with short claws and oblong crisped blades. — Nutt. in Torr. & Gray, Fl. i. 251; Hook. & Arn. Bot. Beech. 327; Benth. Pl. Hartw. 301; Nutt. Sylv. ii. 69, t. 64; Hook. Bot. Mag. t. 5077; Fl. Serres, xiii. 39, t. 1312; Sargent, Silv. ii. 61, t. 71, 72. *Calothyrsus Californica*, Spach, l. c. *Pavia Californica*, Hartw. Jour. Hort. Soc. Lond. ii. 123. — Western Central California from Mt. Shasta (acc. to Brew. & Wats.) to Santa Barbara Co. and eastward to Fort Tejon, *Rothrock*; fl. acc. to locality May to July.

*Æ. PÁRRYI*, Gray (Proc. Am. Acad. xvii. 200), is a related species of N. Lower California, but on account of its 5-fid calyx scarcely to be referred to this section. It may reach S. Calif., and may be readily distinguished by its obovate obtusish leaflets which are canescent-tomentulose beneath. (N. Lower Calif., *Pringle & Parry*, *Orcutt*.)

## ORDER XLV. POLYGALACEÆ.

By B. L. ROBINSON.

Herbaceous, shrubby, or in warmer countries arborescent plants with watery juice (except in the roots of certain species), simple alternate or more rarely opposite or verticillate entire mostly exstipulate leaves, simple hairs, and zygomorphous pseudo-papilionaceous flowers. Sepals 5, free (in one foreign genus adnate to the petals and andræcium), strongly imbricated, the odd one dorsal, this and the anterior pair external, small, sepaloïd; the lateral (inner) ones, com-



monly known as wings (or *alæ*), larger and petaloid. Petals 5 and alternate with the sepals, or more commonly reduced to 3 (an odd anterior one and a dorsal pair); the lower petal, or keel (*carina*) concave, often crested or beaked, more or less connate with the others or at least adnate to the lower portion of the staminal column. Stamens commonly 8 (the anterior and posterior members of the theoretical 10-stamened 2-whorled andrœcium being suppressed); filaments rarely free, more commonly connate into a dorsally cleft tube; anthers erect, innate, usually 2-celled at first but becoming unicellular by the resorption of the partition wall. Carpels 2, rarely 1, or in a foreign genus 5; ovary 2 (rarely 1)-celled; ovules (with rare exceptions) solitary in the cells, anatropous, pendulous. Seeds albuminous or exalbuminous, commonly provided with a more or less conspicuous caruncle at the hilum; embryo straight. — A widely distributed order of which more than half of the species belong to the typical genus *Polygala*.

KRAMÉRIA, Lœff. It. 195, which has often been associated with this order should be positively excluded from it upon the grounds admirably stated by Gray, Gen. III. ii. 227. There appears to be no good reason why the genus should not be placed in the *Leguminosæ Cassiææ*, as by Taubert in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 3, 85.

1. **POLYGALA.** Calyx free; sepals very dissimilar, the lateral (inner) pair larger, petaloid. Petals rarely 5, commonly (through the suppression of one pair) 3, united below into a dorsally cleft tube; the anterior petal strongly carinate, often crested or beaked. Stamens 8; filaments more or less completely united into a dorsally cleft tube adnate at the base to the gamopetalous corolla. Style usually bent and stigma variously and unequally 2(-4)-lobed, often tufted or cucullate-appendaged. Fruit a compressed 2-celled wing-margined or wingless capsule; seeds solitary in the cells, pendulous, commonly hairy and in most of ours conspicuously carunculate.
2. **MONNINA.** Calyx as in *Polygala*. Petals 3, nearly or quite free; the lower one carinate, more or less inclosing the upper connivent pair; these adnate at the base to the staminal tube. Fruit indehiscent, 1-2-celled, winged or wingless.

1. **POLÝGALA, Tourn. MILKWORT.** (Πολύς, much, γάλα, milk; Πολύγαλον, a name used by Dioscorides for some low shrub, reputed a stimulant to lactation.) — Inst. 174, t. 79; L. Gen. no. 567; Gray, Gen. III. ii. 221, t. 183, 184; Benth. & Hook. Gen. i. 136; Bennett, Jour. Bot. xvii. 137 *et seq.*; Wheelock, Mem. Torr. Club, ii. 109; Chodat, Monogr. Polyg. (Mém. Soc. Phys. Hist. Nat. Genève. xxxi. pt. 2, no. 2), & in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 4, 330. — Extensive but natural genus of more than 400 species, chiefly of warm regions and about half of them American. The subdivision of the genus, as here given, is essentially that of Chodat's detailed monograph.

P. NUTKÁNA, Moc. in DC. Prodr. i. 330, & A. DC. Calques des Dess. t. 39, with ovate acuminate leaves, orbicular wings, and emarginate capsules, differs widely from any species known to grow upon our Western Coast. There can be little doubt that Dr. Watson was quite right in regarding it a Mexican plant near *P. Americana* while its confident identification with *P. cucullata*, Benth. by Chodat is not supported by a single character.

§ 1. **HEBECÁRPA, Chodat.** Low undershrubs with alternate leaves, caducous sepals, ecristate beakless keel, and ciliated, pubescent, or tomentulose capsule. — Monogr. Polyg. 9. — Well marked group including 3 W. Indian small-flowered thick-leaved species (*Badiera*, DC. Prodr. i. 334), several Mexican and S. American species, and the following of our southwestern borders.

\* Flowers solitary in the upper axils, violet-purple and white: wings spatulate: small oblong leaves commonly with conspicuous brownish glands upon the lower surface.

- P. macradénia**, GRAY. Erect much branched cinereous-tomentose undershrub, 3 to 8 inches high from stout ligneous root: leaves only 2 or 3 lines in length, a line or less in breadth: violet wings somewhat exceeding the keel: capsule ovate-oblong, emarginate, puberulent; seeds compressed, narrowly oblong, appressed silky-villous,  $2\frac{1}{4}$  lines long, surmounted by a helmet-like puberulent 3-lobed caruncle. — Pl. Wright. i. 39, ii. 30; Torr. & Gray, Pacif. R. Rep. ii. 162; Torr. Bot. Mex. Bound. 49; Chodat, l. c. 36, t. 14, f. 33-36. — Hillsides, W. Texas, Wright, Thurber, to Arizona, Palmer, Pringle, Lemmon; first coll. by Wright. (Adj. Mex., Palmer.)

\* \* Flowers in terminal or lateral spicate racemes, yellowish or greenish white (rarely "blue"?): wings lanceolate or obovate: leaves without conspicuous glands.

- P. pubérula**, GRAY. Puberulent, branched from the base: lowest leaves sometimes oval or often like the others linear, lance-linear, or linear-oblong: wings obovate, obtuse, shorter than the keel: capsule suborbicular, emarginate, 4 lines in diameter, glabrous or puberulous upon the surfaces, pubescent upon the very narrow margin; seeds obovate-oblancoate in outline, finely puberulent and with rounded caruncle. — Pl. Wright. i. 40, ii. 30; Torr. Bot. Mex. Bound. 48; Wheelock, l. c. 150; Chodat, l. c. 22. — W. Texas (acc. to Coulter, reported as far east as Coleman County and Leona River) to Arizona; common. (Mex., Lower Calif.?)

- P. ovatifolia**, GRAY. Moderately branched from a lignescent base, soft tomentose-pubescent: leaves ovate, obtuse or acutish, shortly petiolate, pubescent upon both surfaces, 8 to 10 lines long, two thirds as broad; the uppermost somewhat narrower, ovate-lanceolate: wings lanceolate, acute or acutish, shorter than the keel: capsule large (at maturity 5 lines in diameter), orbicular, smooth on the surfaces but strongly ciliated upon the rather broad and distinctly marked border; seeds ovate, finely silky-villous and with hood-shaped puberulous caruncle. — Pl. Wright. i. 39; Chodat, l. c. 19, t. 13, f. 26-30. *P. ovalifolia*, Gray, Pl. Lindh. pt. 2, 151 (not of later publications); Wats. Bibl. Index, 91, in part; Wheelock, l. c. 148 (by evident clerical error); Coulter, Contrib. U. S. Nat. Herb. i. 31, ii. 27; not DC. — Hillsides, S. and W. Texas, Wright, Reverchon, &c.; New Mexico, Wright. (Adj. Mex., Eaton & Edwards, Palmer.)

**P. MYRTILLOIDES**, Willd. (Spec. iii. 889; *P. buxifolia*, HBK. Nov. Gen. & Spec. v. 407, acc. to Chodat; *P. ovalifolia*, DC. Prodr. i. 331), of Mexico differs in its shorter puberulent rather than pubescent indumentum, obtuser leaves, and longer obtuser wings, which fully equal or somewhat exceed the keel.

§ 2. **HEBÉCLADA**, Chodat, l. c. 43. Lower pair of sepals connate; entire calyx persisting in fruit: keel without crest or beak: a single species of the S. Atlantic and Gulf States with some closely allied species of W. India and S. America.

- P. grandiflora**, WALT. Root lignescent: stems usually several, erect or somewhat flexuous and spreading, slender subsimple or somewhat branched, covered with short appressed puberulence: leaves ovate-lanceolate to lance-linear or narrowly linear-oblong, mostly appressed-puberulent: racemes terminal and lateral, loose and secund; pedicels a line or two long: flowers violet-purple turning greenish in age: wings obovate-cuneate or flabelliform, veiny, 3 lines long, nearly as broad: capsule elliptic-oblong, glabrous, mostly shorter than the wings; seeds oblong, scarcely compressed, appressed-hairy. — Car. 179; Torr. & Gray, Fl. i. 132, 670; Chapm. Fl. 84; Wheelock, l. c. 151; Chodat, l. c. 56. *P. Senega*, var. *rosea*, Michx. Fl. ii. 53. *P. pubescens rosea*, Muhl. Cat. 63. *P. pubescens*, Ell. Sk. ii. 181. *P. Muhlenbergii*, Don, Syst. i. 358. — Pine woods, old fields, &c., South Carolina to Florida and Mississippi; fl. through summer.

**Var. canescens**, SHUTTL. Stem and leaves canescent-tomentulose, the latter lance-oblong, obtuse: flowers essentially as in the type. — Shutt. in distr. pl. Rugel, no. 39, & in Gray, Pl. Wright. i. 41. *P. grandiflora*, var. *pubescens*, Chodat, l. c. 57 (as to pl. descr.), is probably the same, but *P. pubescens rosea*, Muhl., was more likely nearer the typical form. — Long Island, Tampa Bay, Florida, Rugel, no. 39.

**Var. angustifolia**, TORR. & GRAY. Leaves very narrow, linear, acutish, glabrous or nearly so: flowers smaller: capsule slightly narrower and mostly equalling the wings. — Fl. i. 671; *P. flabellata*, Shuttl. distr. pl. Rugel, no. 37; Gray, l. c.; Chodat, l. c. 53, t. 15, f. 25, immature seed (the ripe ones not differing essentially from those of the type). — Centr. and S. Florida, *Leavenworth, Rugel, Cooper, Palmer, Garber, Nash* (plants of the last three in floral char. approaching the type).

§ 3. **CHAMÆBUXUS**, DC. Herbs or undershrubs, sometimes spiny: leaves alternate: calyx mostly deciduous: keel beaked or crested: disk more or less developed. — Prodr. i. 331, as modified by Chodat, l. c. 93.

\* Keel beaked with a cucullate or cornute process: flowers (homomorphous or heteromorphous), mostly in leafless racemes: Western and Southwestern.

— Unarmed.

++ Soft canescent-tomentulose: leaves obtuse or obtusish: flowers rather large in short racemes: species of the Southwest.

**P. Rúsbyi**, GREENE. Low undershrub: stems (3 to 5 inches long) from a much branched ligneous rootstock: leaves elliptic or oblanceolate, cuneate at the base, 5 to 8 lines long, nearly half as broad: flowers nearly half inch in length, slender-pedicelled: wings carmine, elliptical, 4 or 5 lines long, half as broad, somewhat surpassed by the rose-purple petals: keel with oblong bluntish beak. — Bull. Torr. Club, x. 125; Wheelock, l. c. 145; Chodat, l. c. 104, t. 18, f. 1-3. — Arizona, *Palmer; Rusby, Jones, Lemmon*; first coll. by *Palmer*; fl. early summer.

++ ++ Pubescent or puberulent: leaves of firm texture, at least the upper acute or mucronate: flowers smaller, developing successively upon and soon deciduous from a slender bracteolate and mostly geniculate axis: upper sepal often persisting under the young puberulent capsule: southwestern very closely related species with numerous stems from a woody root or branched lignescens stock.

== Upper leaves lanceolate.

**P. Lindheimeri**, GRAY. Pubescent or even tomentose-pubescent with spreading hairs: leaves reticulated, mucronate, not glaucescent; the lower oval, 6 to 9 lines long, a third to more than half as broad; racemes (inch or more in length) few-flowered; rhachis with 4 to 6 soon strongly geniculate joints: flowers purple, 2 to 2½ lines long: outer sepals pubescent and ciliated, narrow and acutish: wings cuneate at the base: capsule elliptic-oblong, covered with spreading pubescence. — Pl. Lindh. pt. 2, 150, Pl. Wright. i. 39, & ii. 30; Wheelock, l. c. 142, at least in great part, but excl. var.; Chodat, l. c. 107, t. 18, f. 10-12. — Rocky ground, Texas and New Mexico; the earliest collectors, *Lindheimer, Wright*.

**P. Texensis**, ROBINSON, n. sp. Habit and foliage of the last preceding species: covered throughout with a very fine incurved or appressed puberulence: upper leaves more narrowly lanceolate: racemes much longer; rhachises with 12 to 18 joints: outer sepals shorter, elliptic-oblong, obtuse, finely incurved-puberulent upon the outer surface: wings scarcely narrowed at the base: appendage of the keel rather narrowly oblong: fruit unknown. — Rocky places, Texas, on the Upper Guadalupe River, *Lindheimer*, no. 337, July, 1845. Evidently growing with or near the type of the last; also near Comanche, *Reverchon*, no. 708.

**P. Arizónæ**, CHODAT. Similar in habit to the last two preceding species: glaucescent and covered (under lens) with very short incurved or appressed hairs: leaves lanceolate to lance-linear, carinate, not strongly reticulated: inflorescences rather short; rhachises 4-8-jointed: outer sepals ovate-oblong, relatively short and broad, obtuse, minutely puberulent: appendage of the keel very short and blunt: puberulent capsule shorter and broader than in *P. Lindheimeri*. — Monogr. Polyg. 108, t. 18, f. 13-15. *P. Lindheimeri*, var. *parvifolia*, Wheelock, l. c. 143. — Arizona, on limestone ledges in foot-hills of the Santa Rita Mountains, *Pringle*, 1884; also secured (acc. to Chodat) on the Mex. Bound. Surv. no. 190, and in New Mexico by *Wright*, no. 946.

== Upper leaves linear.

**P. Tweedyi**, BRITTON. Glauous and (under lens) incurved-puberulent: all leaves except the lowest oblong-linear to linear, acute, pale, erect, 4 to 10 lines long, a line or less in

breadth: inflorescences short, 3-4-flowered, soon recurving: flowers and fruit much as in the last but beak of keel more slender. — Britton in Wheelock, l. c. 143. *P. Arizonae*, var. *tenuifolia*, Chodat, l. c. 109. — W. Texas, Tom Greene Co., *Tweedy*, and what appears to be the same in S. Arizona, *Lemmon*, nos. 497 and 2641.

++ ++ ++ Glabrous or nearly so: low shrubs of the Pacific Slope.

**P. cornúta**, KELLOGG. Branching shrub, 2 to 6 feet high: leaves elliptic-oblong to oval, obtuse, often thickish, 6 to 15 lines long, rather abruptly narrowed at the base to distinct but very short petioles: outer sepals tomentulose over the whole outer surface, rarely almost glabrous: flowers 4 lines in length, yellowish or greenish white, borne in short mostly terminal racemes: wings oblong: petals scarcely equalling the keel; this tipped with a slender straightish beak: capsule orbicular, retuse, 4 lines in diameter; seeds very hairy with deeply lobed caruncle half their length. — Proc. Calif. Acad. Sci. i. 62; Wheelock, l. c. 147. *P. Californica*, Nutt. in herb, as to preserved types; Brew. & Wats. Bot. Calif. i. 59, but certainly not *P. Californica*, Nutt. (as syn.) in Torr. & Gray, Fl. i. 671, which without doubt relates to the next species. *P. cucullata*, Newberry, Pacif. R. Rep. iv. 76, not Benth. *P. Californica*, Chodat, l. c. 106, t. 18, f. 6-9. — Coniferous woods, &c., mountains of California from Los Angeles Co., *Nevin*, northward perhaps to Oregon; first coll. by *Nuttall*.

**P. Californica**, NUTT. Similar in foliage but mostly of lower stature; stems shorter, more slender and numerous: flowers of two kinds; the larger showy, half inch in length, roseate, borne in short terminal racemes, mostly sterile: outer sepals ciliolate, otherwise glabrous: wings spatulate: petals mostly exceeding the keel; this bearing a short thickish mostly recurved beak: inconspicuous fertile flowers upon basal shoots: capsule ovate to suborbicular, 3 to 4 lines in diameter; soft puberulent seeds capped by a less deeply lobed caruncle. — Nutt. in Torr. & Gray, Fl. i. 671 (where definitely characterized but erroneously regarded as identical with the very different and probably Mexican *P. Nutkana*); Greene, Fl. Francis. 93; Wheelock, l. c. 111. *P. Nutkana*, Torr. & Gray, l. c.; Torr. Bot. Mex. Bound. 49, t. 12; Chodat, l. c. 105, t. 18, f. 5; not Moc. *P. cucullata*, Benth. Pl. Hartw. 299; Brew. & Wats. l. c.; Wheelock, l. c. 146 (by clerical error, see Bull. Torr. Club, xix. 32). — Mountains and hillsides, Oregon, *Howell*, to Sta. Barbara, California, and southward, as *P. Fishie*, Parry, Proc. Davenport Acad. iv. 39, of Lower Calif., is doubtless, as stated by Chodat, Bull. Herb. Boiss. iv. 898, only a robust southern form of the same species.

+ + Branches mostly indurating with age and spinescent-tipped.

**P. subspinosa**, WATSON. Puberulent or rarely pubescent to almost glabrous, 2 to 6 inches or more in height, from a long stout ligneous root and considerably branched stock: leaves lance-oblong to elliptic, spatulate or almost linear, of firm texture, acute to very obtuse, 5 to 10 lines long, narrowed to a sessile base: flowers 4 to 5 lines long: elliptic-oblong mostly acute or acutish wings and tips of the lateral petals rose-purple; keel yellow, with a distinct but blunt beak: obovate retuse glabrous or glabrate capsule veiny. — Am. Nat. vii. 299; Bennett, Jour. Bot. xvii. 140; Brew. & Wats. Bot. Calif. i. 59; Wheelock, l. c. 144; Chodat, l. c. 109, t. 18, f. 16-17. — Foothills of W. Colorado, *H. C. Long*, to Silver City, Nevada, *Kellogg*, and northern borders of Arizona, *Palmer*.

**P. acanthoclada**, GRAY. Stems more ligneous, 2 or 3 feet high, becoming an inch in thickness (acc. to Jones), at first cinereous-tomentulose, copiously branched; branches ending in divaricately spreading spines: leaves much as in the last, but in the type smaller, 3 to 5 lines in length, 1-nerved: flowers white or with petals purplish-tinged at the tips: wings obovate, rounded at the apex: keel with a short blunt or in some cases almost obsolete beak or mere ridge; fruit (acc. to Jones) oblong-ovate, 2½ lines long, deeply notched. — Proc. Am. Acad. xi. 73; Coulter, Man. Rocky Mt. Reg. 30; Wheelock, l. c. 144; Jones, Zoe, iii. 284; Chodat, l. c. 110, t. 18, f. 18-20. — W. Colorado, *Brandegee*, to Esmeralda Co., Nevada, *Shockley*, and Sta. Catalina Mts., Arizona, *Lemmon*; first coll. by *Brandegee*.

**Var. intricata**, A. EASTWOOD. Leaves about twice as large (8 or 10 lines long), glabrate or nearly so: wings "tipped with rose-color": fruit oval, deeply emarginate, about 2 lines in length, "red on the margin." — Proc. Calif. Acad. Sci. ser. 2, vi. 283. — Near the eastern border of Utah, *Miss Eastwood*. Without characters which well developed specimens of the too little known type may not also exhibit.

- \* \* Flowers of two kinds, the showy ones few, large (6 to 9 lines long), solitary in the upper axils or appearing terminal: keel with a conspicuous plumose crest: species of the Atlantic Slope, extending westward to Winnipeg.

**P. paucifolia**, WILLD. (FRINGED POLYGALA, FLOWERING WINTERGREEN.) Stems several from a slender elongating rhizome, erect, 3 to 6 inches or more in height; lower leaves small and bractlike; the uppermost clustered at the summit of the stem, cuneate at the petiolate base, rounded and apiculate, obtuse or acutish at the apex, 6 to 20 lines in length, half or two thirds as broad, glabrous or puberulent: wings and petals rose-colored varying to white: obcordate glabrous capsule nearly orbicular in outline, 4 lines in diameter: cleistogamous flowers produced at or near the ends of slender several-bracted branches from the rhizome or bases of the erect stems. — Spec. iii. 880; Barton, Fl. N. A. ii. 59, t. 56, f. 1; Hook. Bot. Mag. t. 2852, & Fl. Bor.-Am. i. 86; Beck, Bot. 46, with var. *alba*, Eights, the white-flowered form; Gray, Gen. III. ii. 224, t. 184; Wheelock, l. c. 141. *P. uniflora*, Michx. Fl. ii. 53. *P. purpurea*, Ait. f. Kew. ed. 2, iv. 244. *Triclisperma grandiflora*, Raf. Specch. i. 117. — Cool sphagnum bogs, &c., Anticosti (acc. to Macoun), New Brunswick, New England, and the Middle Atlantic States, southward in the uplands to Georgia, northwestward along the Great Lakes to Winnipeg, the plains of the Saskatchewan, *Bourgeau* (? acc. to Macoun), and Minnesota.

§ 4. **ORTHOPOLYGALA**, Chodat, l. c. 120. Unarmed herbs or undershrubs with alternate, opposite, or verticillate leaves, persistent calyx, and crested keel.

- \* Oblong capsule oblique at the end, and winged (or wing-margined) upon one edge (wing sometimes inconspicuous or almost obsolete in *P. scoparia*): suffrutescent glabrous perennials of the Southwest with erect alternate linear-oblong acute or even pungent leaves and small whitish spicate-racemose flowers: stigma bilabiate, the upper lobe minutely penicillate.

**P. hemipterocarpa**, GRAY. Stems 1 to several, erect, a foot or two high, sharply furrowed-angulate, subsimple: leaves half inch to inch in length, carinate: flowers soon spreading or deflexed in elongated terminal rather loose secund racemes: wings elliptic-ovate, cuneate at the base, rounded at the apex, scarcely equalling the capsule; wing of the capsule broad, white, crenulate or crisped; seed long and slender, soft-villous, and with a caruncle a third to more than half its length. — Pl. Wright. ii. 31; Torr. Bot. Mex. Bound. 49; Wheelock, l. c. 138; Chodat, l. c. 281, t. 26, f. 1-2 (incl. var. *bracteata*). — Mountains, W. Texas? (see Wheelock, l. c.); New Mexico, *Wright*; Arizona, *Lemmon*, *Pringle*.

**P. scoparia**, HBK. Of lower growth, 6 to 15 inches high, usually much branched from the ligneous base; stems or branches slender, flexuous, leafy: leaves 4 to 6 lines long, pungent: capsule with a very narrow wing-margin on one edge: otherwise much like the last. — Nov. Gen. & Spec. v. 399; Gray, Pl. Wright. i. 38, ii. 30, incl. var. *multicaulis*; Seem. Bot. Herald. 269; Wheelock, l. c. 137; Chodat, l. c. 282, t. 26, f. 3-5. ? *P. scoparioides*, Chodat, l. c. 284, t. 26, f. 6, 7 (differences probably formal). — Mountains and foot-hills, Central and W. Texas to Arizona. (Mex.)

\* \* Capsule wingless.

+ Sepals not conspicuously decurrent upon the pedicels: flowers purple, roseate, white, or cream-color: wings obtuse or obtusish except in *P. Hookeri*, *P. brevifolia*, and *P. cruciata*.

++ Perennials (except *P. alba*, *P. Boykini*, and *P. prætervisa*) with stems (in well developed plants) always several to many from an often lignescent root or stock.

= Flowers of two kinds, namely, small green cleistogene very fertile ones commonly borne on pale basal more or less buried shoots, and larger roseate or white less fertile ones in rather loose terminal racemes: leaves alternate.

**P. polygama**, WALT. Stems angled, leafy, 4 inches to a foot or more in height: leaves elliptic-oblong to linear, obtuse but often mucronulate at the apex, cuneate at base, on the slender fertile basal shoots reduced to small scales: larger flowers rose-colored to almost violet-purple: pedicels slender, soon horizontal and at length recurved, considerably exceeding the deciduous bractlets: wings oval, narrowed at base: capsule broadly oblong-ovate; seed hairy or subglabrous, with conspicuous bilobed loosely cellular caruncle three fourths

its length: cleistogene flowers with reduced greenish or pale envelopes and styleless ovary. — Car. 179; Torr. & Gray, Fl. i. 132; Hook. Fl. Bor.-Am. i. 86, t. 29; Wheelock, l. c. 139; Chodat, l. c. 279, t. 25, f. 36-40 (incl. formal vars. *obtusata* and *macrospora*); not DC. *P. rubella*, Willd. Spec. iii. 875; Bigel. Med. Bot. iii. 129, t. 54. — Sandy fields and rich woods, Nova Scotia to Ontario and Lake of the Woods, *Dawson* (acc. to Macoun), south to Florida and Texas; fl. spring and summer, somewhat according to latitude. A pale-flowered form, the var. *pallida*, Hollick (or rather Britton?), Bull. Torr. Club, xviii. 256, occurs in some localities with the typical one. Forms with short racemes of cleistogamous flowers springing from the upper leaf-axils or even with the flowers of the terminal raceme reduced and cleistogamous (var. *ABORTIVA*, Chodat, l. c. 280), are occasionally found.

== Flowers greenish white (persistent wings sometimes erubescens or purplish), subsessile in terminal mostly compact spikes: none cleistogene: leaves all alternate, lanceolate to ovate: root becoming thickish: wings suborbicular.

- P. Sénega, L.** (SENECA SNAKE-ROOT.) Root stoutish, often irregular, surmounted by a compact branching caudex: stems simple or nearly so, terete, slightly puberulent, 6 to 15 inches in height, leafy: lowest leaves scale-like, obtuse, often erubescens; the others lance-linear to elliptic-lanceolate, 6 to 18 lines in length, a fourth as broad, with scabrous (or under lens denticulate) margins: capsules thickish, broader than long; seeds black, puberulent, somewhat pyriform, conspicuously carunculate. — Spec. ii. 704; Sims, Bot. Mag. t. 1051; Hook. Fl. Bor.-Am. i. 85; Bigel. Med. Bot. ii. 97, t. 30; Gray, Gen. III. ii. 223, t. 183; Wheelock, l. c. 134; Chodat, l. c. 278, t. 25, f. 34, 35. — Open woods in rich soil, Aroostook Falls, New Brunswick, *Hay*; Vermont, *Oakes*; east shore of Hudson Bay, *R. Bell*; the Rocky Mountains of Brit. America; and southward to N. Carolina, Tennessee, and Arkansas; fl. through summer. Extensively collected for officinal root and becoming scarce in most localities. Certainly passing into the often strikingly different

**Var. latifolia, Torr. & Gray.** Root mostly more slender: stems taller: leaves (at least the upper ones) ovate, acuminate at each end, 2 or 3 inches long, an inch or even more in breadth, mostly serrulate: inflorescences inclining to be laxer and capsules and seeds mostly larger than in the typical form. — Fl. i. 131; Gray, Man. ed. 2-6; Wheelock, l. c. 135. *P. Senega*, var. *dentata*, Chodat, l. c. 279, from description, in which author neglects to mention type specimens or range. — Rich woods, Pennsylvania to Georgian Bay, Lake Huron, *Dickson*, acc. to J. M. Macoun, westward to S. Dakota, acc. to Rydberg, and southward to Tennessee. The more marked specimens are western, those of the Virginian mountains showing transitions to the type.

=== Flowers (of one kind) white or roseate, in terminal tapering spikes: root not thickened: leaves linear-lanceolate to elliptic-oblong, all or at least the primary ones tending to be verticillate.

a. Species of the Southern States east of the Mississippi: capsule suborbicular.

- P. Bóykini, Nutt.** Glabrous, 1 to 3 feet high: stems sharply angled: lower leaves elliptic or oval, obtuse, often apiculate; the upper lance-oblong, acute, all verticillate or the upper scattered: spikes  $1\frac{1}{2}$  to 4 inches long, gradually tapering, long-peduncled; the nearly sessile white or greenish white flowers with broad oval or suborbicular wings: capsules  $1\frac{1}{2}$  to 2 lines in diameter; seeds appressed-pubescent, curved, somewhat tapering to the apex; lobes of the caruncle rather broad, often imbricated. — Jour. Acad. Philad. vii. 86; Chodat, l. c. 137, t. 20, f. 15, 16. *P. Boykinii*, Torr. & Gray, Fl. i. 131, 670; Wats. Proc. Am. Acad. xxi. 416; Wheelock, l. c. 120, excl. var. *P. bicolor*, Hook. Jour. Bot. i. 194; Torr. & Gray, Fl. i. 130. *P. alba*, Chapm. Fl. 85, from char. — Preferring calcareous soil, from Georgia, where first coll. by *Boykin*, to Florida and westward to New Orleans, where early coll. by *Drummond*; fl. acc. to conditions, from early spring to autumn. Narrow-leaved specimens from Alabama, *Buckley*, in habit simulate *P. alba*, but owing to their shorter and relatively broader capsules are by Dr. Watson referred to the present species.

b. Species of Florida: capsule elliptic-oval.

- P. prætervisa, Chodat.** Slender glabrous annual (2 feet high) with several flexuous simple or considerably branched slightly angled scaparious stems with a few approximate verticels of leaves near the base, otherwise sparingly alternate-leaved or nearly naked and junceiform: leaves lanceolate to linear, acutish or very acute, even the largest only 4 or 5

lines long and a line or line and a half broad: slender long-peduncled spikes of small white flowers very tapering, 1 to 2 inches long; capsule smaller than in the related species, at full maturity scarcely a line in length, two thirds as broad: small cylindrical appressed-hairy seed with bilobed caruncle half its length; the lobes not imbricated. — Monogr. Polyg. 140, t. 20, f. 19, 20. *P. Boykinii*, var. *sparsifolia*, Wheelock, l. c. 121. — Coral soil, Cudjoe Key, S. Florida, *Curtiss*, no. 503\*; fl. early spring. Amply distinct from *P. Boykini* in its capsule as well as smaller leaves and scaparious habit.

c. Species of western range: capsule short-oblong.

**P. álba**, Nutt. Root single, of doubtful perhaps varying duration: stems erect, 8 to 20 inches in height, leafy up to or somewhat above the middle, terminating in slender naked peduncles: leaves all alternate, or the lowest verticillate, narrow, oblong to linear, half inch to inch in length, a line in breadth; the lowest ones broader, spatulate, obtuse, the others acute: spikes 1 to 3 inches long, at first very dense: flowers white: wings ovate, narrowed at base, exceeding the capsule: 2-lobed caruncle about half the length of the oblong dark-colored appressed-villous seed. — Gen. ii. 87; Torr. & Gray, Fl. i. 131; Gray, Pl. Fendl. 30, Pl. Wright. i. 38, & ii. 30 (excl. Sonoran plants); Wheelock, l. c. 136; Chodat, l. c. 135, t. 20, f. 13, 14. — Plains, Louisiana to Dakota and westward to Washington and Arizona. (Mex.) Common and at the Southwest somewhat variable.

**Var. suspécta**, Watson. Lower in stature, with more slender perhaps annual root and decumbent stems: all of the leaves or at least the lower and middle cauline verticillate, oblong-lanceolate: flowers (sometimes erubescens), fruit, and seed essentially as in the typical form. — Proc. Am. Acad. xxi. 416. *P. álba*, form, Gray, Pl. Wright. ii. 30, as to Sonoran plants. *P. álba*, var. *Schaffneri*, Chodat, l. c. 137. — Mountains of Arizona, *Lemon, Wilcox*. (Common in Mex., where coll. by *Seemann, Gregg, Wright, Schaffner, Parry & Palmer*.) Very closely related if not identical is *P. bicolor*, HBK. Nov. Gen. & Spec. v. 394, t. 507, regarded both by Gray and by Chodat as a low variety of *P. álba*. The Northern Mexican *P. subalata*, Wats. Proc. Am. Acad. xxvi. 132, of identical habit, appears to differ only in seed-characters of doubtful constancy.

++ ++ Strictly annual (except *P. setacea*): root slender, simple or branched and perpendicular, or of slender fascicled fibres, neither ligneous nor thickened: stem single at base (rarely 2 or 3 in the leafless *P. setacea*), erect, sometimes branching from the lower internodes but not from a caudex.

= Leaves all alternate: petals united into a slender tube more than twice the length of the spatulate wings.

**P. incarnáta**, L. Tall slender flexuous smooth and glaucescent annual, simple or few-branched: stems angled, often almost naked: leaves narrow, linear, acute, erect, seldom over half inch long, sometimes much reduced: spikes terminating the axis and elongated branches, cylindric, rather dense: tubular corollas roseate, spreading from near the summit, 2 lines or more in length, conspicuously crested: fruit soon exposed. — Spec. ii. 701; Hill, Veg. Syst. xxii. t. 51, f. 1; Hook. Fl. Bor.-Am. i. 84; Chapm. Fl. 84; Gray, Man. ed. 1-6; Wheelock, l. c. 124; Chodat, l. c. 189, t. 22, f. 10-18. — Dry thin soil, oak and pine barrens, also on prairies, New Jersey to S. Ontario, *Dodge*, acc. to J. M. Macoun, Wisconsin, Indian Territory, *Bush*, and southward to Florida and Texas; fl., acc. to situation, from April to September. The var.  $\beta$  of Torr. & Gray (Fl. i. 129; *P. paniculata*, LeConte, not L.) coll. in Georgia by *LeConte*, and described as paniculately branched, almost leafless, and with corolla-tube little exceeding the wings, is obscure, perhaps not of this species.

= = Leaves all alternate: wings exceeding the corolla: root a fascicle of numerous slender fibres: racemes elongated very slender and loosely flowered: species of the Southwest.

**P. paludósa**, St. Hil. Very slender, glabrous, 1 to 2 feet high, simple below, mostly branched above; the branches few, erect: leaves narrowly linear, very acute, erect: small pale or rose-purple flowers at length nodding on very short filiform pedicels in the slender soon loosely flowered attenuate spicate racemes: elliptic-obovate cuneate-based wings and short-oblong fruit about three fourths line in length; seed pubescent and provided with a small bilobed caruncle about one eighth of its length. — Fl. Bras. Merid. ii. 8, excl. vars. in part; Chodat, l. c. 226, t. 24, f. 4, 5. *P. leptocaulis*, Torr. & Gray, Fl. i. 130; Wheelock, l. c.

127. — Moist sandy and grassy places, Louisiana and Texas. (S. Am. in S. Brazil, Paraguay, &c.) Overlooking the small but distinct bilobed caruncle, Chodat, l. c., has called the N. American form var. *exappendiculata*. In the seeds examined the caruncle appears to be essentially as in the S. American plant. In its peculiar geographic distribution this species may be compared with *Spergularia Platensis*, *Cienfuegosia sulphurea*, &c.

= = = Leaves, at least the lower ones, verticillate : wings obtuse or rounded at the apex : flowers in slender tapering spikes.

**P. leptóstachys**, SHUTTL. Tall and slender, scarcely branched, 1 to 2 feet high : internodes four to six times as long as the linear-oblong acute verticillate leaves : spikes a line and a half in diameter ; small flowers sessile : elliptical wings exceeded by the elliptic-oblong capsule. — Shutt. in Gray, Pl. Wright. i. 41 ; Chapm. Fl. 85 ; Wheelock, l. c. 121 ; Chodat, l. c. 140, t. 20, f. 21. — Dry pine barrens, Florida, first coll. by *Leavenworth*. Readily recognizable by its very elongated internodes.

**P. verticilláta**, L. Rather low, seldom over 8 inches in height except at the southwest, when well developed rather copiously and verticillately branched and somewhat flat-topped : leaves all or nearly all verticillate : flowers white or greenish but rarely with distinct purplish cast, compactly arranged : wings usually smaller than the capsule which is apt to be conspicuously exposed at maturity. — Spec. ii. 706 ; Hill, Veg. Syst. xxii. t. 53, f. 3 ; Torr. & Gray, Fl. i. 130 ; Wheelock, l. c. 122 ; Chodat, l. c. 138, t. 20, f. 17, 18, incl. var. *aparinoides*, at least as to no. 26 of *Drummond*, but excl. var. *ambigua*. — Dry pastures, &c., Maine to Florida, west to the Saskatchewan, *Bourgeau*, Wyoming, Colorado, Texas, and even Utah ; common ; fl. midsummer. A taller form from Texas, coll. *Wright*, has longer more loosely flowered spikes.

**Var. ambigua**, WOOD. Quite simple or irregularly branched, often taller than the type : upper and sometimes middle cauline leaves alternate : spikes often loosely flowered below : flowers commonly but not invariably purple-tinged : wings about equalling and often appressed to the fruit. — Class-Book, ed. of 1861, 296 ; Wats. & Coulter in Gray, Man. ed. 6, 122 ; Chodat, l. c. 139. *P. ambigua*, Nutt. Gen. ii. 89 ; Gray, Man. ed. 1-5 ; Wheelock, l. c. 124. — Dry rich soil, Hartford, Maine, *Parlin* ; Vermont, *Brainerd* ; Springfield, Massachusetts, *Mrs. Smith* ; Rhode Island, *J. F. Collins* (white-flowered) ; New Jersey to Georgia, and westward to Louisiana, Missouri, and Indian Territory, *C. S. Sheldon* (acc. to *Holzing*). Generally recognizable from the type but not distinguished from it by a single constant or wholly satisfactory difference.

= = = Leaves all alternate, sometimes much reduced : wings about equal to or surpassing the corolla : root simple or branched, not of fascicled fibres.

a. Leaves almost filiform or reduced and scale-like : inflorescences (rather dense) ovoid to cylindric, with conical gradually tapering summit : very slender simple or few-branched species of the Gulf States, a foot to 18 inches in height.

**P. setácea**, MICHX. Perennials, sending up successive slender subsimple almost filiform apparently naked stems ; these (rarely 2 or 3 cœtaneous) in turn dying down and leaving only their blackened persisting bases ; branches when present simple, erect : leaves scale-like, linear-subulate, scarcely more than a line in length : flowers small, white or nearly so : wings spatulate : small capsule at length somewhat deltoid from a broad base. — Fl. ii. 52 ; Ell. Sk. ii. 183 ; Torr. & Gray, Fl. i. 129 ; Wheelock, l. c. 126 ; Chodat, l. c. 195, t. 22, f. 28-31. — Pine woods, &c., Florida and perhaps Georgia ; fl. spring.

**P. Chapmánii**, TORR. & GRAY. Similar in its slender flexuous habit but annual : leaves 4 to 8 lines in length : flowers rose-purple : crest of keel reduced to 2 or more low blunt processes. — Fl. i. 131 ; Chapm. Fl. 83 ; Wheelock, l. c. 132 ; Chodat, l. c. 192, t. 22, f. 21-23. — Florida, where first coll. by *Chapman*, to Alabama, *Mohr*, and S. Mississippi, *Miss Skehan*.

b. Leaves linear to narrowly oblong : inflorescences subglobose, ovoid, or short-cylindric, very obtuse or (in *P. Curtissii*) tending to be abruptly apiculate : plants when well developed considerably branched.

**P. Curtissii**, GRAY. When young subsimple but soon copiously branched, 6 to 15 inches high : branches widely spreading, curved-ascending, leafy : stem-leaves oblong-linear, about an inch long ; the rameal linear, 4 to 9 lines in length, not a line in breadth : inflorescences



slender-peduncled, commonly rather dense, ovoid or even oblate, half inch or more in diameter, tending to be apiculate through the protrusion of the bract-covered axis: flowers rose-purple, on filiform divaricate pedicels, these two or three times exceeding the wholly persistent bractlets: wings narrowly ovate-elliptic, conspicuously unguiculate, about a line in breadth: fruit at length exposed, broader than long; small black seeds pyriform, almost beaked, surmounted by a caruncle scarcely a fourth as long. — *Man.* ed. 5, 121; *Wheelock*, l. c. 129. *P. Nuttalli*, *Chodat*, l. c. 190, t. 22, f. 19–20, not *Torr. & Gray*. — Dry ground on hillsides, fields, and in open woods, Pennsylvania, at Bethlehem, *Wolle*, acc. to *Wheelock*, southward to Georgia, westward to Alabama, Tennessee, Kentucky, and (?) Arkansas; especially abundant in Maryland and District of Columbia; fl. June to October. The original specimens (coll. near Alexandria, Virginia, by *Curtiss*) have the flowers loosely racemose with some of the subtending bractlets elongated and subfoliaceous, but are in these regards highly exceptional, possibly abnormal, so that there is scarcely need to apply *Dr. Gray's* name var. *pycnostachya* (published by *Knowlton*, *Proc. Biol. Soc. Washington*, iii. 106) to the ordinary more densely flowered form.

**P. Mariána**, *MILL.* Resembling the last preceding, but mostly with fewer more erect branches: smaller roseate flowers clustered at the summit of the elongated axis in an ovoid mostly very short and obtuse slender-pedunculate inflorescence (4 to 5 lines in diameter): lower bractlets deciduous with or soon after the flowers: wings oval, obtuse, rather abruptly contracted below and very short-clawed: small relatively broad rather turgid pods and pyriform seeds much as in the last. — *Dict.* ed. 8, no. 6, acc. to *Wheelock*, l. c. 131, the type having been examined by *Prof. Britton* (*Pluk. Mant.* 153, t. 438, f. 5). *P. fastigiata*, *Nutt.* *Gen.* ii. 89; *Chapm. Fl.* 83; *Wats. & Coulter* in *Gray*, *Man.* ed. 6, 121; *Chodat*, l. c. 193, t. 22, f. 24, 25. *P. sanguinea*, *Torr. & Gray*, *Fl.* i. 126, in part. — Hillsides, &c., Delaware, *Canby*, to Florida, W. Tennessee, *Bain*, Texas, *Wright*, and Arkansas, acc. to *Lesquereux*.

**P. Nuttallii**, *TORR. & GRAY.* Similar to the two preceding but of lower stature (4 to 9 inches high), almost always with a few erect branches: pedunculate inflorescences more slender and distinctly cylindric, 2 to 3 lines in thickness, obtusish or subacute; divaricate branchlets persisting on lower parts of the floral axes: small flowers nearly sessile, purplish or greenish white: elliptic-lanceolate subacute wings about a line in length. — *Fl.* i. 670 (as to first syn. *P. sanguinea*, *Nutt.*); *Chapm. Fl.* 83; *Wheelock*, l. c. 133. *P. sanguinea*, *Nutt.* *Gen.* ii. 88, not *L.* *P. Torreyi*, *Chodat*, l. c. 194, t. 22, f. 26, 27 (who by *Warwick*, *Kingston*, and *Cogdon*, doubtless means *Warwick*, *Kingston*, and *Cogdon*). — Mostly in poor soil, *Martha's Vineyard*, *Oakes*, Rhode Island, *Thurber*, *Olney*, *Cogdon*, and from *Long Island*, *Winton*, S. Pennsylvania, *Porter*, southward to Maryland, *Canby*, and Kentucky, chiefly near the coast and seemingly most common in the barrens of New Jersey; fl. late summer. The Missouri occurrence of this species, mentioned by *Wats. & Coulter* in *Gray*, *Man.* ed. 6, 121, and its Arkansas occurrence acc. to *Brauner & Coville*, *Rep. Geol. Surv. Ark.* iv. 168, have not been verified by the writer. *Wats. Bibl. Index*, 91, and *Wheelock*, l. c., would seem to be in error in citing *P. ambigua*, *Torr. & Gray*, *Fl.* i. 130, as a synonym of this species.

**P. sanguinea**, *L.* More leafy and leaves broader, even the rameal often oblong rather than linear: spikes thick, soon cylindric, when fully developed half inch in diameter, blunt: flowers considerably larger than in the foregoing related species: the broadly ovate-oblong wings closely imbricated, in fruit 3 lines in length, two thirds as broad, sometimes slightly mucronulate at the broad rounded apex, rose-purple passing through various gradations to greenish white, with conspicuous more deeply colored midnerve: bractlets usually persistent, from half to fully as long as the spreading pedicels: flask-shaped puberulent black seed with a caruncle half or more than half its length. — *Spec.* ii. 705; *Michx.* *Fl.* ii. 52; *Bigel.* *Fl. Bost.* 166; *Wats. & Coulter* in *Gray*, *Man.* ed. 6, 121; *Chodat*, l. c. 191. *P. viridescens*, *L.* l. c.; *Wheelock*, l. c. 127, incl. var. *albiflora*, the white-flowered form. *P. purpurea*, *Nutt.* *Gen.* ii. 88; *Barton*, *Fl. N. A.* ii. t. 47 (wings too acute). — Meadows and roadsides, Nova Scotia, *McCulloch*, southward to N. Carolina, westward to Minnesota, Kansas, and Indian Territory, *Palmer*; fl. June to October. An attractive species, the commonest of the North-eastern States. Albinos are not infrequent.

== == == == Leaves all or in great part verticillate: wings acute to caudate-acuminate.

**P. Hoókeri**, *TORR. & GRAY.* Slender flexuous angulate stem more or less branched above,

6 to 15 inches high, soon almost leafless below: leaves 3 to 6 lines long, scarcely a line wide: pedunculate racemes rather loose and terminated even in fruit by the protruding sterile imbricate-bracted apex of the axis: wings ovate-oblong, slightly narrower and more acute than in the next, mostly conduplicate and thereby appearing still more sharply pointed, commonly exhibiting near the apex a spongy (glandular?) thickening: seeds scarcely half line long. — Fl. i. 671; Chapm. Fl. 84; Wheelock, l. c. 119; Chodat, l. c. 188, t. 22, f. 13-15. *P. attenuata*, Hook. Jour. Bot. i. 195, not Nutt. — Gulf States from Florida to Louisiana; first coll. by *Drummond*.

**P. brevifolia**, Nutt. Erect, much branched, 6 to 10 inches high or rarely taller: leaves narrowly elliptic to linear-oblong, mostly obtuse, 6 to 8 lines long, a line and a half in breadth, the rameal commonly alternate: flowers rose-purple in pedunculate rather dense spicate or capitate racemes which are soon obtuse at the summit: wings broadly ovate-oblong, commonly expanded and flattish, merely acutish: seeds ovoid, fully three fourths line in length, almost black, loosely puberulent, about equalled by the two long narrow scale-like lobes of the caruncle. — Gen. ii. 89; Chapm. Fl. 84; Wats. & Coulter in Gray, Man. ed. 6, 122; Wheelock, l. c. 119; Chodat, l. c. 187, t. 22, f. 10-12. *P. cruciata*, Torr. & Gray, Fl. i. 127, in part. — Margins of swamps, &c., New Jersey, where apparently common; also in Florida, *Chapman*, and Mississippi at Ocean Springs, *Tracy*, *Pollard*, where in its taller growth and more apiculate racemes it approaches the last. Intermediate stations of this (acc. to present knowledge) geographically dissevered species may be sought with interest. Its occurrence in Ohio, although mentioned in the original description, does not appear to have been confirmed in recent times.

**P. cruciata**, L. Mostly low (3 to 10 inches in height) and corymbosely branched: stem wing-angled: leaves, in fours or fives, narrowly elliptic-oblong, obtuse or mucronulate, punctate, about an inch in length, 1 to 2 lines in breadth, the uppermost usually surrounding and often surpassing the short thick subsessile spicate or capitate rather dense sometimes apiculate racemes of rose-purplish to greenish white flowers (rather large for the genus): wings caudate-acuminate from broad deltoid subcordate base: seed sparingly pubescent, black or nearly so, elliptic-oblong in outline, nearly equalled by the caruncle. — Spec. ii. 706; Gray, Gen. iii. 223, t. 183, f. 12, 13, & Man. ed. 1-6; Wheelock, l. c. 117; Chodat, l. c. 185, t. 22, f. 6-9. *P. cuspidata*, Hook. Jour. Bot. i. 194, not DC. — Peat bogs, margins of swamps and occasionally in drier situations, New England to Minnesota and southward to the Gulf of Mexico; fl. midsummer and early autumn. The very characteristic caudate acumination of the wings is sometimes reduced or wanting (*Leggett*). In the Gulf States plants of taller stature, and with narrower linear leaves, pedunculate inflorescences, and deeper-purple flowers, may be distinguished as var. *RAMOSIOR*, Nash, in herb. (Florida, Duval Co., *Curtiss*, no. 509, Lake Co., *Nash*, nos. 1210, 2192, New Smyrna, *Palmer*, no. 30; Alabama, *Gates*; Mississippi, Ocean Springs, *Pollard*, no. 1069), but the name is not well chosen, as the degree of branching is neither constant nor marked.

+ + Flowers (homomorphous) bright yellow or orange (except in *P. Baldwinii*), borne in short thick terminal or corymbosely paniculate obtuse or apiculate spikes or racemes: erect glabrous mostly showy-flowered annuals or biennials with fibrous or single and few-branched roots and always alternate or basal leaves: sepals tending to be decurrent upon the thus angled or narrowly winged pedicels: species of the Middle and S. Atlantic and Gulf States: wings acute or cuspidate. — *Decurrentes*, Chodat, l. c. 197.

++ Spicate or capitate racemes solitary or few and remote, terminating the stems or their few simple branches.

= Wings ovate-lanceolate, gradually and sharply acuminate: keel with a long crest of slender bifid processes: stems low ( $1\frac{1}{2}$  to 4 or 5 inches high), often subscapose.

**P. nana**, DC. Subcaulescent annual with slender perpendicular simple or sparingly branched root and chiefly radical spatulate obtuse or mucronulate leaves: flowers very numerous in compact oblong spikes bristling with the sharp-pointed wings, yellow turning dark bluish green in drying: caruncle scarcely more than half the length of the seed. — Prodr. i. 328; Torr. & Gray, Fl. i. 127; Chapm. Fl. 83; Wheelock, l. c. 116; Chodat, l. c. 199, t. 22, f. 40, 41. *P. lutea*, var. *nana*, Michx. Fl. ii. 54. *P. viridescens*, Walt. Car. 178; Ell. Sk. ii. 186; not L. — Dry fertile soil and low coniferous woodland, S. Carolina to Florida,

Louisiana, and Arkansas; fl. March to June. Var. *humillima*, Chodat, l. c. 200, is merely the most dwarf form (or perhaps state) with inflorescences sessile among the radical leaves.

== Wings ovate-oblong or elliptic-oblong with short sharp apical cusp: keel with a short crest: stems (mostly 8 inches to a foot or more in height) leafy.

**P. lútea**, L. Annual, erect, 6 to 15 inches high: stems often several from a subfibrous root, simple or with a few spreading branches near or above the middle: cauline leaves oblong-lanceolate, acute; the lower and radical ones passing to spatulate or even obovate-cuneate with rounded apex: flowers in broad dense obtuse or (through the projecting innermost bracts) cuspidate long-peduncled capitate racemes, sulphur yellow or orange, not turning dark in drying: wings becoming  $3\frac{1}{2}$  lines in length and  $1\frac{1}{2}$  lines in breadth: crest of the keel of 6 or 8 short processes (half line or less in length), the upper (dorsal) ones rather broad and not filiform: seed with a slender caruncle most often of nearly its own length. — Spec. ii. 705; Torr. & Gray, Fl. i. 127; Chapm. Fl. 83; Meehan, Native Flowers, ser. 2, ii. 125, t. 31; Wheelock, l. c. 115; Chodat, l. c. 197, t. 22, f. 32–35. *P. pseudosenega*, Bertol. Bot. Miscel. xv. 21, t. 3, f. 2 (Bot. Zeit. xiv. 784), acc. to Gray. — Sandy soil, low pine woods, &c., Long Island, New York, and S. E. Pennsylvania, to Florida, Mississippi, and (acc. to Lesquereux) Arkansas; fl. April to July.

**P. Rugéii**, SHUTTL. In technical characters very close to the preceding: taller, a foot or two in height: stems simple or with a few simple mostly erect branches: inflorescence ovoid becoming oblong: flowers somewhat larger (wings becoming fully 2 lines in breadth), lemon yellow, turning dark bluish green in drying: crest of the keel a little over half line in length, the processes subfiliform, often bifid: seeds essentially as in the last. — Shuttl. in Chapm. Bot. Gaz. iii. 4, & Fl. ed. 2, 613; Wheelock, l. c. 114; Chodat, l. c. 198. *P. Reynoldsæ*, Chapm. Fl. ed. 2, 613. — Low ground, Florida; fl. May to September.

++ ++ Racemes numerous and corymbosely arranged in a terminal many-branched inflorescence: flowers small but showy.

== Basal leaves rosulate, elongated, attenuate; the cauline much reduced.

**P. cymósa**, WALT. Root a fascicle of long slender fibres: stems single, erect, large, fistulose, 1 to 3 feet or more in height: radical leaves linear, attenuate, 3 to 6 inches long, yellowish green: racemes at first dense but soon somewhat lax: flowers rather small, yellow becoming greenish black in drying: wings abruptly cuspidate from an obtuse or rounded apex: seeds small, subglobose, acutish at the apex, glabrous; caruncle obsolete. — Car. 179; Torr. & Gray, Fl. i. 128, 670; Chapm. Fl. 82; Wheelock, l. c. 112; Chodat, l. c. 201, t. 23, f. 1–3. *P. corymbosa*, Michx. Fl. ii. 54, in part. *P. gramineifolia*, Poir. Dict. v. 500. *P. attenuata*, Nutt. Gen. ii. 90. *P. acutifolia*, Torr. & Gray, i. 128. — Marshy places and margins of ponds in pine barrens, &c., Delaware, Canby, to Florida and Louisiana; fl. June to September.

== Stems leafy: radical leaves obtuse or obtusish.

**P. ramósa**, ELL. Fibrous-rooted annual, 8 to 15 inches in height: stem not enlarged below, in most specimens equably leafy to the inflorescence: leaves half inch to inch and a half in length; the cauline oblong, acute; radical spatulate, obtuse: flowers slender-pedicelled, in size and arrangement much as in the last preceding species, also yellow and turning green or black in drying: wings more gradually acuminate: seed small, dark brown, soft-puberulent, and with a minute bifid terminal caruncle. — Sk. ii. 186; Chapm. Fl. 82; Wheelock, l. c. 112; Chodat, l. c. 202, t. 23, f. 4, 5. *P. cymosa*, Poir. Dict. v. 500, not Walt. *P. corymbosa*, Nutt. Gen. ii. 89; Torr. & Gray, Fl. i. 128; not Michx. — Sandy hills, also low pine barrens, &c., with same range as the preceding, but westward to Texas, Leavenworth, acc. to Wheelock, l. c. 113; fl. midsummer.

**P. Báldwini**, NUTT. Stature, habit, and foliage as in the preceding: stem strongly angled: flowers somewhat larger (lanceolate acuminate wings 2 lines in length), white, short-pedicelled or subsessile in dense corymbosely arranged heads, fragrant, in typical form drying yellowish white. — Gen. ii. 90; Ell. Sk. ii. 187 (*Baldwini*); Chodat, l. c. 203, t. 23, f. 6, 7. *P. Baldwinii*, Torr. & Gray, Fl. i. 128; Wheelock, l. c. 113. — Moist sandy soil, in pine barrens, &c., Georgia to S. Florida, westward to Mississippi, Tracy; fl. midsummer. Var.

CHLORÓGENA, Torr. & Gray, l. c. 129 (where printed *chlorgena*), is a form in which the flowers turn deep green in drying, but the other distinctions do not hold.

2. MONNÍNA, Ruiz & Pav. (*J. Moñino*, Spanish nobleman and patron of botany.) — Fl. Peruv. Syst. i. 169; HBK. Nov. Gen. & Spec. v. 409, t. 501–505; Hook. Bot. Mag. t. 3122; Benth. & Hook. Gen. i. 139; Baill. Hist. Pl. v. 89; Chodat, Bull. Herb. Boiss. iv. 243. *Hebeandra*, Bonpl. acc. to DC. Prodr. i. 338. — A genus of tropical and subtropical America, ranging from Mexico to Brazil and including some 70 species of herbs, shrubs, and even small trees. Only one species, a smoothish annual, resembling a *Polygala*, reaches our southwestern border.

**M. Wrightii**, GRAY. Erect, slender, subsimple or moderately branched, 10 inches to 2 feet in height: leaves sessile, lanceolate, entire, cuneate at the base, the lower ones obtusish at the apex, the upper ones narrower, lance-linear, long-attenuate: flowers in simple terminal pedunculate spikes, crowded in bud, laxer in anthesis and somewhat scattered in fruit,  $1\frac{1}{2}$  lines long, greenish or cream-colored, becoming bluish with age: fruit deflexed, suborbicular, puberulent, about 2 lines in diameter including the radiately nerved wing. — Pl. Wright. ii. 31; Torr. Bot. Mex. Bound. 49. — Gravelly slopes and rocky hillsides, New Mexico, near the copper mines, *Wright*, no. 938; S. Arizona, *Lemmon*, no. 499. (Chihuahua, *Pringle*.)

## SUPPLEMENT TO VOL. I. PART I.

(ISSUED WITH FASCICLE II.)

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### ADDITIONS AND CORRECTIONS.

By B. L. ROBINSON.

DURING the last year and a half much has been written relating to the orders treated in Fascicle I. To subject this newly published but already copious matter to the careful critique which it merits, and to incorporate any great part of it in the present issue would considerably delay the appearance of Fascicle II. On this account it seems best merely to correct the evident errors in Fascicle I, which have come to the notice of the editor, and to add only such supplementary matter as can be satisfactorily presented without loss of time, judgment upon many of the recently proposed species and varieties being necessarily deferred.

GENERAL KEY TO THE ORDERS, page vii, under \*, line 2, after "perigynous in some *Resedaceæ*," add, many *Ficoideæ*.

### RANUNCULACEÆ.

#### 1. CLÉMATIS, L.

**C. Virginiána**, L., p. 4. Add locality, N. E. Nebraska, *Clements*, a pubescent form.

**C. Suksdórfii**, ROBINSON, p. 4. Add lit. Gard. & For. ix. 255, f. 36.

**C. Viórna**, L., p. 5. Extend range to Middle Georgia, acc. to Small.

**C. Addisónii**, BRITTON, p. 5. Add lit. Gard. & For. ix. 324, f. 43, and extend range to Cumberland Mts., Tennessee, acc. to Small. The form mentioned at the close of the description is the "*C. viornioides*" of Britton (named in Mem. Torr. Club, ii. 30, and defended by Small, Bull. Torr. Club, xxii. 473), confessedly a hybrid, never independently described, nor subsequently included in Professor Britton's own list of species (Mem. Torr. Club, v. 158).

**C. Pitcheri**, TORR. & GRAY, p. 6. Add to range, Kansas, *Norton*. For "**Var. leióstylis**" and "**Var. lasióstylis**," read, **Var. leiostylis** and **Var. lasiostylis**, and in note 2, p. 6, for "*S. cordata*" and "*S. crispa*," read, *C. cordata* and *C. crispa*, respectively.

- C. ochroleúca**, AIT., p. 7. In line 5, for "about inch," read, 15 lines to 2 inches.
- C. Douglásii**, Hook., p. 8. Add syn. *C. Douglasii*, var. *Bigelovii*, Jones, Proc. Calif. Acad. Sci. ser. 2, v. 614, not *C. Bigelovii*, Torr.
- Var. Scóttii**, COULTER. Add to range, Black Hills, S. Dakota, *Rydberg*, and Montana, acc. to Small.
- C. verticilláris**, DC., p. 8. Range should be extended to Delaware, acc. to Canby, and Southwestern Virginia, acc. to Small.
- Var. Columbiána**, GRAY. Add lit. Jones, l. c. Professor Jones, who had independently reached the same conclusion as Dr. Gray regarding this plant, states that his Contrib. to Western Bot. vii., although printed 3 October, 1895, was not distributed until after the issue of Fascicle I of the present work.
- C. alpína**, var. *tenuiloba*, GRAY (1895), p. 9. Later republished by Rydberg, Contrib. U. S. Nat. Herb. iii. 479 (1896). Dr. Gray's name should stand as authority.

## 2. ANEMÓNE, Tourn.

- § 1. **PULSATÍLLA**, Tourn., p. 9. Add lit. E. Huth in Engl. Jahrb. xxii. 582-592.

**PULSATÍLLA MÚLTICEPS**, Greene, Erythea, i. 4, of N. Alaska (where coll. *Turner*), is known to the editor only from the vague and unsatisfactory description. Asiatic species are to be expected in the region and the dwarfed dimensions are very likely the result of the high latitude.

- A. Drummóndii**, WATSON, p. 10. Very near this must stand (*ex char. et icon.*) the recently proposed *A. Californica*, Eastwood, Proc. Calif. Acad. Sci. ser. 2, vi. 423.
- A. Tetonénsis**, PORTER, p. 10. Add lit. Jones, Proc. Calif. Acad. Sci., ser. 2, v. 615.
- A. Canadénsis**, L., p. 12. Add locality, Kansas, *Norton*.

## 5. THALÍCTRUM, Tourn.

- T. Féndleri**, var. *platycarpum*, TRELEASE, p. 16. Add syn. *T. platycarpum*, Greene, Pittonia, i. 166, not Hook. f. & Thoms.
- T. occidentále**, GRAY, p. 16. Add locality, Wyoming, *Nelson*.
- T. venulósum**, TRELEASE, p. 16. *T. campestre*, Greene, Erythea, iv. 123, is said on excellent authority to be a synonym.
- T. polýgamum**, MUHL., p. 17. For "**Var. macrostylum**," read, **Var. macrostylum**. Rugel's plant is probably the one mentioned in Bot. Zeit. iii. 218-219, as *T. Cornuti*, var. *monostyla* (clerical error?).
- T. coriáceum**, SMALL, p. 17. Add locality, Cumberland Mts., Tennessee, acc. to Small.

## 8. MYOSÚRUS, Dill.

- M. apétalus**, GAY, p. 19. Add locality, Assiniboia, *Macoun*.
- M. mínimus**, L., p. 19. Extends to S. E. Virginia, acc. to Small; also northward to Assiniboia, *Macoun*.

## 9. RANÚNCULUS, Tourn.

- R. hystrículus**, GRAY, p. 22. Extend range to Portland, Oregon, *Miss Cummings*.
- R. Andersónii**, GRAY, p. 22. Strike out reference to var. *tenellus*, and at close of description add

**R. juniperinus**, JONES. Nearly related to and with much the habit of *R. Andersonii*: stem taller and more slender, commonly branched, bearing one leaf and mostly 2 flowers: leaves more finely dissected: petals internally white, but becoming at least externally rose-purple: akenes flat, not inflated, 1 to  $1\frac{1}{2}$  lines in length, hence much smaller than in *R. Andersonii*. — Proc. Calif. Acad. Sci. ser. 2, v. 616. *R. Andersonii*, var. *tenellus*, Wats. Bot. King Exp. 7, t. 1, f. 8-10. — Rocky soil, coniferous woods, Utah, *Watson, Parry, Johnson, Jones*. Good fruit-characters separate this from the preceding.

**R. Cymbalaria**, PURSH, p. 23. On last line of page, strike out "ed. 3," and for "173," read, 265.

**R. alismæfolius**, var. **alismellus**, GRAY, p. 27. The extreme form of this plant with broad and even cordate leaves, the *R. Populago* of Greene has been redescribed as *R. Cusickii* by Jones, Proc. Calif. Acad. Sci. ser. 2, v. 615. Although it may well be worthy varietal rank, it lacks constant or satisfactory characters for specific separation.

**R. Lemmóni**, GRAY, p. 28. This rare species has recently been rediscovered near Truckee, California, by *C. F. Sonne*.

**R. glaberrimus**, HOOK., p. 28. Add syn. *R. glaberrimus*, var. *ellipticus*, Greene, Fl. Francis. 298, a form again raised to specific rank by Greene, Pittonia, iii. 92.

**R. Allegheniensis**, BRITTON, p. 32. Specimens of this interesting and geographically dis-severed species have been collected on Mt. Monotuck, Easthampton, Massachusetts, *Purdie*, and in the Adirondack Mts., acc. to Britton.

**R. recurvatus**, POIR., p. 33. Occurs as far west as Montana, acc. to Small.

**R. fasciculáris**, MUHL., p. 37. For "E. New England and Texas," read, E. New England to Texas.

13a. **ERÁNTNIS HYEMÁLIS**, L., p. 42. In line 3 of descr., for "relict," read, relic.

14. **AQUILÉGIA**, Tourn. The etymology of the generic name is at best doubtful.

**A. brevístyla**, HOOK., p. 43. Add lit. Rydberg, Contrib. U. S. Nat. Herb. iii. 481, t. 18.

**A. saximontána**, P. A. RYDBERG, p. 43. Add lit. Rydberg, l. c. 482, t. 19. Perhaps too nearly related is the recently proposed *A. Laramiensis*, A. Nelson, Wyoming Exper. Sta. Bull. xxviii. 78.

**A. Jonésii**, PARRY, p. 43. Add lit. Gard. & For. ix. 365, f. 48. For "Maria Pass," read Old Marias Pass. Specimens with taller bibracteate scape and larger leaflets yet probably of this species have been collected on Sheep Mt., S. Brit. America, by *Macoun*.

**A. cærúlea**, JAMES, p. 44. The following varieties have recently been proposed.

**Var. alpína**, A. NELSON, l. c. Flowers smaller, yellow, with short spurs; upper leaflets entire. — Alpine region, Union Peak, Wyoming, *Nelson*. Professor M. E. Jones suggests that this may well be a hybrid of *A. cærúlea* and *A. flavescens*.

**Var. calcárea**, JONES. Glandular-pubescent: leaves reduced; leaflets small, thick, firm in texture, closely approximated or imbricated by 3's: flowers half to two thirds as large as in the typical form: sepals blue-purple: petals roseate. — Proc. Calif. Acad. Sci. ser. 2, v. 619. — Barren soil, Utah, Kanab, *Mrs. Thompson*, Cannonville, *Jones*. Well marked.

## 15. DELPHÍNIUM, Tourn.

**D. Andersónii**, GRAY, p. 48. For "very glabrous," read, nearly glabrous.

In note 1, p. 49, for "*D. Blockmanæ*," read, *D. Blochmanæ*.

**D. recurvátum**, and **D. Emíliæ**, GREENE, p. 51. From authenticated specimens (named, it is said, by Professor Greene himself) these species seem referable to *D. hesperium* and *D. variegatum* respectively.

## MAGNOLIACEÆ.

## 3. MAGNÓLIA, (Plum.) L.

**M. gláuca**, L., p. 60, note 3. According to information furnished by J. W. Congdon, the Rhode Island specimen mentioned was probably taken from a cultivated plant. The only known indigenous occurrence northeast of Long Island is at Magnolia, Massachusetts, where the species (unfortunately much sought and frequently transplanted for cultivation) is now very rare in a natural state.

**M. Umbrélla**, DESR., p. 60. Dr. Small reports the recent discovery of this species on Stone Mountain, N. Georgia.

**M. acumináta**, L., p. 61. In the synonymy, for "*M. Virginia*," read, *M. Virginiana*.

## ANONACEÆ.

## 2. ASÍMINA, Adans. Add lit. Nash, Bull. Torr. Club, xxiii. 234-242.

**A. tríloba**, DUNAL, p. 63. Extend range to Kansas, *Hitchcock*; also to New Jersey and Nebraska, acc. to Small.

After + +, the species may be revised as follows:—

**A. speciósa**, NASH, l. c. 238. Shrub 2 to 5 feet high: branchlets and spatulate-oblong leaves (3 to 6 inches in length) covered with dense pale or tawny tomentum, which at length becomes thin but does not fully disappear even in age: peduncles 4 to 8 lines long, racemose upon the wood of the previous year: petals very dissimilar, the outer strongly accrescent, ovate-oblong to obovate, becoming 2 inches in length, fully three times as long as the inner. — *A. grandiflora*, Gray, Bot. Gaz. xi. 163, in great part, not Dunal. *Uvaria obovata*, Torr. & Gray, Fl. i. 45, in part. — Sandy soil, S. E. Georgia, *Small*, acc. to Nash, and E. Florida, *Leavenworth*, *Canby*, *Donnell-Smith*, *Curtiss*, *Miss Pierce*.

**A. reticuláta**, CHAPM. This name published with description by Chapman, Fl. ed. 2, 603 (1884), should, as it appears, be reinstated for the species which Dr. Gray later called *A. cuneata*, Shuttl. (Bot. Gaz. xi. 163, 1886). While unfortunate that the *A. reticulata*, "Shuttl." of Chapman is not the *A. reticulata* of Shuttl. in herb., the latter was merely a manuscript name until after the former had been duly described and published.

\* \* Flowers terminal or solitary in the axils of extant subcoriaceous and reticulate-veiny subsessile leaves, produced in spring and early summer.

+ Outer petals, at least when young, ovate, more or less strongly dissimilar to the inner.

**A. grandiflóra**, DUNAL. Shrub 3 to 6 feet high: branchlets, peduncles, calyx, and lower surface of the short and rather broad ovate-oblong to obovate firm leaves rufous-pubescent: flowers large, nearly sessile at the ends of short branches: outer petals cream-colored, becoming obovate and 2½ inches long. — Monogr. Anon. 84, t. 11; Gray, Bot. Gaz. xi. 163, in part. *A. obovata*, Nash, l. c. 239. *Anona grandiflora*, Bartr. Trav. (Am. ed.) t. 2. *Annona obovata*, Willd. Spec. ii. 1269. *Uvaria obovata*, Torr. & Gray, Fl. i. 45, in part. From their rufous pubescence *Orchidocarpum grandiflorum*, Michx. Fl. i. 330, and hence *Porcelia grandiflora*, Pers., may have been of this species rather than of *A. speciosa*, as suggested by Nash. — Pine barrens, Florida, *Palmer*, *Nash*, *Straub*.

**A. angustifólia**, GRAY, p. 64. Amply characterized. Extends, acc. to Small, as far north as Middle Georgia.

**A. pygmæa**, DUNAL, p. 64. In line 2, strike out "oblong," and substitute, oblanccolate. In the synonymy strike out references to the now clearly distinct *A. reticulata*, Shuttl. (not Chapm.), for which see below.



+ + Petals all oblong, short, narrow, and very similar.

**A. Rugélii**, ROBINSON, n. sp. Low undershrub with flexuous red ferrugineous-tomentulose stems: early glabrate reticulate-veiny chartaceo-coriaceous leaves (inch to inch and a half in length, half inch in breadth) typically oblong, rounded at the apex, abruptly contracted at the subpetiolate base: flowers very small, short-pedicelled: petals until their fall not over 3 or 4 lines in length, thick, subsimilar: carpels only 2 or 3, pubescent when young; ovules about 7. — *A. reticulata*, Shuttl. in distr. pl. Rugel, not of Chapm., nor *A. pygmæa*, to which reduced by Gray. — In pine woods, near Smyrna, Florida, *Rugel*, no. 9, May, 1848. With habit of *A. pygmæa*, but differing in its shorter typically oblong not cuneate leaves, smaller flowers, and thick oblong petals.

## MENISPERMACEÆ.

### 2. MENISPÉRMUM, Tourn.

**M. Canadense**, L., p. 66. Extend range west to Kansas, *Shear*, *Hitchcock*, and Nebraska, acc. to Small.

## BERBERIDACEÆ.

1. **BERBERIS**, p. 66. In generic character for "bracts," read, bractlets.

### 1. BÉRBERIS, Tourn.

**B. Nevínii**, GRAY, p. 69. Add. lit. Gard. & For. ix. 415, f. 54.

**B. pinnáta**, LAG., p. 69. It is probable that the type of this species was communicated rather than collected by Neé, whose voyage of exploration does not appear to have extended to California.

**B. Aquifólium**, PURSH, p. 69. Ranges eastward to Waterton Lake, Alberta, *Macoun*.

**B. répens**, LINDL., p. 69. Extends eastward to Alberta, *Macoun*, and the Black Hills, *Rydberg*. Note 1, on p. 70, should apply not to this species but to *B. Aquifolium*, Pursh, on the preceding page. These species have been the subject of much misunderstanding and several contradictory statements. It is probable that both were collected by Lewis & Clarke, and that both send out procumbent sarmentose branches. Pursh describes his species as having shining leaves and one of Lewis's specimens, now in herb. Acad. Philad., shows this character. On the other hand, Lindley states that *B. repens* has leaves glaucous upon each side, so that there seems no good reason to change the general interpretation on pages 69 and 70. To *B. repens*, as there interpreted, *B. nana*, Greene, Pittonia, iii. 98, should be added as a synonym.

**B. nervósa**, PURSH, p. 70. Extends eastward to Latah Co., Idaho, *Sandberg*. The time of fruiting extends from May to September.

## NYMPHÆACEÆ.

### 4. NYMPHÆA, Tourn.

**N. élegans**, Hook., p. 75. In second line of synonymy, for "must be *N. Mexicana*, Zucc.," substitute, is probably *N. flava*, Leitner.

**N. renifórmis**, DC., p. 76. Abundant near Delaware City, Del., *Commons*.

### 5. NÚPHAR, Smith.

**N. ádvena**, Arr. f., p. 77. Typical specimens with the medium-sized flowers and yellow anthers of this species have been found at Stockton, California, *Jepson*.

## SARRACENIACEÆ.

## 2. DARLINGTONIA, Torr.

**D. Californica**, Torr., p. 81. Add. syn. *Chrysamphora Californica*, Greene, Pittonia, ii. 191.

## PAPAVERACEÆ.

**8. ARGEMONE**, Tourn. Add lit. Prain, Jour. Bot. xxxiii. 207-209, 307-312, 325-333, 363-371; Eastwood, Erythea, iv. 93-96. In the light of Prain's admirable revision, our species may be treated as follows:—

\* Flowers orange, yellow, or at least ochroleucous, mostly small for the genus.

**A. MEXICANA**, L. Moderately prickly upon stem, sepals, capsules, as well as margins and midribs of otherwise smooth and glaucescent coarsely sinuate-pinnatifid leaves: flowers subsessile or short-peduncled: petals obovate, orange-colored or more commonly lemon-yellow, an inch or less in length: stigma sessile. — Spec. i. 508; Prain, l. c. 308, where copious synonymy is duly cited. — Common in waste places especially in the Atlantic and Gulf States. (Introd. from Mex., W. Ind., S. Am., and extensively nat. in warmer parts of Old World.)

**Var. ochroleuca**, LINDL. Petals ochroleucous: style evident. — Bot. Reg. t. 1343; Prain, l. c. 310. *A. ochroleuca*, Sweet, Brit. Fl. Gard. iii. t. 242. — Texas, where indigenous, and occasional in waste places in Middle Atlantic States, where (like typical form) introd. (Mex.)

\* \* Flowers white or roseate, mostly larger.

+ Flowers more or less peduncled; the bracts scattered upon the branches.

**A. alba**, LESTIB. Foliage much as in the last but less deeply sinuate and with more numerous spine-tipped teeth: petals oblong, cuneate at the base: capsule armed with rather numerous ascending or incurved spines. — Bot. Belg. ed. 2, iii. pt. 2, 133; Prain, l. c. 329. — S. Carolina, *M. A. Curtis*, to Florida, *Buckley, Nash*, westward to Texas, *Drummond*, acc. to Prain. (A variety in Sandwich Ids. and Polynesia)

+ + Flowers sessile or subsessile, the more or less closely subtending foliaceous bracts being grouped toward the ends of the floriferous branches.

**A. intermedia**, SWEET. Stout, very glaucous, moderately prickly with scattered stramineous spines, otherwise smooth and without any minute setulous hispidity: leaves *Sonchus*-like, repand-toothed to sinuate-pinnatifid: flowers large: petals white or roseate: sepals only sparsely spiny, and with horns usually quite unarmed and not even hispid: valves of the capsule not firm nor thickened and only moderately spiny. — Hort. Brit. ed. 2, 585; Prain, l. c. 363, with copious synonymy. *A. alba*, James in Long, Exp. Am. ed. i. 461; Robinson, Syn. Fl. i. pt. 1, 88, in part; not Lestib. *A. platyceras*, at least in part, of many Am. authors. — Kansas and Nebraska to Idaho, *Miss Mulford*, and southward to Texas and Mexico.

**Var. corymbosa**, A. EASTWOOD. Leaves obovate, subentire, or repand-toothed: flowers somewhat regularly corymbose: petals small. — Erythea, iv. 96. *A. corymbosa*, Greene, Bull. Calif. Acad. Sci. ii. 59. — Mohave Desert, *Mrs. Curran*.

**A. platyceras**, LINK & OTTO. More densely prickly, glaucescent: leaves sinuate-pinnatifid: triangular-lanceolate horns of sepals armed at least dorsally with spines and setæ: petals obovate to reversed-deltoid with truncate summit: capsule-valves of firm texture, very densely appressed-spiny, at length more or less indurated. — Ic. Rar. i. 85, t. 43; Prain, l. c. 366, with synonymy. — Texas to S. California. (Mex.)

**Var. hispida**, PRAIN, l. c. 367. Whole plant densely setulous-hispid as well as armed with stouter stramineous spines: petals obovate with rounded summit. — *A. hispida*, Gray,

Pl. Fendl. 5, in part. *A. munita*, Durand & Hilg. Jour. Acad. Philad. ser. 2, iii. 37, & Pacif. R. Rep. v. 5, t. 1. — From Kansas, *Hitchcock*, Colorado, and New Mexico to E. California.

**14. ESCHSCHÓLTZIA**, Cham. Although the treatment of this genus on pages 90–92 is essentially unsatisfactory, and material at hand shows that several of the species rest upon untrustworthy characters, yet no successful revision can be made without prolonged field study. Unfortunately, nearly all the more recent species have been made without any recognition of the inherent variability of the plants in question, or, what is still more delusive, the changes which individuals undergo as the season progresses. It is affirmed by the more cautious California botanists, who have taken no part in the discussions relative to this genus, that plants which early in the season bear large and deeply colored flowers are apt later to produce small and paler ones. Size and color of the flowers are, therefore, not to be lightly used as specific distinctions. It is to be feared, also, that undue importance has been ascribed to the dilated rim of the torus, which in some cases is variable in otherwise similar plants.

## FUMARIACEÆ.

### 2. DICÉNTRA, Borkh., Bernh.

**D. pauciflóra**, WATSON, p. 94. Add syn. *Capnorchis pauciflora*, Greene, Fl. Francis. 279.

**D. Canadénsis**, DC., p. 94. Extend range westward to Nebraska, acc. to Webber.

In note 1, p. 94, strike out “& *Capnodes*,” also “280.”

**D. ochroleúca**, ENGELM., p. 96. Add syn. *Capnorchis ochroleuca*, Greene, l. c.

### 3. CORÝDALIS, Vent.

**C. Caseána**, GRAY, p. 96. Add syn. *Capnodes Caseanum*, & *C. Bidwellianum*, Greene, l. c. 280.

## CRUCIFERÆ.

### 1. DRABA, Dill.

§ 3. **DRABÉLLA**, DC., p. 106. In key under \*, after “southern,” insert, except the first species.

**D. crassifólia**, GRAHAM, p. 108. Add locality, La Plata Mines, Wyoming, *Nelson*.

**D. nivális**, var. **elongáta**, WATSON, p. 109. For “Upper Maria’s Pass,” read, Old Marias Pass.

**D. auréola**, WATSON, p. 110. Add locality, Mt. Rainier, Washington, at 10,000 feet, *Piper & Smith*.

**D. corrugáta**, WATSON, p. 110. Add locality, Mt. San Jacinto, California, at 11,000 feet, *Davidson*.

**D. incána**, var. **arábisans**, WATSON, p. 111. Southward to Moosehead Lake, Mt. Kineo, Maine, *Kennedy*, and in Vermont to Mt. Eolus, Dorset, *Mrs. Terry*.

**D. Bréweri**, WATSON, p. 111. Add locality, Mt. Warren, Tuolumne Co., California, *Congdon*.

**D. boreális**, DC., p. 111. In line 2 of descr., after "oblong-ovate," insert: flowers usually large: pods broad, ovate to oblong-ovate.

**3. THYSANOCÁRPUS**, Hook. Of this genus three species have been recently proposed as new by Professor Greene, Pittonia, iii. 86, 87.

**T. laciniátus**, NUTT., p. 114. In line 5 of descr., for "4 to 8 lines," read, 4 to 8 inches.

#### 4. BERTERÓA, DC.

**B. INCANA**, DC., p. 114. Add syn. *Farsetia incana* [R. Br. in] Ait. f. Kew. ed. 2, iv. 97. Extend range to Connecticut, where coll. at E. Windsor by *C. H. Bissell*. This species has minutely stellate-canescens elliptic-oblong capsules 3 to 5 lines in length, while in *B. mutabilis* the fruit is broader, oval, and glabrous or nearly so.

#### 8. PHYSÁRIA, Gray.

**P. didymocárpa**, GRAY, p. 121. Eastward to Nebraska, *Rydberg*, acc. to Webber.

**P. Newberryi**, GRAY, p. 121. Add syn. *P. didymocarpa*, var. *Newberryi*, Jones, Proc. Calif. Acad. Sci. ser. 2, v. 624, at least as to syn. cited.

#### 13. LEPÍDIUM, Tourn.

**L. Menziésii**, DC., p. 127. Add locality, Waterman Hot Spring, near San Bernardino, California, *Parish*.

**L. médium**, GREENE, p. 127. This species appears to be introduced in the neighborhood of New York City, where detected by *E. P. Bicknell*. After the description of **var. pubescens**, ROBINSON, insert,

= = Petals obsolete or none.

**L. strictum**, RATTAN, p. 129. Extend range northward to Victoria, Brit. Columbia, *Macoun*.

#### 15. SUBULÁRIA, L.

**S. aquática**, L., p. 130. Add localities, Mt. Desert Isl., Maine, *Faxon & Rand*, Marlboro, Vermont, *Grout & Eggleston*, Whatcom Lake, Washington, *Suksdorf*.

#### 17. CAMÉLINA, Crantz. After *C. sativa*, add,

**C. SYLVÉSTRIS**, Wallr. More slender: inflorescences more elongated but pedicels mostly shorter: fruit smaller, less turgid, more decidedly margined. — Sched. Crit. 347. *C. microcarpa*, Andr. in DC. Syst. ii. 517. — Less frequent, yet widely introduced, Rhode Island, *J. F. Collins*, Kansas, *Norton*, Washington State, *Suksdorf*. Perhaps only a variety of *C. sativa*.

#### 20. RÁPHANUS, L.

**R. RAPHANÍSTRUM**, L., p. 132. Strike out, "the more or less ribbed or corrugated segments," and substitute, segments in dried specimens more or less ribbed or corrugated.

#### 21. BRÁSSICA, Tourn. Add lit. Robinson, Bot. Gaz. xxii. 252, 253.

**B. SINAPÍSTRUM**, Boiss., p. 133. From the descr. strike out, "The form which is naturalized in America has glabrous pods, while in the Old World they are quite as often hispid." To the descr. add: — stem not glaucous: upper leaves rhombic-ovate, rather abruptly contracted at the base: fruiting pedicels short and thick, 2 or 3 lines long, often hispid: fruit usually glabrous, more rarely hispid; beak decidedly acapital, commonly containing a single seed in an indehiscent cell.

**B. JÚNCEA**, COSS., p. 134. Taller than the preceding, decidedly glaucous: upper leaves oblong, cuneate at the base: fruiting pedicels slender, 3 to 5 lines in length: fruit with slender conical seedless beak. — Already widely introduced, with and eastward even more common than the preceding. Several nearly related and somewhat inconstant forms with more cleft or even crisped foliage have been noted at various points in the Eastern States from Maine (*Bicknell, Miss Furbish*) southward, and probably represent escaped and degenerated states of a cultivated salad plant, doubtfully identifiable with *B. Japonica*, Siebold. (See Bailey, Cornell Univ. Agric. Exper. Sta. Bull. 67, 184.)

All reference to *B. ADPRÉSSA*, Boiss., p. 134, should be struck out, the San Bernardino plant, referred to this species, having proved to be immature *Sisymbrium officinale*, Scop.

### 23. CONRÍNGIA, Heist.

**C. PERFOLIÁTA**, Link, p. 134. Add locality, Farmington, Maine, *C. H. Knowlton*.

### 26. SMELÓWSKIA, C. A. Meyer.

**S. calycína**, C. A. MEYER, p. 136. From descr. of fruit strike out parenthetical expression, and after descr. add

**S. ovális**, JONES. With habit of the preceding but mostly lower in stature and more densely cinereous-pubescent: capsule short, ovate, abrupt or even subcordate at the base. — Proc. Calif. Acad. Sci. ser. 2, v. 624. — Higher peaks of the Cascade Mts., from Mt. Rainier, *Allen*, to Lassen's Peak, California, *Lemmon*.

### 27. SISÝMBRIUM, Tourn.

**S. ALTÍSSIMUM**, L., p. 137. Already a common weed of waste and cultivated ground, especially in the Northern States and Southern Brit. America.

**S. linifólium**, NUTT., p. 138. Add syn. *Erysimum linifolium*, Jones, l. c. 622, & *Schænocrambe linifolia*, Greene, Pittonia, iii. 127.

**S. virgátum**, NUTT., p. 138. Add syn. *Stenophragma virgatum*, Greene, Pittonia, iii. 138.

**S. SÓPHIA**, L., p. 139. In line 1 of descr. strike out "of the preceding," and substitute, of *S. canescens*.

**S. incísium**, ENGELM., p. 139.

**Var. Hartwegiánum**, WATSON. Extend range eastward to Minnesota, where coll. by *C. B. Taylor*.

**Var. Sónnei**, ROBINSON, p. 140. Add syn. *Sophia Sonnei*, Greene, l. c. 95.

**29. TROPIDOCÁRPUM**, Hook. Add. lit. Greene, Proc. Acad. Philad. 1895, 551-554; Robinson, Erythea, iv. 109-119, t. 3.

### 30. GRÉGGIA, Gray.

**G. campórum**, var. **angustifólia**, COULTER, p. 142. Add syn. *G. camporum*, var. *linearifolia*, Jones, Proc. Calif. Acad. Sci. ser. 2, v. 625.

**32. ERÝSIMUM**, Tourn. Most of the American species of this genus have recently been enumerated (with much subdivision) by Professor Greene, Pittonia, iii. 128-138, under *Cheiranthus*. For the considerable synonymy, created by this (to most botanists wholly unwarranted) change, reference may be had to the paper cited above.

**E. parviflórum**, NUTT., p. 143. Add syn. *E. asperum*, var. *parviflorum*, Jones, l. c. 622, and extend range eastward to Keweenaw Peninsula, N. Michigan, on authority of Wheeler.

## 34. NASTÚRTIUM, L., R. Br.

- N. lacústre**, GRAY, p. 146. Add syn. *Neobeckia aquatica*, Greene, Pittonia, iii. 95.  
**N. SYLVÉSTRE**, R. Br., p. 147. Becoming frequent in various parts of New England.  
**N. sinuátum**, NUTT., p. 147. Add syn. *Roripa trachycarpa*, Greene, l. c. 96.  
**N. curvisíliqua**, NUTT., p. 148. Add syn. *Roripa occidentalis*, Greene, l. c. 97.  
**N. obtúsum**, var. **sphærocárpum**, WATSON, p. 148. Strike out "n. var.," and as reference add, Wats. in Allen, List Pl. Gray's Man. 123 (1893).  
**N. tanacetifólium**, HOOK. & ARN., p. 148. Add syn. *Roripa Walteri*, Mohr, Bull. Torr. Club, xxiv. 23.  
**N. sessilifórum**, NUTT., p. 149. Add locality, Iowa City, Iowa, *Hitchcock*.

42. **DENTÁRIA**, Tourn. Add lit. Greene, Pittonia, iii. 117-124, where species of this genus and *Cardamine* are redistributed.

**D. cardiophýlla**, ROBINSON, p. 155. Strike out last sentence.

## 43. CARDÁMINE, Tourn.

- C. rhomboídea**, DC., p. 156. In range, for "common in," substitute, common from E. New England to.

## 44. ÁRABIS, L.

- A. filifólia**, GREENE, p. 159. Add syn. *Sibara filifolia*, Greene, Pittonia, iii. 11.  
**A. hirsúta**, SCOP., p. 162. A rare and exceptional form from Sunderland, Massachusetts, coll. *Churchill & Deane*, has spreading capsules.  
**A. Holbéllii**, HORNEM., p. 164. Eastward to Thunder Bay, Michigan, *Wheeler*.  
**A. suffrutéscens**, WATSON, p. 166. Southward to Truckee, California, *Sonne*.  
**A. Howéllii**, WATSON, p. 167. Add locality, Mariposa Co., California, *Congdon*.  
**A. púlchra**, JONES, p. 167. Eastward to Grand Junction, Colorado, *Miss Eastwood*.

45. **STREPTÁNTHUS**, Nutt. The treatment of this genus on pages 167-171, lacking the last touches of its author, contains several serious errors in the arrangement and keys, due in considerable part to imperfect editing. In the light of much more copious material now at hand, the following rearrangement may be offered as a substitute.

§ 1. **EUSTREPTÁNTHUS**, Gray. Flowers large: petals with broad blades; filaments distinct: pods erect or ascending: glabrous annuals: species of the interior.

\* Pedicels conspicuously bracteate: pods narrow.

**S. bracteátus**, GRAY, p. 168.

\* \* Floral bracts minute or none.

**S. maculátus**, NUTT., p. 168.

**S. platycárpus**, GRAY, p. 168.

§ 2. **EUCLÍSIA**, Nutt. Petals narrow (the blade scarcely broader than the claw), usually undulate-crisped.

\* Filaments all free to the base.

+ Stem and leaves (sometimes ciliate on the margin but otherwise) glabrous and often glaucous.

++ Flowers rather large: sepals 3 to 6 lines in length: plant stout.

= Stem leaves sessile by cordate- or auriculate-clasping bases.

a. Capsules broad, erect or nearly so; seeds broadly winged.

1. Leaves (at least the lower) runcinate-pinnatifid: Southern.

**S. carinátus**, WRIGHT, p. 169.

2. Leaves entire or merely dentate.

**S. Arizónicus**, WATSON, p. 169.

**S. cordátus**, NUTT., p. 169.

b. Pods much narrower,  $\frac{3}{4}$  to  $1\frac{1}{2}$  lines in breadth; seeds slightly wing-margined or wingless: leaves cordate-clasping.

**S. campéstris**, WATSON, p. 169. Upper leaves oblong-lanceolate, acute.

**S. barbátus**, WATSON, p. 169. Upper leaves elliptical, oval, or suborbicular, obtuse.—To this species is doubtfully referred a specimen from Shasta Co., California, coll. *Whitmore*.

= = Stem leaves cuneate to petiolate exauriculate bases: capsules narrow, erect or nearly so: species of Oregon.

**S. Howéllii**, WATSON, p. 170.

++ ++ Flowers smaller: sepals  $1\frac{1}{2}$  to  $2\frac{1}{2}$  lines long: plants more slender: capsules narrow, mostly reflexed or pendulous at maturity.

= Floral leaves elliptical or ovate, deeply cordate and amplexicaul.

**S. Lemmóni**, WATSON, p. 169.

**S. diversifólius**, WATSON, p. 168.

= = Leaves all oblong to linear, narrowed and not auricled at the base: annual.

**S. longiróstris**, WATSON, p. 170.

+ + Stem and leaves hirsute-pubescent: annual with narrow reflexed pods.

**S. heterophýllus**, NUTT., p. 169.

\* \* Filaments of one or both pairs of longer stamens connate (except in *S. tortuosus*, *S. orbiculatus*, & *S. suffrutescens*, where sometimes all distinct): capsules rather narrow: flowers often more or less zygomorphous: upper pair of anthers frequently reduced or sterile.

+ Sepals subequal: flowers dark purple or violet. all four longer filaments connate in pairs: leaves linear-oblong, cuneate or subamplexicaul at the base: slender erect annual of Texas and Indian Territory.

**S. hyacinthoides**, Hook., p. 170. Stem either quite glabrous or more often hispid-pubescent near the base.

+ + Sepals of the outer pair similar to each other, often more or less strongly saccate or carinate, yet not very dissimilar to the inner pair: species of the Pacific Slope.

= Stem and foliage more or less hispid-pubescent or hirsute.

a. Calyx quite glabrous, rather broad and saccate: leaves lanceolate to narrowly oblong, more or less sagittate-auriculate at the base.

**S. glandulósus**, Hook., p. 171. A common and somewhat variable species (ranging from the San Bernardino Mts., *W. G. Wright*, northward to S. Oregon), of which the following are certainly only forms: *S. peramænus*, Greene, Bull. Torr. Club, xiii. 142; *S. albidus*, Greene, Pittonia, i. 62; and *S. Biolettii*, Greene, l. c. ii. 225. The following, not seen by the writer, would also seem to be nearly related: *S. MILDREDÆ*, Greene, Fl. Francis. 260, differing chiefly, as to described character, in its smaller very dark-colored flowers; and *S. versicolor*, Greene, Erythea, iii. 99, with flowers said to be more irregular than in the related forms, the petals "white, changing to lilac-purple, very unequal."

b. Calyx narrower: sepals hispid-ciliate upon the midnerve: leaves lanceolate or oblong, acute, coarsely toothed, sagittate-auriculate at the base.

- S. secundus**, GREENE, p. 171. Add localities, Marin Co., California, *Congdon*, *Miss Eastwood*, and Mendocino Co., *Miss Eastwood*. The type is pale-flowered, but *S. pulchellus*, Greene, Pittonia, ii. 225, scarcely differs except in its more deeply colored flowers.
- c. Calyx narrow: sepals hirsute: leaves obovate, coarsely toothed at the rounded summit, cuneate to a narrow slightly auriculate base.
- S. hispídus**, GRAY, p. 171. Add locality, Fresno Co., California, *Brandegee*, *Miss Eastwood*.  
 == Stem and foliage glabrous.
- a. Upper cauline and floral leaves lance-linear to oblong-linear, acute or attenuate at the apex, cordate or auriculate at the base.
1. Flowers (very dark purple or almost black) on long slender pedicels (half inch in length).
- S. niger**, GREENE, p. 170.
2. Flowers subsessile: leaves all narrow, linear.
- S. bárbiger**, GREENE, p. 170. Seeds often, perhaps always, wingless.
3. Flowers very short-pedicelled: middle cauline leaves large, broad, ovate, amplexicaul, obtuse; upper narrow and acute.
- S. Bréweri**, GRAY, p. 170. Add localities, Snow Mt., Lake Co., California, *Mrs. Brandegee*, and Mt. Hepsidom, San Benito Co., *Miss Eastwood*.
- b. Upper cauline and floral leaves acutish, elliptic-oval or elliptic-lanceolate: cordate-clasping at the base.
- S. hespéridis**, JEPSON. Low slender tortuous-branched annual: lower leaves unknown; the upper entire or sparingly toothed, acutely narrowed to a rounded cartilaginous-thickened tip at the apex: flowers small and rather numerous, subsessile in slender flexuous terminal racemes: calyx green, flask-shaped: narrow apparently white petals exerted and recurved: posterior pair of longer filaments connate nearly to the summit, elongated, much exerted and conspicuously recurved, purple: capsules narrow, ascending or falcate-spreading, 2 inches in length; seeds scarcely or not at all winged. — *Erythea*, i. 14. By error accredited to Bioletti on page 170 of present work. — Knoxville Grade to Lower Lake in region of Clear Lake, California, *Jepson*, July, 1892. Near *S. Breweri* and *S. tortuosus*, but probably distinct.
- c. Upper cauline and floral leaves oval to orbicular, not at all narrowed to the very obtuse or rounded and abruptly apiculate apex, deeply cordate-clasping at the base: filaments apparently variable, one pair said to be connate, yet in most flowers examined all distinct.
1. Flowers small: sepals with tips erect or slightly recurved, obtuse or acutish but not caudate-attenuate.
- S. orbiculátus**, GREENE. Low profusely branched annual with short ascending axis only 2 or 3 inches long, much surpassed by the slender ascending branches: leaves rather small; the lower spatulate-oblong, obtuse, subentire or undulate-margined: the upper suborbicular, usually rounded and not apiculate at the apex: pods falcate-recurved; valves thin and torulose. — Fl. Francis. 258. — Near Carson City, Nevada, *Anderson*, and in the Sierras of California from Sta. Lucia Mts., *Miss Eastwood*, and Mono Co., *Coville & Funston*, to Shasta, *Brewer*. A species of highly characteristic habit in well developed individuals, yet without very strong technical characters.
- S. suffrutéscens**, GREENE. Biennial or perhaps perennial, lignescent at the base, the stout sparingly branched leafy axis becoming a foot or more in height: leaves much larger than in the last, those of the stem 2 or 3 inches long: sepals erect or slightly reflexed: flowers and fruit essentially as in the last preceding species. — *Erythea*, i. 147, & *Man. Bay-Reg.* 16. — Hood's Peak, Sonoma Co., California, *Bioletti*. In habit very different from *S. orbiculatus*, yet perhaps only a more robust and enduring form of it.
2. Flowers larger: sepals caudate-attenuate, the tips conspicuously reflexed.
- S. tortuosus**, KELLOGG. Erect sparingly branched annual, 1 to 3 feet high: lower leaves obovate-spatulate, undulate-toothed; the upper suborbicular, but mostly with a short abrupt



apiculation: buds very acute: pods recurved-spreading, 2 to 6 inches in length, longer and seemingly of firmer texture than in the two foregoing species. — Proc. Calif. Acad. Sci. ii. 152, t. 46. — Sierras of E. Central California from the Yosemite to Plumas County.

+ + + Sepals of the outer pair flabelliform-orbicular, dilated, light yellow and petaloid, very unequal and much larger than the oblong sepals of the inner pair: one pair of longer filaments connate.

**S. polygaloides**, GRAY, p. 171. Extend range to Calaveras Co., Davy.

#### 47. CAULÁNTHUS, Watson.

**C. pilósus**, WATSON, p. 173. Strike out last sentence, which relates to poor and unusually hispid specimens of *Sisymbrium altissimum*, L.

#### 48. THELYPÓDIUM, Endl.

**T. Howéllii**, WATSON, p. 174. Add syn. *Streptanthus Howéllii*, Jones, Proc. Calif. Acad. Sci. ser. 2, v. 623, not Wats. The fruit appears to be distinctly that of a *Thelypodium*, and the type seems very remote from *Streptanthus cordatus* to which it is compared by Professor Jones.

**T. (?) salsugíneum**, ROBINSON, p. 175. Add locality, Moose Jaw, Assiniboia, Macoun.

**T. lasiophýllum**, var. **rigidum**, ROBINSON, p. 177. In line 3, for "by May at Elmira, Calif., 1883," read, by Mrs. Curran at Elmira, Calif., May, 1883.

**50. WÁREA**, Nutt. Add lit. Nash, Bull. Torr. Club, xxiii. 101; Small, *ibid.* 408, 409. As Dr. Small has pointed out, it is quite clear from the material now at hand that in describing *W. amplexifolia*, Nuttall (Jour. Acad. Philad. vii. 83, t. 10) combined two distinct plants.

The species of the genus may be revised thus: —

**W. cuneifólia**, Nutt., p. 180. Amply characterized.

**W. sessilifólia**, NASH. Leaves rather small, 6 to 10 lines long, half as broad, ovate, sessile by a rounded exauriculate base: flowers deep purple. — Bull. Torr. Club, xxiv. 101. *W. amplexifolia*, Nutt. l. c. as to descr. in great part and as to plant from W. Florida figured. — Sandy soil, W. Florida, Ware, Nash. The name is not distinctive, as all the known species have leaves sessile or nearly so.

**W. amplexifólia**, Nutt. Leaves larger, becoming an inch or two long, and half as broad, elliptic-ovate, deeply cordate and auriculate-amplexicaul: flowers white or pale purple. — Nutt. l. c., in part, namely, as to syn. *Stanleya? amplexifolia*; Small, l. c., but Nutt. should stand as authority. It is quite evident both from his synonymy and in his descr. (in which occurs "leaves sessile and amplexicaule") that he had both plants in mind when he described *W. amplexifolia*, and if one of these plants is removed as *W. sessilifolia*, the other must stand for Nuttall's species. — Sandy soil, E. Florida, St. Augustine, Miss Reynolds, Tavaris, Lake Co., Webber, acc. to Nash.

### CAPPARIDACEÆ.

#### 2. CRISTATÉLLA, Nutt.

**C. Jamésii**, TORR. & GRAY, p. 182. Extend range to Nebraska, acc. to Rydberg.

#### 4. CLEÓME, L.

**C. integrifólia**, TORR. & GRAY, p. 183. In first line of descr. for "2 or 3 feet high," read, 2 to 6 feet high. And to range add, occasional in California, as at San Emidio Cañon, Kern Co., Tevis, acc. to Miss Eastwood.

## RESEDACEÆ.

## 1. RESÉDA, Tourn.

**R. LÚTEA**, L., p. 188. For Amer. distrib. substitute, Locally established in fields, &c., chiefly in Atlantic States, but said to extend westward as far as Michigan.

## CISTACEÆ.

In the second line of the generic key strike out the word "nerviform."

1. **HELIÁNTHEMUM**, Tourn. In the generic character, for "strictly parietal," read, parietal or septiform.

**H. Canadénse**, MICHX., p. 190. Common in E. Massachusetts and extending northeastward to York Co., Maine, *Fernald*.

**H. arenicola**, CHAPM., p. 190. The Mississippi occurrence appertains to the following species.

**H. Náshi**, BRITTON, p. 190. This species on further investigation proves to have heteromorphous flowers and should therefore be placed in the preceding division of the genus. Many of its cleistogamous flowers have 2-valved apparently bicarpellary fruits.

## 2. HUDSÓNIA, L.

**H. montána**, NUTT., p. 191. In line 4, for "Table Mountain," read, Table Rock.

## 3. LÉCHEA, Kalm.

**L. intermédia**, LEGGETT, p. 193. A dubious form, somewhat intermediate between this species and *L. stricta*, and mentioned under the latter (on p. 193) as occurring in Maine, is also found in the White Mountains. It is the recently proposed *L. juniperina*, Bicknell, Bull. Torr. Club, xxiv. 88, but lacks satisfactory characters.

## VIOLACEÆ.

1. **VÍOLA**, Tourn. For recent literature, see Greene, *Pittonia*, iii. 33-42, 87, 139-145; Pollard, *Proc. Biol. Soc. Wash.* x. 85-92, & *Bot. Gaz.* xxiii. 53; Holzinger, *Contrib. U. S. Nat. Herb.* iii. 214; Britton, *Bull. Torr. Club.* xxiv. 92. It may be noted that nearly all the recently proposed or reinstated species represent plants familiar to Dr. Gray at the time of his revision, and that their altered presentation is largely due to differing views as to the taxonomic value or scope of the term *species*.

**V. pedatifida**, DON, p. 196. Extends eastward to Marblehead Isl. in Lake Erie, near Sandusky, Ohio, *E. L. Moseley*.

**V. Langsdórfii**, FISCHER, by error **Langsdórfii**, p. 197. In references, after Bull. Soc. Nat. Mosc., strike out "xxxv. 240," and substitute, xxxiv. pt. 2, 485.

**V. Selkirkii**, PURSH, p. 197. In references, after Bull. Soc. Nat. Mosc., strike out "xxxv. 227," and substitute, xxxiv. pt. 2, 472.

**V. lanceolata**, L., p. 198. Add locality, Centr. Minnesota, *W. D. Frost*.

**V. glabella**, NUTT., p. 201. In references, after Bull. Soc. Nat. Mosc., strike out "xxxv. 253," and substitute, xxxiv. pt. 2, 498.

**V. canina**, var. **Muhlenbergii**, TRAUTV., p. 203. In references, after Bull. Soc. Nat. Mosc., strike out "xxxv. 245," and substitute, xxxiv. pt. 2, 490.

### 3. IONÍDIUM, Vent.

**I. polygalæfolium**, VENT., p. 205. Add locality, Riley Co., Kansas, *Norton*.



# INDEX.

NAMES of orders are in CAPITALS; of suborders, tribes, &c., in SMALL CAPITALS; of admitted genera and species, in ordinary Roman type; of synonyms, as also of subgenera, sections, and all species merely referred to, in *Italic* type.

- Abelmoschus*, 333, 336.  
*Abutilaceæ*, 296.  
*Abutilon*, 296, 326.  
*Abutilon*, 319.  
*Abutilon*, 327.  
*aurantiacum*, 328.  
*Avicennæ*, 327.  
*Berlandieri*, 328.  
*crispum*, 330.  
*crysipum*, 330.  
*erosum*, 326.  
*graveolens*, 327.  
*hirtum*, 327.  
*holosericeum*, 326.  
*Hulseanum*, 327.  
*hypoleucum*, 327.  
*incanum*, 329.  
*Indicum*, 327.  
*Indicum*, 327.  
*Jacquini*, 327.  
*Jacquini*, 328.  
*Lemmoni*, 328.  
*lignosum*, 327.  
*malacum*, 329.  
*Nealeji*, 326.  
*Newberryi*, 318.  
*Nuttallii*, 329.  
*Palmeri*, 328.  
*Parishii*, 328.  
*parvulum*, 329.  
*pedunculare*, 327.  
*peraffine*, 328.  
*permolle*, 328.  
*reventum*, 329.  
*Sonoræ*, 329.  
*Sonoræ*, 329.  
*Texense*, 329.  
*Theophrasti*, 327.  
*Thurberi*, 329.  
*trichodum*, 330.  
*umbellatum*, 330.  
*velutinum*, 326.  
*Wrightii*, 328.  
*Acer*, 432, 435.  
*barbatum*, 439, 440.  
*Californicum*, 440, 441.  
*Canadense*, 436.  
*Carolinianum*, 437.  
*circinatum*, 437.  
*coccineum*, 437.  
*dasyacarpum*, 438.  
*Douglasii*, 436.  
*Drummondii*, 437.  
*eriocarpum*, 438.  
*Floridanum*, 439.  
*Floridanum*, 440.  
*fraxinifolium*, 440.  
*glabrum*, 436.  
*glaucum*, 437.  
*grandidentatum*, 440.  
*grandidentatum*, 439.  
*laciniatum*, 438.  
*leucoderme*, 440.  
*macrophyllum*, 436.  
*Mexicanum*, 441.  
*microphyllum*, 437.  
*montanum*, 435.  
*Negundo*, 440.  
*nigrum*, 439.  
*palmatum*, 436.  
*palmifolium*, 439.  
*parviflorum*, 435.  
*Pennsylvanicum*, 436.  
*Pennsylvanicum*, 435, 436.  
*platanoides*, 435.  
*Pseudo-platanus*, 436.  
*rubrum*, 437.  
*rubrum*, 437, 438.  
*rubrum mas*, 438.  
*Rugelii*, 439.  
*saccharinum*, 438.  
*saccharinum*, 439.  
*saccharophorum*, 439.  
*saccharum*, 438.  
*saccharum*, 439.  
*semi-orbiculatum*, 437.  
*serratum*, 441.  
*spicatum*, 435.  
*striatum*, 436.  
*tripartitum*, 436.  
*virgatum*, 437.  
*ACERINEÆ*, 432.  
*Achania*, 332.  
*pilosa*, 334.  
*Pæppigii*, 334.  
*Achlys*, 67, 70.  
*triphylla*, 70.  
*Aconite*, 52.  
*Aconitum*, 3, 52.  
*Chamissonianum*, 52.  
*Columbianum*, 52.  
*Columbianum*, 53.  
*delphinifolium*, 52.  
*Fischeri*, 53.  
*Kamtschaticum*, 52.  
*maximum*, 52.  
*Napellus*, 52.  
*Napellus*, 52.  
*nasutum*, 53.  
*Noveboracense*, 52.  
*Noveboracense*, 53.  
*paradoxum*, 52.  
*reclinatum*, 53.  
*semigaleatum*, 52.  
*uncinatum*, 53.  
*uncinatum*, 52.  
*volubile*, 53.  
*Actæa*, 3, 55.  
*Actæa*, 54.  
*alba*, 55.  
*Americana*, 55.  
*arguta*, 55.  
*brachypetala*, 55, 70.  
*cordifolia*, 55.  
*dioica*, 56.  
*grandis*, 18.  
*longipes*, 55.  
*monogyne*, 54.  
*pachypoda*, 56.  
*palmata*, 18.  
*podocarpa*, 54.  
*racemosa*, 54.  
*rubra*, 55.  
*spicata*, 55.  
*spicata*, 55.  
*viridiflora*, 55.  
*Actinospora*, 53.  
*Adenarium*, 238.  
*peplodes*, 238.  
*Adlumia*, 93.  
*cirrrosa*, 93.

- fungosa*, 93.  
**Adolphia**, 402, 418.  
*Californica*, 419.  
*infesta*, 419.  
**Adonis**, 2, 18.  
*annua*, 19.  
*autumnalis*, 19.  
*vernalis*, 19.  
**Aduseton**, 115.  
**Æsculus**, 434, 446.  
*alba*, 446.  
*arguta*, 447.  
*Californica*, 448.  
*carnea*, 446.  
*discolor*, 447.  
*echinata*, 446.  
*flava*, 447.  
*glabra*, 446.  
*glabra*, 447.  
*Hippocastanum*, 446.  
*humilis*, 447.  
*hybrida*, 447.  
*macrostachya*, 448.  
*muricata*, 446.  
*neglecta*, 447.  
*ochroleuca*, 446.  
*octandra*, 447.  
*Ohioensis*, 446.  
*Ohiotensis*, 446.  
*pallida*, 446.  
*Parryi*, 448.  
*parviflora*, 448.  
*Pavia*, 447.  
*Pavia*, 447.  
*rubicunda*, 446.  
*verrucosa*, 446.  
*Watsoniana*, 446.  
**Afarca parviflora**, 406.  
**Ageria Cassena**, 389.  
*heterophylla*, 389.  
*obovata*, 389.  
*opaca*, 388.  
*palustris*, 389.  
**Agrostemma**, 209, 228.  
**Agrostemma**, 227.  
*apetala*, 226.  
*Coronaria*, 227.  
*Githago*, 228.  
*triflora*, 225.  
**Ailanthus**, 377, 378.  
*glandulosus*, 378.  
*Ailantus*, 378.  
*Ailantus-tree*, 378.  
**AIZOIDEÆ**, 256.  
*Aizopsis*, 112.  
*Algeritas*, 68.  
*Alliaria*, 102, 134.  
*Alliaria*, 136.  
*Alliaria*, 135.  
*officinalis*, 135.  
*Alsinanthe*, 238.  
*Alsinastrum*, 275.  
*brachyspermum*, 281.  
**Alsine**, 232, 238, 243.  
*aquatica*, 232.  
*arctica*, 247.  
*Baicalensis*, 233.  
*biflora*, 247.  
*borealis*, 235.  
*brevifolia*, 243.  
*crassifolia*, 235.  
*Drummondii*, 237.  
*fontinalis*, 235.  
*glabra*, 243.  
*graminea*, 234.  
*Grælandica*, 243.  
*hirta*, 246.  
*Holostea*, 237.  
*humifusa*, 235.  
*littoralis*, 236.  
*longifolia*, 233.  
*longipes*, 233, 234.  
*macrocarpa*, 247.  
*macropetala*, 245.  
*media*, 232.  
*Michauxii*, 245.  
*microsperma*, 245.  
*nardifolia*, 240.  
*nitens*, 233.  
*Nuttallii*, 237.  
*palustris*, 243.  
*patula*, 245.  
*peplodes*, 238.  
*Pitcheri*, 245.  
*propinqua*, 246.  
*pubera*, 236.  
*Rossii*, 246.  
*rubella*, 246.  
*squarrosa*, 247.  
*stricta*, 246.  
*tenella*, 244.  
*uliginosa*, 234.  
*vena*, 245, 246.  
*Walteri*, 237.  
**ALSINEÆ**, 209.  
*Alsinella ciliata*, 248.  
*crassicaulis*, 249.  
*occidentalis*, 248.  
*saginoides*, 249.  
**Althæa**, 295, 299.  
*cannabina*, 299.  
*officinalis*, 299.  
*rosea*, 299.  
**Alysmus**, 116.  
**ALYSSINEÆ**, 99.  
**Alyssum**, 100, 115.  
**Alyssum**, 114, 116.  
*alyssoides*, 115.  
*Americanum*, 115.  
*arcticum*, 120.  
*calycinum*, 115.  
*dentatum*, 112.  
*hyperboreum*, 110.  
*incanum*, 114.  
*Lescurii*, 116.  
*Ludovicianum*, 118.  
*maritimum*, 115.  
*montanum*, 115.  
**American Holly**, 388.  
*Smoke-tree*, 382.  
**Ammodenia**, 238.  
**Amoreuxia**, 206.  
*malvæfolia*, 207.  
*palmatifida*, 207.  
*Scheidiana*, 207.  
*Schiedeana*, 207.  
*Wrightii*, 207.  
**Ampelopsis**, 420, 431.  
**Ampelopsis**, 430.  
*bipinnata*, 430.  
*cordata*, 430.  
*cordifolia*, 430.  
*hederacea*, 431.  
*heptaphylla*, 432.  
*heterophylla*, 431.  
*hirsuta*, 431.  
*pubescens*, 432.  
*quinquefolia*, 431.  
*tricuspidata*, 431.  
*Veitchii*, 431.  
**AMYRIDEÆ**, 371.  
**Amyris**, 371, 375.  
*balsamifera*, 376.  
*elemifera*, 376.  
*Floridana*, 376.  
*Hypelate*, 445.  
*maritima*, 376.  
*parvifolia*, 376.  
*sylvatica*, 376.  
**ANACARDIACEÆ**, 381.  
**Anapodophyllum**, 72.  
*petatum*, 72.  
**Andromeda plumata**, 393.  
**Androphylax scandens**, 65.  
**Anemone**, 1, 9, 462.  
*aconitifolia*, 12.  
*acutiloba*, 14.  
*alpina*, 9.  
*Baldensis*, 10.  
*Berlandieri*, 11.  
*borealis*, 10.  
*Californica*, 462.  
*Canadensis*, 12, 462.  
*Caroliniana*, 11.  
*Caroliniana*, 11.  
*Commersoniana*, 10.  
*cuneifolia*, 10.  
*cyanea*, 13.  
*cylindrica*, 11.  
*decapetala*, 10.  
*decapetala*, 10, 11.  
*deltoides*, 12.  
*dichotoma*, 12.  
*Drummondii*, 10, 462.  
*Grayi*, 13.  
*Hepatica*, 14.  
*heterophylla*, 11.  
*hirsuta*, 11.  
*Hudsoniana*, 10.  
*irregularis*, 12.  
*lancifolia*, 13.  
*lanigera*, 10.  
*Ludoviciana*, 9.  
*Lyallii*, 13.  
*minima*, 13.  
*multifida*, 10.  
*narcissiflora*, 12.  
*nemorosa*, 13.  
*nudicaulis*, 12, 25.  
*Nuttallii*, 9.  
*occidentalis*, 9.

- Oregana*, 13.  
*parviflora*, 10.  
*patens*, 9.  
*patens*, 9.  
*pedata*, 13.  
*Pennsylvanica*, 12.  
*quinquefolia*, 13.  
*ranunculoides*, 12.  
*Richardsoni*, 12.  
*Richardsoniana*, 12.  
*sphenophylla*, 11.  
*tenella*, 11.  
*Tetonensis*, 10, 462.  
*thalictroides*, 14.  
*trifolia*, 13.  
*trilobata*, 11.  
*VahlII*, 12.  
*Virginiana*, 11.  
*Walteri*, 11.
- ANEMONEÆ, 1.  
*Anemonella*, 1, 14.  
*thalictroides*, 14.  
*Anemony*, 9.  
*Annona obovata*, 63, 464.  
*triloba*, 63.
- Anoda, 296, 318.  
*abutiloides*, 320.  
*acerifolia*, 319.  
*Arizona*, 319.  
*brachyantha*, 319.  
*crenatiflora*, 321.  
*cristata*, 319.  
*Dilleniana*, 319.  
*hastata*, 319.  
*hastata*, 319, 320.  
*lanceolata*, 319.  
*lavaterioides*, 319.  
*parviflora*, 320, 321.  
*pentaschista*, 320.  
*pentaschista*, 320.  
*pubescens*, 320.  
*reticulata*, 321.  
*Thurberi*, 320.  
*triangularis*, 319.  
*triloba*, 319.  
*Wrightii*, 319.
- Anona, 62.  
*glabra*, 62.  
*grandiflora*, 63, 464.  
*laurifolia*, 62.  
*pygmæa*, 64.  
*triloba*, 63.
- ANONACEÆ, 62, 464.  
*Aphanostemma*, 22. [135.  
*Aphragmus Eschscholtzianus*,  
AQUIFOLIACEÆ, 388.  
*Aquifolium*, 388.  
*Aquilegia*, 2, 42, 463.  
*arctica*, 44.  
*brevistyla*, 43, 463.  
*brevistyla*, 43.  
*cærulea*, 44, 463.  
*cærulea*, 43, 44.  
*Californica*, 44.  
*Canadensis*, 44.  
*Canadensis*, 43, 44.  
*chrysantha*, 44.  
*chrysantha*, 42.  
*ecalcarata*, 43.  
*ecalcarata*, 42.  
*elegans*, 44.  
*eximia*, 44.  
*flavescens*, 43.  
*flavescens*, 463.  
*flaviflora*, 44.  
*formosa*, 44.  
*formosa*, 42, 44.  
*Jonesii*, 43, 463.  
*Laramiensis*, 463.  
*leptocera*, 44.  
*leptoceras*, 44.  
*longissima*, 45.  
*macrantha*, 44.  
*micrantha*, 43.  
*pubescens*, 45.  
*saximontana*, 43, 463.  
*Skinneri*, 44.  
*truncata*, 44.  
*truncata*, 42, 44.  
*variegata*, 44.  
*vulgaris*, 42.  
*vulgaris*, 43.
- ARABIDEÆ, 103.  
*Arabis*, 104, 159, 470.  
*alpina*, 163.  
*ambigua*, 159.  
*arcuata*, 164.  
*arcuata*, 165.  
*atorubens*, 162.  
*Beckwithii*, 165.  
*blepharophylla*, 161.  
*Bolanderi*, 165.  
*Breutlii*, 166.  
*Breweri*, 165.  
*bulbosa*, 156.  
*Canadensis*, 162.  
*canescens*, 165.  
*canescens*, 138, 166.  
*Columbiana*, 164.  
*confinis*, 163.  
*Cusickii*, 167.  
*declinata*, 164.  
*dentata*, 160.  
*Douglassii*, 156.  
*Drummondii*, 166.  
*Drummondii*, 163, 166.  
*fulcata*, 162.  
*filifolia*, 159, 470.  
*furcata*, 161.  
*hesperidoides*, 150.  
*heteromalla*, 164.  
*heterophylla*, 162.  
*hirsuta*, 162, 470.  
*Holboëllii*, 164, 470.  
*Holboëllii*, 164, 165.  
*Hookeri*, 160.  
*Howellii*, 167, 470.  
*humifusa*, 159.  
*lævigata*, 162.  
*lævigata*, 163.  
*Lemmoni*, 166.  
*levigata*, 162.  
*lilacina*, 164.  
*longirostris*, 170, 174.  
*Ludoviciana*, 161.  
*Lyallii*, 166.  
*lyrata*, 159.  
*Macounii*, 163.  
*microphylla*, 167.  
*nudicaulis*, 152.  
*Nuttallii*, 160.  
*Parishii*, 167.  
*patens*, 162.  
*patula*, 164.  
*pauciflorum*, 166.  
*pectinata*, 159.  
*perennans*, 165.  
*perennans*, 164.  
*perfoliata*, 160.  
*petiolaris*, 161.  
*petræa*, 141, 159.  
*platysperma*, 163.  
*puberula*, 166.  
*pulchra*, 167, 470.  
*purpurascens*, 161.  
*repanda*, 161.  
*reptans*, 106.  
*retrofracta*, 164, 165.  
*rhomboidea*, 156.  
*rotundifolia*, 106.  
*rupestris*, 163.  
*sagittata*, 162.  
*secunda*, 164.  
*sparsiflora*, 164.  
*spathulata*, 160.  
*stricta*, 163.  
*subpinnatifida*, 165.  
*suffrutescens*, 166, 470.  
*Thaliana*, 140.  
*tuberosa*, 156.  
*Virginica*, 161.
- Arctomecon, 83, 85.  
*Arctomecon*, 82.  
*Californica*, 86.  
*Californicum*, 86.  
*humilis*, 86.  
*Merriami*, 86.
- Arenaria, 210, 237.  
*Arenaria*, 228, 238, 239, 250.  
*aculeata*, 242.  
*alsinoides*, 240.  
*alsinoides*, 254.  
*arctica*, 247.  
*arctica*, 247.  
*Benthamii*, 239.  
*biflora*, 247.  
*brevifolia*, 243.  
*brevifolia*, 244.  
*buxifolia*, 238.  
*crispata*, 249.  
*Californica*, 244.  
*Californica*, 244.  
*calycantha*, 236.  
*Canadensis*, 252.  
*capillaris*, 240.  
*capillaris*, 232, 241.  
*capillipes*, 244.  
*Caroliniana*, 247.  
*ciliata*, 239.  
*compacta*, 241.  
*congesta*, 241.

- congesta*, 241, 242.  
*diandra*, 251.  
*diffusa*, 240.  
*Douglasii*, 244.  
*elegans*, 246.  
*Fendleri*, 242.  
*Fendleri*, 241.  
*formosa*, 240.  
*Franklinii*, 242.  
*Franklinii*, 242.  
*Giesekii*, 246.  
*glabra*, 243.  
*glabra*, 237, 243.  
*Greenlandica*, 243.  
*Haenkeana*, 238.  
*hirta*, 246.  
*Hookeri*, 242.  
*Howellii*, 244.  
*humifusa*, 240.  
*imbricata*, 247.  
*juniperina*, 245.  
*Kingii*, 241.  
*lanuginosa*, 240.  
*laricifolia*, 247.  
*lateriflora*, 238.  
*lateriflora*, 235.  
*leptoclados*, 239.  
*macradenia*, 241, 242.  
*macrocarpa*, 247.  
*macrophylla*, 238.  
*macrotheca*, 253.  
*marina*, 252.  
*Michauxii*, 245.  
*Miquelonensis*, 250, 252.  
*monticola*, 239.  
*nardifolia*, 240.  
*nemorosa*, 240.  
*Norvegica*, 240.  
*Nuttalli*, 246.  
*Nuttalli*, 246.  
*obtusata*, 247.  
*paludicola*, 243.  
*palustris*, 243.  
*patula*, 245.  
*patula*, 232.  
*Pennsylvanica*, 238.  
*peploides*, 238.  
*physodes*, 239.  
*Pitcheri*, 245.  
*propinqua*, 246.  
*pungens*, 242, 246.  
*Purshiana*, 235.  
*pusilla*, 244.  
*Rafinesquiana*, 247.  
*Rossii*, 246.  
*rubra*, 250, 252.  
*Sajanensis*, 246.  
*salsuginea*, 251.  
*saxosa*, 240.  
*serpyllifolia*, 239.  
*setacea*, 245.  
*Sitchensis*, 239.  
*squarrosa*, 247.  
*stricta*, 245.  
*stricta*, 245, 246.  
*tenella*, 244.  
*tenella*, 245.
- tenuifolia*, 244, 245.  
*thymifolia*, 235, 247.  
*ursina*, 241.  
*verna*, 245.  
*verna*, 244.
- Argemone*, 83, 87, 466.  
*alba*, 88, 466.  
*alba*, 466.  
*albiflora*, 88.  
*corymbosa*, 88.  
*corymbosa*, 466.  
*fruticosa*, 87.  
*Georgiana*, 88.  
*grandiflora*, 87.  
*hispida*, 88, 466.  
*intermedia*, 466.  
*Mexicana*, 87, 466.  
*Mexicana*, 88.  
*munita*, 88, 467.  
*ochroleuca*, 466.  
*platyceras*, 88, 466.  
*platyceras*, 466.
- Armoracia Americana*, 146.  
*rusticana*, 147.
- Ascyrum*, 282, 283.  
*amplexicaule*, 283.  
*Crux-Andree*, 283.  
*Cubense*, 284.  
*hypericoides*, 283.  
*microsepalum*, 284.  
*multicaule*, 283.  
*pauciflorum*, 283.  
*pumilum*, 283.  
*stans*, 283.  
*villosum*, 288.
- Asimina*, 62, 464.  
*angustifolia*, 64, 464.  
*campaniflora*, 63.  
*conoidea*, 63.  
*cuneata*, 64.  
*cuneata*, 464.  
*grandiflora*, 63, 464.  
*grandiflora*, 63, 464.  
*obovata*, 464.  
*parviflora*, 63.  
*pygmæa*, 64, 464.  
*pygmæa*, 63, 64, 465.  
*reticulata*, 464.  
*reticulata*, 64, 464, 465.  
*Rugelii*, 465.  
*secundiflora*, 64.  
*speciosa*, 464.  
*speciosa*, 464.  
*triloba*, 63, 464.
- Aspicarpa*, 350, 352.  
*Hartwegiana*, 352.  
*hyssopifolia*, 352.  
*longipes*, 352.
- Astrophyllum dumosum*, 372.
- Atalanta*, 183.  
*serrulata*, 183.
- Atamisquea*, 181, 187.  
*emarginata*, 187.
- Athysanus*, 99, 112.  
*pusillus*, 113.
- Atocion armerioides*, 212.
- Atragene*, 4, 8.
- alpina*, 8.  
*Americana*, 8.  
*Columbiana*, 8.  
*occidentalis*, 8.  
*Ochotensis*, 8.  
*Sibirica*, 8.
- AURANTIEÆ*, 371.
- Awlwort*, 130.
- Ayenia*, 339, 341.  
*microphylla*, 341.  
*pusilla*, 341.
- Baby's Breath*, 212.
- Badiera*, 449.
- Balardia Platensis*, 251.
- Balloon Vine*, 443.
- Balsam*, 368.
- BALSAMINEÆ*, 358.
- Baneberry*, 55.
- Barbadoes Cherry*, 351.
- Barbarea*, 104, 149.  
*Barbarea*, 149.  
*parviflora*, 150.  
*præcox*, 150.  
*stricta*, 150.  
*vulgaris*, 149.  
*vulgaris*, 150.
- Barberry*, 67.
- Basswood*, 343.
- Bastard Iron-wood*, 374.
- Batrachium*, 20.  
*circinatum*, 21.  
*divaricatum*, 21.  
*hederaceum*, 22.  
*trichophyllum*, 21.
- Baumgartia scandens*, 65.
- Bay*, 59.
- Beaver-tree*, 59.
- Behen*, 214.  
*vulgaris*, 214.
- Behenantha*, 214.
- Bellia*, 446.
- Beloere*, 327.  
*cistiflora*, 327.  
*crispa*, 330.
- BERBERIDACEÆ*, 66, 465.
- Berberis*, 66, 67, 465.  
*Aquifolium*, 69, 465.  
*Aquifolium*, 70.  
*Canadensis*, 68.  
*Canadensis*, 68.  
*crenulata*, 68.  
*dictyota*, 69.  
*emarginata*, 68.  
*Fendleri*, 68.  
*Fremontii*, 69.  
*glumacea*, 70.  
*ilicifolia*, 68.  
*laxiflora*, 68.  
*macrantha*, 68.  
*mitis*, 68.  
*nana*, 465.  
*nervosa*, 70, 465.  
*nervosa*, 70.  
*Nevinii*, 69, 465.  
*Nutkana*, 70.  
*pinnata*, 69, 465.



- pinnata*, 69, 70.  
*pumila*, 69.  
*repens*, 69, 465.  
*Ræmeriana*, 68.  
*Schiedeana*, 68.  
*Swazeyi*, 69.  
*trifoliata*, 68.  
*trifoliata*, 68.  
*vulgaris*, 68.  
*vulgaris*, 68.  
*Wilcoxii*, 69.  
*Berberry*, 67.  
*Berchemia*, 402, 404.  
*scandens*, 405.  
*volubilis*, 404.  
*Bergella*, 282.  
*Texana*, 282.  
*Bergia*, 281, 282.  
*Americana*, 282.  
*ammanioides*, 282.  
*Texana*, 282.  
*Berteroia*, 100, 114, 468.  
*incana*, 114, 468.  
*mutabilis*, 114.  
*mutabilis*, 468.  
*Betula triphylla*, 386.  
*Bicuculla Canadensis*, 94.  
*Cucullaria*, 95.  
*junarioides*, 93.  
*Bicucullaria eximia*, 95.  
*Bicucullata*, 94.  
*Canadensis*, 95.  
*Bird Grape*, 421.  
*Bird's-eye Maple*, 439.  
*Biscutella*, 122.  
*Californica*, 123.  
*Wislizeni*, 123.  
*Bitter Orange*, 376.  
*Bitter-root*, 266, 267.  
*Bitter-sweet*, 398.  
*Bitter-wood*, 378.  
*Bixa Orellana*, 206.  
*BIXACEÆ*, 206.  
*Black Alder*, 391.  
*Cohosh*, 54.  
*Hellebore*, 42.  
*Iron-wood*, 404.  
*Maple*, 439.  
*Mustard*, 133.  
*Snakeroot*, 54.  
*Bladder Champion*, 214.  
*Bladder-nut*, 434.  
*Bloodroot*, 86.  
*Blue Cohosh*, 70.  
*Grape*, 428.  
*Bombacæ*, 295.  
*Bombicella*, 333, 334.  
*Boothia*, 213.  
*Boston Vine*, 431.  
*Botrophis*, 54.  
*acteoides*, 55.  
*serpentaria*, 55.  
*Bouncing Bet*, 213.  
*Box Elder*, 440.  
*Brachylobus hispidus*, 148.  
*Brasenia*, 73, 74.  
*Hydrophylis*, 74.  
*nymphoides*, 74.  
*peltata*, 74.  
*purpurea*, 74.  
*Schreberi*, 74.  
*Brassica*, 102, 133, 468.  
*Brassica*, 134.  
*adpressa*, 134.  
*adpressa*, 469.  
*alba*, 134.  
*alba*, 133.  
*campestris*, 133.  
*Japonica*, 469.  
*juncea*, 134, 469.  
*nigra*, 133.  
*oleracea*, 133.  
*orientalis*, 134.  
*perfoliata*, 134.  
*Sinapistrum*, 133, 468.  
*Washitana*, 168.  
*BRASSICÆÆ*, 101.  
*Braya*, 103, 140.  
*Braya*, 136.  
*alpina*, 140.  
*arctica*, 140.  
*Eschscholtziana*, 135.  
*glabella*, 140.  
*humilis*, 141.  
*Oregonensis*, 112.  
*pectinata*, 136.  
*pilosa*, 141.  
*purpurascens*, 140.  
*rosea*, 141.  
*Brewerina suffrutescens*, 241.  
*Breynia arborescens*, 187.  
*fruticosa*, 187.  
*Broccoli*, 133.  
*Bronnia*, 280.  
*spinosa*, 280.  
*Brussels sprouts*, 133.  
*Bucconia*, 82.  
*Buckeye*, 446.  
*Buckthorn*, 406.  
*Buckwheat-tree*, 393.  
*Buda*, 250.  
*borealis*, 252.  
*marina*, 252.  
*rubra*, 250.  
*BUETTNERIÆÆ*, 339.  
*Bugbane*, 53.  
*Bulbocapnos*, 96.  
*Bull Grape*, 420.  
*Bullace Grape*, 420.  
*Bullit Grape*, 420.  
*Bumalda*, 434.  
*Bumelia angustifolia*, 394.  
*Bunch Grape*, 427.  
*Bunias edentula*, 132.  
*Burning Bush*, 397.  
*Bursa*, 130.  
*Bursa-pastoris*, 131.  
*Bursee*, 130.  
*Bursera*, 380.  
*gummifera*, 380.  
*Illinsiana*, 213.  
*microphylla*, 380.  
*Simaruba*, 380.  
*BURSERACEÆÆ*, 380.  
*Burseria*, 380.  
*Bush Grape*, 421.  
*Buttercup*, 20.  
*Byrsonima*, 350.  
*lucida*, 350.  
*Cabbage*, 133.  
*Cabomba*, 73, 74.  
*aquatica*, 74.  
*Aubletii*, 74.  
*Caroliniana*, 74.  
*peltata*, 74.  
*pinnata*, 363.  
*CABOMBÆÆ*, 73.  
*Cakile*, 101, 132.  
*æqualis*, 132.  
*Americana*, 132.  
*Americana*, 132.  
*edentula*, 132.  
*maritima*, 132.  
*maritima*, 132.  
*CALILINEÆÆ*, 101.  
*Calandrinia*, 263, 269.  
*Calandrinia*, 262, 267.  
*ambigua*, 270.  
*Breweri*, 270.  
*caulescens*, 269.  
*Columbiana*, 269.  
*compressa*, 270.  
*Cotyledon*, 268.  
*elegans*, 270.  
*Grayi*, 268.  
*Howellii*, 268.  
*Leana*, 269.  
*maritima*, 270.  
*Menziesii*, 269, 270.  
*micrantha*, 269.  
*Neoadensis*, 268.  
*oppositifolia*, 268.  
*pulchella*, 270.  
*pygmaea*, 268.  
*sesuvioides*, 270.  
*speciosa*, 269.  
*tuberosa*, 265.  
*Tweedii*, 268.  
*Calceolaria*, 205.  
*verticillata*, 205.  
*California Lilac*, 409.  
*Callirhoë*, 295, 300.  
*alcæoides*, 301.  
*digitata*, 301.  
*involuta*, 300.  
*involuta*, 301.  
*lineariloba*, 301.  
*macrorrhiza*, 301.  
*palmata*, 301.  
*Papaver*, 301.  
*pedata*, 302.  
*scabriuscula*, 302.  
*spicata*, 306.  
*triangulata*, 300.  
*verticillata*, 301.  
*Calloosa Grape*, 429.  
*Calothyrsus*, 446, 448.  
*Californica*, 448.  
*Caltha*, 2, 39.  
*arctica*, 39.

- asarifolia*, 39.  
*biflora*, 40.  
*ficarioides*, 39.  
*fiabellifolia*, 39.  
*leptosepala*, 40.  
*leptosepala*, 40.  
*natans*, 39.  
*palustris*, 39.  
*palustris*, 39.  
*radicans*, 39.  
*sagittata*, 40.  
**Caltrops**, 353.  
**Calycocarpum**, 65, 66.  
*Lyoni*, 66.  
**Calyptridium**, 263, 278.  
*monandrum*, 279.  
*monospermum*, 277.  
*nudum*, 277.  
*paniculatum*, 277.  
*Parryi*, 278.  
*quadripetalum*, 278.  
*roseum*, 278.  
*roseum*, 278.  
*tetrapetalum*, 278.  
*umbellatum*, 277.  
*Calyxhyemia*, 322.  
**Camelina**, 101, 131, 468.  
*barbareefolium*, 148.  
*microcarpa*, 468.  
*sativa*, 131.  
*sylvestris*, 468.  
**CAMELINEÆ**, 101.  
*Camellia*, 291.  
**Campion**, 213.  
**Canary-grass**, 124.  
**Canbya**, 82, 85.  
*aurea*, 85.  
*candida*, 85.  
**Candlewood**, 280.  
**Canella**, 206.  
*alba*, 206.  
*laurifolia*, 206.  
*Winterana*, 206.  
**CANELLACEÆ**, 205.  
**Cañon Grape**, 425.  
**Canotia**, 378, 379.  
*holacantha*, 379.  
**Capnodes**, 94, 467.  
*Bidwellianum*, 467.  
*Caseanum*, 467.  
**Capnoides aureum**, 97.  
*crystallinum*, 98.  
*curvisiliquum*, 97.  
*flavulum*, 98.  
*micranthum*, 98.  
*montanum*, 97.  
*scandens*, 93.  
*sempervirens*, 97.  
**Capnorchis**, 93, 94.  
*chrysantha*, 96.  
*ochroleuca*, 467.  
*pauciflora*, 467.  
**CAPPARÆÆ**, 181.  
**CAPPARIDACEÆ**, 180, 473.  
**Capparis**, 181, 187.  
*Breynia*, 187.  
*cynophallophora*, 187.  
*cynophallophora*, 187.  
*emarginata*, 187.  
*Jamaicensis*, 187.  
*siliquosa*, 187.  
*spinosa*, 187.  
**Capsella**, 101, 130.  
*Bursa-pastoris*, 131.  
*divaricata*, 131.  
*elliptica*, 131.  
*erecta*, 131.  
*procumbens*, 131.  
*pubens*, 131.  
**Cardamine**, 104, 155, 470.  
*Cardamine*, 153, 470.  
*alpina*, 155.  
*angulata*, 157.  
*arenicola*, 158.  
*asarifolia*, 156.  
*bellidifolia*, 155.  
*Breweri*, 157.  
*bulbosa*, 156.  
*Californica*, 155.  
*cardiophylla*, 155.  
*Clematitis*, 157.  
*cordifolia*, 156.  
*cordifolia*, 156.  
*cuneata*, 155.  
*curvisiliqua*, 156.  
*digitata*, 157.  
*diphylla*, 153.  
*Douglassii*, 156.  
*Engelmanniana*, 161.  
*filifolia*, 159.  
*flexuosa*, 158.  
*Gambelii*, 158.  
*Gambelii*, 158.  
*gemmata*, 154.  
*heterophylla*, 153.  
*hirsuta*, 158.  
*hirsuta*, 158.  
*laciniata*, 153.  
*Lenensis*, 155.  
*Ludoviciana*, 161.  
*Lyallii*, 156.  
*maxima*, 154.  
*Menziesii*, 139.  
*multifida*, 139, 153.  
*nudicaulis*, 152.  
*Nuttallii*, 154.  
*oligosperma*, 158.  
*parviflora*, 158.  
*paucisecta*, 155.  
*Pennsylvanica*, 158.  
*pratensis*, 157.  
*pulcherrima*, 154.  
*purpurea*, 157.  
*purpurea*, 155.  
*quercetorum*, 154.  
*rhomboidea*, 156, 470.  
*rhomboidea*, 156.  
*rotundifolia*, 156.  
*rotundifolia*, 156.  
*Schaffneri*, 158.  
*sinuata*, 154.  
*spatulata*, 159.  
*sylvatica*, 158.  
*teres*, 149.  
*uniflora*, 152.  
*Virginica*, 158, 161.  
**Cardaria**, 124.  
*Cardiolepis obtusa*, 408.  
**Cardiospermum**, 433, 443.  
*Corindum*, 443.  
*Halicacabum*, 443.  
*Halicacabum*, 443.  
*microcarpum*, 443.  
*molle*, 443.  
**Carnation**, 211.  
**Carpet-weed**, 257.  
**CARYOPHYLLACEÆ**, 208.  
**Casalea**, 25.  
**Cassena**, 389.  
*Cassine Caroliniana*, 389, 390.  
*Peraqua*, 389.  
*ramulosa*, 389.  
**Castalia**, 75.  
*ampla*, 75.  
*elegans*, 75.  
*flava*, 77.  
*Leibergi*, 76.  
*Mexicana*, 77.  
*odorata*, 76.  
*pudica*, 76.  
*tetragona*, 76.  
*tuberosa*, 76.  
**Castela**, 377, 378.  
*erecta*, 379.  
*Nicholsoni*, 379.  
**Cat Grape**, 423.  
**Catchfly**, 213, 217.  
**Caulanthus**, 105, 172, 473.  
*amplexicaulis*, 172.  
*Coulteri*, 172.  
*crassicaulis*, 173.  
*glauca*, 173.  
*hastatus*, 173.  
*inflatus*, 172.  
*Lemmoni*, 172.  
*pilosus*, 173, 473.  
*procerus*, 173.  
**Cauliflower**, 133.  
**Caulophyllum**, 66, 70.  
**Caulophyllum**, 55.  
*thalictroides*, 70.  
*Cavanilla florida*, 292.  
**Ceanothus**, 402, 409.  
*Americanus*, 409.  
*Americanus*, 410.  
*Andersoni*, 411.  
*arboreus*, 411.  
*azareus*, 413.  
*bicolor*, 415.  
*Californicus*, 411.  
*colubrinus*, 418.  
*connivens*, 416.  
*condulatus*, 412.  
*condulatus*, 413.  
*condulatus*  $\times$  *velutinus*, 412.  
*crassifolius*, 416.  
*crassifolius*, 416, 417.  
*cuneatus*, 416.  
*cuneatus*, 416, 417.  
*decumbens*, 414.  
*dentatus*, 415.

*dentatus*, 414, 415.  
*divaricatus*, 412.  
*divergens*, 417.  
*diversifolius*, 414.  
*diversifolius*, 414.  
*eglandulosus*, 412.  
*elegans*, 415.  
*Fendleri*, 413.  
*ferreus*, 404.  
*floribundus*, 415.  
*foliosus*, 414.  
*foliosus*, 415.  
*glaber*, 412.  
*glandulosus*, 409.  
*Greggii*, 416.  
*herbaceus*, 410.  
*hirsutus*, 414.  
*hirsutus*, 414.  
*impressus*, 415.  
*incanus*, 412.  
*infestus*, 419.  
*integerrimus*, 411.  
*integerrimus*, 411, 412, 415.  
*intermedius*, 410.  
*intricatus*, 413.  
*Jepsonii*, 417.  
*laevigatus*, 410.  
*Lenmoni*, 414.  
*Lobbianus*, 415.  
*macrocarpus*, 416.  
*megacarpus*, 416.  
*microphyllus*, 410.  
*microphyllus*, 410.  
*mollissimus*, 409.  
*Nevadensis*, 411.  
*officinalis*, 410.  
*oliganthus*, 412, 413, 414.  
*Orcuttii*, 414.  
*Oreganus*, 409.  
*ovalis*, 409.  
*ovatus*, 409.  
*Palmeri*, 411.  
*papillosus*, 415.  
*papillosus*, 415.  
*Parryi*, 415.  
*parvifolius*, 411.  
*perennis*, 410.  
*perplexans*, 417.  
*pinetorum*, 416, 417.  
*prostratus*, 417.  
*prostratus*, 416, 417.  
*pumilus*, 416.  
*reclinatus*, 418.  
*rigidus*, 417.  
*rigidus*, 415, 416.  
*rugosus*, 417.  
*sanguineus*, 409.  
*serpyllifolius*, 410.  
*sorediatus*, 413.  
*sorediatus*, 412, 413, 415.  
*spinosus*, 411.  
*spinosus*, 412, 414.  
*tardiflorus*, 410.  
*thyrsiflorus*, 415.  
*thyrsiflorus*, 411, 415.  
*tomentosus*, 413.  
*trinervus*, 410.

*Veitchianus*, 415.  
*velutinus*, 410.  
*velutinus*, 411, 413, 417.  
*verrucosus*, 416.  
*verrucosus*, 416, 417.  
*vestitus*, 416.  
*Cebatha Carolina*, 65.  
*Cedrus Mahagoni*, 387.  
*Celandine*, 89.  
*Poppy*, 89.  
**CELASTRACEÆ**, 395.  
**CELASTRACEÆ**, 395.  
*Celastrus*, 395, 398.  
*bullatus*, 398.  
*scandens*, 398.  
*Cerastes*, 416.  
*Cerastium*, 210, 228.  
*Cerastium*, 228.  
*alpinum*, 231.  
*alpinum*, 231.  
*apricum*, 230.  
*arvense*, 230.  
*arvense*, 230, 231.  
*Beerianum*, 231.  
*brachypodium*, 229.  
*bracteatum*, 230.  
*cerastioides*, 231.  
*connatum*, 229.  
*dichotomum*, 230.  
*Fischerianum*, 231.  
*fulvum*, 229.  
*glomeratum*, 229.  
*grande*, 229.  
*hirsutum*, 229, 231.  
*hybridum*, 230.  
*lanatum*, 231.  
*latifolium*, 231.  
*longe pedunculatum*, 230.  
*maximum*, 229.  
*nutans*, 230.  
*nutans*, 229, 230.  
*oblongifolium*, 230, 231.  
*Pennsylvanicum*, 230.  
*pilosum*, 230, 231.  
*rigidum*, 231.  
*semidecandrum*, 229.  
*semidecandrum*, 229.  
*sericeum*, 230.  
*stellarioides*, 231.  
*Texanum*, 228.  
*trigynum*, 231.  
*triviale*, 229.  
*velutinum*, 231.  
*villosum*, 231.  
*viscosum*, 229.  
*viscosum*, 229.  
*vulgatum*, 229.  
*vulgatum*, 229, 231.  
*Chamaebuxus*, 451.  
*Chamaeplium*, 137.  
*Charlock*, 133. [293.  
**CHEIRANTHODENDREÆ**,  
*Cheiranthodendron*, 294.  
*Californicum*, 294.  
*Cheiranthus*, 142, 150, 469.  
*asper*, 143, 144.  
*capitatus*, 144.

*hesperidoides*, 150.  
*Menziesii*, 152.  
*occidentalis*, 144.  
*Pallasii*, 145.  
*pygmaeus*, 145.  
*Cheirostemon*, 294.  
*Chelidonium*, 84, 89.  
*diphyllum*, 89.  
*Glaucium*, 90.  
*majus*, 89.  
*Cherleria dicranoides*, 237.  
*Chicken Grape*, 424.  
*Chickweed*, 232.  
*Chili Pepper*, 381.  
*China-tree*, 387.  
*Chinese Sumach*, 378.  
*Chitonia*, 352.  
*Chittam-wood*, 382.  
*Chocolate-tree*, 339.  
*Choisya*, 370, 371.  
*dumosa*, 372.  
*ternata*, 372.  
*Christmas Rose*, 42.  
*Chrysanthemum Californica*, 466.  
*Chryseis*, 90.  
*Californica*, 91.  
*cæspitosa*, 91.  
*compacta*, 90.  
*Douglasii*, 91.  
*hypercoides*, 91.  
*tenuifolia*, 91.  
*Chrysocarpus*, 95.  
*Chrysocarpus*, 41.  
*asplenifolia*, 42.  
*occidentalis*, 41.  
*Chryza*, 41.  
*borealis*, 41.  
*Cienfuegia*, 337.  
*Cienfuegosia*, 297, 337.  
*heterophylla*, 338.  
*sulphurea*, 337.  
*Cimicifuga*, 3, 53.  
*Americana*, 54.  
*Americana*, 55.  
*Arizonica*, 54.  
*cordifolia*, 55.  
*Dahurica*, 54.  
*elata*, 54.  
*foetida*, 54.  
*Japonica*, 54.  
*laciniata*, 54.  
*palmata*, 18.  
*podocarpa*, 54.  
*racemosa*, 54.  
*serpentaria*, 54.  
*simplex*, 54.  
*Cimicifugæ*, 2, 3.  
*Cissampelos smilacina*, 65, 66.  
*Cissus*, 420, 430.  
*Cissus*, 430.  
*acida*, 430.  
*Ampelopsis*, 430.  
*bipinnata*, 430.  
*hederacea*, 431.  
*incisa*, 430.  
*orientalis*, 430.  
*Rocheana*, 431.

siccyoides, 431.  
 stans, 430.  
**CISTACEÆ**, 189, 474.  
*Cistus*, 189.  
   *Carolinianus*, 191.  
   *corymbosus*, 190.  
 Citron, 376.  
 Citrus, 371, 376.  
   *Aurantium*, 376.  
   *Bigarradia*, 376.  
   *vulgaris*, 376.  
 Claytonia, 263, 270.  
 Claytonia, 271.  
   *acutiflora*, 127.  
   *acutifolia*, 272.  
   *alsinoides*, 273.  
   *ambigua*, 270.  
   *aquatica*, 275.  
   *arctica*, 272.  
   *arctica*, 271, 272.  
   *arenicola*, 274.  
   *asarifolia*, 273.  
   *Bodini*, 272.  
   *bulbifera*, 273.  
   *Caroliniana*, 271.  
   *Caroliniana*, 271.  
   *Chamissoi*, 272, 275.  
   *Chamissonis*, 275, 277.  
   *cordifolia*, 273.  
   *Cubensis*, 274.  
   *dichotoma*, 276, 277.  
   *diffusa*, 276.  
   *Eschscholtzii*, 272.  
   *exigua*, 275.  
   *filicaulis*, 276.  
   *flagellaris*, 276.  
   *grandiflora*, 271.  
   *gypsophiloides*, 275.  
   *Hallii*, 277.  
   *Joanneana*, 272.  
   *Joanniana*, 272.  
   *lanceolata*, 271.  
   *latifolia*, 271.  
   *linearis*, 276.  
   *megarrhiza*, 272.  
   *Nevadensis*, 273.  
   *nubigena*, 275.  
   *parviflora*, 274.  
   *parvifolia*, 275, 276.  
   *perfoliata*, 274, 275.  
   *sarmentosa*, 272, 276.  
   *saxosa*, 274.  
   *Sibirica*, 272, 273.  
   *Simsii*, 271.  
   *spathulæfolia*, 271.  
   *spathulata*, 271, 274, 275,  
     *spatulæfolia*, 271. [276.  
   *spatulata*, 271.  
   *stolonifera*, 275.  
   *tenuifolia*, 275.  
   *triphylla*, 269.  
   *tuberosa*, 272.  
   *umbellata*, 271.  
   *Unalascensis*, 273.  
   *Virginica*, 271.  
   *Virginica*, 271, 273.  
 Cleistanoda, 321.

**CLEMATIDÆÆ**, 1.  
 Clematis, 1, 4, 461.  
   *Addisonii*, 5, 461.  
   *alpina*, 8, 462.  
   *alpina*, 8, 9.  
   *Baldwinii*, 7.  
   *Bigelovii*, 6, 462.  
   *Catesbyana*, 4.  
   *coccinea*, 6.  
   *Coloradoensis*, 6.  
   *Columbiana*, 8.  
   *cordata*, 4, 6, 7, 461.  
   *cordifolia*, 4.  
   *crispa*, 7.  
   *crispa*, 6, 461.  
   *cylindrica*, 7.  
   *dioica*, 4, 5.  
   *distorta*, 7.  
   *divaricata*, 7.  
   *Douglasii*, 8, 462.  
   *Douglasii*, 462.  
   *Drummondii*, 5.  
   *filifera*, 6.  
   *flore-crispo*, 7.  
   *Fremontii*, 7.  
   *hirsutissima*, 9.  
   *holosericea*, 4.  
   *integrifolia*, 7.  
   *lasiantha*, 5.  
   *ligusticifolia*, 4.  
   *lineariloba*, 7.  
   *nervata*, 5.  
   *ochroleuca*, 7, 462.  
   *ochroleuca*, 7.  
   *ovata*, 6, 7.  
   *Palmeri*, 6.  
   *parviflora*, 5.  
   *pauciflora*, 5.  
   *Pitcheri*, 6, 461.  
   *Pitcheri*, 6.  
   *Plukenetii*, 4.  
   *Pseudo-Atragene*, 9.  
   *reticulata*, 6.  
   *reticulata*, 6.  
   *Sargenti*, 6.  
   *Scottii*, 8.  
   *sericea*, 7.  
   *Simsii*, 6, 7.  
   *Suksdorfii*, 4, 461.  
   *Texana*, 6.  
   *Texensis*, 6.  
   *verticillaris*, 8, 462.  
   *Viorna*, 5, 461.  
   *Viorna*, 6, 7.  
   *viornoides*, 461.  
   *Virginiana*, 4, 461.  
   *Virginica*, 4.  
   *viticella*, 7.  
   *Walteri*, 7.  
   *Wyethii*, 8.  
 Cleome, 180, 183, 473.  
 Cleome, 182.  
   *arborea*, 181.  
   *aurea*, 184.  
   *cuneifolia*, 180.  
   *dodecandra*, 182.  
   *graveolens*, 182.

*gynandra*, 183.  
   *heptaphylla*, 183.  
   *integrifolia*, 183, 473.  
   *lutea*, 184.  
   *pentaphylla*, 183.  
   *pinnata*, 179.  
   *platycarpa*, 184.  
   *pungens*, 183.  
   *serrulata*, 183.  
   *Sonora*, 184.  
   *sparsifolia*, 184.  
   *speciosa*, 183.  
   *spinosa*, 183.  
   *triphylla*, 183.  
   *umiglandulosa*, 182.  
   *viscosa*, 182.  
**CLEOMEÆ**, 180.  
 Cleomella, 180, 184.  
   *angustifolia*, 185.  
   *brevipes*, 185.  
   *Coulteri*, 186.  
   *longipes*, 184.  
   *Mexicana*, 184.  
   *Mexicana*, 185.  
   *obtusifolia*, 186.  
   *ocarpa*, 185.  
   *Palmerana*, 186.  
   *parviflora*, 185.  
   *plocasperma*, 185.  
   *temifolia*, 185.  
 Cliftonia, 392, 393.  
   *ligustrina*, 393.  
   *monophylla*, 393.  
   *nitida*, 393.  
 Climbing Bitter-sweet, 398.  
 Clusia flava, 291.  
 Clypeola, 113.  
   *alyssoides*, 115.  
   *Caroliniana*, 127.  
   *maritima*, 115.  
 Cneoridium, 370, 375.  
 Cneoridium, 377.  
   *dimosum*, 375.  
 Coach-whip, 280.  
 Coccilidium populifolium, 65.  
 Coccus, 65.  
   *Carolinus*, 65.  
   *diversifolius*, 65.  
   *Indicus*, 65.  
   *oblongifolius*, 65.  
   *sagittæfolius*, 65.  
 Cochlearia, 103, 145.  
   *Anglica*, 145.  
   *Anglica*, 146.  
   *aquatica*, 146.  
   *Armoracia*, 147.  
   *Danica*, 145.  
   *fenestrata*, 146.  
   *Grœnlandica*, 146.  
   *Grœnlandica*, 145.  
   *oblongifolia*, 146.  
   *officinalis*, 145.  
   *officinalis*, 146.  
   *septentrionalis*, 110.  
   *siliquosa*, 110.  
   *spathulata*, 110.  
   *trilactylites*, 145.

- COCHLOSPERMÆÆ**, 206.  
*Cochlospermum*, 206.  
 Cockle, 224.  
*Codonium*, 394.  
     *arborescens*, 394.  
 Cohosh, 55.  
*Coilophyllum*, 79.  
*Colletia*, 418.  
     *disperma*, 419.  
     *infesta*, 419.  
     *multiflora*, 419.  
**COLLETIÆÆ**, 402.  
*Colubrina*, 402, 418.  
     *Americana*, 418.  
     *ferruginea*, 418.  
     *ferruginosa*, 418.  
     *infesta*, 419.  
     *reclinata*, 418.  
     *Texensis*, 418.  
 Columbine, 42.  
 Colza, 133.  
 Common Chickweed, 232.  
     Mallow, 298.  
     Mouse-ear Chickweed, 229.  
     Purslane, 263.  
     Sumach, 384.  
     Winter Cress, 149.  
*Condalia*, 402.  
     *ferrea*, 404.  
     *lycioides*, 403.  
     *Mexicana*, 403.  
     *obovata*, 403.  
     *obtusifolia*, 403.  
     *Parryi*, 403.  
     *spathulata*, 403.  
*Condaliopsis*, 403.  
*Conoïmôrpha*, 214.  
*Conosilene*, 214.  
*Conringia*, 102, 134, 469.  
     *orientalis*, 134.  
     *perfoliata*, 134, 469.  
     *Thaliana*, 140.  
*Consolida*, 45.  
*Coptis*, 2, 41.  
     *asplenifolia*, 42.  
     *asplenifolia*, 42.  
     *laciniata*, 42.  
     *occidentalis*, 41.  
     *occidentalis*, 42.  
     *trifolia*, 41.  
*Corchorus*, 342.  
     *acutangulus*, 343.  
     *hirtus*, 342.  
     *olitorius*, 343.  
     *pilolobus*, 343.  
     *siliquosus*, 343.  
     *siliquosus*, 343.  
     *tridens*, 343.  
*Corion*, 250.  
     *marinum*, 252.  
 Corn Cockle, 228.  
     Poppy, 88.  
*Coronaria*, 224, 227.  
     *Flos-cuculi*, 227.  
     *tomentosa*, 227.  
*Coronopus*, 129.  
     *Coronopus*, 130.  
     *didymus*, 130.  
     *Ruellii*, 130.  
*Corydalis*, 93, 96, 467.  
     *ambigua*, 96.  
     *aurea*, 97.  
     *aurea*, 97, 98.  
     *Bidwelliæ*, 96.  
     *Brandegei*, 97.  
     *Canadensis*, 94.  
     *Caseana*, 96, 467.  
     *crystallina*, 98.  
     *Cucullaria*, 95.  
     *curvisiliqua*, 97.  
     *Cusickii*, 96.  
     *flavidula*, 98.  
     *flavula*, 98.  
     *formosa*, 94, 95.  
     *fungosa*, 93.  
     *gigantea*, 96.  
     *glaucæ*, 97.  
     *macrophylla*, 96.  
     *micrantha*, 98.  
     *montana*, 97.  
     *pæonicifolia*, 96.  
     *pauciflora*, 96.  
     *Scouleri*, 96.  
     *sempervirens*, 97.  
     *tenuifolia*, 94.  
*Costæa*, 392.  
*Cotinus*, 381.  
     *Americanus*, 382.  
     *cotinoides*, 382.  
 Cotton, 338.  
*Covillea divaricata*, 356.  
 Cow Cress, 126.  
 Cowslips, 39.  
 Cranesbill, 358.  
 Cream-cups, 84.  
*Cremontia*, 333.  
 Creosote-plant, 355.  
*Cristaria coccinea*, 313.  
*Cristatella*, 180, 181, 473.  
     *erosa*, 181.  
     *Jamesii*, 182, 473.  
*Crocianthemum Carolinianum*,  
 Crossosoma, 3, 57. [191].  
     *Bigelovii*, 57.  
     *Californicum*, 57.  
     *Californicum*, 57.  
     *parviflora*, 57.  
 Crowfoot, 20.  
**CRUCIFERÆÆ**, 98, 467.  
*Crymodes*, 22.  
*Crypta*, 281.  
     *minima*, 281.  
*Cuba bast*, 337.  
*Cucubalus acaulis*, 216.  
     *Behen*, 214.  
     *Douglasii*, 223.  
     *niveus*, 216.  
     *polypetalus*, 216.  
     *stellatus*, 216.  
*Cucullaria*, 94, 95.  
     *bulbosa*, 95.  
 Cucumber-tree, 60, 61.  
 Curled Mallow, 298.  
 Curly Maple, 439.  
 Currants, 68.  
*Cusickia*, 112.  
 Custard Apple, 62.  
*Cyamus*, 74.  
     *flavicomus*, 75.  
     *luteus*, 75.  
     *pentapetalus*, 75.  
     *reniformis*, 75.  
*Cymbostemon parviflorus*, 59.  
*Cynocardamum Virginicum*, 127.  
*Cynophallophorus*, 187.  
*Cypselea*, 256, 258.  
     *humifusa*, 258.  
*Cyrbasium*, 181.  
     *erosum*, 181.  
     *Jamesii*, 182.  
 Cyrilla, 392.  
     *Caroliniana*, 393.  
     *fuscata*, 393.  
     *parvifolia*, 393.  
     *polystachya*, 393.  
     *racemiflora*, 393.  
     *racemosa*, 393.  
**CYRILLACEÆÆ**, 392.  
*Cyrtorhyncha*, 20, 23.  
     *Cymbalaria*, 24.  
     *ramunculina*, 23.  
*Cysticapnos*, 96.  
*Dactylocapnos*, 93.  
 Dahoon Holly, 388.  
 Dame's Violet, 142.  
 Darlingtonia, 79, 81, 466.  
     *Californica*, 81, 466.  
*Datisca hirta*, 384.  
*Decurrentes*, 458.  
*Delphidium flexuosum*, 45.  
*Delphinastrium*, 45.  
*Delphinium*, 3, 45, 463.  
     *Ajaxis*, 45.  
     *apinum*, 47.  
     *Andersonii*, 48, 463.  
     *Andersonii*, 52.  
     *apiculatum*, 49.  
     *azureum*, 46.  
     *azureum*, 47, 49.  
     *Barbeyi*, 47.  
     *bicolor*, 48.  
     *Blockmance*, 49, 463.  
     *Blockmance*, 463.  
     *Burkei*, 52.  
     *Californicum*, 47.  
     *camporum*, 46.  
     *cardinale*, 51.  
     *Carolinianum*, 46, 47.  
     *coccineum*, 51.  
     *Columbianum*, 51.  
     *Consolida*, 45.  
     *decorum*, 50.  
     *decorum*, 46, 48, 49, 50, 51.  
     *depauperatum*, 50.  
     *distichum*, 49.  
     *distichum*, 52.  
     *elatum*, 47.  
     *Emilia*, 51, 463.  
     *exaltatum*, 46.  
     *exaltatum*, 47, 48.

- Geyeri*, 46.  
*glaucum*, 47.  
*grandiflorum*, 49.  
*hesperium*, 49.  
*hesperium*, 463.  
*hybridum*, 47.  
*leucophæum*, 51.  
*Menziesii*, 50.  
*Menziesii*, 48, 49, 50.  
*nudicanle*, 51.  
*Nuttallianum*, 50.  
*Nuttallii*, 50.  
*occidentale*, 47.  
*orientale*, 45.  
*ornatum*, 49.  
*Parishii*, 48.  
*Parryi*, 48.  
*patens*, 50.  
*pauciflorum*, 50.  
*pauciflorum*, 50.  
*pauperculum*, 50.  
*Penhardi*, 46.  
*recurvatum*, 51, 463.  
*sarcophyllum*, 51.  
*scaposum*, 46.  
*scopulorum*, 47.  
*scopulorum*, 47.  
*simplex*, 49.  
*simplex*, 46, 49, 51.  
*tricornis*, 45.  
*tricornis*, 50.  
*tridactylum*, 47.  
*trolliifolium*, 48.  
*uliginosum*, 46.  
*urceolatum*, 47.  
*variegatum*, 49.  
*variegatum*, 51, 463.  
*vimineum*, 46.  
*virescens*, 46.  
*Demidovia*, 260.  
*Dendromecon*, 83, 86.  
*Dendromecon*, 82.  
*flexilis*, 87.  
*Harfordii*, 87.  
*rigida*, 86.  
*rigida*, 87.  
*Dentaria*, 104, 153, 470.  
*Dentaria*, 156.  
*bifolia*, 153.  
*Californica*, 154.  
*Californica*, 155.  
*cardiophylla*, 155, 470.  
*concatenata*, 153.  
*diphylla*, 153.  
*diphylla*, 154.  
*dissecta*, 153.  
*gemmata*, 154.  
*heterophylla*, 153.  
*integrifolia*, 155.  
*laciniata*, 153.  
*laciniata*, 154.  
*macrocarpa*, 154.  
*maxima*, 154.  
*multifida*, 153.  
*pachystigma*, 155.  
*tenella*, 154.  
*tenella*, 154.  
*tenuifolia*, 154.  
*Deptford Pink*, 211.  
*Descurainia*, 136, 137, 138.  
*canescens*, 139.  
*incisa*, 139.  
*pinnata*, 139.  
*Sophia*, 139.  
*Descuria*, 138.  
*Dianthus*, 209, 211.  
*alpinus*, 211.  
*Armeria*, 211.  
*armeroides*, 212.  
*barbatus*, 211.  
*deltoides*, 211.  
*furcatus*, 211.  
*prolifer*, 212.  
*repens*, 211.  
*Saxifragus*, 212.  
*Dicentra*, 93, 467.  
*Canadensis*, 94, 467.  
*chrysantha*, 95.  
*Cucullaria*, 95.  
*eximia*, 95.  
*eximia*, 94.  
*formosa*, 95.  
*ochroleuca*, 96, 467.  
*pauciflora*, 94, 467.  
*tenuifolia*, 94.  
*uniflora*, 94.  
*Dichodon*, 231.  
*Diclytra*, 93, 94.  
*bracteosa*, 95.  
*Canadensis*, 94, 95.  
*Cucullaria*, 95.  
*eximia*, 94, 95.  
*formosa*, 95.  
*lachenaliflora*, 94.  
*tenuifolia*, 94.  
*Dictamnus Fraxinella*, 369.  
*Dielytra*, 94.  
*Canadensis*, 94.  
*chrysantha*, 95.  
*Cucullaria*, 95.  
*eximia*, 94, 95.  
*formosa*, 95.  
*saccata*, 95.  
*Dilepticum diffusum*, 127.  
*præcox*, 127.  
*Dipetalia*, 188.  
*subulata*, 188.  
*Diphyllia*, 67, 72.  
*cymosa*, 72.  
*Grayi*, 72.  
*Diplisca elliptica*, 418.  
*Diplocalyx*, 394.  
*chrysophylloides*, 394.  
*Diploxys*, 102, 134.  
*muralis*, 134.  
*tenuifolia*, 134.  
*Dithyrea*, 100, 122.  
*Californica*, 123.  
*Wislizeni*, 123.  
*Dodonæa*, 433, 441.  
*angustifolia*, 441.  
*Burmänniana*, 441.  
*nana*, 441.  
*Schiediana*, 441.  
*spatulata*, 441.  
*viscosa*, 441.  
*Dodonæa*, 433.  
*Dolophragma*, 238.  
*Draba*, 99, 105, 467.  
*alpina*, 108.  
*alpina*, 108, 109, 110, 112.  
*androsacea*, 109.  
*Arabis*, 111.  
*arabisans*, 111.  
*arctica*, 111.  
*asprella*, 107.  
*asprella*, 106.  
*aurea*, 110.  
*aureola*, 110, 467.  
*borealis*, 111, 468.  
*brachycarpa*, 107.  
*Breweri*, 111, 467.  
*Canadensis*, 111.  
*Caroliniana*, 106.  
*chrysantha*, 110.  
*confusa*, 111.  
*contorta*, 111.  
*corrugata*, 110, 467.  
*corymbosa*, 109.  
*crassifolia*, 108, 467.  
*crassifolia*, 106.  
*Crockeri*, 112.  
*cuneifolia*, 107.  
*densifolia*, 112.  
*dentata*, 112.  
*Douglasii*, 112.  
*eurycarpa*, 109.  
*filicaulis*, 107.  
*Fladnizensis*, 109.  
*glabella*, 111.  
*glacialis*, 112.  
*gracilis*, 107, 111.  
*grandis*, 110.  
*Henneana*, 111.  
*hirta*, 111.  
*hirta*, 110.  
*hispidula*, 106.  
*Howellii*, 108.  
*hyperborea*, 110.  
*incana*, 111, 467.  
*incana*, 111.  
*lactea*, 109.  
*levigata*, 135.  
*lævipis*, 109.  
*Laponica*, 109.  
*Lemmoni*, 108.  
*lutea*, 107.  
*micrantha*, 106.  
*micropetala*, 108.  
*Mogollonica*, 107.  
*montana*, 108.  
*muricella*, 109.  
*memoralis*, 107.  
*nemorosa*, 107.  
*nivalis*, 109, 467.  
*oblongata*, 111.  
*oligosperma*, 112.  
*pauciflora*, 108.  
*platycarpa*, 107.  
*ramosissima*, 111.  
*Remeriana*, 107.

- rupestris*, 108, 111.  
*Sachalinensis*, 111.  
*Sonoræ*, 107.  
*stellata*, 109.  
*stenoloba*, 107.  
*streptocarpa*, 110.  
*subsessilis*, 109.  
*Unalaschkiana*, 111.  
*unilateralis*, 106.  
*unilateralis*, 112.  
*ventosa*, 108.  
*verna*, 106.  
*Wahlenbergii*, 109.  
*Drabea*, 108.  
*Drabella*, 106, 467.  
*Drymaria*, 210, 253.  
*cordata*, 253.  
*crassifolia*, 254.  
*crassifolia*, 254.  
*effusa*, 254.  
*Fendleri*, 253.  
*glandulosa*, 253.  
*holosteoides*, 253.  
*holosteoides*, 254.  
*nodosa*, 254.  
*polycarpoides*, 254.  
*sperguloides*, 254.  
*tenella*, 254.  
*Veatchii*, 254.  
*viscosa*, 254.  
*Dryopetalon*, 104, 150.  
*runcinatum*, 150.  
*Dryopetalum*, 150.  
*Dutchman's Breeches*, 95.  
*Dwarf Mallow*, 298.  
*Sumach*, 384.  
*Dyer's Rocket*, 188.  
*Weed*, 188.  
*Early Winter Cress*, 150.  
*Ebraxis virgata*, 215.  
*Elaphrium*, 380.  
**ELATINACEÆ**, 280.  
*Elatine*, 281.  
*Elatine*, 282.  
*Americana*, 281.  
*brachysperma*, 281.  
*Californica*, 282.  
*Clintoniana*, 281.  
*Hydropiper*, 282.  
*minima*, 281.  
*Texana*, 282.  
*triandra*, 281.  
*Elatinella*, 282.  
*Elidurandia Texana*, 337.  
*Elisanthe Drummondii*, 225.  
*Scouleri*, 224.  
*Elk-wood*, 61.  
*Ellimia ruderalis*, 188.  
*Elodea*, 284, 291.  
*campanulata*, 291.  
*petiolata*, 291.  
*tubulosa*, 291.  
*Virginica*, 291.  
*Elodes*, 284.  
*campanulata*, 291.  
*petiolata*, 291.  
*Virginica*, 291.  
*Emetila ramulosa*, 389.  
*Empleurosma*, 441.  
*Endotropis oleifolia*, 408.  
*Enemion*, 40.  
*biteratum*, 40.  
*Ennepta atomaria*, 390.  
*coriacea*, 390.  
*myricoides*, 390.  
*Epapulosa*, 261.  
*Epimedium hexandrum*, 71.  
*Eranthis*, 2, 42.  
*hyemalis*, 42, 463.  
*Eriocephalus*, 10.  
*Erodium*, 357, 361.  
*Botrys*, 362.  
*Californicum*, 362.  
*Californicum*, 362.  
*ciconium*, 362.  
*cicutarium*, 362.  
*macrophyllum*, 361.  
*malachoides*, 362.  
*malacoides*, 362.  
*moschatum*, 362.  
*Texanum*, 362.  
*Erophila*, 105, 106.  
*Americana*, 106.  
*vulgaris*, 106.  
*Erucastrum incanum*, 134.  
*Erysimum*, 103, 142, 469.  
*Erysimum*, 134.  
*Alliaria*, 134, 135.  
*arenicola*, 144.  
*Arkansanum*, 144.  
*asperum*, 143.  
*asperum*, 143, 144, 469.  
*Barbarea*, 149.  
*Californicum*, 144.  
*capitatum*, 144.  
*cheiranthoides*, 143.  
*cheiranthoides*, 143.  
*elatum*, 143.  
*glaberrimum*, 138.  
*grandiflorum*, 144.  
*hieracifolium*, 143.  
*inconspicuum*, 143.  
*insulare*, 144.  
*lanceolatum*, 143.  
*linifolium*, 469.  
*occidentale*, 144.  
*officinale*, 137.  
*orientale*, 134.  
*parviflorum*, 143, 469.  
*parviflorum*, 143.  
*perfoliatum*, 134.  
*pinnatum*, 139.  
*pumilum*, 144.  
*pygmæum*, 145.  
*repandum*, 143.  
*retrofractum*, 177.  
*syrticum*, 143.  
*Eschscholtzia*, 84, 90, 467.  
*Eschscholtzia*, 82.  
*ambigua*, 91.  
*Austine*, 91.  
*cæspitosa*, 91.  
*cæspitosa*, 92.  
*Californica*, 90.  
*Californica*, 91, 92.  
*Californicum*, 90.  
*compacta*, 90.  
*crocea*, 90.  
*cucullata*, 90.  
*Douglasii*, 91, 92.  
*elegans*, 91.  
*glauca*, 90.  
*glyptosperma*, 92.  
*hypecoides*, 91.  
*Lemmonii*, 92.  
*leptandra*, 90.  
*maritima*, 91.  
*Mexicana*, 91.  
*minutiflora*, 92.  
*modesta*, 92.  
*Parishii*, 92.  
*peninsularis*, 91.  
*ramosa*, 91.  
*rhombipetala*, 92.  
*tenuifolia*, 92.  
*tenuifolia*, 90, 91.  
*tenuisecta*, 90.  
*Esculus*, 446.  
*Euaesculus*, 446.  
*Eualysson*, 115.  
*Euanemone*, 9.  
*Euarabis*, 160.  
*Eucalandrinia*, 269.  
*Eucapnos*, 95.  
*eximius*, 95.  
*formosa*, 95.  
*Euceanotus*, 409.  
*Euclaytonia*, 271, 272.  
*Eucleome*, 183.  
*Euclisia*, 168, 470.  
*Eucondalia*, 403.  
*Eudianthe*, 224.  
*Euhibiscus*, 333.  
*Eulechea*, 192.  
*Eulinum*, 344.  
*Eulychnis*, 225.  
**EUMALVEÆ**, 295.  
*Eumelochia*, 340.  
*Euonymoides scandens*, 398.  
*Euonymus*, 395, 396.  
*acuminatus*, 397.  
*alternifolius*, 396.  
*Americanus*, 396.  
*Americanus*, 396, 397.  
*angustifolius*, 396.  
*atropurpureus*, 397.  
*atropurpureus*, 397.  
*Carolinensis*, 397.  
*cuneatus*, 397.  
*Europæus*, 397.  
*heterophyllus*, 397.  
*muricatus*, 396.  
*obovatus*, 397.  
*occidentalis*, 397.  
*Parishii*, 397.  
*sarmentosus*, 396.  
*sempervirens*, 396.  
*Euranunculus*, 24.  
*European Barberry*, 68.  
*Columbine*, 42.

- Lime, 343.  
*Euryanthe Schiedeana*, 207.  
*Eusapindus*, 444.  
*Eusilene*, 214.  
*Eusisymbrium*, 137.  
*Eustellaria*, 232.  
*Eustreptanthus*, 168, 470.  
*Euthelypodium*, 174.  
*Eutrema*, 102, 135.  
*Eutrema*, 140.  
   *arenicola*, 136.  
   *Edwardsii*, 135.  
   *Eschscholtzianum*, 135.  
   *Labradoricum*, 135.  
   *Rossii*, 146.  
*Euvitis*, 421.  
*Evanoda*, 319.  
 Evening Lychnis, 227.  
 Everbearing Grape, 421.  
*Exothea*, 433, 444.  
   *oblongifolia*, 445.  
   *paniculata*, 445.  
*Fagara*, 374.  
   *Caroliniana*, 374.  
   *coriacea*, 375.  
   *flava*, 375.  
   *fraxinifolia*, 374.  
   *lentiscifolia*, 374.  
   *Pterota*, 374.  
*Fagonia*, 353, 355.  
   *Californica*, 355.  
   *Californica*, 355.  
 Fall Grape, 425.  
 False Flax, 131.  
   Mallow, 308.  
   Mermail, 363.  
*Farsetia*, 114.  
   *incana*, 468.  
 Fetid Buckeye, 446.  
   Hellebore, 42.  
*Ficaria*, 20.  
 FICOIDEÆ, 256.  
 Fire Pink, 217.  
*Firmiana plataniifolia*, 339.  
*Flammula*, 4.  
 Flax, 344.  
*Flørkea*, 358, 363.  
   *alba*, 364.  
   *alba*, 364.  
   *Douglasii*, 364.  
   *lacustris*, 363.  
   *Macounii*, 363.  
   *palustris*, 363.  
   *proserpinacoides*, 363.  
   *rosea*, 364.  
   *uliginosa*, 363.  
   *versicolor*, 364.  
 Flowering Wintergreen, 453.  
 Flower-of-an-hour, 336.  
*Forsellesia*, 400.  
   *Nevadensis*, 401.  
   *spinescens*, 400.  
*Fouquiera*, 280.  
*Fouquieria*, 279, 280.  
   *spinosa*, 280.  
   *spinosa*, 280.  
   *splendens*, 280.  
 Fox Grape, 429.  
*Frangula*, 406, 407.  
   *Californica*, 408.  
   *Caroliniana*, 407.  
   *fragilis*, 407.  
   *Purshiana*, 408.  
*Frankenia*, 207.  
   *Bertecana*, 208.  
   *grandifolia*, 207.  
   *grandifolia*, 208.  
   *Jamesii*, 208.  
   *latifolia*, 207.  
   *Palmeri*, 208.  
   *pulverulenta*, 208.  
 FRANKENIACEÆ, 207.  
*Franklinia*, 293.  
   *Altamaha*, 293.  
*Fremontia*, 294.  
   *Californica*, 294.  
*Fremontodendron Californicum*,  
 French Weed, 123. [294.  
 Fringed Polygala, 453.  
 Frost Grape, 422, 424.  
 Frost-weed, 190.  
*Fugosia*, 337.  
   *Drummondii*, 337.  
   *heterophylla*, 338.  
   *sulfurea*, 337.  
*Fumaria*, 93.  
   *aurca*, 97.  
   *Cucullaria*, 95.  
   *eximia*, 95.  
   *flavula*, 98.  
   *formosa*, 95.  
   *fungosa*, 93.  
   *glauca*, 97.  
   *officinalis*, 93.  
   *pallida*, 95.  
   *pauciflora*, 96.  
   *recta*, 93.  
   *sempervirens*, 97.  
 FUMARIACEÆ, 92, 467.  
*Gaissenia verna*, 40.  
 Galphimia, 350, 351.  
   *angustifolia*, 351.  
   *linifolia*, 351.  
*Gansblum*, 106.  
 Garden Cress, 126.  
   Poppy, 88.  
*Gastroilene*, 214.  
*Gastrostyla*, 375.  
*Gayoides*, 330.  
 GERANIACEÆ, 357.  
 GERANIEÆ, 357.  
*Geranium*, 357, 358, 363.  
   *albiflorum*, 359.  
   *atrum*, 360.  
   *Bicknellii*, 360.  
   *cæspitose*, 360.  
   *cæspitosum*, 359.  
   *Carolinianum*, 360.  
   *columbinum*, 360.  
   *dissectum*, 360.  
   *dissectum*, 361.  
   *erianthum*, 358.  
   *erianthum*, 359.  
   *Fremontii*, 359.  
   *Fremontii*, 359, 360.  
   *Hernandezii*, 359.  
   *Hookerianum*, 359.  
   *incisum*, 359.  
   *inodorum*, 361.  
   *lanuginosum*, 360.  
   *maculatum*, 358.  
   *maculatum*, 359.  
   *Mexicanum*, 359.  
   *molle*, 361.  
   *parviflorum*, 361.  
   *pentagynum*, 359.  
   *pilosum*, 360.  
   *pusillum*, 361.  
   *Pyrenaicum*, 361.  
   *retrosum*, 360.  
   *Richardsonii*, 359.  
   *Robertianum*, 361.  
   *rotundifolium*, 361.  
   *Sibiricum*, 360.  
   *viscosissimum*, 359.  
*Girtanneria alnifolia*, 407.  
   *franguloides*, 407.  
*Githago*, 228.  
   *segetum*, 228.  
*Glabra*, 436.  
 Glade Mallow, 307.  
*Glaucium*, 84, 90.  
*Glaucium*, 82.  
   *flavum*, 90.  
   *Glaucium*, 90.  
   *luteum*, 90.  
*Glinus*, 256, 258.  
*Glinus*, 257.  
   *Cambessidesii*, 258.  
   *dictamnoides*, 258.  
   *lotoides*, 258.  
   *lotoides*, 258.  
   *radiatus*, 258.  
 Globe-flower, 40.  
 Glossopetalon, 396, 400.  
   *meionandrum*, 401.  
   *Nevadense*, 401.  
   *spinescens*, 400.  
*Glossopetalum*, 400.  
 Gobernadora, 355.  
 Golden-seal, 56.  
 Gold-thread, 41.  
*Gombo*, 337.  
*Gordonia*, 292.  
*Gordonia*, 293.  
   *Altamaha*, 293.  
   *Franklini*, 293.  
   *Lasianthus*, 293.  
   *Lasyanthus*, 293.  
   *pubescens*, 293.  
   *pyramidalis*, 293.  
*Gordonia*, 291.  
*Gossypium*, 297, 338.  
   *Barbadense*, 338.  
   *herbaceum*, 338.  
   *religiosum*, 338.  
   *Thurberi*, 338.  
*Gouania*, 402, 419.  
   *Domingensis*, 419.



- GOUANIEÆ, 402.  
 Grape-vine, 420.  
 Great Chickweed, 236.  
 Green Hellebore, 42.  
*Greevesia cleisocalyx*, 331.  
 Greggia, 103, 142, 469.  
   *camporum*, 142, 469  
   *camporum*, 469.  
   *linearifolia*, 142.  
*Greniera Douglasii*, 244.  
   *tenella*, 244.  
*Guaiacacidium*, 356.  
*Guaiacum*, 353, 356.  
   *angustifolium*, 356.  
   *Coulteri*, 356.  
   *parvifolium*, 356.  
   *Planchonii*, 356.  
   *sanctum*, 356.  
   *Sloanei*, 356.  
   *verticale*, 356.  
*Guaijacum*, 356.  
 Gum Guaiacum, 356.  
 Gumbo Limbo, 380.  
 GUTTIFERÆ, 291.  
*Gyminda*, 395, 398.  
*Gyminda*, 399.  
   *Grisebachii*, 399.  
*Gymnogonia*, 183.  
*Gynandropsis*, 183.  
   *palmipes*, 183.  
   *pentaphylla*, 183.  
   *speciosa*, 183.  
   *triphylla*, 183.  
*Gypsophila*, 209, 212.  
*Gypsophila*, 213.  
   *muralis*, 212.  
   *paniculata*, 212.  
*Haenkea*, 398.  
*Halianthus*, 238.  
*Halodes*, 23.  
 Hard Maple, 438.  
*Harmala*, 355.  
 Heartsease, 204.  
 Heartseed, 443.  
*Hebeandra*, 460.  
*Hebecarpa*, 449.  
*Hebeclada*, 450.  
*Hedera arborea*, 430.  
   *quinquefolia*, 431.  
 Hedge Mustard, 136, 137.  
*Helianthemum*, 189, 474.  
*Helianthemum*, 192.  
   *Aldersonii*, 191.  
   *arenicola*, 190, 474.  
   *Canadense*, 190, 474.  
   *Canadense*, 190.  
   *capitatum*, 190.  
   *Carolinianum*, 190.  
   *corymbosum*, 190.  
   *corymbosum*, 190.  
   *Greenei*, 191.  
   *majus*, 190.  
   *Nashi*, 190, 474.  
   *occidentale*, 191.  
   *polifolium*, 190.  
   *ramuliflorum*, 190.  
   *rosmarinifolium*, 190.  
   *scoparium*, 191.  
*Helietta*, 370, 372.  
   *parvifolia*, 372.  
 HELLEBOREÆ, 2.  
*Helleborus*, 2, 42.  
   *foetidus*, 42.  
   *hyemalis*, 42.  
   *niger*, 42.  
   *trifolius*, 41.  
   *viridis*, 42.  
*Hepatica*, 1, 13.  
   *acuta*, 14.  
   *acutiloba*, 14.  
   *Americana*, 14.  
   *Hepatica*, 14.  
   *triloba*, 13.  
 Herb Robert, 361.  
 Herbemont, 428.  
 Hercules Club, 374.  
*Hermannia*, 339.  
   *pauciflora*, 340.  
   *Texana*, 339.  
 HERMANNIÆ, 339.  
*Herodium*, 362.  
*Hesperalcea*, 307.  
   *malachroides*, 307.  
*Hesperidanthus*, 174.  
*Hesperis*, 103, 142.  
   *Hookeri*, 145.  
   *matronalis*, 142.  
   *matronalis*, 174.  
   *Menziesii*, 152.  
   *minima*, 145.  
   *Pallasii*, 143, 145.  
   *pinnatifida*, 150.  
   *pygmæa*, 145.  
   *scapigera*, 152.  
*Hesperolinon*, 344, 348.  
*Heterodraba*, 106.  
   *unilateralis*, 106.  
*Heteromeris*, 189.  
   *cymosa*, 190.  
   *polifolia*, 190.  
*Heterothrix*, 178.  
 HIBISCEÆ, 297.  
*Hibiscus*, 297, 333.  
   *aculeatus*, 335.  
   *altheæfolius*, 333.  
   *aquaticus*, 336.  
   *Bancroftianus*, 333.  
   *biseptus*, 334.  
   *Californicus*, 335.  
   *cardiophyllus*, 334.  
   *Carolinianus*, 336.  
   *coccineus*, 336.  
   *Collinsiana*, 336, 337.  
   *Coulteri*, 334.  
   *clypeatus*, 333.  
   *denudatus*, 334.  
   *elatus*, 337.  
   *esulentus*, 337.  
   *Floridanus*, 333.  
   *furcellatus*, 335.  
   *grandiflorus*, 335.  
   *grandiflorus*, 335.  
   *hastatus*, 336.  
   *incanus*, 336.  
   *lævis*, 336.  
   *lasiocarpus*, 335.  
   *lasiocarpus*, 335.  
   *Manihot*, 337.  
   *militaris*, 336.  
   *Moscheutos*, 335.  
   *Moscheutos*, 335, 336.  
   *pallidus*, 336.  
   *palustris*, 335, 336.  
   *pentaspermus*, 333.  
   *Pæppigii*, 333.  
   *populneus*, 337.  
   *ribifolius*, 334.  
   *riparius*, 336.  
   *Rosa-Sinensis*, 336.  
   *roseus*, 336.  
   *scaber*, 335.  
   *semilobatus*, 336.  
   *smilacifolius*, 333.  
   *speciosus*, 336.  
   *spinifex*, 331.  
   *Syracus*, 334.  
   *tiliaceus*, 337.  
   *trionum*, 336.  
   *truncatus*, 333.  
   *tubiflorus*, 333.  
   *Virginicus*, 333, 336.  
*Hierophyllum Cassine*, 389.  
 High Mallow, 298.  
 HIPPOCASTANEÆ, 434.  
*Hippocastanum*, 446.  
*Hippocratea*, 396, 401.  
   *ovata*, 401.  
 HIPPOCRATEÆ, 396.  
*Hiræa*, 350, 351.  
   *macroptera*, 351.  
   *septentrionalis*, 351.  
*Hog Plum*, 381, 394.  
*Holacantha*, 377, 379.  
   *Emoryi*, 379.  
*Holly*, 388.  
*Holopetalum*, 188.  
*Holosteum*, 209, 228.  
   *succulentum*, 232.  
   *umbellatum*, 228.  
*Honkenya*, 238.  
   *oblongifolia*, 239.  
*Honkenya*, 238.  
   *peploides*, 238, 239.  
 Hop-tree, 372.  
 Horned Poppy, 90.  
 Horse-chestnut, 446.  
 Horse-radish, 146.  
*Horsfordia*, 296, 318.  
   *alata*, 318.  
   *Newberryi*, 318.  
*Hudsonia*, 189, 191, 474.  
   *ericoides*, 191.  
   *ericoides*, 191.  
   *montana*, 191, 474.  
   *Nuttallii*, 191.  
   *tomentosa*, 191.  
*Hunnemannia*, 84.  
 HUNNEMANNIÆ, 84.  
 Huntsman's Cup, 80.  
*Hutchinsia calycina*, 136.

*procumbens*, 131.  
*Hybanthus*, 205.  
*Hydrastis*, 3, 56.  
*Hydrastis*, 18.  
     *Canadensis*, 56.  
     *Canadensis*, 18.  
     *Carolinensis*, 18.  
*Hydropeltis*, 74.  
     *pulla*, 74.  
     *purpurea*, 74.  
*Hydrophyllum verum*, 56.  
*Hymenolobæ*, 131.  
*Hymenolobus*, 130.  
     *divaricatus*, 131.  
     *erectus*, 131.  
     *pubens*, 131.  
*Hypelate*, 434, 445.  
*Hypelate*, 445.  
     *paniculata*, 445.  
     *trifoliata*, 445.  
**HYPERICACEÆ**, 282.  
*Hypericum*, 283, 284.  
*Hypericum*, 283, 284.  
     *acutifolium*, 288.  
     *adpressum*, 287.  
     *adpressum*, 287.  
     *ambiguum*, 286.  
     *amœnum*, 286.  
     *anagalloides*, 289.  
     *anagalloides*, 290.  
     *angulosum*, 288.  
     *ascyroides*, 285, 286.  
     *Ascyron*, 284.  
     *aspathoides*, 286.  
     *aureum*, 286.  
     *axillare*, 286, 291.  
     *Bonaparteæ*, 287.  
     *boreale*, 290.  
     *bracteatum*, 289.  
     *Bucklei*, 285.  
     *Bucklei*, 286.  
     *campanulatum*, 291.  
     *Canadense*, 290.  
     *Canadense*, 290.  
     *cistifolium*, 287.  
     *cistifolium*, 287.  
     *concinnum*, 289.  
     *corymbosum*, 288.  
     *densiflorum*, 285.  
     *densiflorum*, 285.  
     *dolabriforme*, 287.  
     *Drummondii*, 290.  
     *elatum*, 284.  
     *ellipticum*, 287.  
     *emarginatum*, 291.  
     *fasciculatum*, 286.  
     *fasciculatum*, 285, 286.  
     *fastigiatum*, 287.  
     *formosum*, 289.  
     *formosum*, 289.  
     *frondosum*, 286.  
     *galioides*, 286.  
     *galioides*, 285, 286.  
     *gentianoides*, 291.  
     *glaucum*, 286.  
     *graveolens*, 289.  
     *gymnanthum*, 290.

*gymnanthum*, 290.  
*hedyotifolium*, 288.  
*Japonicum*, 289, 290.  
*Kalmianum*, 285.  
*Kalmianum*, 285.  
*Lasianthus*, 293.  
*lobocarpum*, 285.  
*lobocarpum*, 285, 286.  
*macrocarpum*, 285.  
*maculatum*, 288.  
*majus*, 290.  
*micranthum*, 288.  
*microsepalum*, 284.  
*microsepalum*, 283.  
*Moranense*, 290.  
*mutilum*, 289.  
*mutilum*, 289, 290.  
*myrtifolium*, 286.  
*nitidum*, 286.  
*nudicaule*, 290.  
*nudiflorum*, 287.  
*opacum*, 287.  
*paludosum*, 291.  
*parviflorum*, 289.  
*pauciflorum*, 290.  
*perforatum*, 288.  
*perforatum*, 289.  
*petiolatum*, 291.  
*pilosum*, 288.  
*procumbens*, 287.  
*prolificum*, 285.  
*prolificum*, 285, 286.  
*punctatum*, 288.  
*punctulosum*, 287.  
*pyramidatum*, 285.  
*quinquennervium*, 289.  
*rosmarinifolium*, 285, 286, [287].  
*Sarothra*, 291.  
*Scouleri*, 289.  
*sessiliflorum*, 286.  
*setosum*, 284, 288, 291.  
*simplex*, 288.  
*sphaerocarpon*, 287.  
*sphaerocarpon*, 287.  
*stellarioides*, 289.  
*tetrapetalum*, 284.  
*thesifolium*, 290.  
*triplinerve*, 284.  
*tubulosum*, 291.  
*virgatum*, 288.  
*Virginicum*, 291.  
*Virginicum*, 288.

*Iberis*, 123.

*Ice Plant*, 261.

*Idria*, 280.

*Ilex*, 388.

*estivalis*, 389.

*ambigua*, 389.

*ambigua*, 390.

*Amelanchier*, 390.

*Amelanchier*, 390.

*angustifolia*, 389.

*Canadensis*, 391.

*Caroliniana*, 389.

*Cassena*, 389.

*Cassine*, 388.

*Cassine*, 388, 389.

*cassinoides*, 389.

*coriacea*, 390.

*Dakoon*, 388, 389.

*decidua*, 389.

*decidua*, 391.

*delicatula*, 391.

*dubia*, 390.

*Floridana*, 389.

*glabra*, 390.

*laevigata*, 391.

*lanceolata*, 391.

*laurifolia*, 389.

*ligustrifolia*, 389.

*ligustrina*, 389.

*longipes*, 389.

*lucida*, 390.

*mollis*, 390.

*montana*, 390.

*monticola*, 390.

*monticola*, 390.

*Myrsinites*, 398.

*myrtifolia*, 389.

*opaca*, 388.

*prinoides*, 389.

*Prionites*, 389.

*quercifolia*, 388.

*ramulosa*, 389.

*religiosa*, 389.

*rosmarinifolia*, 389.

*verticillata*, 391.

*verticillata*, 391.

*vomitaria*, 389.

*Watsoniana*, 389.

*Illicium*, 391.

*mucronata*, 391.

*Illicium*, 58.

*Floridanum*, 59.

*parviflorum*, 59.

*Impatiens*, 358, 368.

*aurea*, 369.

*biflora*, 369.

*fulva*, 369.

*maculata*, 369.

*nolitangere*, 369.

*nolitangere*, 369.

*pallida*, 369.

*Indian Chickweed*, 257.

*Mallows*, 327.

*Physic*, 60.

*Ingenhouzia*, 297, 338.

*triloba*, 338.

*Inkberry*, 390.

*Iodanthus*, 104, 150.

*hesperidoides*, 150.

*linearifolius*, 174.

*pinnatifidus*, 150.

*Ionidium*, 195, 205, 475.

*concolor*, 204.

*fruticulosum*, 205.

*gracile*, 205.

*lineare*, 205.

*parietariæfolium*, 205.

*polygalæfolium*, 205, 475.

*riparium*, 205.

*Sprengelianum*, 204.

*stipulaceum*, 205.

- strictum*, 204.  
*Isomeris*, 180, 181.  
   *arborea*, 181.  
*Isophyllum*, 283, 284.  
   *Drummondii*, 284.  
*Isopyrum*, 2, 40.  
   *bitermum*, 40.  
   *Clarkei*, 41.  
   *Hallii*, 41.  
   *occidentale*, 40.  
   *stipitatum*, 41.  
   *thalictroides*, 40.  
   *trifolium*, 41.  
*Itea* *Cyrilla*, 393.  
  
*Jacksonia*, 182.  
*Jamaica Sumach*, 382.  
*Janusia*, 350, 351.  
   *Californica*, 351.  
   *gracilis*, 351.  
*Japanese Creeper*, 431.  
   *Ivy*, 431.  
*Jeffersonia*, 67, 71.  
   *Bartonia*, 72.  
   *binata*, 71.  
   *diphylla*, 71, 72.  
   *dubia*, 71.  
   *lobata*, 72.  
   *odorata*, 72.  
*Jewel-weed*, 368.  
*Jointed Charlock*, 132.  
*Juliana*, 372.  
  
*Kale*, 133.  
*Kallstroemia*, 353, 354.  
   *brachystylis*, 354.  
   *Californica*, 354.  
   *grandiflora*, 355.  
   *maxima*, 354.  
*Kampmannia fraxinifolia*, 374.  
*Karwinskia*, 402, 405.  
   *affinis*, 405.  
   *biniflora*, 405.  
   *glandulosa*, 405.  
   *Humboldtiana*, 405.  
*Ketmia*, 334.  
*Kitaibelia*, 295.  
*Kæberlinia*, 377, 379.  
   *spinosa*, 379.  
*Kohlrabi*, 133.  
*König*, 115.  
*König*, 115.  
   *maritima*, 115.  
*Kosteletzkya*, 297, 332.  
   *althæifolia*, 333.  
   *althæifolia*, 333.  
   *althæifolia*, 333.  
   *Coulteri*, 332.  
   *digitata*, 332.  
   *hastata*, 333.  
   *hispidula*, 332.  
   *palmata*, 332.  
   *paniculata*, 332.  
   *smilacifolia*, 333.  
   *Thurberi*, 332.  
   *Virginica*, 333.  
   *Virginica*, 333.  
  
*Krameria*, 449.  
*Kumlienia*, 22.  
   *Cooleyæ*, 23.  
   *hystericula*, 22.  
  
*Lacathea florida*, 293.  
*Lace-pod*, 114.  
*Lampetia*, 257.  
*Landukia*, 431.  
   *Landuk*, 431.  
*Larbrea*, 232.  
   *aquatica*, 232.  
   *uliginosa*, 234, 235.  
*Lardizabaleæ*, 66.  
*Larkspur*, 45.  
*Larrea*, 353, 355.  
   *divaricata*, 356.  
   *glutinosa*, 355.  
   *Mexicana*, 355.  
   *Mexicana*, 356.  
   *tridentata*, 356.  
*Lasianthus*, 293.  
*Laurel*, 59.  
*Laurus Winterana*, 206.  
*Lavatera*, 295, 299.  
   *acerifolia*, 299.  
   *assurgentiflora*, 299.  
   *insularis*, 300.  
   *occidentalis*, 300.  
   *trimestris*, 299.  
   *venosa*, 300.  
*Leather-flower*, 5.  
*Leather-leaf Grape*, 429.  
*Leavenworthia*, 104, 152.  
   *aurea*, 152.  
   *aurea*, 153.  
   *Michauxii*, 152.  
   *Michauxii*, 152.  
   *stylosa*, 152.  
   *torulosa*, 152.  
   *uniflora*, 152.  
*Lechea*, 189, 192, 474.  
   *divaricata*, 192.  
   *Drummondii*, 194.  
   *Drummondii*, 192.  
   *intermedia*, 193, 474.  
   *juniperina*, 474.  
   *Leggettii*, 193.  
   *major*, 192.  
   *major*, 190.  
   *maritima*, 192.  
   *minor*, 192.  
   *minor*, 192, 193.  
   *mucronata*, 192.  
   *Novæ Cesariæ*, 192.  
   *patula*, 194.  
   *racemulosa*, 193.  
   *racemulosa*, 194.  
   *stricta*, 193.  
   *stricta*, 474.  
   *tenuifolia*, 193.  
   *thesioides*, 193.  
   *thymifolia*, 192, 193.  
   *Torreyi*, 194.  
   *villosa*, 192.  
*Lechidium*, 192, 194.  
   *Drummondii*, 194.  
  
*Leea*, 420.  
*Lemon*, 376.  
*Leña Amarilla*, 69.  
*Le Noir*, 428.  
*Leontice thalictroides*, 70.  
   *triphylla*, 71.  
 LEPIDINEÆ, 100.  
*Lepidium*, 101, 124, 468.  
   *alyssoides*, 125.  
   *apetalum*, 127.  
   *bipinnatifidum*, 128.  
   *Californicum*, 127.  
   *campestre*, 126.  
   *corymbosum*, 125.  
   *dictyotum*, 129.  
   *didymum*, 130.  
   *Draba*, 124.  
   *flavum*, 125.  
   *Fremontii*, 126.  
   *heterophyllum*, 125.  
   *Iberis*, 126.  
   *incisum*, 127.  
   *integrifolium*, 125.  
   *integrifolium*, 125.  
   *intermedium*, 127.  
   *Jaredi*, 124.  
   *lasiocarpum*, 128.  
   *lasiocarpum*, 127.  
   *latipes*, 129.  
   *leiocarpum*, 128.  
   *majus*, 126.  
   *medium*, 127, 468.  
   *Menziesii*, 127, 468.  
   *Menziesii*, 128.  
   *micranthum*, 127.  
   *montanum*, 125.  
   *montanum*, 125.  
   *nanum*, 124.  
   *nitidum*, 128.  
   *occidentale*, 127.  
   *Oreganum*, 129.  
   *oxycarpum*, 129.  
   *oxycarpum*, 129.  
   *procumbens*, 131.  
   *ruderales*, 128.  
   *ruderales*, 127, 128.  
   *sativum*, 126.  
   *sativum*, 155.  
   *scopulorum*, 125.  
   *Smithii*, 126.  
   *sordidum*, 128.  
   *spatulatum*, 125.  
   *strictum*, 129, 468.  
   *triandrum*, 126.  
   *Utahense*, 126.  
   *Utahviense*, 125.  
   *Virginicum*, 126.  
   *Virginicum*, 127, 128.  
   *Wrightii*, 128.  
*Lepigonum*, 250.  
   *Chilense*, 253.  
   *gracile*, 251.  
   *macrothecum*, 253.  
   *marinum*, 252.  
   *medium*, 252.  
   *rubrum*, 250.  
   *salinum*, 252.

*tenue*, 251.  
*Leptrina*, 272.  
*autumnalis*, 281.  
*Lesquerella*, 100, 116.  
*Lesquerella*, 121.  
*alpina*, 117.  
*angustifolia*, 120.  
*arctica*, 120.  
*argyrea*, 120.  
*Arizonica*, 117.  
*auriculata*, 116.  
*Berlandieri*, 118.  
*cinerea*, 118.  
*densiflora*, 116.  
*Douglasii*, 118.  
*Engelmanni*, 120.  
*Fendleri*, 120.  
*globosa*, 118.  
*Gordonii*, 120.  
*gracilis*, 119.  
*grandiflora*, 116.  
*Kingii*, 117.  
*lasiocarpa*, 116.  
*Lescurii*, 116.  
*Lindheimeri*, 119.  
*Ludoviciana*, 118.  
*montana*, 117.  
*Nuttallii*, 119.  
*occidentalis*, 117.  
*pallida*, 119.  
*Palmeri*, 118.  
*purpurea*, 119.  
*recurvata*, 119.  
*repanda*, 119.  
*Wardii*, 118.  
*Lewisia*, 263, 266.  
*alba*, 267.  
*brachycalyx*, 267.  
*brachycalyx*, 267.  
*Columbiana*, 269.  
*Cotyledon*, 268.  
*Howellii*, 268.  
*Kelloggii*, 267.  
*Leana*, 269.  
*Nevadensis*, 268.  
*oppositifolia*, 268.  
*pygmæa*, 268.  
*rediviva*, 267.  
*triphylla*, 269.  
*Tweedyi*, 268.  
*Lignum-vitæ*, 356.  
*Lime*, 376.  
*Lime-tree*, 343.  
*LIMNANTHÆ*, 358.  
*Limnanthemum peltatum*, 74.  
*Limnanthes*, 363.  
*alba*, 364.  
*Douglasii*, 364.  
*grandiflorus*, 364.  
*Macounii*, 363.  
*pumila*, 364.  
*rosea*, 364.  
*sulphureus*, 364.  
*Limnia*, 272, 273.  
*alsinoides*, 273.  
*perfoliata*, 274.  
*Sibirica*, 273.

**LINACEÆ**, 344.  
*Linastrum*, 345.  
*Linden*, 343.  
*Linum*, 344.  
*adenophyllum*, 348.  
*annuum*, 347.  
*aristatum*, 347.  
*Berendieri*, 347.  
*Berlandieri*, 347.  
*Boottii*, 347.  
*Boottii*, 346.  
*Breweri*, 349.  
*Californicum*, 349.  
*catharticum*, 346.  
*Clevelandi*, 349.  
*congestum*, 349.  
*decurrens*, 345.  
*digynum*, 348.  
*drymarioides*, 348.  
*Floridanum*, 345.  
*Greggii*, 346.  
*hudsonioides*, 348.  
*humile*, 345.  
*Kingii*, 346.  
*Lewisii*, 345.  
*Lyallianum*, 345.  
*micranthum*, 349.  
*multicaule*, 348.  
*Neo-Mexicanum*, 346.  
*perenne*, 345.  
*rigidum*, 347.  
*rigidum*, 348.  
*rupestre*, 346.  
*San Sabeanum*, 194.  
*Schiedeanum*, 346.  
*Sibiricum*, 345.  
*simplex*, 346.  
*spergulinum*, 349.  
*striatum*, 346.  
*sulcatum*, 347.  
*trispalum*, 191.  
*usitatissimum*, 345.  
*usitatissimum*, 345.  
*Virginianum*, 345.  
*Virginianum*, 345, 346.  
*Liriodendron*, 58, 61.  
*Tulipifera*, 61.  
*Lithræa*, 381.  
*laurina*, 383.  
*Liverleaf*, 13.  
*Lobadium*, 383, 384, 385.  
*amentaceum*, 386.  
*Loblolly Bay*, 292, 293.  
*Lobularia*, 100, 115.  
*maritima*, 115.  
*Lœflingia*, 210, 255.  
*pusilla*, 255.  
*squarrosa*, 255.  
*squarrosa*, 255.  
*Texana*, 255.  
*Lychnis*, 209, 224, 228.  
*Lychnis*, 213.  
*acaulis*, 216.  
*affinis*, 226.  
*Ajanensis*, 226.  
*alba*, 227.  
*alpina*, 227.

*apetala*, 226.  
*apetala*, 225, 226.  
*Californica*, 222.  
*Chalcedonica*, 227.  
*coronaria*, 227.  
*dioica*, 227.  
*dioica*, 227.  
*diurna*, 227.  
*Drummondii*, 225.  
*elata*, 223, 224.  
*Flos-cuculi*, 227.  
*frigida*, 226.  
*Githago*, 228.  
*Kingii*, 226.  
*Kingii*, 226.  
*montana*, 226.  
*montana*, 226.  
*nuda*, 220.  
*Parryi*, 222.  
*pauciflora*, 225.  
*pulchra*, 218.  
*Suecica*, 227.  
*Tayloræ*, 225.  
*triflora*, 225.  
*triflora*, 226.  
*vespertina*, 227.  
*Lyrocarpa*, 100, 122.  
*Lyrocarpa*, 121.  
*Coulteri*, 122.  
*Palmeri*, 122.  
*Lytopleura*, 75.  
*Macrobotrys*, 54.  
*Macropodium laciniatum*, 177.  
*Macrothyrsus*, 446, 448.  
*Macrotrys*, 54.  
*actæoides*, 54.  
*Macrotrys*, 54.  
*Magnolia*, 58, 59, 464.  
*acuminata*, 61, 464.  
*acuminata*, 61.  
*auricularis*, 60.  
*auriculata*, 60.  
*conspicua*, 59.  
*cordata*, 61.  
*fœtida*, 59.  
*fragrans*, 60.  
*Fraseri*, 60.  
*frondosa*, 61.  
*fuscata*, 59.  
*glauca*, 59, 464.  
*glauca*, 60.  
*grandiflora*, 59.  
*longifolia*, 60.  
*macrophylla*, 60.  
*obovata*, 59.  
*purpurea*, 59.  
*pyramidata*, 60.  
*tripetala*, 60.  
*Umbrella*, 60, 464.  
*Virginia*, 61, 464.  
*Virginiana*, 59, 60, 464.  
**MAGNOLIACEÆ**, 57, 464.  
**MAGNOLIÆ**, 58.  
*Mahogany*, 387.  
*Mahogany-tree*, 387.  
*Mahonia*, 68.

- Aquifolium*, 69, 70.  
*fascicularis*, 69.  
*glumacea*, 70.  
*nervosa*, 70.  
*trifolia*, 68.  
**Maiden Pink**, 211.  
*Malache scabra*, 331.  
*Malachia*, 232.  
   *aquatica*, 232.  
*Malachium aquaticum*, 232.  
*Malachodendron*, 292.  
   *ovatum*, 292.  
   *pentagynum*, 292.  
**Malachra**, 296, 330.  
   *alceaefolia*, 330.  
   *alceifolia*, 330.  
   *capitata*, 330.  
   *capitata*, 330.  
   *Mexicana*, 331.  
   *palmata*, 330.  
   *rotundifolia*, 330.  
   *triloba*, 330.  
   *urens*, 330.  
*Malacodendron*, 292.  
**Mallow**, 297.  
*Malope malacoides*, 295.  
**MALOPEÆ**, 295.  
*Malosma*, 383.  
**Malpighia**, 350, 351.  
   *glabra*, 351.  
   *lucida*, 350.  
**MALPIGHIACEÆ**, 350.  
**Malva**, 295, 297.  
   *abutiloides*, 333.  
   *acerifolia*, 317.  
   *Alcea*, 298.  
   *Alcea*, 298.  
   *Americana*, 309.  
   *angustifolia*, 316.  
   *aurantiaca*, 310.  
   *borealis*, 298, 299.  
   *Californica*, 321.  
   *Caroliniana*, 318.  
   *coccinea*, 313.  
   *corchorifolia*, 309.  
   *Coromandeliana*, 309.  
   *Creeana*, 314.  
   *crispa*, 298.  
   *digitata*, 301.  
   *Domingensis*, 309.  
   *fasciculata*, 312.  
   *hederacea*, 321.  
   *Houghtonii*, 300.  
   *involuta*, 301.  
   *LeContii*, 331.  
   *Lindheimeriana*, 309.  
   *lineariloba*, 301.  
   *malachroides*, 307.  
   *moschata*, 298.  
   *moschata*, 298.  
   *Munroana*, 315.  
   *Niceënsis*, 299.  
   *Nuttaloides*, 301.  
   *obtusata*, 298.  
   *ovata*, 309.  
   *Papaver*, 301.  
   *parviflora*, 298.  
   *parviflora*, 298.  
   *pedata*, 301.  
   *plicata*, 321.  
   *polystachya*, 309.  
   *pusilla*, 298.  
   *rivularis*, 317.  
   *rotundifolia*, 298.  
   *rotundifolia*, 298.  
   *scoparia*, 309.  
   *spicata*, 309.  
   *subastata*, 309.  
   *sylvestris*, 298.  
   *triangulata*, 300.  
   *tricuspidata*, 309.  
   *verticillata*, 298.  
**MALVACEÆ**, 294.  
**Malvastrum**, 296, 308.  
   *aboriginum*, 311.  
   *Americanum*, 309.  
   *angustum*, 308.  
   *arcuatum*, 311.  
   *aurantiacum*, 310.  
   *calycinum*, 317.  
   *carpinifolium*, 309.  
   *coccineum*, 313.  
   *coccineum*, 314.  
   *coromandelianum*, 309.  
   *Coulteri*, 313.  
   *Davidsonii*, 312.  
   *densiflorum*, 310.  
   *exile*, 308.  
   *fasciculatum*, 312.  
   *foliosum*, 311.  
   *Fremontii*, 311.  
   *Fremontii*, 312.  
   *grossularicefolium*, 314.  
   *involutum*, 310.  
   *leptophyllum*, 310.  
   *Lindheimerianum*, 309.  
   *linearifolium*, 323.  
   *marrubioides*, 311.  
   *marrubioides*, 311.  
   *Munroanum*, 315.  
   *nesioticum*, 312.  
   *orbiculatum*, 313.  
   *Palmeri*, 310.  
   *Parryi*, 308.  
   *pedatifidum*, 314.  
   *rotundifolium*, 308.  
   *Rugelii*, 309.  
   *scoparium*, 309.  
   *spicatum*, 309.  
   *splendidum*, 312.  
   *Thurberi*, 312.  
   *Thurberi*, 312.  
   *tricuspidatum*, 309.  
   *Wrightii*, 309.  
*Malvaviscoides*, 333.  
*Malvaviscus*, 297, 332.  
*Malvaviscus*, 331, 337.  
   *Drummondii*, 332.  
   *Floridanus*, 334.  
   *mollis*, 332.  
   *pilosus*, 334.  
**MALVÆ**, 295.  
*Malveopsis*, 308.  
   *Americana*, 309.  
   *arcuata*, 311.  
   *aurantiaca*, 310.  
   *coccinea*, 313.  
   *Coulteri*, 313.  
   *exilis*, 308.  
   *fasciculata*, 312.  
   *Fremontii*, 311.  
   *hispida*, 309.  
   *leptophylla*, 310.  
   *marrubioides*, 311.  
   *multiflorum*, 313.  
   *Munroana*, 315.  
   *rotundifolia*, 308.  
   *spicata*, 309.  
   *splendida*, 312.  
*Malvinda*, 323.  
   *unicornis*, 324.  
**Mandrake**, 72.  
**Mango**, 381.  
*Manihot*, 336.  
**Maple**, 435.  
*Marcovella colubrina*, 418.  
**Marsh Mallow**, 299.  
   *Marigold*, 39.  
**Mastic-tree**, 380.  
**May-apple**, 72.  
**Maytenus**, 395, 398.  
   *phyllanthoides*, 398.  
**Meadow-rue**, 14.  
*Meconella*, 84, 85.  
   *Californica*, 85.  
   *denticulata*, 85.  
   *Oregana*, 85.  
**Meconopsis**, 83, 89.  
   *crassifolia*, 89.  
   *diphylla*, 89.  
   *heterophylla*, 89.  
   *petiolata*, 89.  
**Melandrium**, 213, 225.  
   *affine*, 226.  
   *rubrum*, 227.  
   *silvestre*, 227.  
   *triflorum*, 225.  
**Melandryum**, 213, 214, 224, 225.  
   *album*, 227.  
   *apetalum*, 226.  
   *Baldwini*, 216.  
   *Bolanderi*, 218.  
   *Californicum*, 218.  
   *Greggii*, 218.  
   *Hookeri*, 218.  
   *Illinoense*, 217.  
   *involutum*, 226.  
   *laciniatum*, 218.  
   *Pennsylvanicum*, 217.  
   *regium*, 217.  
   *rotundifolium*, 217.  
   *Wrightii*, 218.  
**Melia**, 387.  
   *Azedarach*, 387.  
   *Azedarach*, 444.  
**MELIACEÆ**, 387.  
*Melicocca*, 445.  
   *paniculata*, 445.  
*Meliphlea*, 313.  
*Melochia*, 339, 340.  
   *corchorifolia*, 341.

- crenata*, 340.  
*hirsuta*, 340.  
*hirsuta*, 340, 341.  
*pyramidata*, 340.  
*serrata*, 309, 340.  
*tomentosa*, 340.  
**MENISPERMACEÆ**, 64, 465.  
*Menispermum*, 65, 465  
   *angulatum*, 66.  
   *Canadense*, 66, 465.  
   *Carolinianum*, 65.  
   *Carolinum*, 65.  
   *Lyoni*, 66.  
   *smilacinum*, 66.  
   *Virginicum*, 65.  
*Menyanthes nymphoides*, 74.  
   *peltata*, 74.  
*Merckia*, 238, 239.  
   *physodes*, 239.  
*Merimea Texana*, 282.  
*Merkia*, 238, 239.  
*Mesembrianthemum*, 260.  
**MESEMBRYANTHEÆ**, 257.  
*Mesembryanthemum*, 257.  
*Mesembryanthemum*, 260.  
   *aquilaterale*, 261.  
   *apetalum*, 261.  
   *coccineum*, 261.  
   *copticum*, 261.  
   *cordifolium*, 261.  
   *crystallinum*, 261.  
   *dimidiatum*, 261.  
   *nodiflorum*, 261.  
   *stenum*, 261.  
*Metopium*, 381, 382.  
   *Linnei*, 382.  
*Mexican Buckeye*, 445.  
*Michauxia sessilis*, 293.  
*Micropetalon*, 232.  
   *gramineum*, 233.  
   *lanceolatum*, 235.  
   *lanuginosum*, 240.  
   *longifolia*, 233.  
*Microrhamnus*, 402, 404.  
   *ericoides*, 404.  
*Mignonette*, 188.  
*Milkwort*, 449.  
*Minuartia*, 238.  
*Modiola*, 296, 318.  
   *Caroliniana*, 318.  
   *multifida*, 318.  
*Mœhringia*, 238.  
   *lateriflora*, 238.  
   *macrophylla*, 238.  
   *umbrosa*, 240.  
**MOLLUGINEÆ**, 256.  
*Mollugo*, 256, 257.  
*Mollugo*, 257, 258.  
   *arenaria*, 257.  
   *Cambessedesii*, 254.  
   *Cerviana*, 257.  
   *glinoides*, 258.  
   *maritima*, 260.  
   *radiata*, 258.  
   *verticillata*, 257.  
   *verticillata*, 254.  
*Monkshood*, 52.  
*Monnina*, 449, 460.  
   *Wrightii*, 460.  
*Monocosmia*, 278.  
*Monteverdia*, 398.  
*Montia*, 263, 272.  
*Montia*, 270, 277.  
   *arenicola*, 274.  
   *asarifolia*, 273.  
   *bulbifera*, 273.  
   *Chamissonis*, 275.  
   *dichotoma*, 276.  
   *diffusa*, 276.  
   *flagellaris*, 276.  
   *fontana*, 277.  
   *gypsophiloides*, 275.  
   *gypsophiloides*, 274.  
   *Halli*, 277.  
   *Howellii*, 276.  
   *lamprosperma*, 277.  
   *linearis*, 276.  
   *minor*, 277.  
   *parviflora*, 274.  
   *parvifolia*, 275.  
   *perfoliata*, 274.  
   *rivularis*, 277.  
   *rubra*, 275.  
   *sarmentosa*, 272.  
   *saxosa*, 274.  
   *Sibirica*, 273.  
   *spatululata*, 275.  
   *tenifolia*, 275.  
*Montiastrum*, 276.  
*Moonseed*, 65.  
*Moosewood*, 436.  
*Mortonia*, 396, 400.  
   *effusa*, 400.  
   *Greggii*, 400.  
   *Palmeri*, 400.  
   *scabrella*, 400.  
   *sempervirens*, 400.  
*Moss Champion*, 215.  
*Mougeotia hirsuta*, 340.  
*Mountain Grape*, 421, 425  
   *Holly*, 391.  
   *Maple*, 435.  
   *Plum*, 394.  
*Mouse-ear Chickweed*, 228, 229.  
   *Cress*, 140.  
*Mousetail*, 19.  
*Mullein Pink*, 227.  
*Muscadine Grape*, 420.  
*Muscadinia*, 420.  
*Musk Mallow*, 298.  
   *Rose*, 298.  
*Mustang Grape*, 421, 428.  
*Myagræum argenteum*, 118.  
   *paniculatum*, 132.  
*Mycinda*, 399.  
*Myginda*, 399.  
   *aquifolia*, 399.  
   *ilicifolia*, 399.  
   *integrifolia*, 399, 404.  
   *latifolia*, 399.  
   *myrtifolia*, 398.  
   *pallens*, 399.  
   *Rhacoma*, 399.  
*Mylocarium*, 393.  
*Mylocaryum*, 393.  
   *ligustrinum*, 393.  
*Myosoton*, 232.  
*Myosuron*, 19.  
*Myosurus*, 2, 19, 462.  
   *alopecuroides*, 20.  
   *apetalus*, 19, 462.  
   *aristatus*, 19.  
   *australis*, 19.  
   *breviscapus*, 19.  
   *cupulatus*, 20.  
   *minimus*, 19, 462.  
   *minimus*, 19, 20.  
   *sessilis*, 19.  
   *Shortii*, 19.  
*Myriandra brachyphylla*, 286.  
   *galioides*, 286.  
   *glauca*, 286.  
   *ledifolia*, 285.  
   *Michauxii*, 286.  
   *nitida*, 286.  
   *spatululata*, 285.  
*Naiocrene*, 275.  
*Nankin Cotton*, 338.  
*Napæa*, 295, 307.  
   *dioica*, 308.  
   *hermaphrodita*, 307, 322.  
   *lævis*, 322.  
   *scabra*, 308.  
*Nasturtium*, 103, 146, 363, 470.  
   *amphibium*, 147.  
   *Armoracia*, 146.  
   *brevipes*, 149.  
   *calycinum*, 147.  
   *cernuum*, 148.  
   *curvisiliqua*, 148, 470.  
   *dictyotum*, 149.  
   *hispidum*, 148.  
   *lacustre*, 146, 470.  
   *limosum*, 149.  
   *linifolium*, 138.  
   *lyratum*, 148.  
   *Menziesii*, 139.  
   *Mexicanum*, 149.  
   *micropetalum*, 149.  
   *multifidum*, 139.  
   *natans*, 146.  
   *obtusum*, 148, 470.  
   *occidentale*, 148.  
   *officinale*, 146.  
   *officinale*, 157.  
   *palustre*, 147, 149.  
   *polymorphum*, 148.  
   *pumilum*, 138.  
   *sessiliflorum*, 149, 470.  
   *sinuatum*, 147, 470.  
   *sinuatum*, 148.  
   *spherocharpum*, 148.  
   *stylosum*, 157.  
   *sylvestre*, 147, 470.  
   *tanacetifolium*, 148, 470.  
   *tanacetifolium*, 149.  
   *terrestre*, 147.  
   *trachycarpum*, 147.  
   *Walteri*, 149.  
*Nectris*, 74.

- aquatica*, 74.  
*peltata*, 74.  
*pinnata*, 363.  
*Negundium*, 440.  
*fraxinifolium*, 440.  
*Negundo*, 435, 440.  
*aceroides*, 440, 441.  
*Californicum*, 441.  
*lobatum*, 440.  
*Mexicanum*, 441.  
*Negundo*, 440.  
*trifoliatum*, 440.  
*Nelumbium*, 73, 74.  
*codophyllum*, 75.  
*Jamaicense*, 75.  
*luteum*, 75.  
*pentapetalum*, 75.  
*reniforme*, 75.  
*speciosum*, 75.  
*Nelumbo*, 73, 74.  
*lutea*, 75.  
*nucifera*, 74, 75.  
**NELUMBONÆ**, 73.  
*Nemallosis*, 257.  
*Nemopanthus*, 391.  
*ambigua*, 390.  
*Canadensis*, 391.  
*fascicularis*, 391.  
*Nemopanthus*, 388, 391.  
*fascicularis*, 391.  
*Neobeckia aquatica*, 470.  
*Nephropetalum*, 339, 341.  
*Pringlei*, 341.  
*Neslia*, 101, 131.  
*paniculata*, 131.  
*Neurolooma nudicaule*, 152.  
*scapigerum*, 152.  
*New Jersey Tea*, 409.  
*New Zealand Spinach*, 260.  
*Noisetia acuminata*, 204.  
*Norway Maple*, 435.  
*Nuphar*, 73, 77, 465.  
*advena*, 77, 465.  
*advena*, 77.  
*advena* × *Kalmiana*, 78.  
*Americanum*, 78.  
*Fletcheri*, 78.  
*Kalmiana*, 78.  
*longifolia*, 79.  
*lutea*, 78.  
*luteum*, 77, 78.  
*minimum*, 78.  
*polysepalum*, 77.  
*pumilum*, 78.  
*rubrodiscum*, 78.  
*sagittæfolium*, 78.  
*sagittifolium*, 79.  
*Nuttallia*, 300, 391.  
*Canadensis*, 391.  
*cordata*, 301.  
*cordifolia*, 300.  
*digitata*, 301.  
*grandiflora*, 301.  
*involuta*, 301.  
*malvaeflora*, 305.  
*Munroana*, 315.  
*palmata*, 301.  
*Papaver*, 301.  
*pedata*, 301, 302.  
*triangulata*, 300.  
*Nymphæa*, 73, 75, 465.  
*Nymphæa*, 77.  
*advena*, 77, 78.  
*alba*, 76.  
*ampla*, 75.  
*arifolia*, 78.  
*elegans*, 75, 465.  
*flava*, 76.  
*flava*, 465.  
*Kalmiana*, 78.  
*Leibergi*, 76.  
*longifolia*, 79.  
*lutea*, 78.  
*Mexicana*, 75, 77, 465.  
*microphylla*, 78.  
*Nelumbo*, 75.  
*odorata*, 76.  
*odorata*, 76.  
*pentapetala*, 75.  
*polysepalum*, 77.  
*pygmæa*, 76.  
*reniformis*, 76, 465.  
*reniformis*, 75, 76.  
*rosea*, 76.  
*rubrodisca*, 78.  
*sagittata*, 79.  
*sagittifolia*, 79.  
*tetragona*, 76.  
*tuberosa*, 76.  
*tussilagifolia*, 77.  
**NYMPHÆACEÆ**, 72, 465.  
**NYMPHÆACEÆ**, 73.  
*Nymphosanthus*, 77.  
*Odostemon*, 68.  
*Oenoplea*, 404.  
*Oenoplia*, 404.  
*Ohio Buckeye*, 446.  
*Okra*, 337.  
**OLACINÆ**, 393.  
*Oligomeris*, 188.  
*dispersa*, 188.  
*glaucescens*, 188.  
*subulata*, 188.  
*Opium Poppy*, 88.  
*Orange*, 376.  
*Orchidocarpum*, 63.  
*arietinum*, 63.  
*grandiflorum*, 63, 464.  
*parviflorum*, 63.  
*pygmæum*, 64.  
*Oreas involucreta*, 135.  
*Oregon Grape*, 69.  
*Orebroma*, 267.  
*Columbiana*, 269.  
*Cotyledon*, 268.  
*Howellii*, 268.  
*Leana*, 269.  
*Nevadensis*, 268.  
*oppositifolia*, 268.  
*pygmæa*, 268.  
*tryphylla*, 269.  
*Tweedii*, 268.  
*Oreophila*, 397.  
*myrtifolia*, 398.  
*Orthodon*, 229.  
*Orthopetalum*, 332.  
*Orthopolygala*, 453.  
**OXALIDÆ**, 358.  
*Oxalis*, 358, 364.  
*Acetosella*, 367.  
*Acetosella*, 367.  
*ambigua*, 366.  
*Americana*, 367.  
*Berlandieri*, 364.  
*cernua*, 368.  
*cespitosa*, 366.  
*corniculata*, 365.  
*corniculata*, 365, 366.  
*cymosa*, 366.  
*decaphylla*, 368.  
*dichondraefolia*, 364.  
*Dillenii*, 365.  
*divergens*, 368.  
*Drummondii*, 368.  
*florida*, 366.  
*furcata*, 365.  
*grandis*, 366.  
*latifolia*, 368.  
*longiflora*, 367.  
*Ljoni*, 366.  
*macrantha*, 366.  
*Martiana*, 367.  
*microphylla*, 366.  
*Oregana*, 367.  
*Oregana*, 367.  
*pilosa*, 366.  
*pumila*, 366.  
*pusilla*, 365.  
*recurva*, 366.  
*recurva*, 366.  
*stricta*, 366.  
*stricta*, 365, 366.  
*Suksdorfii*, 366.  
*trilliifolia*, 367.  
*tropeoloides*, 365.  
*vespertilionis*, 368.  
*violacea*, 367.  
*violacea*, 368.  
*Wrightii*, 365.  
*Oxygraphis*, 20, 22.  
*Andersoni*, 22.  
*Oxystylis*, 181, 186.  
*lutea*, 186.  
*Pachistima*, 395, 397.  
*Canbyi*, 398.  
*Myrsinites*, 397.  
*Pachypodium*, 137, 174.  
*integrifolium*, 176.  
*laciniatum*, 177.  
*linearifolium*, 174.  
*sagittatum*, 175.  
*Pachyrrhiza*, 267.  
*Pachystima*, 397.  
*Pæonia*, 3, 56.  
*Brownii*, 56.  
*Californica*, 56.  
**PÆONIÆ**, 3.  
*Pæony*, 56.  
*Pale Touch-me-not*, 369.

- Paliurus Texanus*, 403.  
 Pansy, 204.  
 Papaver, 83, 88.  
     *alpinum*, 89.  
     *Argemone*, 88.  
     *Californicum*, 88.  
     *crassifolium*, 89.  
     *dubium*, 88.  
     *heterophyllum*, 89.  
     *Lemmoni*, 88, 89.  
     *microcarpum*, 89.  
     *nudicaule*, 89.  
     *nudicaule*, 89.  
     *Rhœas*, 88.  
     *somniferum*, 88.  
 PAPAVERACEÆ, 82, 466.  
 PAPAVEREÆ, 82.  
 Papaw, 62, 63.  
 Papulosa, 261.  
 Paradise-tree, 378.  
 Paritium, 337.  
     *tiliaceum*, 337.  
 Parrasia, 142.  
     *camporum*, 142.  
     *linearifolia*, 142.  
 Parrya, 104, 151.  
 Parrya, 140, 151.  
     *arctica*, 151.  
     *arenicola*, 136.  
     *macrocarpa*, 151.  
     *Menziesii*, 152.  
     *nudicaulis*, 152.  
 Parthenocissus, 431.  
     *quinquefolia*, 431.  
     *vitacea*, 431.  
 Paulinia, 432, 442.  
 Pavia, 446, 447.  
     *atropurpurea*, 447.  
     *bicolor*, 447.  
     *Californica*, 448.  
     *carnea*, 446.  
     *discolor*, 447.  
     *flava*, 447.  
     *fulva*, 447.  
     *glabra*, 446.  
     *humilis*, 447.  
     *hybrida*, 447.  
     *intermedia*, 447.  
     *Lindleyana*, 447.  
     *livida*, 447.  
     *lucida*, 447.  
     *Michauxii*, 447.  
     *mutabilis*, 447.  
     *neglecta*, 447.  
     *Ohioensis*, 446.  
     *pallida*, 446.  
     *rubicunda*, 446.  
     *versicolor*, 447.  
     *Watsoniana*, 446.  
     *Willdenowiana*, 447.  
 Paviana flava, 447.  
 Pavonia, 297, 331.  
     *Drummondii*, 332.  
     *hastata*, 331.  
     *Jonesii*, 331.  
     *lasiopetala*, 331.  
     *LeContii*, 331.  
     *racemosa*, 331.  
     *spicata*, 331.  
     *spinifex*, 331.  
     *Virginica*, 333.  
     *Wrightii*, 331.  
 Pearlwort, 247.  
 Pedunculosa, 308.  
 Peganum, 352, 353, 355.  
     *Harmala*, 355.  
     *Mexicanum*, 355.  
 PELARGONIEÆ, 357.  
 Pelargonium, 357, 363.  
     *anceps*, 363.  
 Penny Cress, 123.  
 Pentagonocarpus, 332.  
 Pentaspermum  
     *althæefolium*, 333.  
     *smilacifolium*, 333.  
 Peplis Americana, 281.  
 Peppergrass, 124, 126.  
 Pepper-root, 153.  
 Pepper-tree, 381.  
 Pepper-wood, 374.  
 Perjonon ferrugineum, 418.  
     *laurifolium*, 408.  
 Peritoma, 183.  
     *aurea*, 184.  
     *integrifolia*, 183.  
     *serrulatum*, 183.  
 Pharnaceum Cerviana, 258.  
     *maritimum*, 260.  
 Pheasant's-eye, 18.  
 Phemeranthus, 266.  
     *teretifolius*, 266.  
 Philetaria, 280.  
 Phœnicaulis, 152.  
     *cheiranthoides*, 152.  
     *Menziesii*, 152.  
 Phœnicodelphis, 51.  
 Physa, 258.  
 Physaria, 100, 121, 468.  
 Physaria, 116, 118.  
     *didymocarpa*, 121, 468.  
     *didymocarpa*, 468.  
     *Geyeri*, 121.  
     *montana*, 117.  
     *Newberryi*, 121, 468.  
     *Oregona*, 121.  
 PHYSARIEÆ, 100.  
 Physelytron, 442.  
 Picramnia, 377, 379.  
     *pentandra*, 379.  
 PICRAMNIEÆ, 377.  
 Picrella, 372.  
 Pigeon Grape, 427.  
 Pine-wood Grape, 428.  
 Pink, 211.  
 Pinweed, 192.  
 Pistacia Mexicana, 381, 386.  
     *Simaruba*, 380.  
 Pistacioides, 386.  
 Pitavia, 375.  
     *dumosa*, 375.  
 Pitcher-plant, 79.  
 Pityrosperma, 54.  
 Plagiorhegma dubium, 71.  
 Platypetalum, 140.  
     *dubium*, 140.  
     *purpurascens*, 140.  
 Platyspermum, 104, 151.  
     *scapigerum*, 151.  
 Platystemon, 82, 84.  
 Platystemon, 85.  
     *Californicus*, 84.  
     *Californicus*, 84.  
     *crinitus*, 84.  
     *denticulatus*, 85.  
     *leiocarpus*, 84.  
     *linearis*, 85.  
     *Oreganus*, 85.  
     *Torreyi*, 85.  
 PLATYSTEMONÆ, 82.  
 Platystigma, 82, 84.  
     *Californicum*, 85.  
     *denticulatum*, 85.  
     *lineare*, 85.  
     *Oreganum*, 85.  
 Podophyllum, 67, 72.  
     *callicarpum*, 72.  
     *diphyllum*, 72.  
     *montanum*, 72.  
     *peltatum*, 72.  
 Poison Bay, 59.  
     *Dogwood*, 383.  
     *Elder*, 383.  
     *Ivy*, 382.  
     *Oak*, 382, 383.  
     *Sumach*, 383.  
     *Vines*, 382.  
 Poison-wood, 382.  
 Polanisia, 180, 182.  
     *graveolens*, 182.  
     *tenuifolia*, 182.  
     *trachysperma*, 182.  
     *uniglandulosa*, 182.  
     *uniglandulosa*, 182.  
     *viscosa*, 182.  
 Polycarpa, 254.  
 Polycarpæa, 255.  
 POLYCARPÆÆ, 210.  
 Polycarpon, 210, 254.  
     *depressum*, 255.  
     *stipulicidum*, 255.  
     *tetraphyllum*, 254.  
     *uniflorum*, 240, 254.  
 Polygala, 449.  
     *acanthoclada*, 452.  
     *acutifolia*, 459.  
     *alba*, 455.  
     *alba*, 454, 455.  
     *ambigua*, 456, 457.  
     *Americana*, 449.  
     *Arizona*, 451.  
     *Arizona*, 452.  
     *attenuata*, 458, 459.  
     *Balduini*, 459.  
     *Baldwini*, 459.  
     *Baldwini*, 459.  
     *bicolor*, 454, 455.  
     *Boykinii*, 454.  
     *Boykinii*, 454, 455.  
     *brevifolia*, 458.  
     *buxifolia*, 450.  
     *Californica*, 452.



*Californica*, 452.  
*Chapmanii*, 456.  
*cornuta*, 452.  
*corymbosa*, 459.  
*cruciata*, 458.  
*cruciata*, 458.  
*cucullata*, 449, 452.  
*Curtissii*, 456.  
*cuspidata*, 458.  
*cymosa*, 459.  
*cymosa*, 459.  
*fastigiata*, 457.  
*Fishie*, 452.  
*flabellata*, 451.  
*gramineifolia*, 459.  
*grandiflora*, 450.  
*grandiflora*, 450.  
*hemipterocarpa*, 453.  
*Hookeri*, 457.  
*incarnata*, 455.  
*leptocaulis*, 455.  
*leptostachys*, 456.  
*Lindheimeri*, 451.  
*Lindheimeri*, 451.  
*lutea*, 459.  
*lutea*, 458.  
*macradenia*, 450.  
*Mariana*, 457.  
*Muhlenbergii*, 450.  
*myrtilloides*, 450.  
*nana*, 458.  
*Nutkana*, 449.  
*Nutkana*, 452.  
*Nuttallii*, 457.  
*Nuttallii*, 457.  
*ovalifolia*, 450.  
*ovatifolia*, 450.  
*paludosa*, 455.  
*paniculata*, 455.  
*paucifolia*, 453.  
*polygama*, 453.  
*præterversa*, 454.  
*Pseudosenege*, 459.  
*puberula*, 450.  
*pubescens*, 450.  
*pubescens rosea*, 450.  
*purpurea*, 453, 457.  
*ramosa*, 459.  
*Reynoldsæ*, 459.  
*rubella*, 454.  
*Rugelii*, 459.  
*Rusbyi*, 451.  
*sanguinea*, 457.  
*sanguinea*, 457.  
*scoparia*, 453.  
*scoparioides*, 453.  
*Senega*, 454.  
*Senega*, 450, 454.  
*setacea*, 456.  
*subalata*, 455.  
*subspinosa*, 452.  
*Texensis*, 451.  
*Torreyi*, 457.  
*Tweedyi*, 451.  
*uniflora*, 453.  
*verticillata*, 456.  
*viridescens*, 457, 458.

## POLYGALACEÆ, 448.

Poplar, 61.  
 Poppy, 88.  
*Porcelia grandiflora*, 63, 464.  
*parviflora*, 62, 63.  
*pygmaea*, 64.  
*triloba*, 63.  
*Portieria*, 356.  
*angustifolia*, 356.  
*Portulaca*, 262, 263.  
*coronata*, 264.  
*foliosa*, 264.  
*grandiflora*, 264.  
*halimoides*, 264.  
*halimoides*, 264.  
*lauceolata*, 263.  
*oleracea*, 263.  
*oleracea*, 264.  
*paniculata*, 265.  
*parvula*, 264.  
*pilosa*, 264.  
*pilosa*, 264.  
*Portulacastrum*, 259.  
*retusa*, 263.  
*stelliformis*, 264.  
*suffrutescens*, 264.  
 PORTULACACEÆ, 262.  
 Possum Grape, 424.  
 Post-oak Grape, 428.  
*Potamoipithys*, 281.  
 Poverty Grass, 191.  
*Preonanthus*, 9.  
 Prickly Ash, 373.  
 Poppy, 87.  
 Pride of India, 387.  
*Prinoides*, 389.  
*Prinos*, 390.  
*ambiguus*, 390.  
*atomarius*, 390.  
*confertus*, 391.  
*coriaceus*, 390.  
*deciduus*, 389.  
*dubius*, 390.  
*glaber*, 390.  
*Gronovii*, 391.  
*integrifolius*, 391.  
*levigatus*, 391.  
*lanceolata*, 391.  
*longipes*, 391.  
*lucidus*, 390.  
*padifolius*, 391.  
*verticillatus*, 391.  
*Pseudagrostemma*, 227.  
*Pseudaphanostemma*, 22.  
*Pseudarabis*, 159.  
*Pseudoarabis*, 159.  
*Pseudo-Malvastrum*, 321.  
*Pseudo-Napaea*, 322.  
*Psilonema*, 115.  
*Ptelea*, 370, 372.  
*angustifolia*, 373.  
*aptera*, 372.  
*Baldwinii*, 373.  
*crenulata*, 373.  
*mollis*, 373.  
*monophylla*, 393.  
*parvifolia*, 372, 373.

*pentandra*, 372.  
*pentandra*, 373.  
*podocarpa*, 373.  
*tomentosa*, 373.  
*trifoliata*, 372.  
*trifoliata*, 373.  
*vilicifolia*, 373.  
*Pterophyllum*, 41.  
*Pterota*, 374.  
*Pulsatilla*, 9, 462.  
*hirsutissima*, 9.  
*multiceps*, 462.  
*Nuttalliana*, 9.  
*occidentalis*, 9.  
*patens*, 9.  
*Punctulosis*, 420.  
 Purslane, 263.  
*Pyxipoma*, 259.  
*Quassia Simaruba*, 378.  
*Quinaria*, 431.  
*hederacea*, 431.  
*hirsuta*, 431.

Raccoon Grape, 424.  
 Racine d'Amère, 267.  
*Radiana*, 258.

Radish, 132, 133.  
 Ragged Robin, 227.

## RANUNCULACEÆ, 1, 461.

*Ranunculus*, 2, 20, 462.  
*abortivus*, 32.  
*abortivus*, 32.  
*acris*, 35.  
*acris*, 34, 35.  
*adoneus*, 29.  
*adoneus*, 30.  
*affinis*, 31.  
*affinis*, 30, 31, 34.  
*alceus*, 39.  
*alismæfolius*, 27, 463.  
*alismæfolius*, 27.  
*alismellus*, 27.  
*Alleghehiensis*, 32, 463.  
*Altaicus*, 28.  
*ambiguus*, 27.  
*amœnus*, 29, 31.  
*Andersonii*, 22, 462.  
*Andersonii*, 463.  
*aquatilis*, 21.  
*aquatilis*, 21, 22.  
*arcticus*, 31.  
*Arizonicus*, 30.  
*Arizonicus*, 30, 31.  
*arvensis*, 38.  
*auricomus*, 31, 32.  
*Austinæ*, 39.  
*Beckii*, 24.  
*Belvisii*, 37.  
*Biolettii*, 26.  
*Bloomeri*, 32.  
*Bolanderi*, 27.  
*Bonariensis*, 26.  
*Bongardi*, 33.  
*brevicaulis*, 28, 31.  
*bulbosus*, 35.

- bulbosus*, 20.  
*Californicus*, 35.  
*Californicus*, 34.  
*calthæiflorus*, 27.  
*Canadensis*, 36.  
*canus*, 34.  
*canus*, 35.  
*cardiophyllus*, 31.  
*Chamissonis*, 23.  
*Chilensis*, 32.  
*circinatus*, 21.  
*Clintonii*, 36.  
*conferoides*, 21.  
*Cooleyæ*, 23.  
*Cusckii*, 463.  
*Cymbalaria*, 23, 463.  
*debilis*, 20.  
*delphinifolius*, 24, 35.  
*dichotomus*, 38.  
*digitatus*, 29.  
*dissectus*, 35.  
*divaricatus*, 21.  
*Drummondii*, 29.  
*Eiseni*, 34.  
*ellipticus*, 29.  
*Eschscholtzii*, 31.  
*eximius*, 30.  
*fascicularis*, 37, 463.  
*fuscularis*, 34, 36, 37.  
*Ficaria*, 20.  
*filiformis*, 27.  
*flaccidus*, 21.  
*Flammula*, 26.  
*Flammula*, 26, 27.  
*fluitans*, 21.  
*fluviatilis*, 24.  
*Forskæhlîi*, 24.  
*frigida*, 28.  
*glaberrimus*, 28, 463.  
*glaberrimus*, 463.  
*glacialis*, 23.  
*Gmelini*, 24.  
*Grayanus*, 21.  
*Grayi*, 29.  
*halophilus*, 23.  
*Hartwegi*, 27.  
*Harveyi*, 32.  
*hebecarpus*, 38.  
*hederaceus*, 22.  
*hederaceus*, 21, 22.  
*hesperoxys*, 34.  
*heterophyllus*, 21.  
*hirsutus*, 38.  
*hispidus*, 36.  
*hispidus*, 36.  
*Hookeri*, 29.  
*Hornemannii*, 20.  
*humilis*, 26.  
*hydrocharis*, 20, 22.  
*hydrocharoides*, 26.  
*hyperboreus*, 25.  
*hyperboreus*, 25.  
*hystriculus*, 22, 462.  
*hystriculus*, 23.  
*juniperinus*, 463.  
*lacustris*, 24.  
*Langsdorfi*, 25.  
*lanuginosus*, 33.  
*Lapponicus*, 25.  
*Lapponicus*, 12, 29.  
*laxicaulis*, 26.  
*Lemmoni*, 28, 463.  
*Lemmoni*, 29.  
*limosus*, 25.  
*Lingua*, 27.  
*Lobbii*, 22.  
*longirostris*, 21.  
*lucidus*, 37.  
*Ludovicianus*, 35.  
*Macauleyi*, 28.  
*Macounii*, 36.  
*macranthus*, 37.  
*macranthus*, 38.  
*Marilandicus*, 37.  
*maximus*, 38.  
*micranthus*, 32.  
*Missouriensis*, 24.  
*multifidus*, 24.  
*multifidus*, 25.  
*muricatus*, 38.  
*natans*, 25.  
*Nelsonii*, 33, 34.  
*nitidus*, 32, 36.  
*nivalis*, 28.  
*nivalis*, 28, 31.  
*Nuttallii*, 23.  
*oblongifolius*, 26.  
*obtusiusculus*, 20, 27.  
*occidentalis*, 33.  
*occidentalis*, 33, 34, 37.  
*Oncostyli*, 33.  
*ornithorhynchus*, 38.  
*orthorhynchus*, 37.  
*orthorhynchus*, 29, 38.  
*ovalis*, 31.  
*oxynotus*, 28.  
*Pallasii*, 24.  
*Pallasii*, 24.  
*palmaris*, 37.  
*pantothrix*, 21.  
*parviflorus*, 38.  
*parviflorus*, 38.  
*parvulus*, 38.  
*parvulus*, 35.  
*pedatifidus*, 29, 31.  
*Pennsylvanicus*, 35.  
*Pennsylvanicus*, 33, 36.  
*philonotis*, 37, 38.  
*plantaginifolius*, 23.  
*Populago*, 27, 463.  
*Porteri*, 21.  
*prostratus*, 36.  
*Pseudo-Hirculus*, 27.  
*pulchellus*, 27.  
*Purshii*, 24.  
*Purshii*, 24, 25.  
*pusillus*, 26.  
*pusillus*, 20, 25, 26.  
*pygmæus*, 29.  
*radicans*, 25.  
*recurvatus*, 33, 463.  
*recurvatus*, 33, 34.  
*repens*, 36.  
*repens*, 28, 36, 37, 38.  
*reptans*, 26, 27.  
*rhomboideus*, 31.  
*rigidus*, 21.  
*rugulosus*, 35.  
*Ruthenicus*, 23.  
*Sabinii*, 29.  
*salsuginosus*, 23.  
*saniculæformis*, 33.  
*Sardous*, 38.  
*sceleratus*, 33.  
*Schlechtendalii*, 34, 37.  
*septentrionalis*, 37.  
*septentrionalis*, 28, 36, 37.  
*stagnatalis*, 21.  
*stolonifer*, 26.  
*subsagittatus*, 30.  
*Suksdorfii*, 30.  
*sulphureus*, 28.  
*tenellus*, 33.  
*Texensis*, 26.  
*tomentosus*, 33, 37.  
*trachyspermus*, 38.  
*trachyspermus*, 25, 26.  
*trichophyllus*, 21.  
*tridentatus*, 23.  
*trifolius*, 36.  
*triternatus*, 29.  
*tuberosus*, 20.  
*Turneri*, 34.  
*Rapa*, 133.  
*Rape*, 133.  
*Raphanus*, 102, 132, 468.  
*Raphanistrum*, 132, 468.  
*sativus*, 133.  
*Red Campion*, 227.  
*Grape*, 423.  
*Lychnis*, 227.  
*Maple*, 437.  
*Redoutea*, 337.  
*heterophylla*, 338.  
*Reseda* 188, 474.  
*alba*, 188.  
*dipetala*, 188.  
*linifolia*, 188.  
*lutea*, 188, 474.  
*Luteola*, 188.  
*odorata*, 188.  
*Phyteuma*, 188.  
*subulata*, 188.  
*RESEDACEÆ*, 187, 474.  
*Resedella dipetala*, 188.  
*subulata*, 188.  
*Reynosia*, 402, 405.  
*latifolia*, 405.  
*Rhacoma*, 396, 399.  
*Crossopetalum*, 399.  
*ilicifolia*, 399.  
*RHAMNACEÆ*, 401.  
*RHAMNEÆ*, 402.  
*Rhamnidium*, 402, 404.  
*ferreum*, 404.  
*Rhamnus*, 402, 406.  
*alnifolia*, 407.  
*anonefolia*, 408.  
*betulaefolia*, 408.  
*Californica*, 408.  
*Californica*, 408.

- Caroliniana, 407.  
 cathartica, 407.  
 colubrinus, 418.  
 crocea, 406.  
*Drummondii*, 418.  
*ellipticus*, 418.  
*ferreus*, 404.  
*ferrugineus*, 418.  
*Frangula*, 407.  
*franguloides*, 407.  
*Humboldtianus*, 405.  
*ilicifolia*, 406.  
*insularis*, 406.  
*lanceolata*, 407.  
*laurifolius*, 408.  
*leucodermis*, 408.  
*minutiflorus*, 406.  
*obtusifolius*, 403.  
*occidentalis*, 408.  
*oleifolius*, 408.  
*parvifolius*, 407.  
*pirifolia*, 406.  
*Purshiana*, 408.  
*Purshiana*, 408.  
*rubra*, 408.  
*scandens*, 405.  
*Shortii*, 407.  
*Smithii*, 407.  
*Texensis*, 418.  
*tomentella*, 408.  
*umbellatus*, 405.  
*volubilis*, 405.  
 Rheumatism-root, 72.  
*Rhoicissus*, 430.  
*Rhus*, 381.  
*Rhus*, 382.  
     *Americanus*, 382.  
     *aromatica*, 385, 386.  
     *Blodgettii*, 382.  
     *Canadensis*, 385.  
     *Canadensis*, 383, 384.  
     *Caroliniana*, 384.  
     *copallina*, 384.  
     *cotinoides*, 382.  
     *Cotinus*, 382.  
     *diversiloba*, 383.  
     *elegans*, 384.  
     *glabra*, 384.  
     *Illinoisiana*, 385.  
     *hirta*, 384.  
     *hypselodendron*, 384.  
     *integrifolia*, 385.  
     *integrifolia*, 385.  
     *laurina*, 383.  
     *Lentii*, 385.  
     *leucantha*, 384.  
     *lobata*, 383.  
     *Metopium*, 382.  
     *Mexicana*, 386.  
     *Michauxii*, 384.  
     *microphylla*, 386.  
     *ovata*, 385.  
     *pumila*, 384.  
     *pumila*, 383.  
     *radicans*, 382, 383.  
     *sempervirens*, 385.  
     *suaveolens*, 385.  
     *Toxicodendron*, 382.  
     *Toxicodendron*, 372, 383.  
     *trichocarpa*, 382, 383.  
     *trilobata*, 386.  
     *typhina*, 384.  
     *Veatchiana*, 381.  
     *venenata*, 383.  
     *Vernix*, 383.  
     *verrucosa*, 383.  
     *virens*, 385.  
     *viridiflora*, 384.  
*Riedlea*, 340.  
     *elongata*, 340.  
     *serrata*, 340.  
*Riedlea*, 340.  
 Riverbank Grape, 422.  
 Rock Cress, 159.  
     Grape, 421.  
     Maple, 438.  
     Rose, 189.  
 Rocket, 142.  
 Romneya, 83, 87.  
     *Coulteri*, 87.  
*Ropalon*, 77.  
*Roripa*, 146.  
     *Americana*, 146.  
     *Armoracia*, 147.  
     *curvisiliqua*, 148.  
     *dictyota*, 149.  
     *hispida*, 148.  
     *Nasturtium*, 146.  
     *obtusata*, 148.  
     *occidentalis*, 470.  
     *palustris*, 147.  
     *sessiliflora*, 149.  
     *sinuata*, 147.  
     *sphaerocarpa*, 148.  
     *sylvestris*, 147.  
     *tenerrima*, 149.  
     *trachycarpa*, 470.  
     *Walteri*, 470.  
*Rorippa*, 146.  
 Rose Mallow, 333.  
 Rose-wood, 375.  
 Round-leaved Catchfly, 217.  
 Royal Catchfly, 217.  
*Rubra*, 437.  
*Rulac Negundo*, 440.  
*Ruta graveolens*, 369.  
*Rutabaga*, 133.  
 RUTACEÆ, 369.  
 RUTEÆ, 369.  
*Rutosma*, 371.  
     *Texana*, 371.  
*Sabulina*, 238.  
*Saccharina*, 438.  
 Sacred Bean, 74.  
*Sageretia*, 402, 405.  
     *Michauxii*, 406.  
     *Wrightii*, 406.  
*Sagina*, 210, 247.  
     *apetala*, 248.  
     *crassicaulis*, 249.  
     *decumbens*, 248.  
     *Elliottii*, 248.  
     *fontinalis*, 235.  
     *intermedia*, 249.  
     *Linnæi*, 249.  
     *Linnæi*, 248.  
     *Linnei*, 249.  
     *maxima*, 249.  
     *nivalis*, 249.  
     *nodosa*, 249.  
     *occidentalis*, 248.  
     *occidentalis*, 249.  
     *procumbens*, 248.  
     *procumbens*, 248.  
     *saginoides*, 249.  
     *saxatilis*, 249.  
     *subulata*, 248.  
 St. John's-wort, 284.  
 St. Peter's-wort, 283.  
*Samydea*, 206.  
 Sand Grape, 421.  
 Sandwort, 237.  
*Sanguinaria*, 83, 86.  
     *acaulis*, 86.  
     *Canadensis*, 86.  
     *grandiflora*, 86.  
     *vernalis*, 86.  
 SAPINDACEÆ, 432.  
 SAPINDEÆ, 433.  
*Sapindus*, 433, 443.  
     *acuminata*, 444.  
     *acuminatus*, 444.  
     *Drummondii*, 444.  
     *fulcatus*, 444.  
     *lucidus*, 445.  
     *Manatensis*, 444.  
     *marginatus*, 444.  
     *marginatus*, 444.  
     *Saponaria*, 444.  
     *Saponaria*, 444.  
*Saponaria*, 209, 212.  
     *dioica*, 215.  
     *officinalis*, 213.  
     *officinalis*, 212.  
     *Vaccaria*, 213.  
*Sarcophthalus Carolinianus*, 407.  
     *ferreus*, 404.  
*Sarothra*, 284.  
     *Drummondii*, 290.  
     *gentianoides*, 291.  
     *hypericoides*, 291.  
*Sarracenia*, 79.  
*Sarracenia*, 79.  
     *adunca*, 81.  
     *calceolata*, 80.  
     *Catesbaei*, 81.  
     *Drummondii*, 80.  
     *flava*, 81.  
     *Gronovii*, 80, 81.  
     *heterophylla*, 80.  
     *leucophylla*, 80.  
     *minor*, 80, 81.  
     *psittacina*, 80.  
     *pulchella*, 80.  
     *purpurea*, 80.  
     *purpurea*, 80.  
     *rubra*, 80.  
     *Sweetii*, 80.  
     *undulata*, 80.  
     *variolaris*, 81.

## SARRACENIACEÆ, 79, 466.

- Satin-wood, 375.  
*Sauragesiaceæ*, 195.  
*Saviniona*, 295, 299.  
 Scarlet Lightning, 227.  
   *Lychnis*, 227.  
   Maple, 437.  
*Schæfferia*, 396, 399.  
   *buxifolia*, 399.  
   *completa*, 399.  
   *cuneifolia*, 400.  
   *frutescens*, 399.  
*Schinus discolor*, 381.  
   *Fagara*, 374.  
   Molle, 381.  
*Schizandra*, 58.  
   *coccinea*, 58.  
 SCHIZANDREÆ, 58.  
*Schænocrambe linifolia*, 469.  
*Schœpfia*, 394.  
   *Americana*, 394.  
   *arborescens*, 394.  
   *chrysophylloides*, 394.  
   *Marchii*, 394.  
   Schreberi, 394.  
 Scurvy Grass, 150.  
*Scutia ferrea*, 404.  
 Sea Ash, 374.  
   Purslane, 259.  
   Rocket, 132.  
 Sea-island Cotton, 338.  
*Segregatia Michauxii*, 406.  
*Selenia*, 104, 151.  
   *aurea*, 151.  
   *aurea*, 151.  
   *dissecta*, 151.  
*Senebiera*, 101, 129.  
   *Coronopus*, 130.  
   *didyma*, 130.  
   *pinnatifida*, 130.  
*Seneca Snakeroot*, 454.  
*Sericodes Greggii*, 352.  
*Serjania*, 433, 442.  
   *brachycarpa*, 443.  
   *incisa*, 442.  
   *macrocarpa*, 443.  
   *racemosa*, 442.  
*Sesuvium*, 257, 259.  
   *maritimum*, 260.  
   *parviflorum*, 259.  
   *pedunculatum*, 259.  
   *pentandrum*, 260.  
   *Portulacastrum*, 259.  
   *Portulacastrum*, 254, 259, [260].  
   *sessile*, 259.  
   *sessile*, 260.  
 Shepherd's Purse, 131.  
 Shrub Yellow-root, 56.  
 Shrubby Althæa, 334.  
   Bitter-sweet, 398.  
*Sibara filifolia*, 470.  
 Sickie-pod, 162.  
*Sida*, 296, 321.  
   *Abutilon*, 327.  
   *acuta*, 324.  
   *alata*, 318.  
   *alceoides*, 301.

- althæifolia*, 324.  
   *angustifolia*, 324.  
   *anomala*, 323.  
   *Berlandieri*, 320.  
   *bracteolata*, 309.  
   *Californica*, 304.  
   *Canariensis*, 324.  
   *carpinifolia*, 324, 325.  
   *carpinoides*, 309, 325.  
   *ciliaris*, 323.  
   *coccinea*, 313.  
   *cordifolia*, 323.  
   *crispa*, 330.  
   *cristata*, 319.  
   *cuneifolia*, 322.  
   *delphinifolia*, 303, 305.  
   *diffusa*, 323.  
   *diffusa*, 323.  
   *dioica*, 308.  
   *diploscypha*, 303.  
   *dissecta*, 313.  
   *Elliottii*, 325.  
   *Elliottii*, 323, 325.  
   *fusculata*, 323.  
   *filicaulis*, 323.  
   *filiformis*, 323.  
   *filipes*, 326.  
   *glabra*, 325.  
   *gracilis*, 325.  
   *grossulariæfolia*, 314.  
   *hastata*, 322.  
   *hederacea*, 321.  
   *Helleri*, 322.  
   *herbacea*, 324.  
   *hermaphrodita*, 322.  
   *hernandioides*, 326.  
   *heterocarpa*, 324.  
   *hirta*, 327.  
   *hispidula*, 308.  
   *Hondensis*, 324.  
   *Hulseana*, 327.  
   *imberbis*, 330.  
   *incana*, 329.  
   *involuta*, 323.  
   *lepidota*, 321.  
   *lepidota*, 321.  
   *lignosa*, 327.  
   *Lindheimeri*, 325.  
   *Lindheimeri*, 325.  
   *linearis*, 324.  
   *longipes*, 326.  
   *macrorhiza*, 301.  
   *Madrensis*, 324.  
   *malvæflora*, 304, 305.  
   *micans*, 324.  
   *multiflora*, 324.  
   *muricata*, 323.  
   *Napæa*, 322.  
   *Neo-Mexicana*, 325.  
   *obliqua*, 321.  
   *oculata*, 324.  
   *Oregana*, 305.  
   *Palmeri*, 320.  
   *parviflora*, 321.  
   *pedata*, 301, 302.  
   *permollis*, 328.  
   *physocalyx*, 322.  
   *pilosa*, 323.  
   *procumbens*, 323.  
   *rhombifolia*, 324.  
   *rhombifolia*, 325.  
   *rotundifolia*, 324.  
   *rubro-marginata*, 325.  
   *Sabeana*, 340.  
   *spinosa*, 324.  
   *spinosa*, 324.  
   *spiræifolia*, 325.  
   *stellata*, 316.  
   *stipulata*, 325.  
   *sulphurea*, 321.  
   *supina*, 323.  
   *tragiæfolia*, 324.  
   *triangularis*, 319.  
   *ovata*, 323.  
*Sidalcea*, 295, 302.  
*Sidalcea*, 307.  
   *asprella*, 305.  
   *atacosa*, 314.  
   *Californica*, 304.  
   *calycosa*, 303.  
   *calycosa*, 303.  
   *campestris*, 305.  
   *candida*, 304.  
   *delphinifolia*, 303, 304.  
   *diploscypha*, 303.  
   *glaucescens*, 306.  
   *glaucescens*, 305.  
   *Hartwegi*, 303.  
   *Hartwegi*, 303.  
   *Hendersonii*, 306.  
   *Hickmani*, 307.  
   *Hickmani*, 307.  
   *hirsuta*, 303.  
   *hirsuta*, 304.  
   *humilis*, 304.  
   *malachroides*, 307.  
   *malvæflora*, 304.  
   *malvæflora*, 305, 306.  
   *Murrayana*, 306.  
   *Neo-Mexicana*, 306.  
   *Oregana*, 305.  
   *Oregana*, 305, 306.  
   *parviflora*, 305.  
   *pedata*, 306.  
   *secundiflora*, 303.  
   *spicata*, 306.  
   *sulcata*, 303.  
   *tenella*, 304.  
   *vitifolia*, 307.  
*Sidanoda*, 320.  
 SIDEÆ, 296.  
 Side-saddle Flower, 79, 80.  
*Sidoides*, 308.  
*Silene*, 209, 213.  
*Silene*, 224.  
   *acaulis*, 215.  
   *alba*, 216.  
   *Anglica*, 214.  
   *antirrhina*, 215.  
   *Armeria*, 215.  
   *Baldwinii*, 216.  
   *Bernardina*, 222.  
   *Bolanderi*, 218.  
   *Bridgesii*, 219.

Californica, 218.  
 campanulata, 219.  
 campanulata, 214.  
 Caroliniana, 217.  
 Catesbæi, 217.  
 cheiranthoides, 217.  
 coccinea, 217.  
 conoidea, 214.  
 Cucubalus, 214.  
 dichotoma, 215.  
 Dorrii, 219.  
 Douglasii, 222.  
 Douglasii, 214.  
 Drummondii, 223, 224, 225.  
 Engelmanni, 220, 221.  
 fimbriata, 216.  
 Gallica, 214.  
 Grayii, 222.  
 Greggii, 218.  
 Hallii, 223.  
 Hallii, 214.  
 Hookeri, 218.  
 Illinoensis, 217.  
 incarnata, 217.  
 incompta, 220.  
 inflata, 214.  
 laciniata, 218.  
 laciniata, 218.  
 Lemmoni, 219.  
 longistylis, 219.  
 Luisana, 221.  
 Lusitanica, 215.  
 Lyallii, 223.  
 Macounii, 223.  
 Menziesii, 219.  
 monantha, 223.  
 montana, 220.  
 multicaulis, 223.  
 multinervia, 214.  
 nivea, 216.  
 noctiflora, 215.  
 nutans, 216.  
 occidentalis, 221.  
 Oregana, 220.  
 ovata, 216.  
 Palmeri, 219.  
 Parishii, 218.  
 pectinata, 220.  
 pectinata, 214.  
 Pennsylvanica, 216.  
 platyota, 221.  
 platypetala, 217.  
 plicata, 220.  
 Pringlei, 224.  
 pulchra, 218.  
 purpurata, 221.  
 quinquevulnera, 215.  
 racemosa, 215.  
 regia, 217.  
 repens, 221.  
 repens, 220.  
 rotundifolia, 217.  
 rubicunda, 217.  
 Sargentii, 221.  
 scaposa, 223.  
 Scouleri, 224.  
 Scouleri, 224, 225.

Shockleyi, 220.  
 simulans, 218.  
 Spaldingii, 221.  
 speciosa, 218.  
 stellarioides, 219.  
 stellata, 216.  
 subciliata, 217.  
 Suksdorfii, 222.  
 Thurberi, 220.  
 Tilingi, 218.  
 verecunda, 221.  
 Virginica, 217.  
 Virginica, 217, 218.  
 vulgaris, 214.  
 Watsoni, 222.  
 Watsoni, 214.  
 Wrightii, 218.  
 SILENEÆ, 208.  
 Silver Maple, 438.  
 Simarouba, 378.  
 Simaruba, 377, 378.  
 glauca, 378.  
 medicinalis, 378.  
 SIMARUBACEÆ, 376.  
 SIMARUBEÆ, 377.  
 Sinapis, 133.  
 alba, 134.  
 arcensis, 133.  
 nigra, 133.  
 Sinapistrum, 133, 183.  
 SISYMBRIÆ, 102.  
 Sisymbria, 159.  
 Sisymbrium, 103, 136, 469.  
 Sisymbrium, 135, 175.  
 acutangulum, 177.  
 Alliaria, 135.  
 altissimum, 137, 469.  
 altissimum, 473.  
 arabidoides, 159.  
 auriculatum, 138.  
 brachycarpon, 139.  
 brachycarpum, 139.  
 Californicum, 139.  
 canescens, 139.  
 canescens, 139, 469.  
 cheiranthoides, 143.  
 Cumingianum, 139.  
 curvisiliqua, 148.  
 deflexum, 177.  
 dentatum, 160.  
 diffusum, 138.  
 Edwardsii, 135.  
 glaucum, 175.  
 hispidum, 148.  
 humifusum, 160.  
 humile, 141, 159.  
 incanum, 139.  
 incisum, 139, 469.  
 incisum, 140.  
 Irio, 137.  
 junceum, 138.  
 lasiophyllum, 177.  
 linifolium, 138, 469.  
 longepedicellatum, 140.  
 Nasturtium, 146.  
 Niagaraense, 137.  
 officinale, 137.

officinale, 469.  
 palustre, 147.  
 Pannonicum, 137.  
 pauciflorum, 138.  
 pauciflorum, 166.  
 pinnatum, 139.  
 pygmaeum, 145, 177.  
 reflexum, 177.  
 salsugineum, 137, 175.  
 sinapistrum, 137.  
 Sophia, 139, 469.  
 sophioides, 139.  
 tanacetifolium, 149.  
 teres, 149.  
 Thalianum, 140.  
 Vaseyi, 138.  
 virgatum, 138, 469.  
 Walteri, 149.  
 Skunk Grape, 429.  
 Sleepy Catchfly, 215.  
 Smelowskia, 102, 136, 469.  
 Californica, 139.  
 calycina, 136, 469.  
 cinerea, 135, 136.  
 Fremontii, 136.  
 ovalis, 469.  
 Smooth Sumach, 384.  
 Snapdragon Catchfly, 215.  
 Soap-berry, 444.  
 Soapwort, 212, 213.  
 Soft Maple, 437.  
 Solea, 195, 204.  
 Solea, 205.  
 concolor, 204.  
 stricta, 204.  
 Sophia, 138.  
 Sonnei, 469.  
 Sour Orange, 376.  
 Southern Fox Grape, 420.  
 Spanish Grape, 425.  
 Spatter-dock, 77.  
 Spearwort, 26.  
 Spergula, 210, 253.  
 arvensis, 253.  
 decumbens, 248.  
 fontinalis, 235.  
 gracilis, 251.  
 nodosa, 248, 249.  
 ramosissima, 253.  
 rubra, 250.  
 saginoides, 248, 249.  
 subulata, 248.  
 Spergularia, 210, 249.  
 borealis, 252.  
 borealis, 250.  
 campestris, 250.  
 Canadensis, 252.  
 Clevelandii, 251.  
 diandra, 251.  
 macrotheca, 252.  
 marginata, 252.  
 marina, 252.  
 media, 252.  
 media, 252.  
 Miquelonensis, 250.  
 Miquelonensis, 252.

- Platensis, 251.  
 rubra, 250.  
 rubra, 252, 253.  
 salina, 251.  
 salina, 250.  
 salsuginea, 251.  
 tenuis, 251.  
 tenuis, 252.  
 villosa, 251.  
*Spergulastrum*, 232.  
   *gramineum*, 233.  
   *lanceolatum*, 235.  
   *lanuginosum*, 240.  
*Sphæralcea*, 296, 313.  
   *acerifolia*, 317.  
   *acerifolia*, 317.  
   *ambigua*, 315.  
   *ambigua*, 315, 317.  
   *angustifolia*, 316.  
   *angustifolia*, 316.  
   *Cedrosensis*, 317.  
   *Cisplatina*, 313, 315.  
   *Coulteri*, 313.  
   *crotonoides*, 318.  
   *Emoryi*, 316.  
   *Emoryi*, 314, 315, 317.  
   *Fendleri*, 316.  
   *Fendleri*, 313, 317.  
   *hastulata*, 315.  
   *incana*, 316.  
   *incana*, 316.  
   *leptosepala*, 318.  
   *Lindheimeri*, 315.  
   *Lindheimeri*, 311.  
   *longisepala*, 317.  
   *miniata*, 316.  
   *Munroana*, 314.  
   *Munroana*, 315.  
   *Orcuttii*, 314.  
   *pedata*, 314.  
   *pedatifida*, 314.  
   *rivularis*, 317.  
   *Rusbyi*, 317.  
   *stellata*, 316.  
   *subhastata*, 315.  
   *sulphurea*, 315.  
   *Wrightii*, 317.  
*Sphæralceoides*, 310.  
*Sphæroma acerifolium*, 317.  
   *angustifolium*, 316.  
*Sphærostemma*, 58.  
*Spicata*, 435.  
 Spindle Tree, 396, 397.  
*Spondias lutea*, 381.  
*Spondylantha aphylla*, 431.  
 Spotted Touch-me-not, 369.  
*Spraguea*, 233, 277.  
*Spraguea*, 278.  
   *multiceps*, 278.  
   *nuda*, 277.  
   *paniculata*, 277.  
   *umbellata*, 277.  
 Spring Beauty, 270, 271.  
 Spurry, 253.  
 Squirrel-corn, 94.  
 Staff-tree, 398.  
 Stag-horn Sumach, 384.  
*Stanfordia*, 105, 171.  
   *Californica*, 172.  
*Stanleya*, 105, 178.  
*Stanleya*, 179.  
   *albescens*, 179.  
   *amplexifolia*, 180, 473.  
   *collina*, 178.  
   *elata*, 179.  
   *fruticosa*, 179.  
   *gracilis*, 180.  
   *heterophylla*, 179.  
   *integrifolia*, 179.  
   *pinnata*, 179.  
   *pinnatifida*, 179.  
   *tomentosa*, 179.  
   *viridiflora*, 178.  
   *Washitana*, 168.  
 STANLEYÆ, 105.  
*Staphylea*, 432, 434.  
   *Bolanderi*, 434.  
   *trifolia*, 434.  
   *trifoliata*, 434.  
 STAPHYLINÆ, 432.  
*Staphyllodendron*, 434.  
*Staphyllodendron*, 434.  
   *trifoliatum*, 434.  
 Star Anise, 58.  
 Starry Campion, 216.  
 Starwort, 232.  
*Stegia*, 299.  
*Stellaria*, 210, 232.  
*Stellaria*, 228, 237.  
   *alpestris*, 235.  
   *alsine*, 234.  
   *aquatica*, 232.  
   *aquatica*, 234.  
   *biflora*, 238, 247.  
   *borealis*, 234.  
   *borealis*, 233, 234, 235, 236.  
   *brachypetala*, 235.  
   *calycantha*, 236.  
   *cerastoides*, 231.  
   *crassifolia*, 235.  
   *crassifolia*, 233, 235.  
   *crispa*, 236.  
   *crispa*, 236.  
   *cuspidata*, 232.  
   *dichotoma*, 237.  
   *dichotoma*, 236.  
   *diceranoides*, 237.  
   *Edwardsii*, 234.  
   *elongata*, 240.  
   *Fenzlii*, 235.  
   *fontinalis*, 235.  
   *glauca*, 233.  
   *gracilis*, 235.  
   *graminea*, 233, 234.  
   *graminea*, 233, 237.  
   *Grælandica*, 243.  
   *Holostea*, 237.  
   *humifusa*, 235.  
   *humifusa*, 235.  
   *Jamesiana*, 237.  
   *Jamesii*, 237.  
   *Kingii*, 232, 241.  
   *Labradorica*, 243.  
   *lata*, 233, 234.  
   *lanuginosa*, 240.  
   *littoralis*, 236.  
   *longifolia*, 233.  
   *longifolia*, 233, 234.  
   *longipes*, 233, 234.  
   *longipes*, 234.  
   *macropetala*, 232, 245.  
   *marginata*, 235.  
   *media*, 232.  
   *manchoides*, 233.  
   *montana*, 228.  
   *nitens*, 233.  
   *nitida*, 234.  
   *Nuttallii*, 237.  
   *obtus*, 235.  
   *ocalifolia*, 239.  
   *ovata*, 232.  
   *palustris*, 233.  
   *prostrata*, 232.  
   *pubera*, 236.  
   *ruscifolia*, 236.  
   *stricta*, 233, 234.  
   *uliginosa*, 234.  
   *umbellata*, 233.  
   *uniflora*, 237.  
*Stellularia*, 232.  
*Stenophragma*, 136, 137, 140.  
   *Thaliana*, 140.  
   *virgatum*, 469.  
*Sterculia platanifolia*, 339.  
 STERCULIACEÆ, 338.  
*Sterculiæ*, 339.  
*Stewartia*, 292.  
*Stipuleida*, 210, 255.  
   *filiformis*, 255.  
   *setacea*, 255.  
 Storksbill, 361.  
 Strawberry Bush, 396.  
*Strephodon*, 228, 231.  
*Streptanthus*, 105, 167, 470.  
*Streptanthus*, 98, 172.  
   *albidus*, 171, 471.  
   *angustifolius*, 166.  
   *arcuatus*, 164.  
   *Arizonicus*, 169, 471.  
   *barbatus*, 169, 471.  
   *barbiger*, 170, 472.  
   *Biolettii*, 171, 471.  
   *bracteatus*, 168, 470.  
   *Brazoensis*, 161.  
   *Breweri*, 170, 472.  
   *Breweri*, 168.  
   *Californicus*, 172.  
   *campestris*, 169, 471.  
   *carinatus*, 169, 471.  
   *cordatus*, 169, 471.  
   *cordatus*, 473.  
   *Coulteri*, 172.  
   *crassicaulis*, 173.  
   *diversifolius*, 168, 471.  
   *flavescens*, 170, 173, 177, 178.  
   *glabrifolius*, 170. [178].  
   *glandulosus*, 171, 471.  
   *hesperidis*, 472.  
   *hesperidis*, 170.  
   *heterophyllus*, 169, 471.  
   *heterophyllus*, 172.

- hispidus, 171, 472.  
 Howellii, 170, 471.  
*Howellii*, 473.  
 hyacinthoides, 170, 471.  
 inflatus, 172.  
 Lemmoni, 169, 471.  
 linearifolius, 174.  
 longifolius, 170, 178.  
 longirostris, 170, 471.  
 maculatus, 168, 470.  
 micranthus, 178.  
 Mildredæ, 171.  
 Mildredæ, 471.  
 niger, 170, 472.  
 obtusifolius, 168.  
 orbiculatus, 472.  
 orbiculatus, 168.  
 Parryi, 172.  
 peramæus, 171, 471.  
 petiolaris, 161.  
 platycarpus, 168, 470.  
 polygaloides, 171, 473.  
 procerus, 173.  
 pulchellus, 171, 472.  
 sagittatus, 176.  
 secundus, 171, 472.  
 suffrutescens, 168, 472.  
 tortuosus, 168, 472.  
 tortuosus, 169.  
 versicolor, 171, 471.  
 virgatus, 164.  
 Striped Maple, 436.  
 Stuartia, 291, 292.  
   Malachodendron, 292.  
   *Marilandica*, 292.  
   *montana*, 292.  
   *nobilis*, 292.  
   pentagyna, 292.  
   *Virginica*, 292.  
 Stylophorum, 84, 89.  
   diphyllum, 89.  
   *Ohiense*, 89.  
   *petiolatum*, 89.  
 Styphonia, 385.  
   *integrifolia*, 385.  
   *serrata*, 385.  
 Subularia, 101, 130, 468.  
   aquatica, 130, 468.  
 Sugar Grape, 421.  
   Maple, 438.  
 Sumac, 383.  
 Sumach, 381, 383.  
 Summer Grape, 427, 428.  
 Supple Jack, 404.  
 Suriana, 377, 378.  
   *maritima*, 378.  
 SURIANÆ, 377.  
 Swallow-wort, 89.  
 Sweet Alyssum, 115.  
   Bay, 59.  
   Buckeye, 447.  
   Mountain Grape, 422.  
   Violet, 197.  
   William, 211.  
   Winter Grape, 425.  
 Swietenia, 387.  
   Mahagoni, 387.  
   *Mahagoni*, 387.  
 Swine Cress, 129.  
 Sycamore Maple, 436.  
 Symphytopleuræ, 75.  
 Syndesmon, 14.  
   *thalictroides*, 14.  
 Synstima acuminata, 390.  
   *ambigua*, 390.  
 Synthlipsis, 100, 121.  
   Berlandieri, 122.  
   Greggii, 122.  
   heterochroma, 122.  
 Talinopsis, 262, 264.  
   frutescens, 265.  
 Talinum, 262, 265.  
   *aurantiacum*, 265.  
   *brachypodium*, 265.  
   brevifolium, 265.  
   calycinum, 266.  
   *confertiflorum*, 266.  
   humile, 265.  
   lineare, 265.  
   *Menziesii*, 269.  
   *Mexicanum*, 266.  
   *monandrum*, 278.  
   *napiiforme*, 266.  
   *paniculatum*, 265.  
   *parviflorum*, 266.  
   *parviflorum*, 266.  
   patens, 265.  
   *pygmæum*, 268.  
   *reflexum*, 265.  
   *sarmentosum*, 265.  
   *spathulatum*, 265.  
   spinescens, 266.  
   teretifolium, 266.  
   *teretifolium*, 266.  
 TAMARISCINÆ, 279.  
 Tamarisk, 279.  
 Tamarix, 279.  
   *Gallica*, 279.  
 Tansy Mustard, 139.  
 Tea-Plant, 291.  
 TERNSTRÆMIACÆ, 291.  
   *Tetragonella*, 260.  
 Tetragonia, 257, 260.  
   *expansa*, 260.  
   *Tetragonocarpus*, 260.  
   *Tetrapoma barbareefolium*, 148.  
     *Krupsianum*, 148.  
     *pyriforme*, 148.  
 Thalictrum, 1, 14, 462.  
 Thalictrum, 14.  
   alpinum, 14.  
   *anemonoides*, 14.  
   *aquilegifolium*, 18.  
   *cesium*, 16.  
   *campestre*, 462.  
   *Carolinianum*, 11, 17.  
   *clavatum*, 15.  
   *clavatum*, 15.  
   *coriaceum*, 17, 462.  
   Cornuti, 17.  
   *Cornuti*, 18, 462.  
   *corynellum*, 17.  
   *dasyacarpum*, 17.  
   debile, 18.  
   dioicum, 17.  
   *dioicum*, 16, 17.  
   *discolor*, 18.  
   Fendleri, 15, 462.  
   Fendleri, 16.  
   *filipes*, 15.  
   *glaucum*, 18.  
   *graveolens*, 17.  
   *hesperium*, 16.  
   *Kemense*, 15.  
   *kevigatum*, 17.  
   *leucostemon*, 17.  
   *macrostylum*, 17.  
   *megacarpum*, 16.  
   *minus*, 15.  
   *nudicaule*, 15.  
   occidentale, 16, 462.  
   *palmatum*, 18.  
   *platycarpum*, 462.  
   *polycarpum*, 16.  
   *polygamum*, 17, 462.  
   *pubescens*, 17.  
   *purpurascens*, 17.  
   *ranunculinum*, 18.  
   *revolutum*, 17.  
   *rugosum*, 17, 18.  
   *sparsiflorum*, 15.  
   *venulosum*, 16, 462.  
   *venulosum*, 15.  
   *Wrightii*, 16.  
 Thamnosa, 370, 371.  
 Thamnosa, 369.  
   *montana*, 371.  
   Texana, 371.  
 Thelypodium, 105, 173, 473.  
 Thelypodium, 137, 150, 170, 172.  
   *ambiguum*, 176.  
   *aureum*, 176.  
   *aureum*, 137.  
   *auriculatum*, 138.  
   *brachycarpum*, 174.  
   Cooperi, 174.  
   *elegans*, 176.  
   *elegans*, 137.  
   *eucosmum*, 175.  
   *flavescens*, 177.  
   *flexuosum*, 175.  
   Hookeri, 177.  
   Howellii, 174, 473.  
   *integrifolium*, 176.  
   *laciniatum*, 177.  
   *lasiophyllum*, 177, 473.  
   Lemmoni, 178.  
   *linearifolium*, 174.  
   *longifolium*, 178.  
   *longifolium*, 178.  
   *micranthum*, 178.  
   *neglectum*, 177.  
   Nuttallii, 176.  
   *procerum*, 173.  
   *rigidum*, 177.  
   *sagittatum*, 175.  
   *sagittatum*, 175.  
   *salsugineum*, 175, 473.  
   *stenopetalum*, 176.  
   Vaseyi, 175.

*Vaseyi*, 138.  
*Wrightii*, 177.  
*Theobroma*, 339.  
*Thespesia*, 297, 337.  
     *populnea*, 337.  
*Thlaspi*, 101, 123.  
     *alpestre*, 123.  
     *arvense*, 123.  
     *Bursa-pastoris*, 131.  
     *Californicum*, 124.  
     *cochleariforme*, 124.  
     *Fendleri*, 124.  
     *montanum*, 124.  
     *tuberosum*, 156.  
     *Virginianum*, 127.  
*Thyralis angustifolia*, 351.  
*Thurberia*, 338.  
     *thespesioides*, 338.  
*Thyme-leaved Sandwort*, 239.  
*Thysanocarpus*, 100, 113, 468.  
*Thysanocarpus*, 112.  
     *conchuliferus*, 113.  
     *crenatus*, 114.  
     *curvipes*, 113.  
     *curvipes*, 114.  
     *elegans*, 114.  
     *laciniatus*, 114, 468.  
     *oblongifolius*, 113.  
     *pulchellus*, 114.  
     *pusillus*, 113.  
     *radiatus*, 114.  
     *ramosus*, 114.  
*Tilia*, 342, 343.  
     *alba*, 344.  
     *Americana*, 343.  
     *Americana*, 343, 344.  
     *argentea*, 344.  
     *Canadensis*, 343.  
     *Caroliniana*, 343.  
     *Europæa*, 343.  
     *glabra*, 343.  
     *grandifolia*, 343.  
     *heterophylla*, 344.  
     *laxiflora*, 343, 344.  
     *nigra*, 343.  
     *rotundifolia*, 344.  
     *parvifolia*, 343.  
     *pubescens*, 343.  
     *pubescens*, 343.  
*TILIACEÆ*, 342.  
*Tissa*, 250.  
     *Canadensis*, 252.  
     *Clevelandi*, 251.  
     *diandra*, 251.  
     *gracilis*, 251.  
     *leucantha*, 253.  
     *macrotheca*, 253.  
     *marina*, 252.  
     *pallida*, 253.  
     *rubra*, 250, 251.  
     *salina*, 252.  
     *sparsiflora*, 252.  
     *tenuis*, 251.  
     *valida*, 253.  
     *villosa*, 251.  
*Titi*, 393.  
*Tobinia*, 375.

*Toothache-tree*, 373, 374.  
*Toothwort*, 153.  
*Torch-wood*, 375.  
*Touch-me-not*, 369.  
*Tower Mustard*, 160.  
*Toxicodendron*, 381, 382.  
     *crenatum*, 383.  
     *pubescens*, 383.  
     *serratum*, 383.  
     *vobubilis*, 383.  
     *vulgare*, 383.  
*Trautvetteria*, 1, 18.  
     *Caroliniensis*, 18.  
     *grandis*, 18.  
     *palmata*, 18.  
     *palmata*, 18.  
*Treacle Mustard*, 142.  
*Tree of Heaven*, 378.  
*Triadenum*, 284.  
*Trianthema*, 256, 259.  
     *monogyna*, 259.  
     *Portulacastrum*, 259.  
*Tribulus*, 353.  
     *brachystylis*, 354.  
     *Californicus*, 354.  
     *cistoides*, 354.  
     *Fischeri*, 355.  
     *grandiflorus*, 355.  
     *maximus*, 354.  
     *terrestris*, 354.  
     *terrestris*, 354.  
     *trijugatus*, 354.  
*Tricerna*, 398.  
     *crassifolium*, 398.  
*Trichocarpæ*, 383.  
*Tridisperma grandiflora*, 453.  
*Trilicina*, 68.  
*Trionum*, 336.  
*Triumfetta*, 342.  
     *semitriloba*, 342.  
*Trollius*, 2, 40.  
     *Americanus*, 40.  
     *Europæus*, 40.  
     *laxus*, 40.  
*Tropæolum*, 357, 363.  
     *majus*, 363.  
*Tropidocarpum*, 103, 141, 469.  
     *capparideum*, 141.  
     *dubium*, 141.  
     *gracile*, 141.  
     *scabriusculum*, 141.  
*Trumpet-leaf*, 81.  
*Trumpets*, 79, 81.  
*Tryphane*, 238.  
*Tulipastrum Americanum*, 61.  
*Tulipifera*, 61.  
*Tulip-tree*, 61.  
*Tunica*, 209, 212.  
     *prolifera*, 212.  
     *saxifraga*, 212.  
*Turkey Grape*, 428.  
*Turnip*, 133.  
*Turnipia glabra*, 386.  
     *pubescens*, 386.  
*Turritis*, 159, 163.  
     *brachycarpa*, 163.  
     *diffusa*, 175.

*glabra*, 160, 163.  
     *laevigata*, 162.  
     *lasiophylla*, 177.  
     *macrocarpa*, 160.  
     *mollis*, 160.  
     *ovata*, 163.  
     *patula*, 164, 165.  
     *retrofracta*, 164.  
     *salsuginea*, 175.  
     *spathulata*, 163.  
     *stricta*, 163, 166.  
*Twin-Leaf*, 71.  
*Umbrella-tree*, 60.  
*Ungnadia*, 434, 445.  
     *heptaphylla*, 446.  
     *heterophylla*, 446.  
     *speciosa*, 445.  
*Upland Cotton*, 338.  
*Urena*, 297, 331.  
*Urena*, 331.  
     *lobata*, 331.  
*URENÆÆ*, 296.  
*Urvillea*, 433, 441.  
     *Berteriana*, 442.  
     *Mexicana*, 442.  
     *triphylla*, 442.  
     *ulmacea*, 442.  
*Uvaria obovata*, 63, 464.  
     *parviflora*, 63.  
     *pygmaea*, 64.  
     *triloba*, 63.  
*Uvarie*, 63.  
*Vaccaria*, 213.  
     *vulgaris*, 213.  
*Vaccinium mucronatum*, 391.  
*Valley Grape*, 426.  
*Vancouveria*, 67, 71.  
     *aurea*, 71.  
     *chrysantha*, 71.  
     *hexandra*, 71.  
     *hexandra*, 71.  
     *parviflora*, 71.  
     *planipetala*, 71.  
*Varnish-trees*, 383.  
*Veatchia Cedrosensis*, 381.  
     *discolor*, 381.  
*Velarum*, 137.  
*Velezia*, 209, 210.  
     *latifolia*, 207.  
     *rigida*, 211.  
*Velvet-leaf*, 327.  
*Vesicaria*, 116, 121.  
     *alpina*, 117.  
     *angustifolia*, 119, 120.  
     *arctica*, 118, 120.  
     *arenosa*, 118.  
     *argyrea*, 120.  
     *ariculata*, 116.  
     *Berlandieri*, 118.  
     *brevistyla*, 116.  
     *densiflora*, 117.  
     *didymocarpa*, 121.  
     *Engelmanni*, 120.  
     *Fendleri*, 120.  
     *Geyeri*, 121.

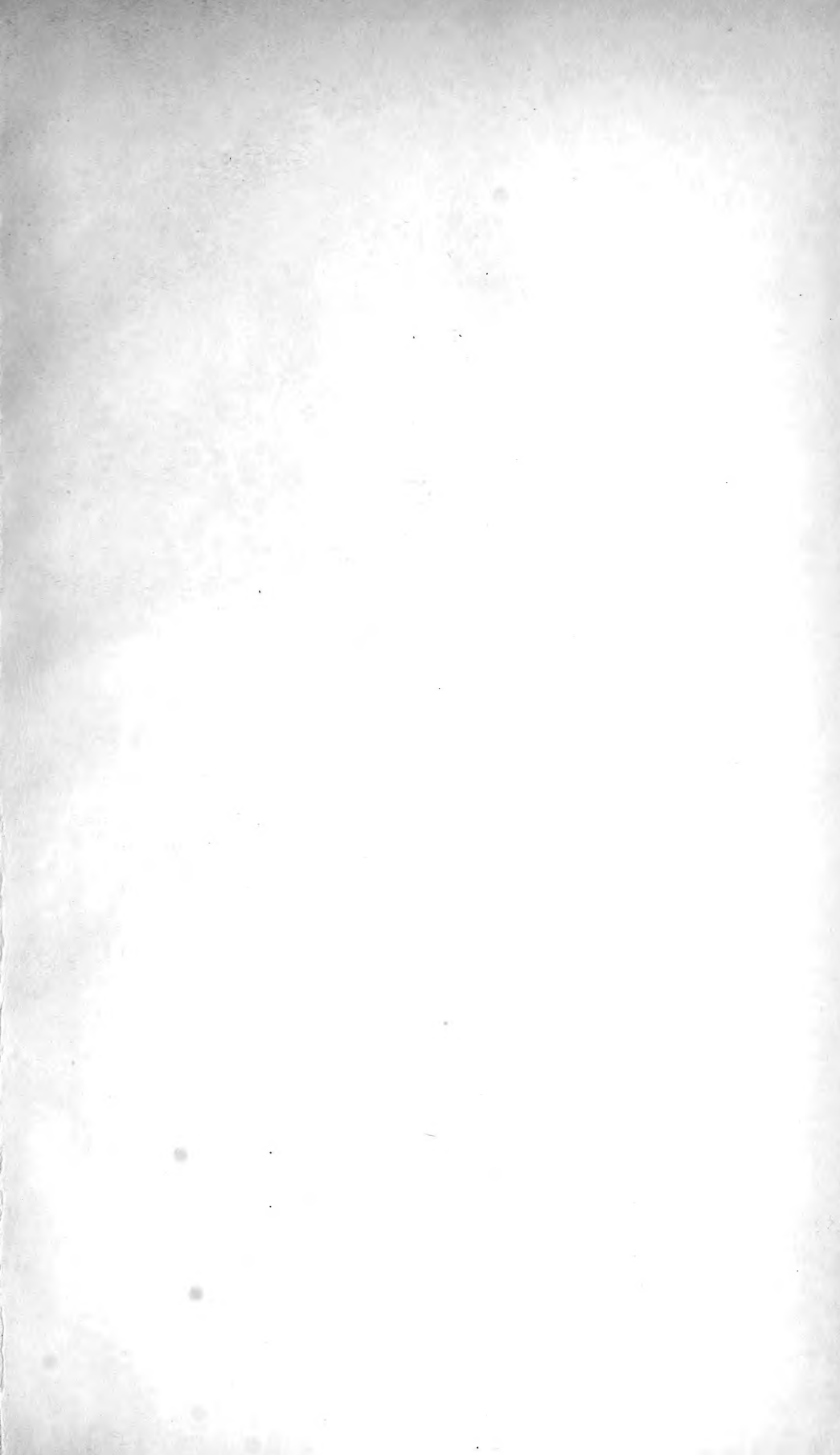


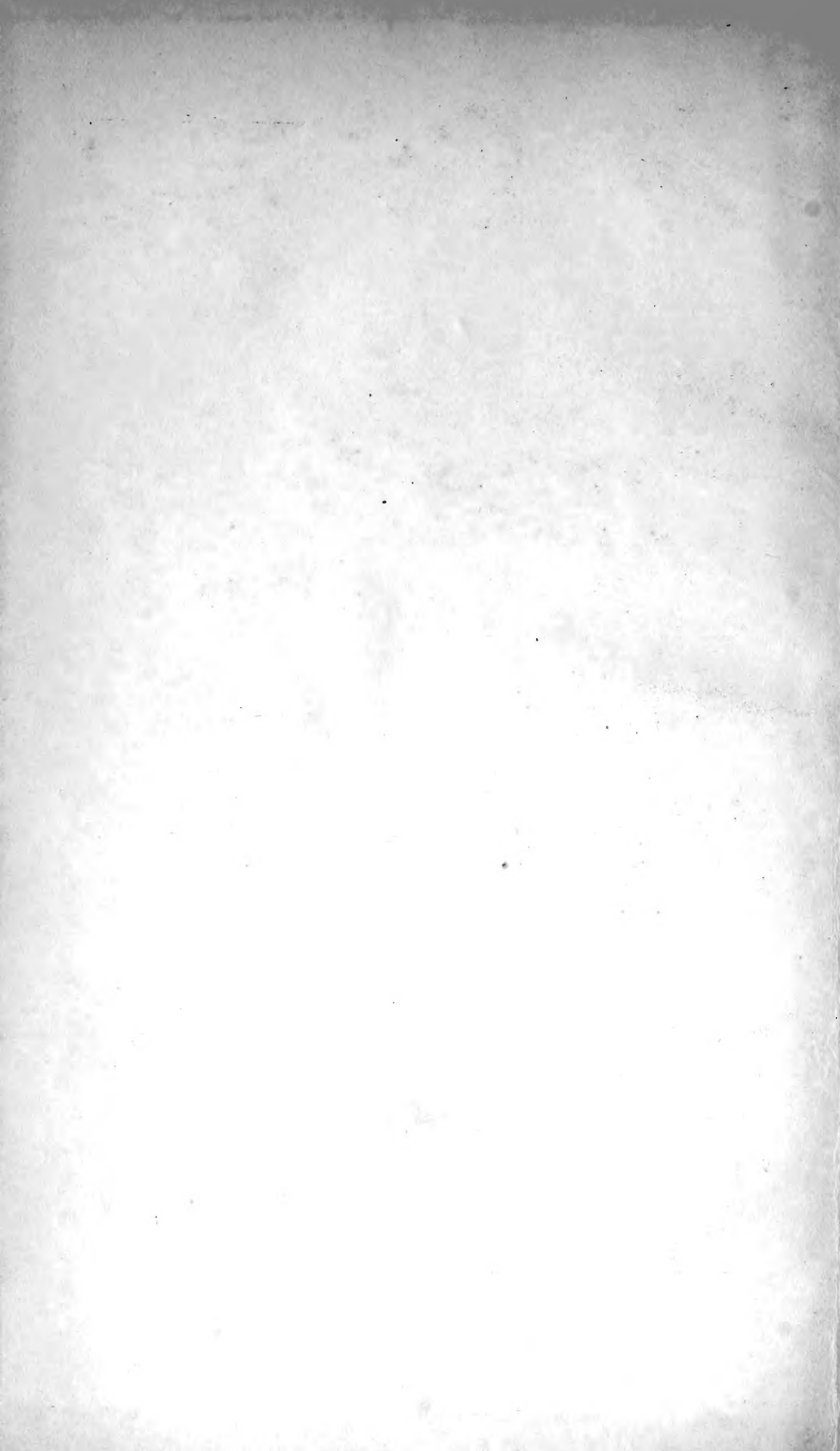
- globosa*, 118.  
*Gordoni*, 120.  
*gracilis*, 119.  
*grandiflora*, 116, 119.  
*Kingii*, 117.  
*lasiocarpa*, 116.  
*Lescurii*, 116.  
*Lindheimeri*, 119.  
*Ludoviciana*, 117, 118, 119.  
*montana*, 117, 118.  
*Nuttallii*, 119.  
*occidentalis*, 117.  
*pallida*, 119.  
*polyantha*, 119.  
*pulchella*, 120.  
*purpurea*, 119.  
*recurvata*, 119.  
*repanda*, 119.  
*Shortii*, 118.  
*stenophylla*, 120.  
*Villarsia peltata*, 74.  
 Vine, 420.  
   Maple, 437.  
*Viola*, 195, 474.  
   *acuta*, 198.  
   *adunca*, 203.  
   *affinis*, 196.  
   *albiflora*, 203.  
   *Alleghaniensis*, 197.  
   *amæna*, 198.  
   *arenaria*, 203.  
   *arvensis*, 204.  
   *asarifolia*, 196, 203.  
   *attenuata*, 198.  
   *aurea*, 200.  
   *Beckwithii*, 200.  
   *Beckwithii*, 201.  
   *bicolor*, 204.  
   *biflora*, 199.  
   *biflora*, 201.  
   *blanda*, 198.  
   *blanda*, 198.  
   *borealis*, 197.  
   *Brooksii*, 200.  
   *Canadensis*, 202.  
   *Canadensis*, 201.  
   *canina*, 203, 475.  
   *canina*, 203.  
   *chrysanth*, 200.  
   *chrysanth*, 201.  
   *ciliata*, 197.  
   *clandestina*, 198, 199.  
   *concolor*, 204.  
   *congener*, 196.  
   *conspersa*, 203.  
   *cordata*, 196.  
   *cordifolia*, 196.  
   *cucullata*, 196, 197.  
   *cuneata*, 202.  
   *debilis*, 203.  
   *delphinifolia*, 196.  
   *dentata*, 197.  
   *digitata*, 196.  
   *Douglasii*, 200.  
   *edulis*, 196.  
   *emarginata*, 197.  
   *epipsila*, 197.  
   *eriocarpa*, 202.  
   *finbriatula*, 197.  
   *flabellifolia*, 195.  
   *gibbosa*, 201.  
   *glabella*, 201, 475.  
   *glabella*, 201.  
   *Hallii*, 200.  
   *hastata*, 201.  
   *heterophylla*, 196.  
   *hirta*, 201.  
   *Howellii*, 204.  
   *Kamtschatica*, 197.  
   *Labradorica*, 203.  
   *lanceolata*, 198, 475.  
   *Langsdorffii*, 197, 474.  
   *Langsdorffii*, 474.  
   *Lewisiana*, 203.  
   *linguefolia*, 199.  
   *lobata*, 201.  
   *longipes*, 203.  
   *Macloskeyi*, 198.  
   *mirabilis*, 197, 204.  
   *montana*, 200.  
   *Muhlenbergiana*, 203.  
   *Muhlenbergii*, 203.  
   *multicaulis*, 203.  
   *Nuttallii*, 199.  
   *Nuttallii*, 200.  
   *obliqua*, 196, 198.  
   *ocellata*, 202.  
   *ochroleuca*, 203.  
   *odorata*, 197.  
   *orbiculata*, 199.  
   *ovata*, 197.  
   *palmata*, 196.  
   *palmata*, 197.  
   *palustris*, 197.  
   *palustris*, 198.  
   *papilionacea*, 196.  
   *parva*, 198.  
   *pedata*, 195.  
   *pedata*, 195, 196.  
   *pedatifida*, 196, 474.  
   *pedunculata*, 199.  
   *Pennsylvanica*, 202.  
   *pinetorum*, 200.  
   *pinnata*, 196.  
   *præmorsa*, 200.  
   *præmorsa*, 199.  
   *primulæfolia*, 198.  
   *primulifolia*, 197.  
   *pubescens*, 202.  
   *pubescens*, 201.  
   *punctata*, 203.  
   *purpurea*, 200.  
   *radicans*, 203.  
   *ramunculifolia*, 196.  
   *renifolia*, 198.  
   *repens*, 203.  
   *rostrata*, 204.  
   *rotundifolia*, 198.  
   *rotundifolia*, 199.  
   *sagittata*, 196.  
   *sagittata*, 197.  
   *sarmentosa*, 199.  
   *scabriuscula*, 202.  
   *Scoulerii*, 201.  
   *Selkirkii*, 197, 474.  
   *Selkirkii*, 198.  
   *septemloba*, 196.  
   *Séquoiensis*, 201.  
   *Sheltonii*, 200.  
   *sororia*, 196.  
   *striata*, 202.  
   *striata*, 201, 203.  
   *sylvestris*, 203.  
   *tenella*, 204.  
   *tricolor*, 204.  
   *triloba*, 196.  
   *trinervata*, 201.  
   *tripartita*, 201.  
   *umbrosa*, 197.  
   *uniflora*, 201, 202.  
   *verticillata*, 205.  
   *villosa*, 196.  
*VIOLACEÆ*, 194, 474.  
*Violet*, 195.  
*Viorna*, 5.  
   *cylindrica*, 7.  
   *urnigera*, 5.  
*Virginia Creeper*, 431.  
*Virgin's Bower*, 4.  
*Viscaria*, 224, 227.  
*VITACEÆ*, 419.  
*Viticella*, 5.  
   *crispa*, 7.  
*Vitis*, 420.  
*Vitis*, 430.  
   *acida*, 430, 431.  
   *æstivalis*, 427. [429, 430.  
   *æstivalis*, 420, 425, 426, 428,  
   *Americana*, 427.  
   *angulata*, 421.  
   *araneosus*, 427.  
   *arborea*, 430.  
   *argentifolia*, 428.  
   *Arizonaensis*, 426.  
   *Arizonica*, 425.  
   *Arizonica*, 423, 426.  
   *Baileyana*, 424.  
   *Berlandieri*, 425.  
   *Berlandieri*, 422, 423.  
   *bicolor*, 428.  
   *bicolor*, 426, 427.  
   *bipinnata*, 430.  
   *Blancoi*, 428.  
   *Blandi*, 429.  
   *Borquiniana*, 428.  
   *bracteata*, 427.  
   *Californica*, 426.  
   *Californica*, 426.  
   *candicans*, 428.  
   *candicans*, 423, 427, 429.  
   *Caribæa*, 428.  
   *Caribæa*, 425, 426, 429.  
   *Champini*, 423.  
   *cinerea*, 425.  
   *cinerea*, 425, 426, 427, 429.  
   *cordifolia*, 424.  
   *cordifolia*, 422, 423.  
   *coriacea*, 429.  
   *diversifolia*, 428.  
   *Doaniana*, 427.  
   *Doaniana*, 423.

- Floridana*, 421.  
*Foveana*, 422.  
*Girdiana*, 426.  
*hederacea*, 431.  
*Illinoensis*, 422.  
*incisa*, 431.  
*indivisa*, 430.  
*Labrusca*, 429.  
*Labrusca*, 420, 422, 427, 429.  
*Lincecumii*, 427.  
*Linsecomii*, 428.  
*Longii*, 423.  
*Longii*, 427.  
*Missouriensis*, 422.  
*monosperma*, 424.  
*monticola*, 422.  
*monticola*, 423, 425, 426.  
*Munsoniana*, 421.  
*muscadina*, 421.  
*Mustangensis*, 429.  
*Nortonii*, 427.  
*Nuevo-Mexicana*, 423.  
*occidentalis*, 427.  
*odoratissima*, 422.  
*palmata*, 423.  
*palmata*, 424.  
*pellata*, 421.  
*pubescens*, 432.  
*pullaria*, 424.  
*quinquefolia*, 431.  
*riparia*, 422, 424.  
*rotundifolia*, 420.  
*rotundifolia*, 421.  
*rubra*, 424.  
*rupestris*, 421.  
*rupestris*, 423.  
*serotina*, 422.  
*Simpsoni*, 429.  
*Solonis*, 423.  
*sylvestris*, 427.  
*taurina*, 421.  
*tenuifolia*, 422.  
*Texana*, 422.  
*Treleasei*, 423.  
*verrucosa*, 421.  
*vinifera*, 420, 427, 428.  
*Virginiana*, 425.  
*vulpina*, 422.  
*vulpina*, 421, 422, 423, 424,  
 [427, 429].  
*Wafer-ash*, 372.  
*Wahlbergella affinis*, 226.  
*apetala*, 226.  
*triflora*, 225.  
*Wahoo*, 60, 397.  
*Walteriana*, 393.  
*Carolinensis*, 393.  
*Waltheria*, 339, 341.  
*Americana*, 341.  
*detonsa*, 341.  
*Wankapin*, 75.  
*Warea*, 105, 179, 473.  
*amplexifolia*, 180, 473.  
*amplexifolia*, 473.  
*cuneifolia*, 180, 473.  
*sessilifolia*, 473.  
*Warneria*, 56.  
*Wart Cress*, 129.  
*Watches*, 81.  
*Water Chinquapin*, 75.  
*Cress*, 146.  
*Water-Lily*, 75.  
*Water-shield*, 74.  
*Waterwort*, 281.  
*Wendlandia Caroliniana*, 65.  
*populifolia*, 65.  
*West Ind. Birch*, 380.  
*Western Wall-flower*, 143.  
*White Bay*, 59.  
*Campion*, 227.  
*Canella*, 206.  
*Iron Wood*, 445.  
*Laurel*, 59.  
*Mustard*, 134.  
*Winter's Bark*, 206.  
*White-wood*, 61, 206.  
*Whitlow-grass*, 106.  
*Wild Cabbage*, 172.  
*China Tree*, 444.  
*Cinnamon*, 206.  
*Lime*, 394.  
*Orange*, 374.  
*Pink*, 216.  
*Radish*, 132.  
*Wind-flower*, 9.  
*Wine Grape*, 428.  
*Winter Aconite*, 42.  
*Cress*, 149.  
*Grape*, 424, 425.  
*Winterania Canella*, 206.  
*Winterberry*, 391.  
*WINTERÆ*, 58.  
*Winteria triflora*, 390.  
*Winter's Bark*, 206.  
*Wislizenia*, 181, 186.  
*Palmeri*, 186.  
*refracta*, 186.  
*Wissadula*, 296, 326.  
*holosericea*, 326.  
*mucronulata*, 326.  
*periplocifolia*, 326.  
*rostrata*, 326.  
*Zeylanica*, 326.  
*Wolfsbane*, 52.  
*Wood Sorrel*, 364.  
*Woodbine*, 431.  
*Worm-seed Mustard*, 143.  
*Xanthorrhiza*, 3, 56.  
*apiifolia*, 56.  
*simplicissima*, 56.  
*Xanthorrhizæ*, 3.  
*XANTHOXYLÆ*, 370.  
*Xanthoxylum*, 370, 373.  
*Xanthoxylum*, 375.  
*alveolatum*, 374.  
*Americanum*, 373.  
*aromaticum*, 374.  
*Caribæum*, 375.  
*Carolinianum*, 374.  
*Catesbium*, 374.  
*Clava-Herculis*, 374.  
*Clava-Herculis*, 374, 375.  
*coriaceum*, 375.  
*cribosum*, 375.  
*Elephantiasis*, 375.  
*emarginatum*, 375.  
*Fagara*, 374.  
*flavum*, 375.  
*Floridanum*, 375.  
*fraxineum*, 374.  
*fraxinifolium*, 374.  
*hirsutum*, 374.  
*macrophyllum*, 374.  
*mite*, 374.  
*Pterota*, 374.  
*ramiflorum*, 374.  
*Texanum*, 374.  
*tricarpum*, 374.  
*Tweedii*, 374.  
*Ximenea*, 394.  
*Americana*, 394.  
*multiflora*, 394.  
*ramosissima*, 394.  
*Yaupon*, 389.  
*Yard*, 383.  
*Yellow Cress*, 147.  
*Pond-Lily*, 77.  
*Puccoon*, 56.  
*Rocket*, 149.  
*Yellow-root*, 56.  
*Yellow-weed*, 188.  
*Yellow-wood*, 373.  
*Zanthorhiza*, 56.  
*Zanthoxylum*, 373, 374.  
*ZIZYPHÆ*, 401.  
*Zizyphus*, 403.  
*Domingensis*, 418.  
*emarginatus*, 404.  
*lycioides*, 403.  
*obtusifolia*, 403.  
*Parryi*, 404.  
*volubilis*, 405.  
*ZYGOPHYLLACEÆ*, 352.  
*Zygophyllum Californicum*, 356.  
*tridentatum*, 356.









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